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ESA

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About the California Solar Initiative (CSI)

The California Solar Initiative (CSI) is the solar rebate program for California consumers that are customers of the investor-owned utilities - Pacific Gas and Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E). Together with the rebate program for New Solar Homes and rebate programs offered through the dozens of publicly owned utilities in the state - the CSI program is a key component of the Go Solar California campaign for California.

- A solar rebate program for customers in PG&E, SCE, and SDG&E territories. This program funds solar on existing homes, existing or new commercial, agricultural, government and non-profit buildings. This program funds both solar photovoltaics (PV), as well as other solar thermal generating technologies. This program is sometimes referred to as the CSI general market program.
- A solar hot water rebate program for customers in PG&E, SCE, and SDG&E territories. This program funds solar hot water (solar thermal systems) on homes and businesses. This program is called the CSI-Thermal program.
- A solar rebate program for low-income residents that own their own single-family home and meet a variety of income and housing eligibility criteria. This program is called the Single-family Affordable Solar Homes (SASH) program.
- A solar rebate program for multifamily affordable housing. This program is called the Multifamily Affordable Solar Housing (MASH) program.
- A solar grant program to fund grants for research, development, demonstration and deployment (RD&D) of solar technologies. This program is the CSI RD&D program.

The CSI offers solar customers different incentive levels based on the performance of their solar panels, including such factors as installation angle, tilt, and location rather than system capacity alone. This performance framework ensures that California is generating clean solar energy and rewarding systems that can provide maximum solar generation.

The CSI program has a total budget of $2.167 billion between 2007 and 2016 and a goal to install approximately 1,940 MW of new solar generation capacity. The CSI-Thermal portion of the program has a total budget of $250 million between 2010 and 2017, and a goal to install 200,000 new solar hot water systems. The CSI program is funded by electric ratepayers and the CSI-Thermal portion of the program is funded by gas ratepayers. The CSI program is overseen by the California Public Utilities Commission and rebates are offered through the Program Administrators.

See also:

- California Public Utilities Commission's California Solar Initiative information
- History of solar rebates in California
- History of Solar Energy Use in California
- Solar Energy Legislation

By Robert Bamberger, Congressional Research Service
Updated September 25, 2002

Automobile and Light Truck Fuel Economy: The CAFE Standards

SUMMARY

One of the least controversial provisions of the Energy Policy and Conservation Act of 1975 (P. L. 94-163) established corporate average fuel economy (CAFE) standards for new passenger cars. As oil prices rose, there was little expectation that manufacturers would have any difficulty complying with the standards. However, oil prices softened and the demand for small cars diminished. In response to petitions from manufacturers facing stiff civil penalties for noncompliance, the National Highway Traffic Safety Administration (NHTSA) relaxed the standard for model years 1986-1989.

The current standard is 27.5 mpg for passenger automobiles and 20.7 mpg for light trucks, a classification that also includes sport utility vehicles (SUVs). An attempt in the 102 nd Congress to raise CAFE proved too controversial and was dropped from omnibus energy policy legislation before it could pass (Energy Policy Act of 1992, P. L. 102-486). The Clinton Administration supported greater fuel efficiency, but indicated in 1993 that an increase in the CAFE standards was not the option likeliest to be embraced first.

In 1994, the National Highway Traffic Safety Administration (NHTSA) issued a notice of proposed rulemaking to explore raising the CAFE standard for light-duty trucks. Congress included language in the FY1996-FY2001 DOT Appropriations (P. L. 104-50, P. L. 104-205, P. L. 105-66, P. L. 106- 69, and P. L. 106-346) prohibiting the use of appropriated funds for any rulemaking on CAFE, effectively freezing the standards. However, the Senate conferees to the FY2001 appropriations insisted upon a study of CAFE by the National Academy of Sciences (NAS).

That study, released on July 30, 2001, concluded that it was possible to achieve a more than 40% improvement in light truck and SUV fuel economy over a 10-15 year period at costs that would be recoverable over the lifetime of ownership.

There are sharp differences in the CAFE provisions between the House and Senate versions of comprehensive energy legislation, H. R. 4. On July 12, 2001, the House Subcommittee on Energy and Air Quality adopted an amendment in markup to H. R. 2587 that called for a reduction of 5 billion gallons in light-duty truck fuel consumption over the period of model years (MYs) 2004-2010. This proposal came to the House floor on August 1, 2001 as part of H. R. 4. An amendment to establish a combined passenger car and truck CAFE of 27.5 mpg by MY2007 was defeated 160-269. The

NAS study, released two days earlier, figured prominently in the debate.

The Senate began debate on comprehensive energy legislation at the end of February 2002. Senators Kerry and McCain reached a compromise to propose a combined fleetwide average of 36 mpg by MY2015. However, on March 13, 2002, the Senate voted (62-38) for an amendment to charge NHTSA with devel-opment of new CAFE standards. The Senate then approved an amendment (56-44) to freeze "pickup trucks" at the current light truck standard of 20.7 mpg. The Senate passed its energy bill April 25 (88-11). On September 19, the conferees agreed to the House-passed goal of saving 5 billion gallons, but shifted the window to MY2006-MY2012. [See also CRS Report RL31427 for a side-by-side comparison].

MOST RECENT DEVELOPMENTS

There are sharp differences in the Corporate Average Fuel Economy Standard (CAFE) provisions between the House and Senate versions of comprehensive energy legislation, H. R. 4. The House bill, passed on August 1, 2001, includes a provision calling for a reduction of 5 billion gallons in light-duty truck fuel consumption over the period of model years (MYs) 2004-2010. The provision would also require National Highway Traffic Safety Administration (NHTSA) to develop a weight-based system for establishing fuel-efficiency standards. The Senate began debate on comprehensive energy legislation at the end of February 2002. Senators Kerry and McCain reached a compromise to propose a combined fleetwide average of 36 mpg by MY2015. However, on March 13, 2002, the Senate voted (62-38) for an amendment offered by Senators Levin and Bond to charge NHTSA with development of new CAFE standards. The Senate went on to approve an amendment (56-44) from Senator Miller to freeze "pickup trucks" (to be defined by the Secretary of Transportation) at the current light truck standard of 20.7 mpg. This language was in the final version of the Senate energy bill when it passed April 25, 2002 (88-11). On September 19, the conferees agreed to the House-passed goal of achieving 5 billion gallons, but shifted the window to MY2006-MY2012.

BACKGROUND AND ANALYSIS

The Arab oil embargo of 1973-1974 and the tripling in the price of crude oil brought into sharp focus the fuel inefficiency of U. S. automobiles. New car fleet fuel economy had declined from 14.8 miles per gallon (mpg) in model year 1967 to 12.9 mpg in 1974. In the search for ways to reduce dependence on imported oil, automobiles were an obvious target. The Energy Policy and Conservation Act (P. L. 94-163) established corporate average fuel economy (CAFE) standards for

passenger cars for model years 1978-1980 and 1985 and thereafter. The CAFE standards called for essentially a doubling in new car fleet fuel economy, establishing a standard of 18 mpg in model year (MY) 1978 and rising to 27.5 by MY1985. (Interim standards for model years 1981-1984 were announced by the Secretary of Transportation in June of 1977.) EPCA also established fuel economy standards for light duty trucks, beginning at 17.2 mpg in MY1979, and currently 20.7 mpg.

Compliance with the standards is measured by calculating a sales-weighted mean of the fuel economies of a given manufacturer's product line, with domestically produced and imported vehicles measured separately. As originally enacted, the penalty for non-compliance was $5 for every 0.1 mpg below the standard, multiplied by the number of cars in the manufacturer's new car fleet for that year. Civil penalties collected from 1983-1998 totaled roughly $475 million.

When oil prices rose sharply in the early 1980s, smaller cars were selling well, and it was expected that manufacturers would have no difficulty complying with the standards. However, oil prices had declined by 1985. Sales of smaller cars tapered off as consumers began to place less value on fuel economy and gasoline cost as an input in the overall costs of vehicle ownership. In response to petitions from manufacturers facing stiff civil penalties for noncompliance, the National Highway Traffic Safety Administration (NHTSA) relaxed the standard for model years 1986-1989, but it was restored to 27.5 in MY1990. The Persian Gulf War in 1990 caused a brief spike in oil prices, but it also demonstrated that it was unlikely that the United States or many of the producing nations would tolerate a prolonged disruption in international petroleum commerce. As a consequence, U. S. dependence upon imported petroleum, from a policy perspective, was considered less of a vulnerability.

It was also becoming apparent that reducing U. S. dependence on imported oil would be extremely difficult without imposing a large price increase on gasoline, or restricting consumer choice in passenger vehicles. Many argued that the impacts of such actions upon the economy or the automotive industry would be unacceptable. Meanwhile, gasoline consumption, which fell to 6.5 million barrels per day (mbd) in 1982, averaged nearly 8.4 mbd in 1999, and has been peaking at roughly 9.0 mbd during the summer of 2002.

There were highly controversial attempts to significantly raise the CAFE standards on passenger cars in the early 1990s. One proposal included in omnibus energy legislation was so controversial that it contributed to the Senate's inability in 1991 to bring the bill up for debate on the floor.

NHTSA typically established truck CAFE standards 18 months prior to the beginning of each model year, as EPCA allows. However, such a narrow window permitted NHTSA to do little more than ratify manufacturers' projections for the model year in question. In April 1994, the agency proposed to abandon this practice and issued an Advance Notice of Proposed Rulemaking inviting comment on what level that standards

might be established for trucks for MY1998-MY2006. The following year, however, after a change in congressional leadership, Congress included language in the FY1996 Department of Transportation Appropriations to prohibit expenditures for any rulemaking that would make any adjustment to the CAFE standards. Identical language was included in the appropriations and spending bills for FY1997-FY2000. An effort to pass a sense of the Senate amendment that conferees on the FY2000 DOT Appropriations should not agree to the House-passed rider for FY2000 was defeated in the Senate on September 15, 1999 (55-40). The rider also appeared in the FY2001 DOT Appropriations (H. R. 4475) approved by the House Committee on Appropriations May 16, 2000, and approved by the House May 19, 2000. However, as is detailed later, the conferees reached a compromise to drop it.

Refocusing on Fuel Economy: SUVs, OPEC, and Kyoto Recent developments have focused fresh attention on the CAFE standards and fuel economy in general. The sharp increase in crude oil and gasoline prices that began in 1999 has brought into higher relief the continuing loss of market share of passenger cars to the larger, multipurpose sport utility vehicles (SUVs) that are subject to the less stringent light-truck fuel economy standard. A 1996 study conducted for the Department of Transportation found that consumers valued the larger vehicles for their versatility and roominess, and the availability of four-wheel drive. The increasing market share of these vehicles, combined with their lower average fuel economy, has contributed to a lowering in overall average fuel economy since the mid-1980s.

Other pressures have had less to do with energy security and more to do with environmental objectives. The Kyoto Agreement would have required the United States to achieve a 7% reduction from1990 levels of carbon dioxide emissions, which implied a significant reduction in gasoline consumption, among other elements. Preferring to forestall any state or federal regulation, General Motors, Ford, Chrysler and Toyota announced on February 4, 1998, that they would produce cars in MY1999 with engine and catalytic converter technologies that would achieve lower emissions. In early November 1998, the California Air Resources Board (CARB) voted to reclassify SUVs 8500 pounds or less as passenger cars and hold those vehicles to California emission standards beginning in MY2004. Ford Motor announced in late July 2000 that it would improve the fuel economy of its SUV model line by 25% over a five-year period. Other manufacturers echoed similar intentions.

During the Clinton Administration, the Congress was chary of committing the United States to the Kyoto Agreement, pending further decisions about the participation of developing nations, and how the agreement would be enforced. However, on March 27, 2001, Environmental Protection Agency Administrator Christine Todd Whitman indicated that the Bush Administration had "no interest" in any further negotiations on implementing the Kyoto Protocol. On February 14, 2002, the President proposed his own plan to reduce the growth in emissions.

CAFE in Congress (1994-2000): Freezing the Standard Months prior to the midterm elections in 1994, NHTSA published a notice of possible adjustment to the fuel economy standards for trucks before the end of the decade. The following year, however, the House-passed version of H. R. 2002, the FY1996 Department of Transportation Appropriation, prohibited the use of appropriated funds to promulgate any CAFE rules; the Senate version did not include the language, but it was restored in conference. The House and Senate approved the conference report, and the bill became law (P. L. 104-50) on Nov. 15, 1995. Much the same scenario occurred in the second session of the 104 th and the first session of the 105 th : A similar rider was passed by the House and not by the Senate, but included by the conferees and enacted. This scenario occurred again in the second session. The prohibition was included in the version of the FY1999 appropriations passed by the House (H. R. 4328) in July 1998, but not in the Senate version (S. 2307); it was finally included in the omnibus spending bill at the end of the 105 th Congress (P. L. 105-277). The prohibition was reported from the House Appropriations Committee in the FY2000 DOT Appropriations (H. R. 2084) and passed by the House on June 23, 1999. However, the growth in gasoline consumption and the size of the light-duty truck fleet were concerns cited behind introduction in the Senate of an amendment to the bill expressing the sense of the Senate that the conferees should not agree to the House-passed rider for FY2000. The amendment, sponsored by Senators Gorton and Feinstein was defeated in the Senate on September 15, 1999 (55-40) and the prohibition was once again enacted into law (P. L. 106-69).

On May 16, 2000, the House Committee on Appropriations voted to include the rider in the FY2001 DOT Appropriations (H. R. 4475). An effort to strip the language was expected when the bill reached the House floor; however, there was none, and the bill, with the rider, passed the House on May 19, 2000 (395-13). Following its passage in the Senate, Senator Gorton introduced a motion to instruct the Senate conferees to not accept the House rider. After debate, the motion was altered to instruct the conferees to accept the House rider in return for agreement to authorize a study by the National Academy of Sciences (NAS), in conjunction with DOT, "to recommend, but not to promulgate without approval by a Joint Resolution of Congress, appropriate corporate average fuel efficiency standards." In addition to the factors required by statute to be weighed in determining maximum feasible CAFE levels, the motion was to require the study to consider the impacts of any proposed CAFE standard on vehicle safety and on effects on employment in the automotive sector and to analyze potentially disparate effects of revised standards across the sector. The motion was agreed to, followed by clarification, it applied only to the FY2001 appropriation. The conferees were successful, and the language was included in the appropriations bill signed into law on October 23, 2000 (P. L. 106-346).

Legislation was introduced in the 104th Congress (H. R. 2200), the 105 th Congress (S. 286, H. R. 880), and the 106 th Congress (S. 147) that would freeze the current CAFE

standards. Unlike the annual prohibition on rulemaking that has been included in the FY1996-FY2001 appropriations, these bills would have maintained the CAFE standards at the level in force at the time of enactment unless superseded by a subsequent act of Congress. None of these bills received further congressional attention.

The Freeze Is Thawed: CAFE in the 107 th Congress
A second summer of high gasoline prices, coupled with a heightened awareness that the nation is experiencing problems with many fuels and on many fronts, has built support for reconsideration of the CAFE standards in the 107 th Congress. For the first time since FY1996, the FY2001 House DOT appropriations did not include a rider prohibiting expenditures on CAFE rules, and legislation (H. R. 2587) reported out of committee in July 2001 that would require the automotive industry and NHTSA to achieve fuel savings.

Past Role of CAFE Standards. The effectiveness of the CAFE standards themselves has been controversial. Since 1974, domestic new car fuel economy has roughly doubled; the fuel economy of imports has increased by roughly one-third. Some argue that these improvements would have happened as a consequence of rising oil prices during the 1970s and 1980s. Some studies suggest that the majority of the gains in passenger car fuel economy during the 1970s and 1980s were technical achievements, rather than the consequence of consumers' favoring smaller cars. Between 1976 and 1989, roughly 70% of the improvement in fuel economy was the result of weight reduction, improvements in transmissions and aerodynamics, wider use of front-wheel drive, and use of fuel-injection. The fact that overall passenger car fleet fuel economy remained comparatively flat during a period of declining real prices for gasoline also suggested that the CAFE regulations have contributed to placing some sort of floor under new-car fuel economy.

General criticisms of raising the CAFE standards have been that, owing to the significant lead times manufacturers need to change model lines and because of the time needed for the vehicle fleet to turn over, increasing CAFE is a slow and inefficient means of achieving reductions in fuel consumption. Further, it is argued that the standards risk interfering with consumer choice and jeopardizing the health of a recovered domestic automotive industry. Opponents of raising CAFE usually cite fears that higher efficiency will likely be obtained by downsizing vehicle size and weight, raising concerns about safety.

Proponents of a CAFE increase have argued that boosting the standards might bring about the introduction of technological improvements that do not compromise features that consumers value, but which would otherwise not be added because these improvements do add to the cost of a new vehicle.

Growth of Light-Duty Trucks and SUVs. What has spurred a new focus on CAFE in the 107 th Congress is the growing percentage of the fleet made up of light-duty trucks and sport utility vehicles (SUVs), which are subject to a less stringent CAFE standard than are passenger automobiles. In

1988, light trucks constituted roughly 30% of the vehicle fleet. By 1994, this figure had grown to slightly more than 40% and reached an estimated 45% by 2000. The change is attributable to the burgeoning popularity of mini-vans and SUVs. The share of gasoline consumption by light duty trucks grew at an annual rate of 4.5% from 1985 to 1995 while automobile fuel consumption fell fractionally during the same period. (See also CRS Report RS20298, *Sport Utility Vehicles, Mini-Vans and Light Trucks: An Overview of Fuel Economy and Emissions Standards.)*

On May 1, 2001, Senator Feinstein, joined by three co-sponsors, introduced S. 804. The legislation would raise the CAFE standard for light duty trucks and SUVs to 27.5 mpg – the same standard as for passenger automobiles – by MY2007. Applicability of the standards would also be raised from 8,500 pounds gross vehicle weight (GVW) to include vehicles up to 10,000 GVW. The legislation would also require that the fuel economy of new vehicles acquired by the federal government exceed the baseline for a particular vehicle class by 3 mpg at the end of FY2003, and 6 mpg by the end of FY2005.

Once fully implemented and depending upon the growth in the size of the light truck fleet, it is possible that requiring these vehicles to meet the higher standard could save roughly 1.0 million barrels of oil daily. However, these savings could take nearly 20 years to fully capture; once the 27.5 standard were in effect for MY2007, it would still take an additional 10 years or more before the fleet of older, less efficient trucks and SUVs would be retired.

On July 12, 2001, the House Subcommittee on Energy and Air Quality adopted an amendment in markup on an energy conservation bill (H. R. 2587) that calls for a reduction of 5 billion gallons in light-duty truck fuel consumption over the period of MYs 2004-2010. The provision would also require NHTSA to develop a weight-based system for establishing fuel-efficiency standards. The amendment, introduced by Chairman Barton and Representative Burr, passed by a vote of 29-3. An amendment by Representative Markey that would have established a CAFE of 37.5 for passenger cars and 29.0 mpg for light-duty trucks by MY2011 was withdrawn.

Some members of the subcommittee criticized the provision that was adopted as saving very little fuel; however, Representative Dingell suggested that it was as stringent as he could support, and Chairman Barton emphasized the importance of achieving consensus within the committee on the language. The Chairman referred to the amendment as an "excellent first step." Critics of the proposal suggested it would require a relatively insignificant improvement in fuel efficiency to achieve these savings, with estimates ranging between 1-3 mpg over the period.

The fuel economy provisions of H. R. 2587 were included in H. R. 4, debated by the House on August 1, 2001. An amendment to establish a combined CAFE fleet standard of 27.5 mpg by MY2007 was defeated, 160-269.

The NAS study, released on July 30, 2001, was cited by opponents as well as supporters of the House proposal. The study concludes that it is possible to achieve a more than 40% improvement in light truck and SUV fuel economy over a 10-15 year period at costs that would be recoverable over the lifetime of ownership. The study does suggest that there may be safety consequences if manufacturers opt to meet higher standards by reduced vehicle weight. However, this position is disputed by some, who argue that heavier vehicles may be safer for their occupants, but may be responsible for fatalities when they strike lighter vehicles; and that a lightening of vehicles could reduce fatalities in certain incidents. The study also recommends that any redesign of the CAFE program include a program for trading fuel economy credits among manufacturers, and that CAFE standards should be based on vehicle "attributes," such as weight, rather than basing CAFE standards on whether a vehicle is a car or a truck.

The congressionally mandated NAS study on fuel economy also recommends eliminating the CAFE credits that accrue to manufacturers of dual-fueled vehicles. These vehicles are rarely operated on anything but conventional gasoline, but allow their manufacturers to sell less efficient vehicles overall while still remaining in compliance with the CAFE requirements. Some estimate that the dual-fueled vehicle credit has resulted in an overall reduction of five-tenths to nine-tenths of a gallon in the average efficiency of vehicles sold. H. R. 4, as passed by the House, would extend the credit through MY2008. The bill also includes provisions requiring federal purchase of alternative-fueled vehicles and hybrids, and would require an additional study by the NAS on the "feasibility and effects" of reducing "by a significant percentage" fuel use by automobiles by MY2010. (The current NAS study may be read online at [http:// books. nap.edu/html/ cafe/].)

In the wake of the terrorist attacks on September 11, 2001, Senate Republicans pressed the Democratic leadership to bring a Senate version of omnibus energy legislation to the floor as soon as possible, arguing for the soonest possible action on legislation that they asserted would enhance U. S. energy security. Debate on a revised version of a bill originally introduced by Senator Bingaman, S. 517, began in late February 2002.

An amendment to that bill proposed to include the language of the National Fuel Savings and Security Act of 2002 (S. 1926) introduced on February 8, 2002, by Senator Kerry, the chair of the Senate Commerce Committee. Major provisions of this legislation relating to CAFE include:

- The Secretary of Transportation, in consultation with the Administrator of EPA, is to "prescribe" standards beginning MY2005 that would achieve a combined CAFE for passenger automobiles and light duty trucks of 35 mpg for MY2013.
- An interim standard would be established of 33.2 mpg for cars and 26.3 for light trucks, by MY2010. After MY2010, the Secretary would have the discretion to set a combined standard for cars and trucks.

- If standards are not established 18 months after passage, a series of default standards take effect, raising automobile CAFE to 38.3 mpg in MY2013 and light trucks to 32 mpg; there would be no combined standard.
- DOT would be required to review the difference between rated CAFE and in-use CAFE under "average driving conditions," with the objective of narrowing any differences to no more than 5% by MY2015.
- A system where manufacturers could trade credits for exceeding the standards between cars and trucks, and domestics and imports would be established.
- A special identifying label (Green Label Program) would be created for vehicles that both meet or exceed the CAFE standard and are also certified to have the lowest greenhouse gas emissions for vehicles in its class. A system of green stars would also be established to denote cars that exceed the standards, and a special gold star for cars exceeding 50 mph and light trucks exceeding 37 mpg. DOT would study "social marketing strategies" to acquaint the public to the meaning of these logos.
- Grants and awards would be provided for various competitions for technical demonstrations and innovation.

A somewhat similar bill (S. 1923), introduced by Senator McCain, would delay the establishment of higher standards until MY2007, but would require a combined CAFE of 36 mpg by MY2016. It would introduce combined standards for cars and trucks in MY2007 and limit the credits that could be traded or purchased. This legislation would also eliminate the credit for dual-fueled vehicles. As debate on the Daschle amendment to S. 517 commenced in late February, it was reported that Senators McCain and Kerry had reached agreement to seek a combined CAFE of 36 mpg by MY2015. However, on March 13, 2002, the Senate voted (62-38) for an amendment offered by Senators Levin and Bond to charge NHTSA with development of new CAFE standards. The Senate went on to approve an amendment (56- 44) from Senator Miller to freeze "pickup trucks"– to be defined by the Secretary of Transportation – at the current light truck standard of 20.7 mpg. Proponents of the amendment argued that subjecting pickup trucks to higher CAFE standards would render these vehicles inadequately powered for farmers and laborers who use these vehicles to haul loads and perform work. Critics of the amendment pointed to the inconsistency of the Senate's maintaining, on the one hand, that the body lacked the expertise to set CAFE standards, but then turning around to freeze pickup trucks at 20.7 mpg. It is not apparent how "pickup trucks" was to be defined. If enacted, the provision could well result in a third category of vehicles, differentiated both from passenger automobiles, and the sort of SUVs and passenger vans that are currently categorized as "light duty trucks."

Reaction in the hours after these votes focused upon the Levin amendment as a defeat for pro-CAFE forces – which it was, in a sense, although the resumption of a role for NHTSA in establishing fuel economy targets could be significant.

However, the ramifications of the Miller amendment could prove a potent offset to NHTSA rulemakings, depending upon how much of the light truck fleet comes to be exempted from higher CAFE requirements. The Senate passed S. 517 (88-11) on April 25, 2002, substituting the bill's language for H. R. 4. Shortly before final passage, the Senate voted 57-42 to table an amendment offered by Senators Carper and Specter to require a reduction of 1 million b/ d (barrels/ day) in transportation sector fuel consumption. The amendment and its proposed reduction in fuel use was perceived by some as an arbitrary target and an indirect way of securing a significant increase in CAFE. Opponents argued that the Senate had already voted for NHTSA to conduct a rulemaking, and that the Senate had, in the Levin amendment, rejected setting specific targets, whether it be CAFE standards or specific reductions in fuel consumption.

The conference committee instructed staff to see whether a compromise could be worked out by August 30, 2002. On September 19, the conferees agreed to the House-passed savings of 5 billion gallons in light-truck fuel consumption, but it shifted the applicable window to MY2006-MY2012. Both the House and Senate versions of the bill proposed to extend the CAFE credit to manufacturers of dual-fueled vehicles. The maximum annual credit of 1.2 mpg applies to vehicles manufactured through MY2008; that maximum drops to 0.9 mpg during MY2009-MY2012. A Senate-proposed list of expanded criteria to be taken into consideration in setting maximum feasible fuel economy levels was dropped. Also dropped was House language requiring a study of the "feasibility and effects" of reducing fuel use by automobiles "by a significant percentage." The Senate floor amendment capping "pickup truck" CAFE at 20.7 mpg also was not included in any of the House and Senate offers tendered to the conference committee. Conference Committee Chairman Tauzin, in response to criticism that the 5 billion gallon savings was negligible, pointed out that this target was a floor, not a ceiling, and that NHTSA could set future CAFE at levels that would achieve greater savings.

Improving Fuel Economy: Other Policy Approaches
Two possible approaches to reduce gasoline consumption involve (1) raising the price of gasoline through taxation, or other means, to a level that induces some conservation; and (2) increasing the efficiency of the automobile fleet in use. Of course, a combination of these two broad approaches can be used as well.

Freedom CAR and the Partnership for a New Generation of Vehicles (PNGV)(1993-2002). In late September 1993, President Clinton announced establishment of a government and industry research program, the Partnership for a New Generation of Vehicles (PNGV), that had among its goals development of an environmentally friendly "Supercar" that would achieve 80 mpg without sacrificing performance, affordability, and safety. The PNGV was an effort to combine the resources and expertise of federal agencies and laboratories with the private sector to reduce U. S. dependence on oil and maintain competitiveness without intervening to alter the market price of fuel. Research

and development was to be focused on hybrid electric vehicles, direct-injection engines, fuel cells, and greater use of lightweight materials. Production prototypes of the Supercar were projected to be ready by 2004, a deadline that was appearing unlikely to be met.

On January 9, 2002, the Bush Administration indicated that it would abandon the PNGV in favor of a new initiative to push for development of fuel cells. Research on fuel cells has been a focus of PNGV; of the $127 million provided to the program in FY2002, roughly $40 million was provided for fuel cell research and an additional $20 for hydrogen R& D. Although the Administration promises that the new initiative, called Freedom CAR, will be more aggressive, others expect it may largely operate along the lines of PNGV. However, where PNGV was directed by the Commerce Department, Freedom CAR will be administered by DOE.

Price of Gasoline. Owing to higher taxation of gasoline in other nations, Americans enjoy one of the lowest prices for gasoline. As a consequence, the higher prices since 1999 – especially during the summer driving seasons – are experienced in the United States as a much greater increase, in percentage terms, than elsewhere.

Past proposals to raise the price of gasoline to leverage consumers into more efficient vehicles have garnered little support. Owing to the relative price inelasticity of gasoline demand, many believe that the size of the price increase it would take to curb gasoline consumption to any degree would have a damaging effect on the economy of several times greater magnitude. Indeed, analysis of recent research (Plotkin, Greene, 1997, cited in References) suggested that an increase in gasoline taxes would be one-third as effective in achieving a reduction in demand as studies of the 1980s once projected. This is a significant reflection of the place that personal transportation and inexpensive gasoline has assumed in our economy and value system.

Price, however, could be used to at least keep some floor under the cost of gasoline to motorists. For example, some argued during past episodes of high prices that, when prices softened again, the federal government should step in and capture the difference as a tax, and possibly devote the proceeds to developing public transportation infrastructure and incentives. This tax could be adjusted periodically to see that gasoline would not become less expensive than a certain level in real (inflation adjusted) dollars.

Owing to the unpopularity of raising gasoline prices, raising the CAFE standard is more comfortable for some; however, it is a long-term response. Depending upon the magnitude of an increase in gasoline prices, no matter what the cause, a price-induced conservation response is nearly immediate and may grow as consumers initially drive less, and eventually seek out more efficient vehicles.

CAFE and Reduction of Carbon Dioxide Emissions. Vehicles account for one-fifth of U. S. production of CO2 emissions. Some argue that raising the CAFE standards would

be an ineffective or marginal way to reduce emissions of carbon dioxide. On one hand, improvements in fuel economy should enable the same vehicle to burn less fuel to travel a given distance. However, to the extent that technologies to improve fuel economy add cost to new vehicles, it has been argued that consumers will tend to retain older, less efficient cars longer. It has also been suggested that there is a correlation between improved fuel economy and an increase in miles driven and vehicle emissions. However, vehicle miles traveled have continued to increase in recent years when fuel economy improved only slightly, suggesting that the broader factor is the overall cost of driving, which is tied as well to the price of gasoline. The relationship between where people live and where they work is also a factor.

The Clinton Administration proposed a five-year, $6.3 billion package of tax credits, and reliance on voluntary efforts by individuals and industry, to meet the proposed targets of the Kyoto agreement. Many believed that the Clinton Administration plan would fall well short, largely because carbon emissions are forecast by the Department of Energy to be 34% above 1990 levels by the year 2010. Some urged that Congress disapprove the treaty and sought renegotiation of the targets, arguing that meeting the proposed targets would require possibly crippling taxes and regulations. Others suggested that a significant increase in CAFE requirements would help meet the Kyoto targets and that an increase in CAFE should not wait final dispensation of the agreement. However, as noted earlier, the Bush Administration has removed the U. S. from the Kyoto process in favor of, for example, voluntary commitments on the part of industry.

One interesting development is legislation enacted in July 2002 in California authorizing the California Air Resources Board (CARB) to establish regulations reducing greenhouse emissions from cars, light trucks and non-commercial vehicles. These would apply to MY2009 vehicles. The legislation, which makes California the first state to regulate carbon dioxide emissions, may be challenged. Though the legislation neither sets target reductions nor specifies how they are to be achieved, the assumption is that these reductions could only be achieved by higher efficiency. Consequently, the automobile industry argues that the law infringes on the authority of the federal government to set fuel economy standards.

Historical Note on the CAFE Debate in the 102 nd Congress. As an historical note, legislation to boost the CAFE standards last received major attention in the 102nd Congress. One proposal (S. 279) would have abandoned uniform standards but otherwise left the historic infrastructure of the CAFE standards intact. Under S. 279, each manufacturer would have been required to achieve a 20% improvement in passenger car fuel economy by 1996 and 40% by 2001 over its 1988 baseline. The same standard of improvement would have been required of light trucks.

In that same Congress, legislation was being developed to open up the Arctic National Wildlife Refuge (ANWR) for exploration. Proponents of higher CAFE standards predicted

that there would be no support for exploration of ANWR without some increase in CAFE. S. 341, omnibus energy legislation reported from the Senate Committee on Energy and Natural Resources in May 1991, would have extended discretion to the Department of Transportation (DOT) to set "maximum feasible" CAFE targets for each manufacturer for MY1996 and MY2002. The DOT would have taken into account application of known fuel-saving technologies, MY1990 as a baseline for performance, sales mix, vehicle interior size, and safety standards. Credits earned could have been traded or held by the manufacturer. When it appeared that the ANWR provisions would almost certainly not survive unless the CAFE provisions were strengthened, Senator Johnston proposed an amendment in markup that would have had the effect of embracing the goals of S. 279, but over a longer time frame. The amendment was defeated in markup, as was an attempt to append to the omnibus bill the specific targets in S. 279.

The proposal appeared to fail at the combined hands of those who either thought they went too far or not far enough. But the omnibus bill failed to reach the floor; a cloture vote on whether to proceed with it (it became S. 1220) was defeated Nov. 1, 1991. Both CAFE and ANWR provisions were stripped from modified legislation introduced in the second session of the 102 nd Congress. With the exception of the riders attached to the DOT Appropriations during the period of FY1996-FY2000, there has been no major legislative focus on CAFE until the 107 th Congress.

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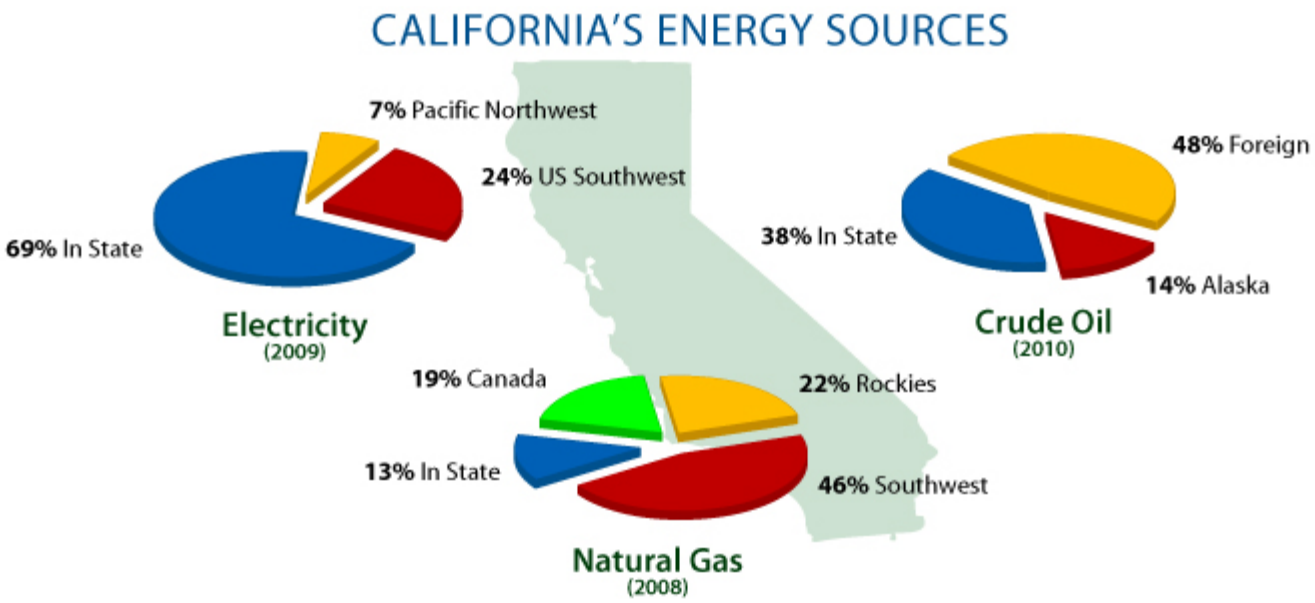
What's Related

- General Environmental Links

- Air Quality
- Energy
- Global Warming
- Hazardous Waste
- Land Use
- Recycling
- Toxics and Pesticides
- Water Quality
- Wildlife


CALIFORNIA'S ENERGY SOURCES
7% Pacific Northwest
24% US Southwest
69% In State
Electricity
(2009)
48% Foreign
38% In State
14% Alaska
Crude Oil
(2010)
19% Canada
22% Rockies
13% In State
46% Southwest
Natural Gas
(2008)

California's Petroleum Infrastructure Overview and Import Projections

Port of Los Angeles
Harbor Commission Meeting
San Pedro, CA
February 1, 2007

Gordon Schremp
Fuels and Transportation Division
California Energy Commission
gschremp@energy.state.ca.us

Presentation Topics

- Petroleum infrastructure – key elements
- Crude oil – overview, production & import forecast
- California transportation energy demand
- Forecasted imports of clean products
- Petroleum infrastructure - significance to state
- Summary

Petroleum Industry Infrastructure

Petroleum Infrastructure – Key Elements

- The California petroleum "infrastructure" consists of several interconnected assets operated by a combination of refiner and third-party companies
  - Refineries
  - Pipelines
  - Marine terminals
  - Storage tanks
- Crude oil and petroleum product infrastructure assets are separate and distinct from one another – not interchangeable
- Unlike with the electricity distribution system, Northern California is not directly connected to Southern California

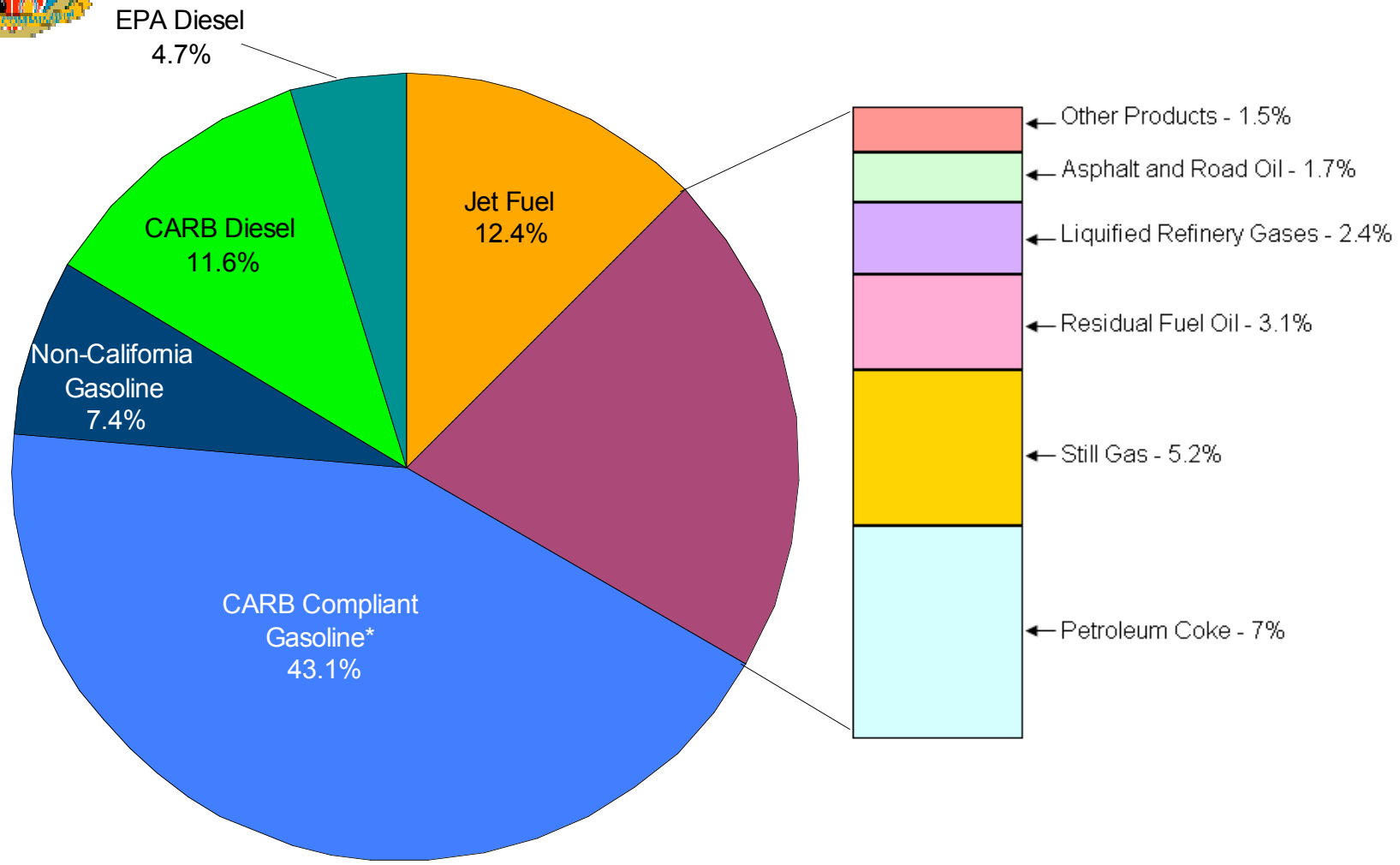
Key Elements - Refineries

- 3 primary refinery locations
- 14 refineries produce transportation fuels that meet California standards
- 8 smaller refineries produce asphalt and other petroleum products
- California refineries provide majority of transportation fuel to neighboring states
- Limited petrochemical facilities outside the refineries

Key Elements - Refineries

- Refineries are a primary hub of logistical activity
  - Raw materials imported & finished products shipped
- Crude oil is received by pipelines and marine vessels
- Process units operate continuously at or near maximum capacity, except during periods of planned maintenance or unplanned outages

California Refinery Output in 2005 by Product Type



*Note: Does not include ethanol.

Key Elements – Refineries

- Output from the refineries is usually placed in intermediate tanks prior to blending the finished products
- The majority of gasoline, diesel, and jet fuel is shipped from the refinery by pipeline to over 60 distribution terminals
- Most of the refineries dispense a smaller portion of their output into tanker trucks that are loaded at the refinery

Key Elements – Pipelines

- Pipelines are used throughout the distribution infrastructure to interconnect key elements
- Intra-state pipelines are used to convey petroleum products within California's borders
- Interstate pipelines are used to export transportation fuels to Arizona and Nevada
  - NV – Nearly 100% of supply
  - AZ – Over 60% of supply
- Pipelines usually include pump stations, break-out tanks, storage tanks, and distribution terminals
- As is the case with refineries, pipeline systems normally operate on a continuous basis

Key Elements – Marine Facilities

- Marine facilities are located in sheltered harbors with adequate draught to accommodate typical sizes of petroleum product tankers and crude oil vessels
- Wharves usually have adjacent storage tanks that are used to temporarily hold petroleum products prior to transfer to a subsequent location
- Most refiners operate a proprietary dock
- Third party storage provides access to majors and independents
  - Kinder Morgan
  - Pacific Atlantic
  - Chemoil
  - Petro-Diamond

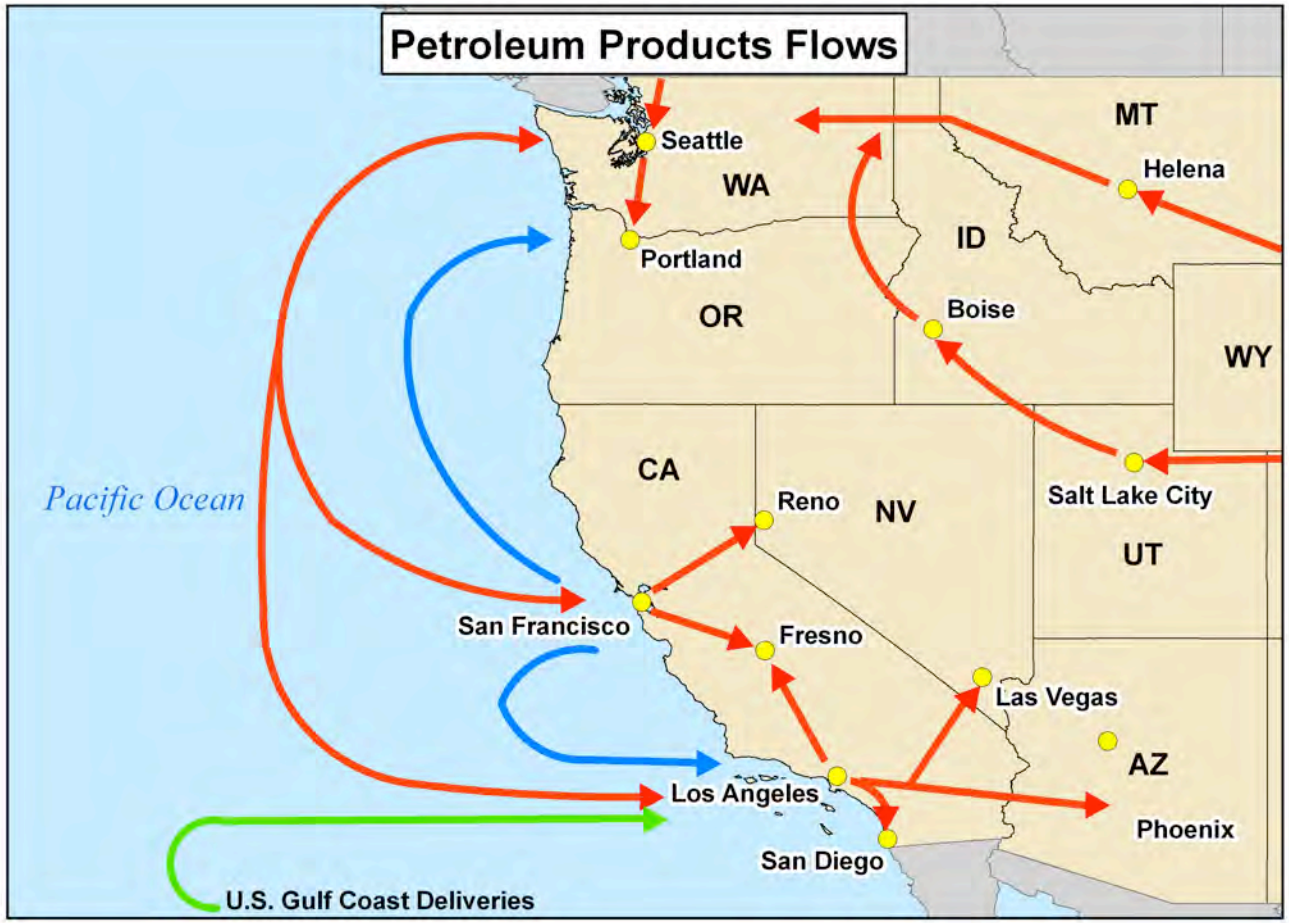
Key Elements – Storage Tanks

- Storage tanks are vital to the continuous flow of petroleum products into and through California
- Tanks are located at docks, refineries, terminals, and tank farms
- Tanks serve different storage purposes:
  - Unload marine vessels
  - Receive pipeline shipments
  - Feed truck loading facilities
  - Hold inventories in advance of planned maintenance
  - Strategic storage that can be used for emergencies or periods of rapid price increases

Key Elements – Storage Tanks

- "Dedicated" tanks are normally used for only one type of petroleum product
- "Drain dry" tanks can be used to store different types of petroleum products throughout the year, increasing versatility and flexibility for the distribution infrastructure
- Renovation of existing or construction of new storage tanks will be necessary to adequately handle the additional influx of imports foreseen over the next decade
- Most, if not all, of these projects will occur in locations with existing tanks

Interstate Dependence for Transportation Fuel Supply



Source: Argonne National Laboratory

West Coast Petroleum Flows

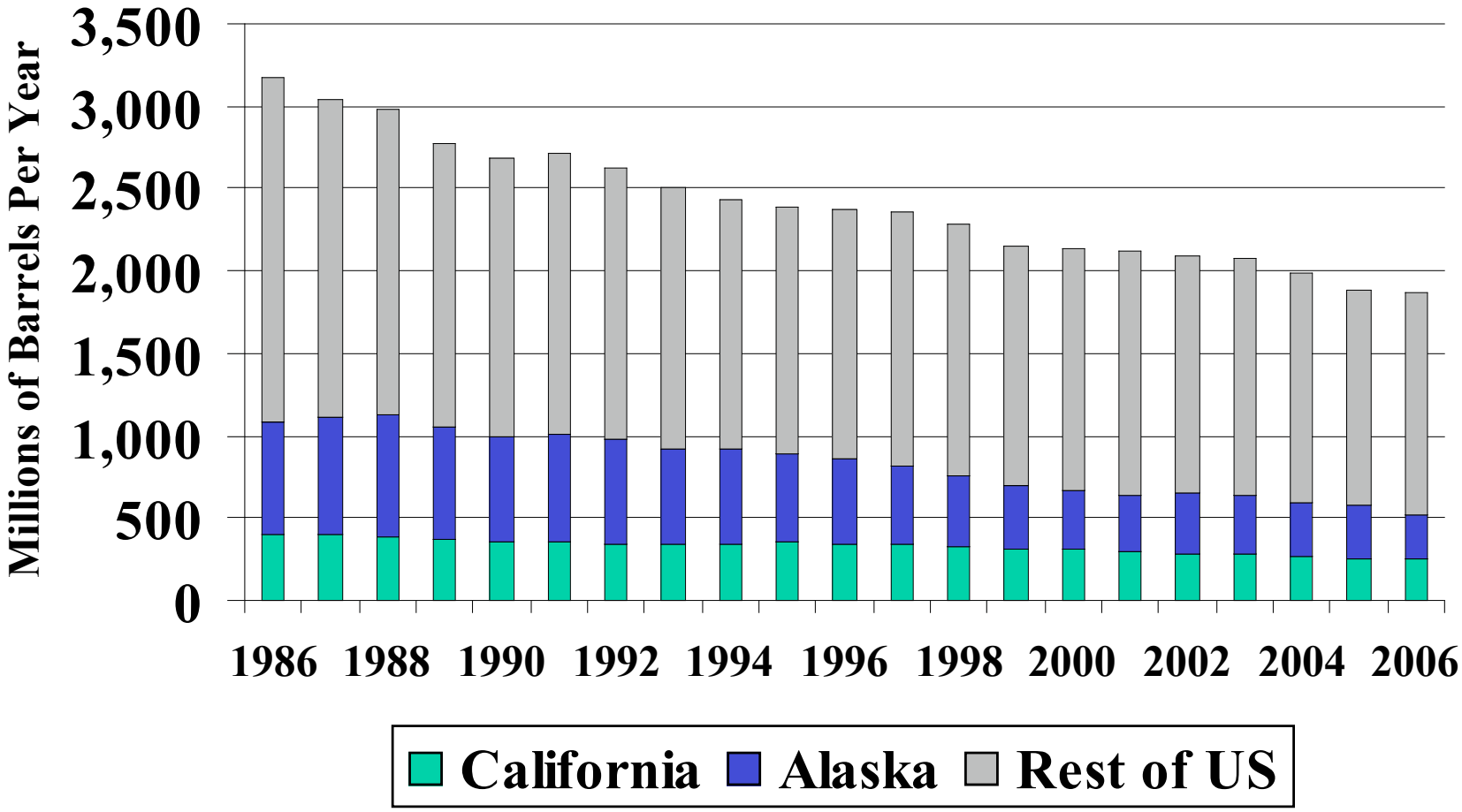
1 Foreign Imports into Northern California
2 Foreign Imports into Southern California
3 US Gulf Coast Imports into Northern California
4 US Gulf Coast Imports into Southern California
5 Ship/Barge - San Francisco to Los Angeles
6 Ship/Barge - San Francisco to Portland
7 Ship/Barge - Washington to Los Angeles
8 Kinder Morgan - San Francisco to Chico
9 Truck - Chico into Southern Oregon
10 Kinder Morgan - San Francisco to Reno
11 Kinder Morgan - San Francisco to Fresno
12 Kinder Morgan - Bakersfield to Fresno
13 Truck - Imperial into Western Arizona
14 Kinder Morgan - Los Angeles to Las Vegas
15 Kinder Morgan - Los Angeles to San Diego
16 Kinder Morgan - Los Angeles to Imperial
17 Kinder Morgan - Los Angeles to Phoenix
18 Kinder Morgan - Los Angeles to Tucson
19 Kinder Morgan - Tucson to Phoenix
20 Kinder Morgan - El Paso to Tucson
21 Longhorn Pipeline - Houston to El Paso
22 Ship/Barge - San Francisco to Eureka

Crude Oil

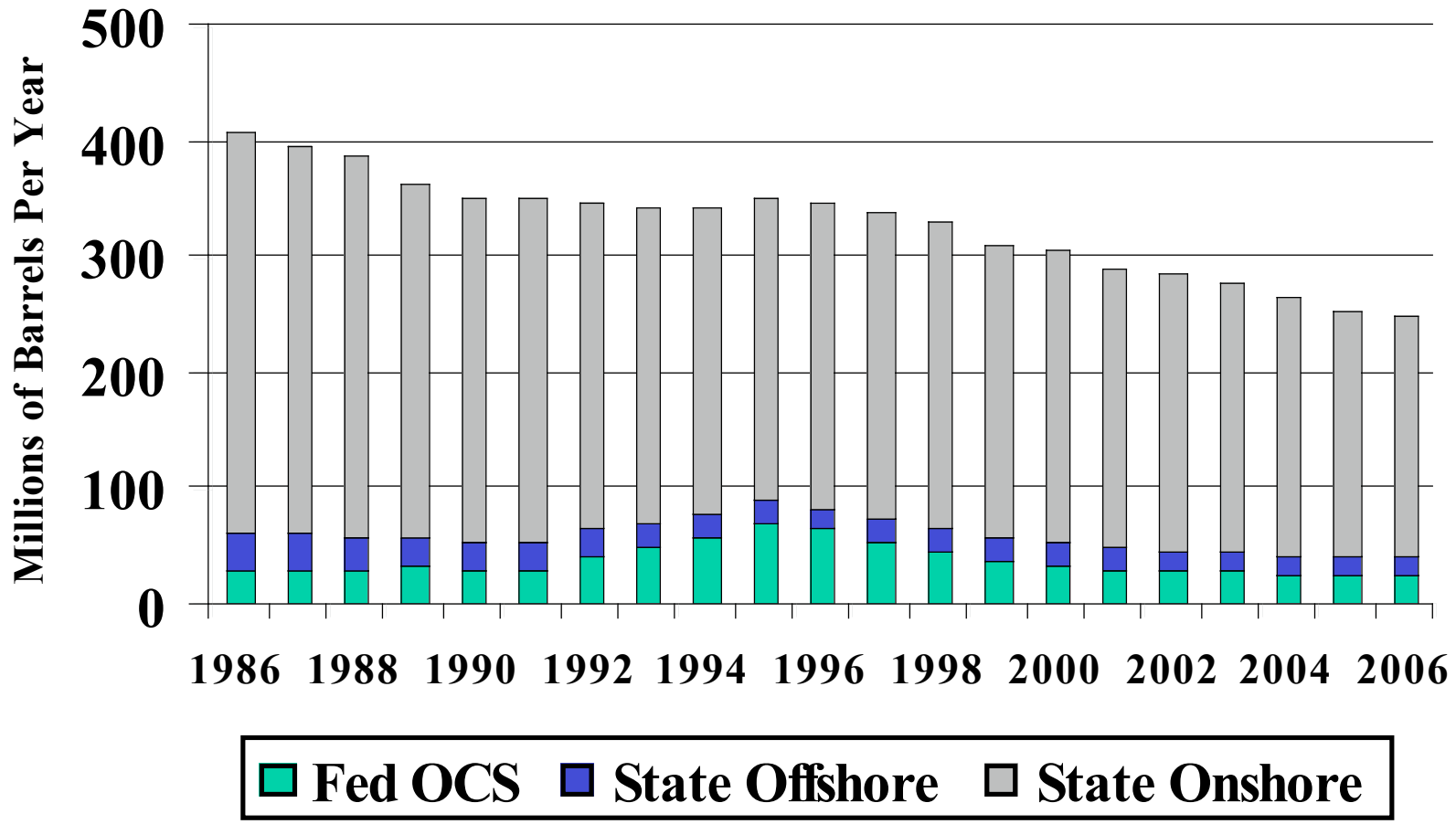
Crude Oil - Overview

- Global demand for crude oil estimated at 84 million barrels per day for 2005
- U.S. refiners processed over 15.2 million barrels per day during 2005
  - Crude oil imports 10.1 million barrels per day or 66% of supply
- California refiners processed 1.8 million barrels per day during 2005
  - California 40% (729 TBD)
  - Foreign 40% (746 TBD)
  - Alaska 20% (372 TBD)
- Declining domestic production will be replaced with foreign crude oil delivered by marine vessel & pipeline
- Crude oil processing by refineries expected to gradually increase, referred to as “refinery creep”

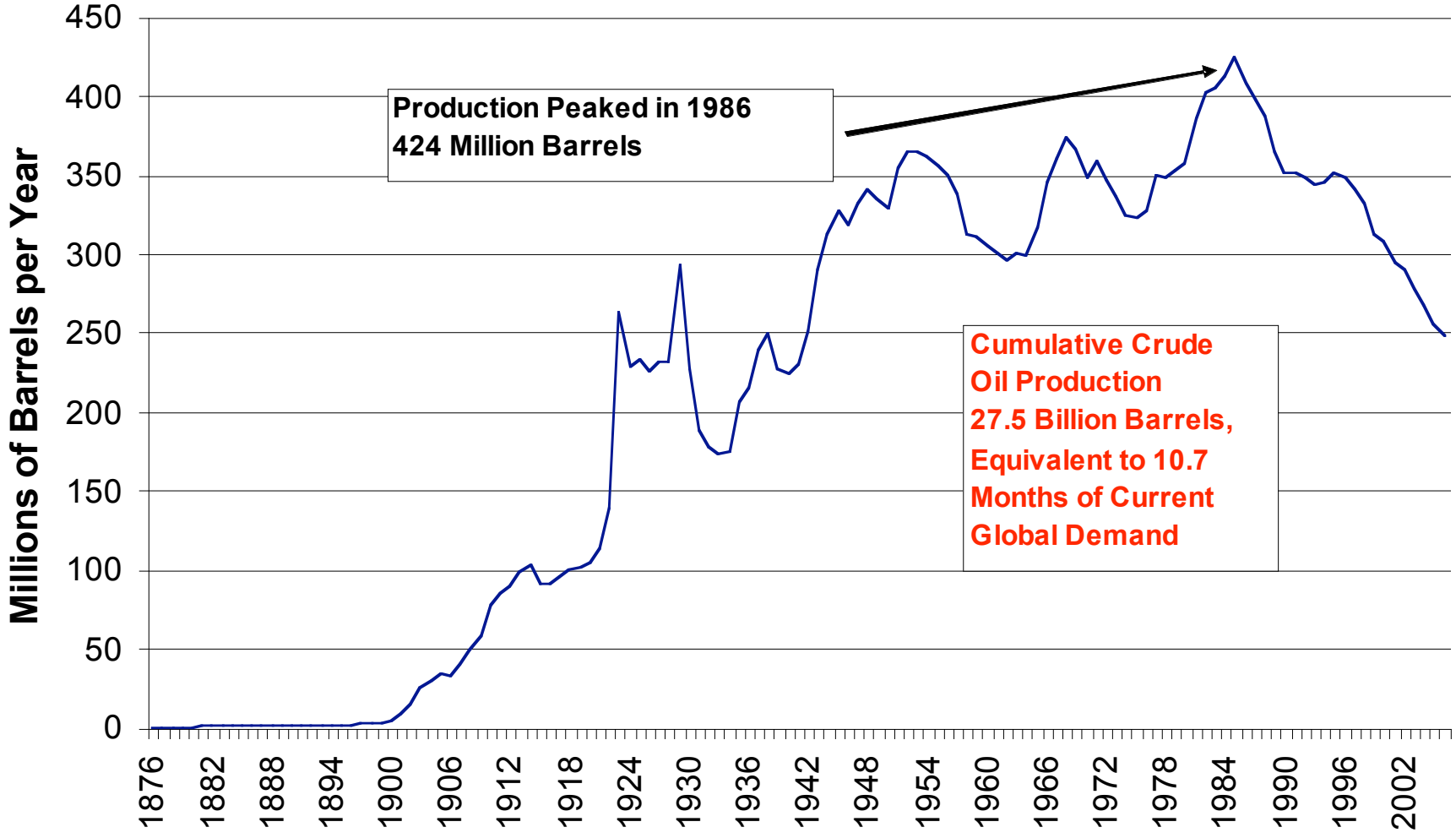
United States Oil Production
1986 to 2006



California Oil Production
1986 to 2006



California Oil Production
1876 to 2006

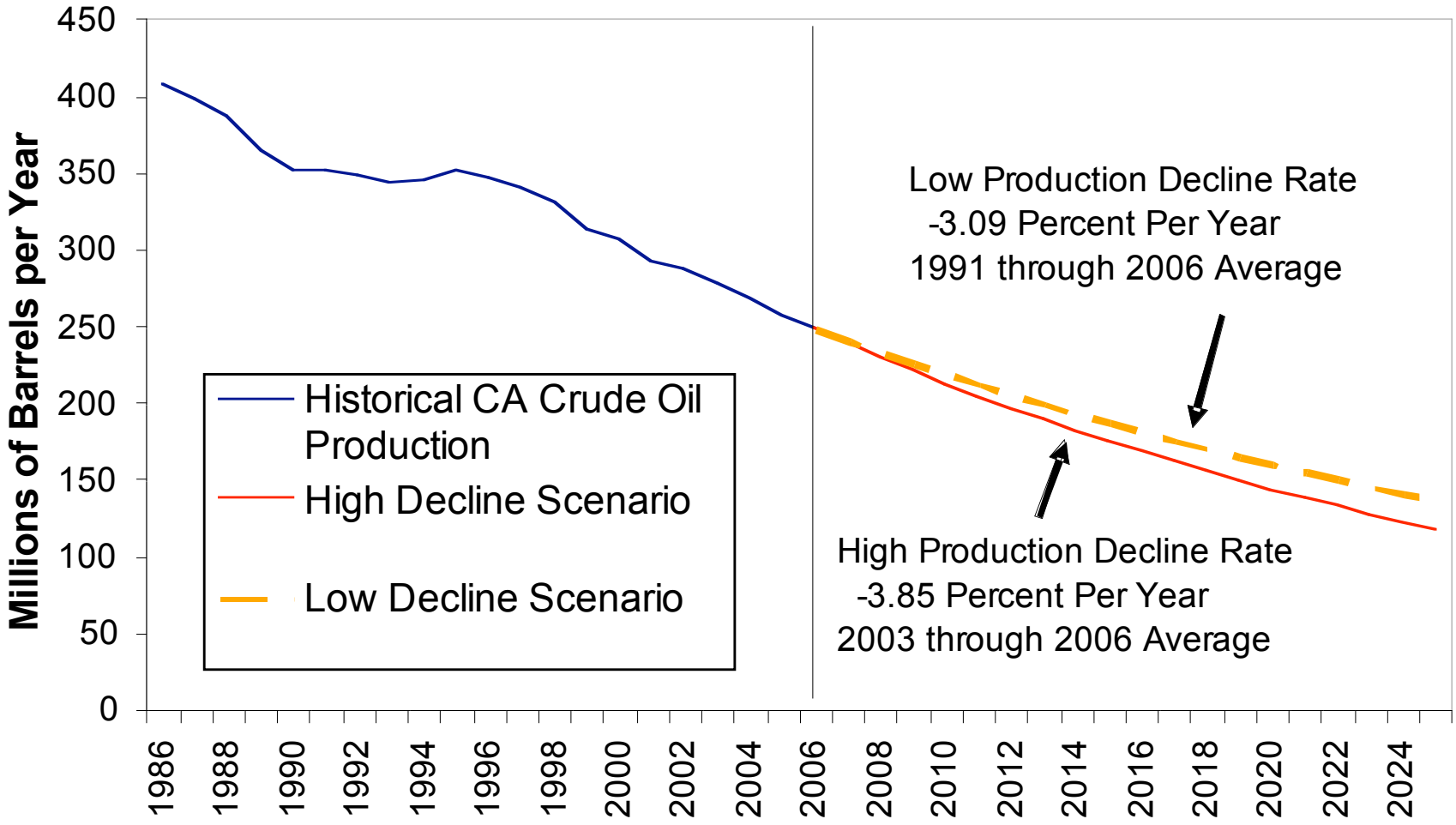


CALIFORNIA ENERGY COMMISSION

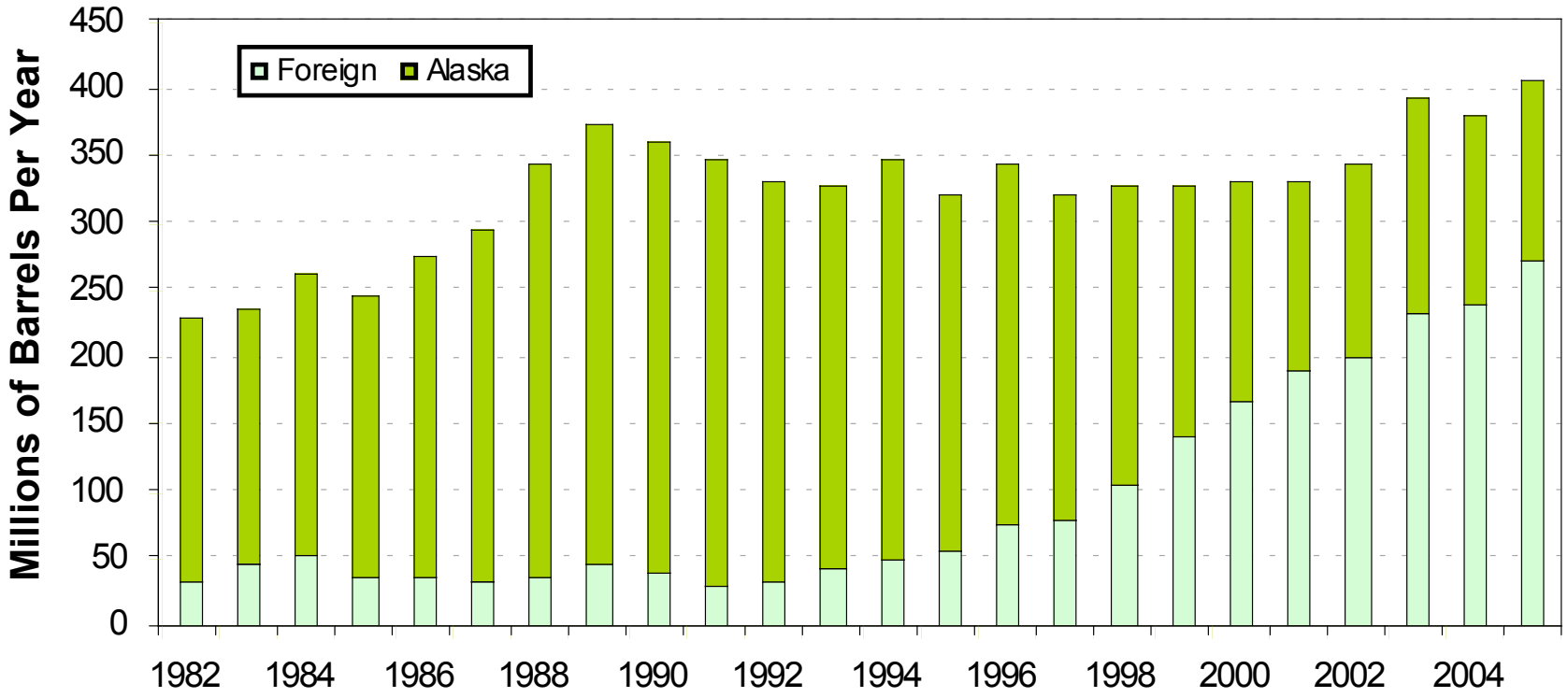
Recent Crude Oil Production Trends

- 2006 U.S. crude oil production 1.87 billion barrels or 5.1 million barrels per day
- California crude oil production has declined 39% since 1986, Alaska 60% and the rest of U.S. by 35%
- Declining domestic oil production will need to be replaced with increased imports of crude oil from foreign sources
- Growing demand for foreign oil will need to be accommodated:
  - Expansion of marine facilities' import capacity
  - New crude oil pipeline capacity between Canada and U.S.
- Delay or impediment of these types of expansion projects could place at risk the ability of domestic refiners to operate at or near maximum transportation fuel production levels
- What is the outlook for California crude oil production & imports?

California Crude Oil Production Decline Forecast 2007-2025



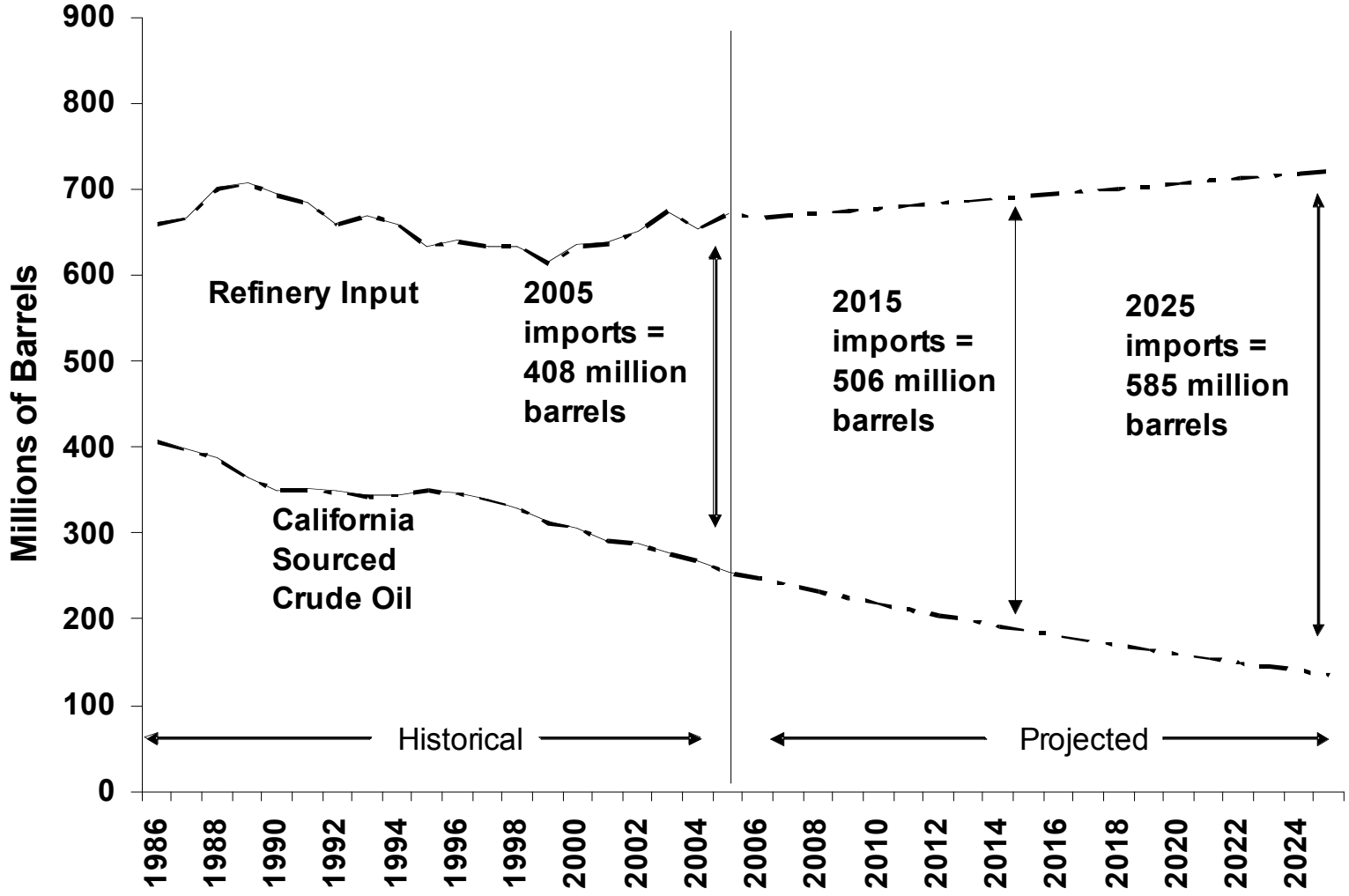
California Crude Oil Imports
1982 through 2005



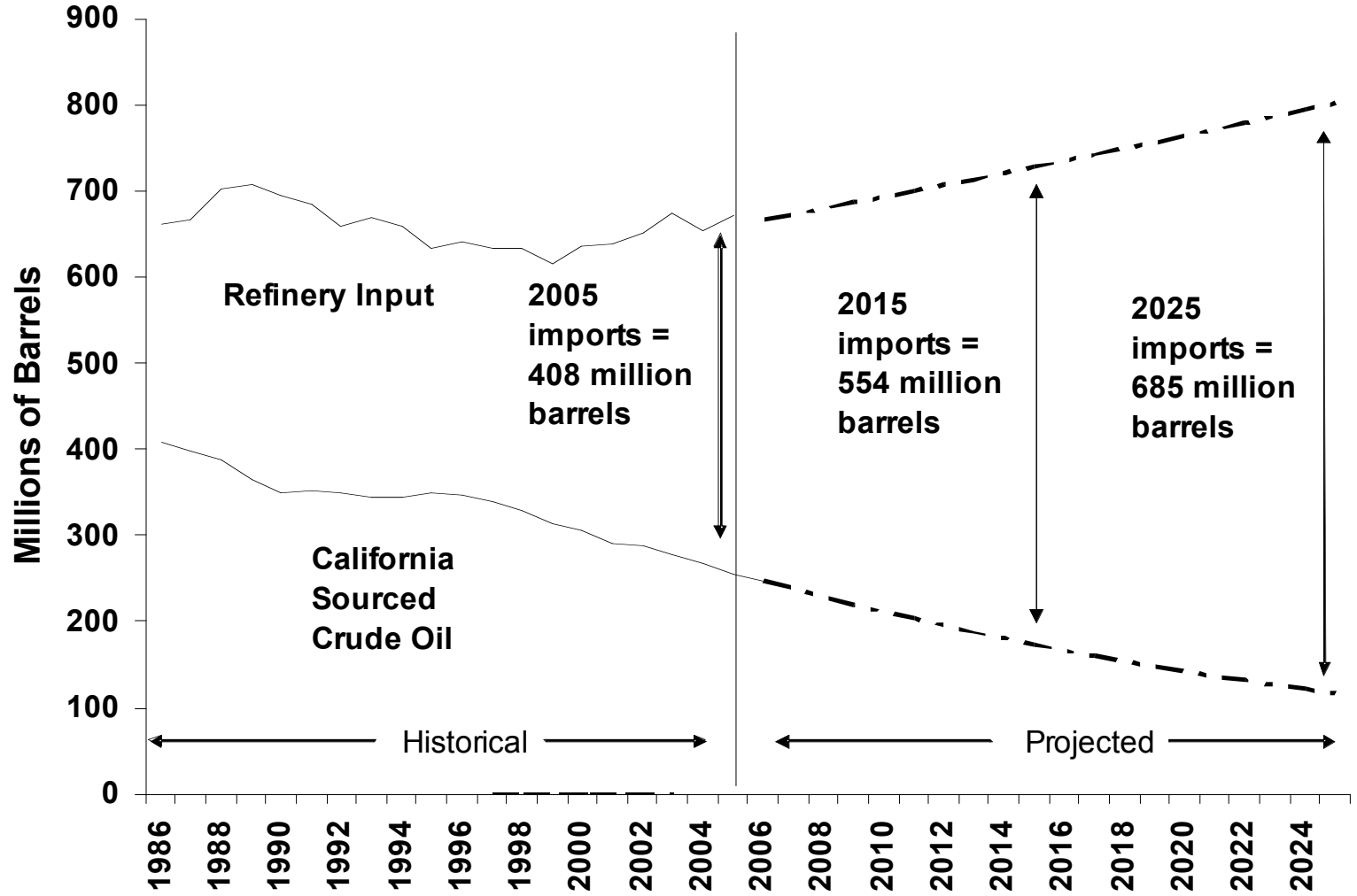
California Crude Oil Imports – Historical

- Imports of crude oil have increased as California crude production fell and refineries processed additional oil
- Total imports of crude oil have increased 18% between 1996 and 2005
- Imports of Alaska crude oil declined a total of 50% between 1996 and 2005
- The largest increase has been for foreign crude oil imports
  - 15.6% per year increase
- What is the outlook for crude oil imports for California and what are the primary factors influencing the forecasts?

California Crude Oil Imports – Low Forecast



California Crude Oil Imports – High Forecast



California Crude Oil Imports - Forecast

- Crude oil imports are forecast to increase in California due to:
  - –Continuing decline of local crude oil production
  - –Gradual expansion of the capacity of California refineries to process crude oil – referred to as “refinery creep”
- The lower estimate for increased crude oil imports assumes that crude oil production declines at a slower pace (3.1% per year) & expansion of distillation capacity is at a smaller rate (0.4% per year)
- The higher estimate for incremental crude oil imports assumes that the production of California crude oil declines at a steeper pace (3.8% per year), while refiners expand distillation capacity at a higher rate (nearly 1% per year)

Crude Oil Imports – Entire State

Incremental California Crude Oil Imports - Millions of Barrels				
Distillation Capacity Growth Rate	Low Rate of Crude Oil Decline - 3.1%		High Rate of Crude Oil Decline - 3.8%	
	2015	2025	2015	2025
0.41 Percent	98	177	110	196
0.70 Percent	116	217	128	236
0.98 Percent	133	258	146	277

- Southern California is forecast to receive 60% of the crude oil imports

Crude Oil Imports – Southern California

Incremental **S. Calif.** Crude Oil Imports - Millions of Barrels				
Distillation Capacity Growth Rate	Low Rate of Crude Oil Decline - 3.1%		High Rate of Crude Oil Decline - 3.8%	
	2015	2025	2015	2025
0.41 Percent	59	106	66	118
0.70 Percent	69	130	77	142
0.98 Percent	80	155	88	166

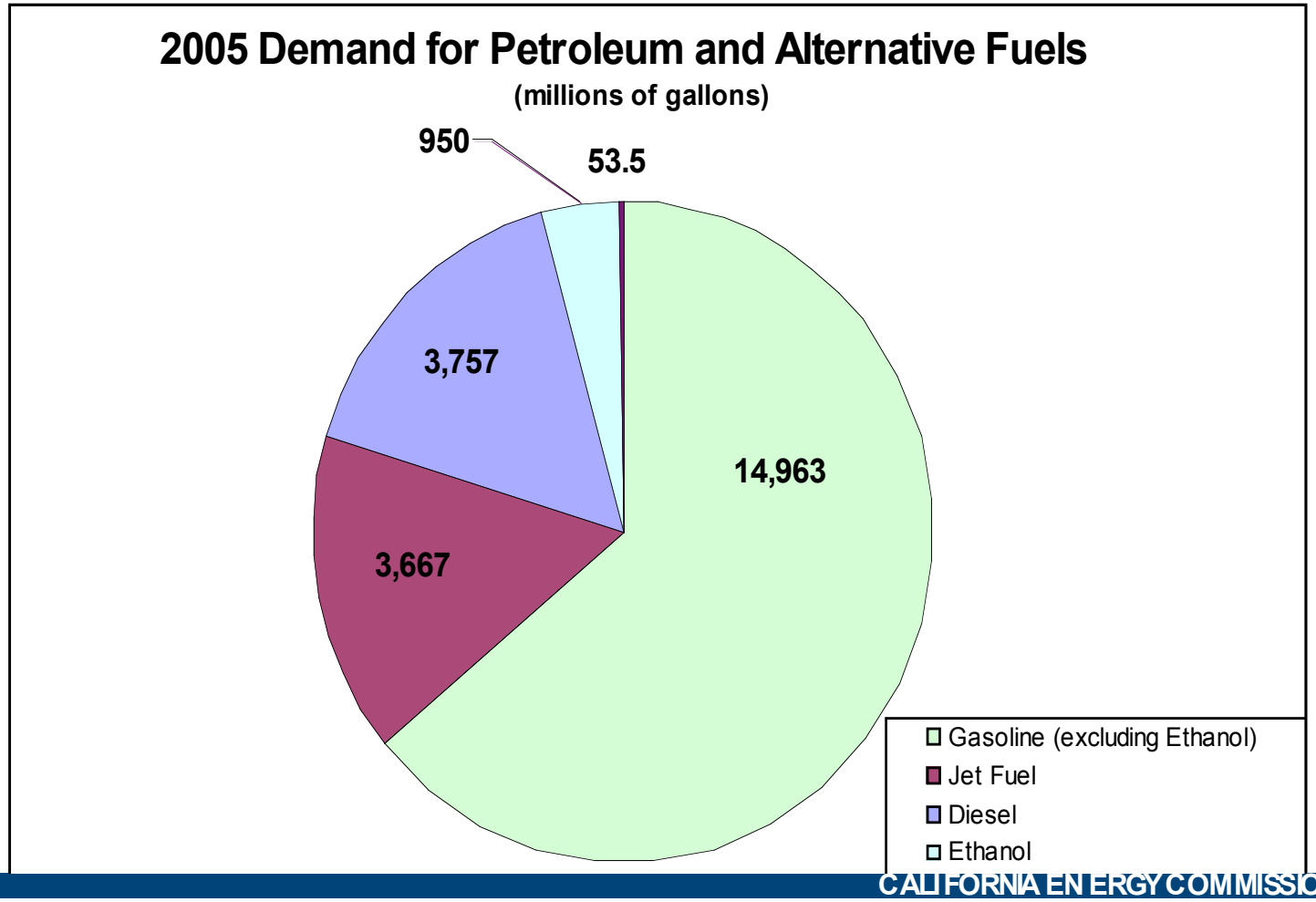
- Southern California crude oil imports are forecast to increase by 59 to 88 million barrels per year by 2015, an average increase of 161 to 240 thousand barrels per day (TBD)
- Longer term, incremental imports of crude oil for the region are forecast at 106 to 166 million barrels per year by 2025, roughly 291 to 455 TBD more than 2005 levels

California Crude Oil Imports - Summary

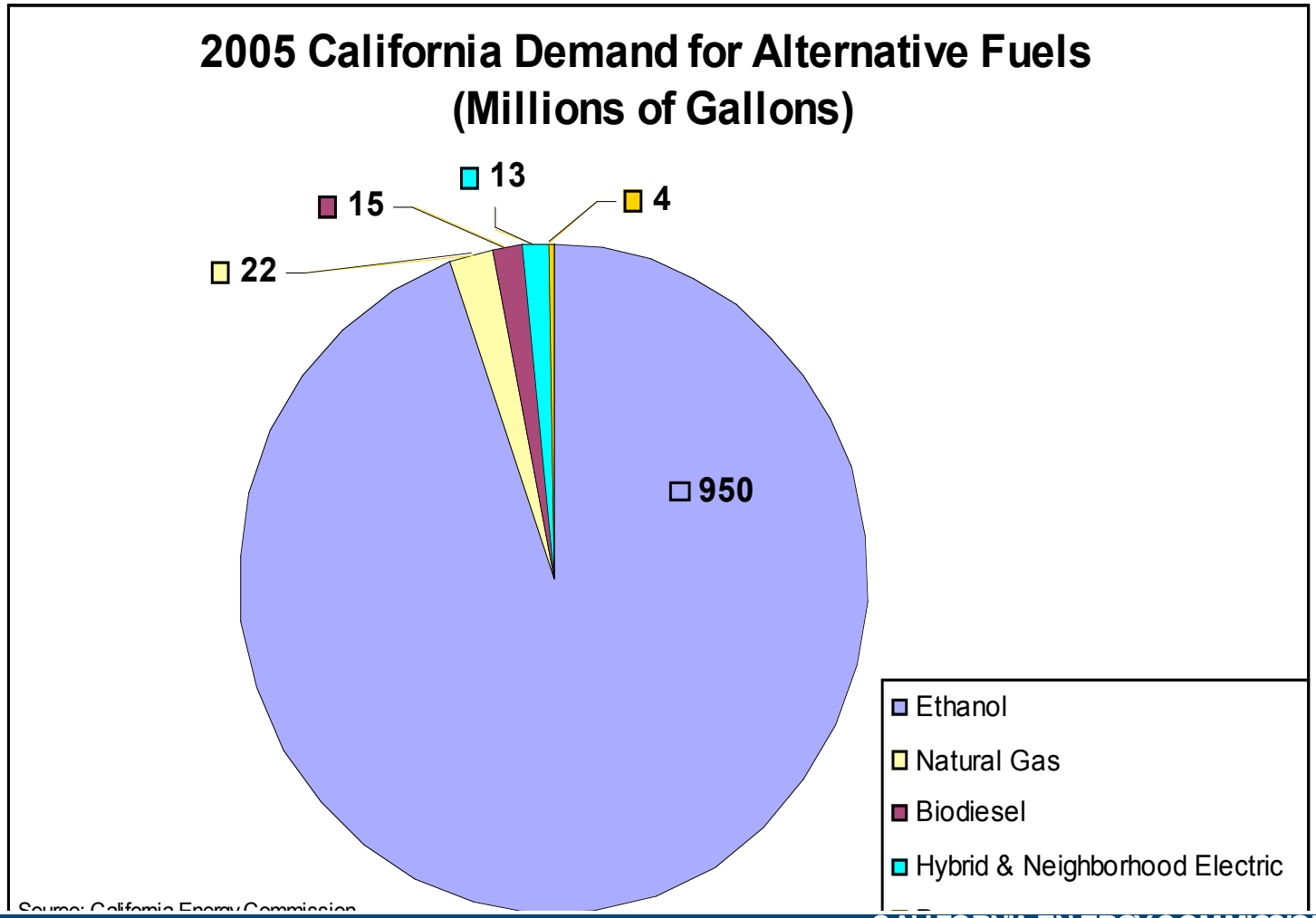
- Crude oil imports continue to increase because California crude oil production is declining and refineries are processing greater quantities over time
- Crude oil imports are forecast to increase by 98 to 146 million barrels by 2015, an increase of between 24% and 36% compared to the levels of imported crude oil in 2005
- Reducing the rate of demand growth for traditional transportation fuels (gasoline, diesel, and jet fuels) will not have any appreciable impact on crude oil imports
- Over the longer term, any reduction in demand for traditional fuels will likely result in a decrease of imported clean fuels, rather than a decrease in crude oil processing

California's Transportation Fuels Demand

5 Percent of California's Transportation Fuels Are From Sources Other Than Gasoline, Diesel & Jet Fuel

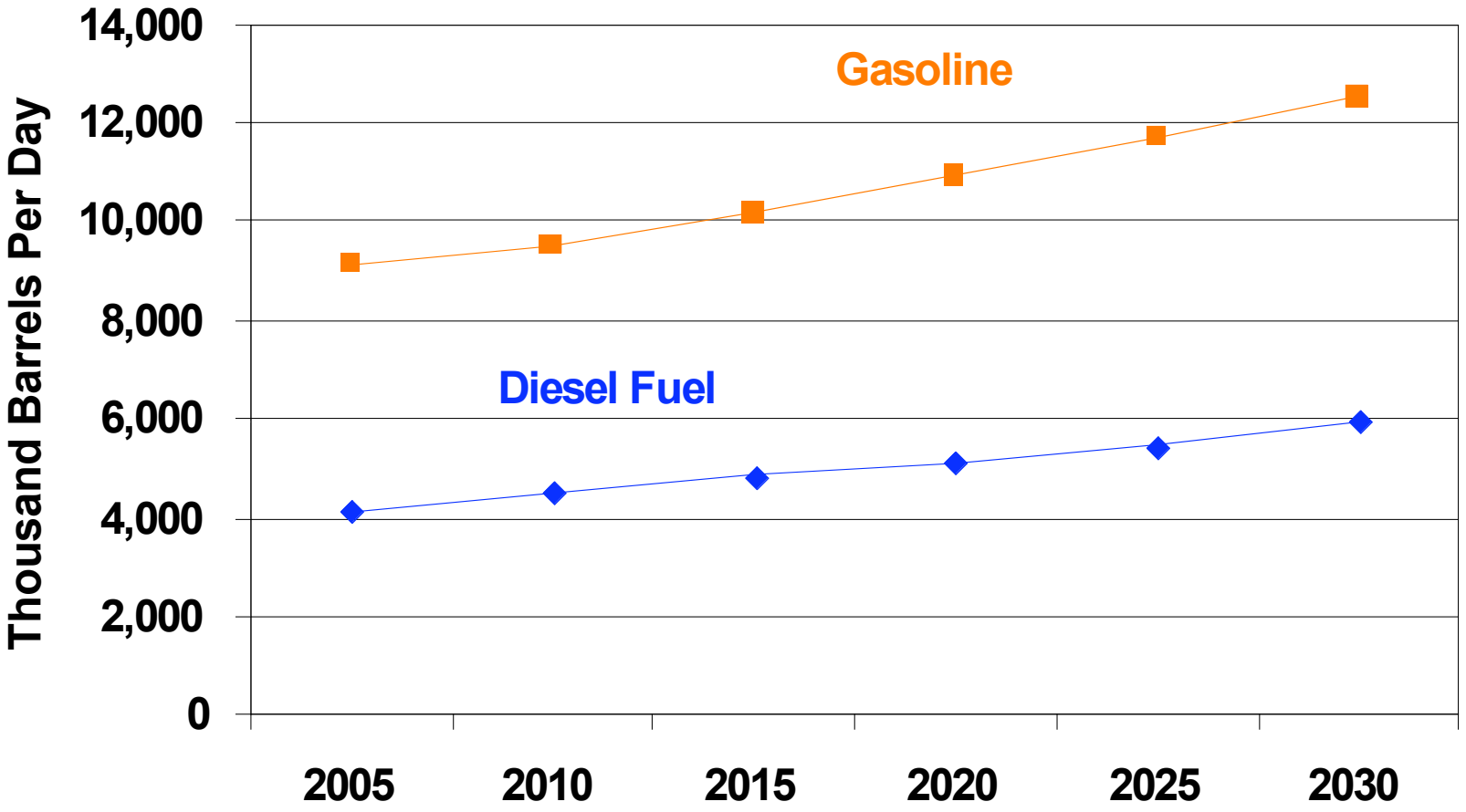


Alternative Fuels are Dominated by Ethanol Fuel Demand



Source: California Energy Commission

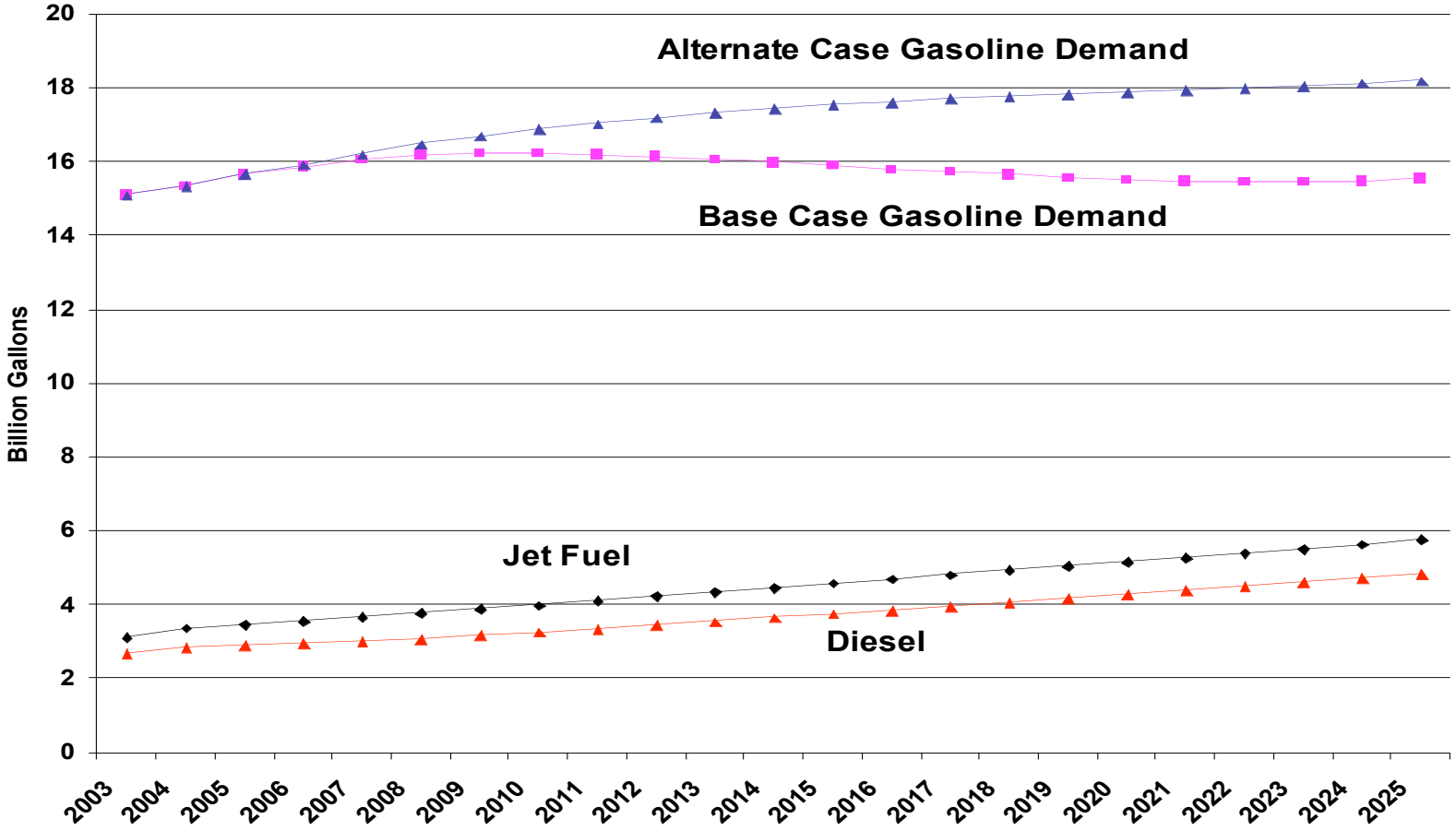
U.S. Transportation Fuel Demand Historical & Forecast



U.S. gasoline demand greater than diesel fuel but forecast to increase at lower rate (1.3 vs. 1.5 percent per year).

Source: EIA Annual Energy Outlook 2007

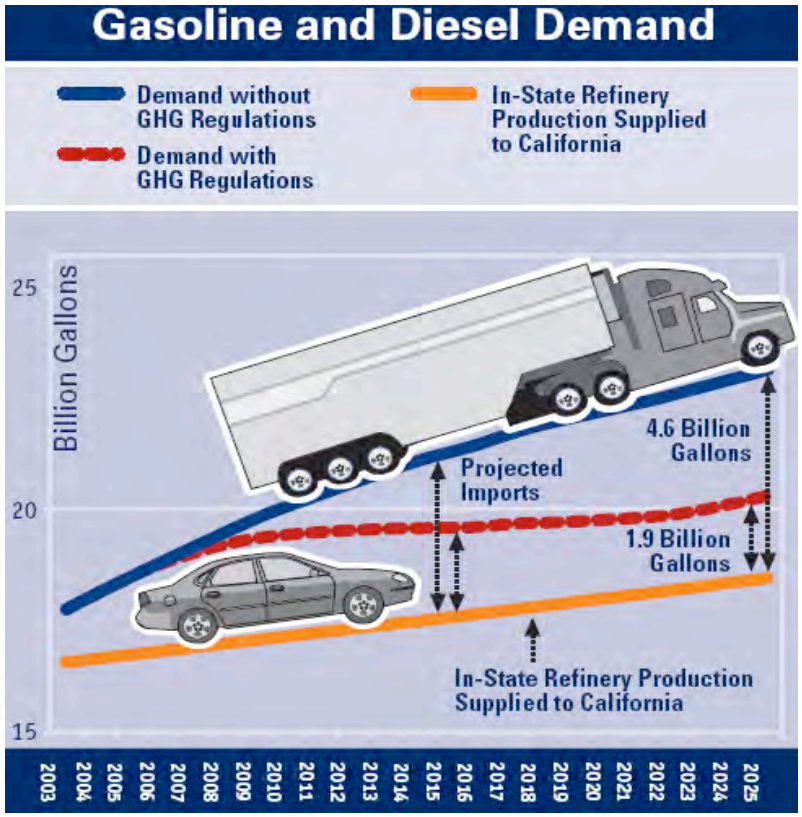
California Transportation Fuels Demand Forecast



California Transportation Fuels Demand Forecast

- Base case for gasoline assumes compliance with GHG reduction goals from Pavley legislation
- **Gasoline demand** in California grows by an average of 0.1% per year in the base case forecast and by 0.9% in the alternative forecast from 2005-2025
- **Diesel demand** grows by an average of 2.7% per year in the base case forecast and by 2.9% in the alternative forecast
- **Jet fuel** demand grows by an average of 2.9 % per year
- Average **fuel efficiency** rises by 33% over the forecast period in the base case and by 10% in the alternative case

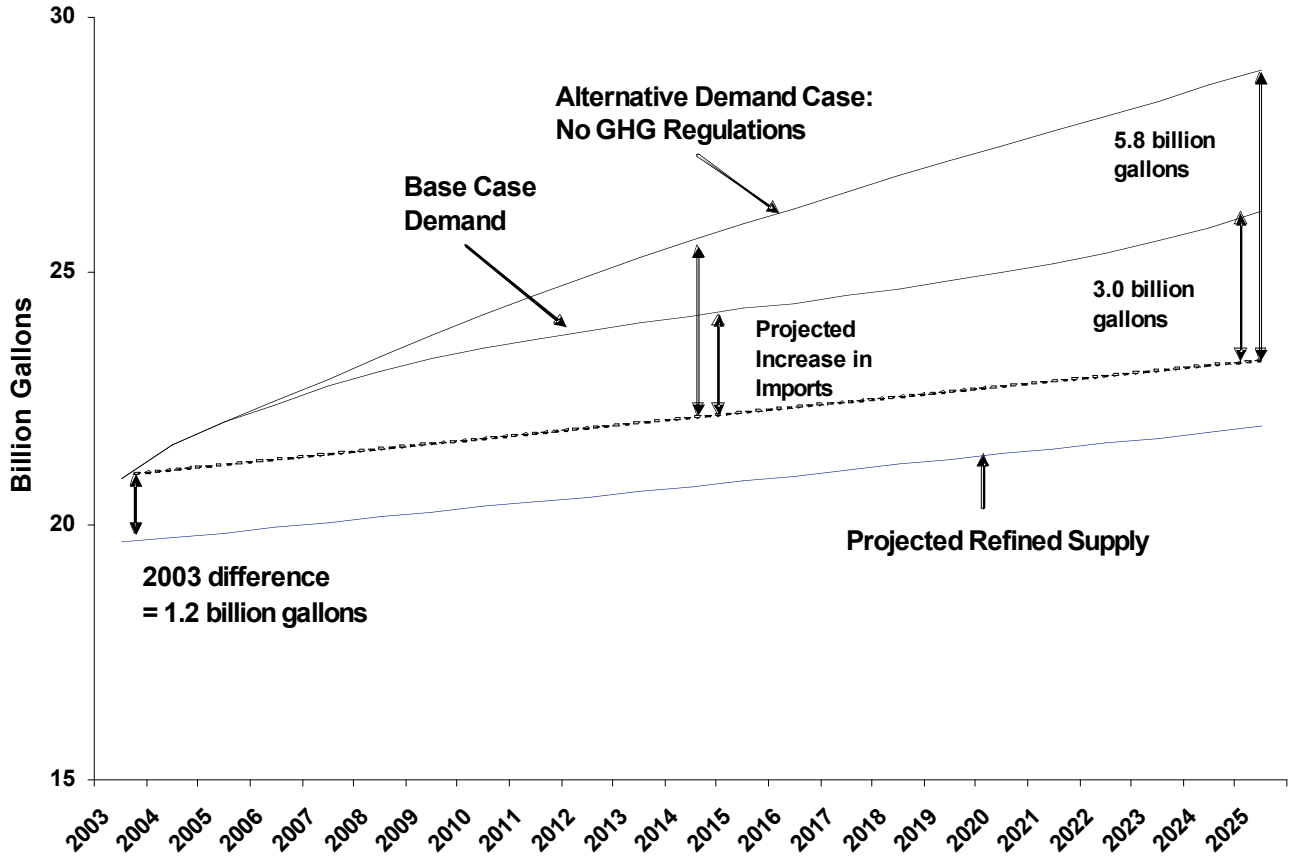
California Transportation Fuels Demand & Import Projections



- 80 percent of the projected transportation fuel imports are expected to go through the Ports of Los Angeles and Long Beach
- Demand growth rate for diesel
- fuel is forecast to be higher than that of gasoline
- Reducing dependence on petroleum through increased use of alternative fuels could help ease import demand for clean products over the longer-term, but have little impact on crude oil imports

Source: California Energy Commission

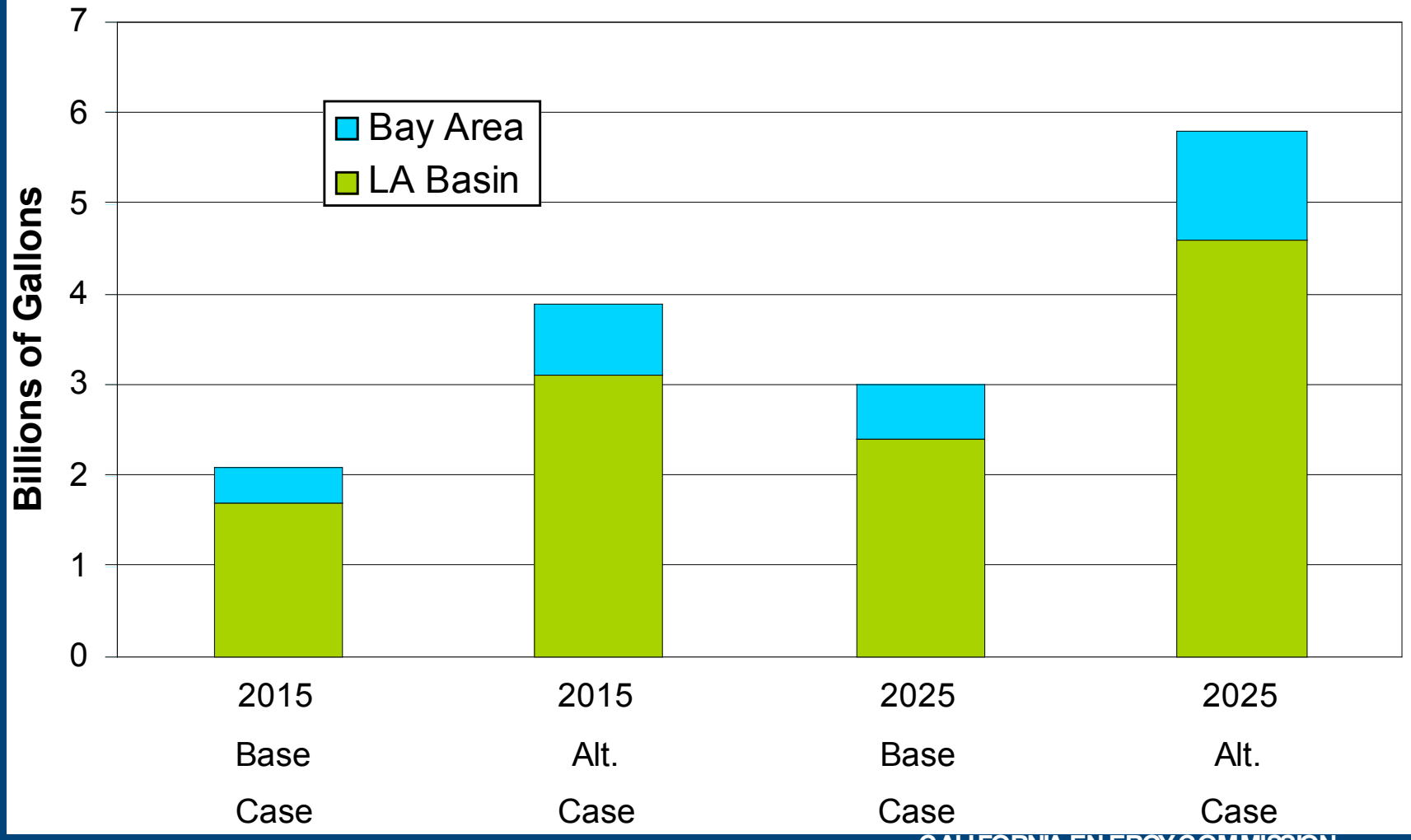
Clean Fuels Imports - Forecast



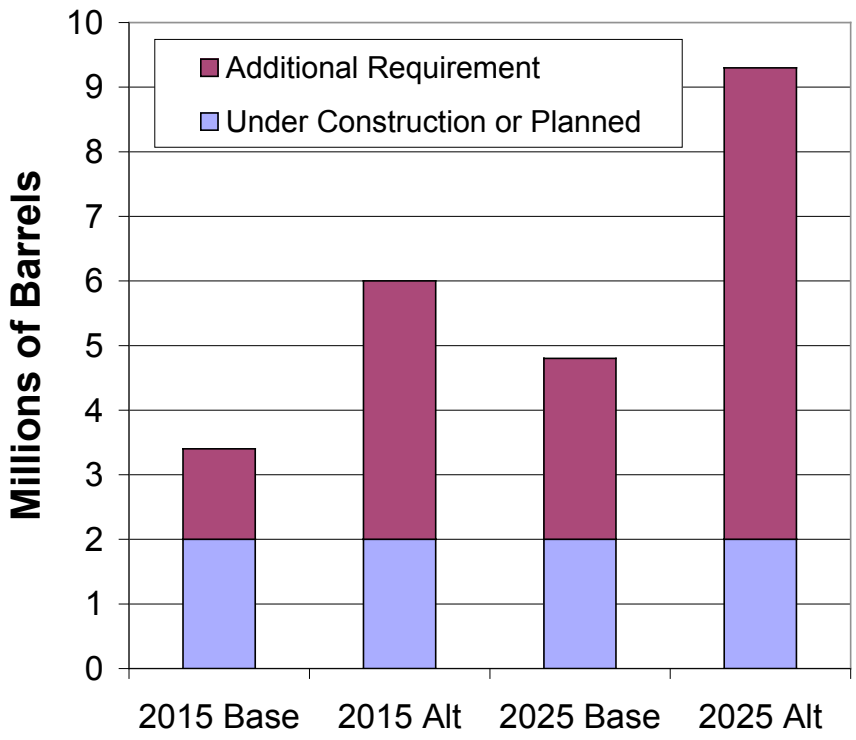
Clean Fuels Imports - Forecast

- Annual production increase by California refiners, or "refinery creep," projected to be 0.5%
- Base case demand forecast -- clean fuels imports increase over the 2004 level by
  - 2.1 billion gallons in 2015
  - 3.0 billion gallons in 2025
- Alternative forecast – clean fuels imports increase by
  - 3.9 billion gallons in 2015
  - 5.8 billion gallons in 2025
- Increased use of alternative fuels can reduce the projected imports of gasoline and diesel fuels, but will likely increase the forecasted imports of ethanol and other alternative fuels

Clean Fuels - Incremental Import Forecast
Los Angeles Basin & Bay Area



Additional Storage – Los Angeles Basin



- Assuming existing petroleum infrastructure capacity is retained, an additional 2.8 to 7.3 million barrels of new storage capacity will be needed in the Los Angeles Basin to handle to projected clean fuels imports
- If one of the proposed crude oil import terminals is constructed in the Los Angeles Basin, crude oil import capacity should be sufficient to handle the projected imports through 2015

Petroleum Infrastructure Significance to State

- California's economy is estimated to have generated a gross state product of over $1.5 trillion during 2005
- Adequate supplies of transportation fuels are a necessary component of ensuring continued movement of goods through and within the state
- Loss of existing petroleum infrastructure assets could diminish access to transportation fuels resulting in:
  - higher costs for California consumers and businesses
  - Increased risk of supply problems
  - Reduced options for re-supply during unplanned outages
  - Increased vulnerability to temporary loss of marine infrastructure assets – less redundancy or surge capability

Summary

- California refinery production is not expected to keep pace with demand growth for transportation fuels
- California crude oil production forecasted to continue to decline
- Crude oil and clean fuel imports are forecast to increase, especially in the Los Angeles Basin
- Additional petroleum infrastructure projects will be necessary to ensure an adequate crude oil supply for the refineries and an adequate transportation fuel supply for California's consumers
- But potential problems exist for retaining existing petroleum infrastructure, as well as potential constraints to accommodating these future increased imports of crude oil and clean fuels

Summary

- Spare land to expand petroleum infrastructure, especially in Southern California (Los Angeles and Long Beach), is hard to find
- Increased imports of non-petroleum goods (cargo containers) also require additional land, sometimes in direct competition with petroleum infrastructure
- Even though initiatives are being developed to reduce demand for traditional transportation fuels, these strategies may not appreciably impact demand over the near-term
- Therefore, demand for gasoline, diesel, and jet fuel will likely continue to increase over the next decade or so, requiring an expansion of the capability to accommodate additional imports

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2008 BEST PERMITTING PRACTICES GUIDELINES FOR LIQUID TRANSPORTATION FUELS INFRASTRUCTURE

STAFF REPORT

May 2008

CEC-700-2008-002SF

Arnold Schwarzenegger, *Governor*

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Acknowledgments

The *2008 Best Permitting Practices Guidelines for Liquid Transportation Fuels Infrastructure* was prepared with the support and assistance of the following individuals in the Energy Facilities Siting Division.

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Formatting and Report Production
Teresa Reid

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ABSTRACT

The *2008 Best Permitting Practices Guidelines for Liquid Transportation Fuel Infrastructure* provides recommendations to local, state, and federal agencies, as well project proponents, on approaches and tools to streamline and coordinate the permitting process for petroleum and other liquid transportation fuel infrastructure projects, with no reduction in environmental protection. The guidelines do not recommend changes to laws, regulations, or agency jurisdictions or responsibilities. The guidelines were developed in response to recommendations in the *2005 Integrated Energy Policy Report*. They are based on transportation fuel forecasts developed for the *2007 Integrated Energy Policy Report*, a review of the existing regulatory framework for development projects in California, and advice and information provided by more than 300 stakeholders and agency representatives.

Keywords: petroleum, transportation fuels, petroleum infrastructure, permits, permitting practices, regulatory framework, permitting processes, refineries, marine terminals, fuel storage facilities, environmental impact report, environmental impact statement, California.

Executive Summary

The California Energy Commission (Energy Commission) is responsible for proposing policies to ensure affordable, reliable and environmentally sound supplies of petroleum, other fuels, and electricity. The *2005 Integrated Energy Policy Report* (*IEPR*) calls for improving and expanding petroleum infrastructure to meet California's needs in the next 20 years. The *2005 IEPR* found, based on public hearings in 2004 and 2005 (Order Instituting Investigation, Docket # 04-SIT-1), that regulatory and permitting coordination among a potpourri of local, state, and federal agencies presented a barrier to infrastructure expansion. To address this problem, the Energy Commission recommended initiating an effort to identify and develop permitting guidelines for petroleum infrastructure projects, with no reduction in environmental standards.

In 2006 Energy Commission staff embarked on developing best permitting practices guidelines for petroleum and other liquid transportation fuel infrastructure, including refineries, storage facilities, onshore pipelines, and marine terminals. Guidelines development considered the number and location of existing facilities, transportation fuel and infrastructure forecasts, the existing regulatory framework, comments and information from staff outreach efforts to more than 300 agency, local government, industry and community stakeholders, and recommendations that could be implemented within the existing regulatory framework and processes.

There are 22 refineries and about 52 related storage/onshore distribution facilities operating in California. Most of the facilities are located in the Los Angeles Basin, San Francisco Bay Area, and in the San Joaquin Valley. The nearly 5,560 miles of onshore petroleum product pipelines in California cross 228 cities and 31 counties. Most of California's 51 marine terminals that handle petroleum and clean fuels are located in Southern California and the San Francisco Bay Area.

Forecasts of needed infrastructure additions are based on petroleum and other transportation fuel forecasts presented in the Energy Commission final staff report *Transportation Energy Forecasts for the Integrated Energy Policy Report (CEC-600-2007-009SF).* Staff is projecting that overall demand for transportation fuels will continue to increase at rates marginally greater than indicated in the *2005 IEPR*. This increase in demand leads staff to conclude that specific kinds of infrastructure capacity expansions must occur to prevent substantial economic losses to state consumers.

Many energy-related projects require local, state, and federal authorizations. In all, and depending on the type of project, a new or expanded facility may require from 15 to 50 regulatory agency permits and other authorizations. A typical permitting process for these types of facilities ranges from nearly six months (for a non-emergency project exempt from California Environmental Quality Act [CEQA] requirements) to more than two years for a project that must comply with CEQA and the National Environmental Policy Act (NEPA). In addition, many projects demand an involved pre-application phase that can take from 3.5 months to a year or more, depending on a project's status and changes made as a result of consultations between agencies and project proponents.

Conclusions from the *2005 and 2007 IEPR* processes and recent discussions with agencies and stakeholders regarding petroleum and other transportation fuel infrastructure are as follows:

- California will need new/improved transportation fuels infrastructure over the next 10 to 25 years.
- There are regulatory challenges at the state, regional, and local levels of government that delay permitting of transportation fuel facilities.
- Most problems are with the permitting processes, rather than the laws that guide those processes.
- Most of the problems can be addressed by 1) clearly and accurately defining the issues and 2) balancing competing interests when designing/maintaining environmentally and technologically robust and safe infrastructure.
- There is industry and agency acknowledgement that better coordination and information transfer will facilitate permitting.
- Some agencies/local governments have best permitting practices that may serve as models for others.

Regulatory and permitting issues raised in 2004 and 2005 and by the more than 300 contacts in 2006 and 2007 can be summarized as follows:

- Incomplete applications.
- Disagreement or confusion on applicability of laws.
- Lack of coordination among agencies.
- Inexperienced staff.
- Agency consultation/approval delays.
- Inconsistent agency decisions.
- Balancing community and environmental impacts and the state's need for continuing supplies of transportation fuels.
- Community and environmental concerns draw out CEQA project review process.
- Lack of information on statewide importance of projects.

The following recommended best permitting practices guidelines for petroleum and other liquid transportation fuels infrastructure are: 1) offered to agencies, project proponents, and stakeholders; 2) focus on anticipating and acting on issues early in regulatory processes and improving coordination and cooperation; and 3) do not suggest changes to laws, regulations, or agency jurisdictions or responsibilities. Energy Commission staff found through its investigations that many permitting issues are raised on an individual project or permit basis

and that the identified problems and challenges can be addressed by 1) proactive planning by project proponents, and 2) modifying individual agency processes.

Recommendations

Background for each recommendation is provided in Chapter 4: Issues and Recommended Guidelines.

Make use of pre-application meetings. Energy Commission staff recommend applicants request and agencies offer and pursue at least one pre-application meeting before submitting of a permit application for a project. Staff suggests that project applicants consider scheduling these meetings a minimum of one year and three months before the start of anticipated construction. Depending on the project's complexity and expected level of public controversy, project proponents have initiated such meetings as much as two to three years before the start of environmental review processes to allow for changes in project design. Meetings are most productive if the scope of the project is clearly defined by the applicant.

Identify the key responsible, trustee, and cooperating agencies. It is critical to identify the responsible, trustee, and cooperating agencies that will likely review and issue authorizations for a project. The identification can be done through pre-application meetings and using staff and consultant knowledge/experience early in the project design process.

Provide timely CEQA/NEPA document consultations and comments. Timely and complete environmental document consultations and comments by trustee, responsible, and coordinating agencies 1) will facilitate lead agency decision-making on the documents, 2) notify project proponents of issues that will likely be raised by fish and wildlife and coastal management agencies during their permitting processes, and 3) may expedite issuance of permits.

Agency partnering. Consider partnering between the lead and a responsible agency during preparation of environmental documents and the project permitting process, especially when one or more critical issues focus on a single environmental topic, such as air quality. Partnering agreements or memorandums of understanding (MOUs) are used to formalize the relationship. These documents specify the purpose of the agreements, legal and regulatory roles of the partnering agencies, coordination of project review schedules, and other arrangements.

Coordinate agency reviews. Staff recommends lead, responsible, trustee, cooperating, and interested agencies coordinate their review of projects and/or environmental documents to avoid duplication of effort and expedite decisions on the documents and related permits.

Establish joint-agency working groups. Establishing an interagency working group can effectively educate agency staff on statewide policy issues surrounding proposed major and complex petroleum or transportation fuel projects that involve multiple regulatory jurisdictions. Staff recommends the main purpose of such a group be to inform agency staff on the policy implications of particular transportation fuel projects or activities. Successful groups have been facilitated by an agency or entity that does not have direct regulatory authority over the projects. The group could 1) facilitate communication among the regulatory staffs, 2) serve as an information transfer forum to discuss the technology and major statewide environmental and

energy policy issues raised by a project, and 3) prepare agency staff for public discourse on projects.

Establish, coordinate, and adhere to project timelines/milestones. Develop a master schedule for a project that addresses the environmental analysis and permitting phases and include dates for major milestones. Through coordinated scheduling, regulatory agencies involved in authorizing a particular project can identify the sequencing of permits, better assure adherence to State Permit Streamlining Act (PSA) time limits, and provide advice to applicants on scheduling submittal of land and water resource surveys and permit applications to project applicants.

Consider expedited agency reviews. Agencies should consider offering expedited reviews of permit applications to project proponents, when appropriate and feasible. Factors to consider may be the potential impacts on the state's supply of transportation fuels, as well as the scope and complexity of issues raised by a project.

Establish or maintain buffers around facilities. It may be prudent in some communities for local governments to consider limiting expansion of residential or other incompatible uses around existing, functioning, and planned facilities. Limiting such expansions may require strategic assessment of land use patterns and the need to balance approvals for transportation fuel facilities and residential, open space, recreational, and commercial development.

Facility master planning. Regulators and project proponents should consider approval and use of a master plan for a number of facility improvements rather than seeking permits for each improvement.

Ensure adequately trained staff.

- Regulatory agencies and project proponents should consider training staff if knowledge and experience levels warrant the additional education and information exchange.
- Energy Commission staff should consider facilitating workshops and training forums for agency and stakeholder participants, as appropriate.

Seek staff with energy facility siting experience during hiring processes. Consider requiring energy facility siting expertise as part of the job descriptions for certain positions within an organization.

Clearly identify "chain of command."

- Identify responsible staff representatives, project managers and primary points of contact within agencies and project applicant teams before or at pre-application meetings, or as soon thereafter as possible to facilitate timely information exchange.
- Identify roles/responsibilities of staff and consultants and keep them up-to-date. Specify decision-making authorities of primary points of contact and know who else to consult when issues or questions arise that identified individuals cannot address. Provide responses/information in a prudent, accurate, and timely manner.

Create and use clear criteria for regulatory decisions. Consider adopting criteria to guide decision-making on projects throughout an agency, address agency mandates and policies, and ensure consistent treatment of project proposals.

Publish model agency decisions or guidance documents. Agencies should consider posting on the Internet or otherwise distribute decisions to known interested parties (including agency staff) that would serve as models for future actions on similar projects.

Implement governmental relations and public outreach efforts. Regulatory agencies and project proponents have found that robust governmental relations and public outreach programs for an organization, as a whole, and/or designed for a particular project help to identify and address community, environmental, and agency concerns.

Continue and expand the Energy Commission's participation in project regulatory processes. Consider expansion of the Energy Commission's efforts to inform regulatory agencies of transportation fuel demand, supply and infrastructure forecasts, and related statewide energy policies including sound environmental and security measures that meet regulatory agency mandates. Consider having Energy Commission staff available to work with ports, other local governments, local permit appeal entities, and state and federal regulators to address the identified challenges and issues in a balanced manner.

Proposed next steps for the Energy Commission being an active participant in petroleum and other transportation fuel infrastructure regulatory processes are summarized below:

- Establish an Energy Commission-led interagency working group for addressing major statewide petroleum and other transportation fuel infrastructure issues.
- Assess the Energy Commission's resources for an expanded and continuous informational transfer role in petroleum and other transportation fuel project environmental and regulatory processes.
- Consider local agency requests for financial assistance or training to enhance their regulatory staff capabilities. Local governments suggested use of grants or Energy Commission staff to assist their regulatory efforts.
- Assess the Energy Commission's role in promoting land use policies that address balancing approvals for transportation fuel facilities and potentially incompatible development and land uses.

Chapter 1: Introduction

Purpose

The California Energy Commission (Energy Commission) is responsible for proposing policies to ensure affordable, reliable, and environmentally sound supplies of petroleum, alternative fuels, and electricity to meet California's growing energy needs. The *2005 Integrated Energy Policy Report (IEPR)* calls for improving and expanding petroleum infrastructure to meet California's transportation fuel needs in the next 20 years. The Commission recognized these improvements would be needed despite working toward reducing the state's long-term dependence on petroleum fuels through successful energy efficiency programs, continued technological advances, and development of new energy supplies. To promote development of the forecasted infrastructure improvements and expansions, the Commission found that developing best permitting practices guidelines for petroleum infrastructure facilities would address a potential barrier to meeting the state's rising demand for petroleum fuels. The *2007 IEPR* transportation fuel forecasts predict that expansion of infrastructure will continue to be needed to meet expected demand for petroleum and other transportation fuels. As a result of the forecasts, the *2007 IEPR* and the *State Alternatives Fuels Plan (CEC-600-2007-011-CMF)* support expansion of necessary and environmentally sound infrastructure for petroleum and alternative transportation fuels. This report will recommend to state and federal agencies, local governments, project proponents, and other stakeholders best permitting practices guidelines for petroleum and other liquid transportation fuel infrastructure.

Organization of this Report

Development of guidelines requires some understanding of transportation fuel forecasts, the regulatory structure in California for permitting industrial energy facilities, and concerns about construction and operation of petroleum infrastructure facilities. Chapter 2 provides an overview of the existing transportation fuel infrastructure network. The chapter summarizes Energy Commission transportation fuel forecasts and related forecasts for the facilities needed to receive, refine, store, and transport the fuels. The chapter also summarizes concerns regarding the future of the transportation fuel infrastructure. Chapter 3 focuses on the industrial energy facility permitting structure and process in California. Chapter 4 describes the permitting and regulatory issues raised by the Energy Commission and more than 300 agency, local government and stakeholder representatives in 2006 and 2007. Most importantly, the chapter offers recommended guidelines and tools for addressing the issues. Chapter 5 concludes with suggested next steps.

Chapter 2: Liquid Transportation Fuels Infrastructure, Forecasts, and Concerns

California Transportation Fuels Infrastructure

Refineries and storage facilities, onshore pipelines,[1] and marine terminals make up the majority of California's liquid transportation fuel infrastructure used for importing, storing, refining, and distributing unrefined and refined fuel products to consumers. Descriptions of the facilities and the Energy Commission 2007 transportation fuels forecasts are provided below.

Refineries and Storage Facilities

Most of California's refineries, tank storage facilities, and related onshore terminals that handle transportation-related petroleum, alternative and clean fuels are located in Southern California, the San Joaquin Valley, and the San Francisco Bay Area. At the present time, 22 refineries and about 52 onshore storage and distribution facilities operate in California.

Certain refineries in California have filed permit applications to expand their facilities. For example, planned expansions at the ConocoPhilips refinery in Rodeo and the Chevron refinery in Richmond call for new facilities for producing relatively clean-burning gasoline and ultra-low-sulfur diesel fuels that meet requirements established by the California Air Resources Board (ARB). Other refineries may file similar expansion plans in the future.

Refineries in California produce many different commodities from crude oil, including transportation fuels. The six groups of refined product include:

- Liquefied petroleum gases, such as butane and propane
- Gasoline
- Jet fuel
- Distillates, including diesel and high-sulfur distillate fuel oil
- Residual fuel oil, used to power ships and generators
- Miscellaneous products

To process the products, various process units in a refinery perform one or more of four fundamental functions:

- Separation of feedstock, that is, crude oil, into distinct streams of lighter and heavier hydrocarbons (equipment/facilities: distillation column, fractionators, splitter)

[1] Subsea pipelines are generally used to transport crude oil and gas from production platforms or islands to shoreside processing facilities, marine terminals and onshore pipeline networks. The oil and gas production infrastructure is not a subject of this report.

- Conversion of petroleum molecules by cracking and reforming (equipment/facilities: catalytic cracking, hydrocracking and coking units)
- Purification of products (equipment/facilities: hydrotreaters, sulfur recovery plant)
- Blending (mixing) of hydrocarbon streams into finished products (equipment/facilities: storage tanks, process vessels)

Refineries require support processes that provide utilities such as cooling water, electricity, steam, and hydrogen. These processes generally require cogeneration facilities, boilers, and furnaces for continuous electricity and steam. Refineries also manage wastes in wastewater treatment systems or collect solid wastes for offsite disposal. Part of the waste management process includes recovery and recycling of hydrocarbons. These hydrocarbons are "fed" back into the processing units.

Refinery facilities include storage tanks used for several purposes: 1) storing crude oil before processing, 2) storing intermediate petroleum compounds from a process unit, 3) storing blending components used for creating finished products, and 4) holding finished products before distribution. The tanks store crude oil, clean fuels, finished gasoline, diesel fuel, and blend stocks. These tanks range in size from 30,000 barrels to 80,000 barrels. The tank facilities are connected or adjacent to onshore and marine terminals. Product in the tanks is generally transported via pipelines to/from the refineries or distribution facilities. The product is stored for transport and distributed throughout the state by pipeline, rail, or truck. Some of the produced product leaves the state from marine terminals in the Bay Area or Los Angeles Basin or by pipeline to Arizona and Nevada. The marine facilities also handle imported product transported to California by marine tankers.

Figure 1 depicts a refinery and storage facility in California. Figure 2 (page 12) shows the general locations of refineries in California.

Figure 1: Refinery/Storage Facility

Source: Google Image 2007

Onshore Pipelines

There are nearly 5,560 miles of onshore petroleum product pipelines in California. Pipelines range in size from 2 inches to 42 inches in diameter. They carry crude oil (generally larger diameter pipelines linking oil fields in the southern San Joaquin Valley and terminals in the Los Angeles and San Francisco Bay areas) and refined products (including gasoline, jet fuel, clean fuels, and other products). The size of refined products pipelines depend on type of product, length and overall capacity of the pipeline. Figure 2 shows the major pipeline and petroleum refinery network in California.

Figure 2: California Pipeline and Refinery Network

Source: California Energy Commission 2007

Onshore petroleum products pipelines are sited either on the ground, above on trestles or other elevated structures, or buried. Streams and other water body crossings are generally trenched

through or drilled beneath the channels. The latter option is generally preferred to avoid contact with the water body during construction.

Marine Terminals

Most of California's 51 marine terminals that handle petroleum and clean fuels are located in Southern California and the San Francisco Bay Area. Several are located in Humboldt County (north of San Francisco - four terminals) and along the central and south central coasts (nine).

Stationary marine terminals include piers or offshore moorings for tanker/barge loading/unloading. Pipelines (whether above ground or subsea) connect to an upland storage, transportation or refinery facility. The on-property onshore distribution network is usually composed of pipelines and/or rail or truck terminals. According to *An Assessment of California's Petroleum Infrastructure Needs in Support of the 2005 Integrated Energy Policy Report (CEC-600-2005-009)*, an average-size facility in California handles about 5 million barrels annual throughput for clean fuels and 20 million barrels annual throughput for crude oil. Very large facilities can handle up to 50 million barrels annual throughput. Figure 3 is an example of a marine terminal with an offshore pier and trestle. Pipelines linking the vessel dock to shore are located on the trestle.

Figure 3: Marine Terminal Facility

Source: Google Image 2007

Energy Commission Forecasts

Transportation Energy Forecasts for the 2007 Integrated Energy Policy Report (CEC-600-2007-009SF) provides transportation fuel import forecasts that will be used as a basis for the infrastructure needs forecasts. Energy Commission staff found the following:

"The outlook for the adequacy of California's transportation fuel import infrastructure has worsened slightly since publication of the *2005 IEPR*. Staff projections indicate that overall demand for transportation fuels will continue to increase at rates marginally greater than indicated in that document. Staff expects that this growing demand will exceed likely infrastructure capacity expansions currently under construction or to which the industry is committed. Numerous uncertainties can affect these estimates of future import infrastructure needs, including fuel prices; rates of adoption of new technologies and alternative fuels; demand for fuels in California and neighboring states; decline rates of California oil production; refinery and other infrastructure capacity expansions; and greenhouse gas (GHG) reduction rules and standards. However, this potential shortfall in the ability to provide transportation fuels leads staff to conclude that certain specific kinds of infrastructure capacity expansions must occur to prevent substantial economic losses to state consumers."

In *CEC-600-2007-009SF* staff further found the following regarding fuel demand, imports, and refinery and storage tank capacity forecasts.

"--Staff estimates that total **gasoline, diesel, and jet fuel demand** will grow to between 26.3 billion and 33.1 billion gallons (627 to 789 million barrels) per year by 2030, an increase of 13.5 to 42.5 percent, from levels of 23.2 billion gallons per year in 2005.

--**Imports of crude oil** into California are expected to rise 19.9 to 33.8 percent (81 million to 138 million barrels per year) from 2005 levels by 2015 and 37 to 65.2 percent (151 million and 266 million barrels per year) by 2025.

--Staff expects combined **imports of gasoline, diesel, and jet fuel** to increase by 18.9 million barrels per year by 2015 and 11 million barrels per year by 2025 in the low fuel demand case compared to 2005 levels. Combined fuel imports are estimated to increase by 115.5 million barrels per year by 2015 and 199.7 million barrels per year by 2025 in the high fuel demand case.

--To meet **neighboring state demand** for transportation fuels, pipeline exports to Nevada will grow by 28.7 to 36.3 million barrels per year by 2025, an increase of 50.4 to 63.7 percent. Exports to Arizona are expected to increase by 29 million barrels per year (59 percent).

--Staff expects California **refinery capacity growth** ("refinery creep") to produce between 20 million and 48 million barrels per year of additional transportation fuels by 2015 compared to 2006 levels (an increase of 3.3 to 8.1 percent). By 2025, the increased output of transportation fuels is forecast to increase by 43 million to 107 million barrels per year compared to 2006 (an increase of 7.2 to 17.9 percent).

--Staff estimates that the number of **additional product tanker arrivals** in California per year by 2025 could range from as few as 37 to as many as 1,331 depending on assumptions about product demand and size of tanker loads. Estimates of the number of additional crude oil tanker arrivals in the state range from 76 to 380 per year depending on assumptions about vessel loads, state oil production, and refinery capacity additions.

--Staff estimates additional **storage tank capacity** needed to meet California product storage requirements by 2025 to be between 0.9 million and 16.8 million barrels depending primarily on

assumptions about demand. Estimates of additional state crude oil storage capacity needed by 2025 range from 6.6 million to 22.2 million barrels.

--Assuming planned capacity additions are built, **crude oil import capacity** in the Los Angeles Basin will be sufficient through 2015, but in the higher imports case, more capacity would be required by 2025.

--Incremental **imports of ethanol** could grow by 2025 to as much as 661 million gallons (15.9 million barrels) per year more than 2006 import levels of 906 million gallons, with high gasoline demand and limited in-state growth of ethanol production (an increase of 73 percent). Conversely, assuming lower gasoline demand and higher state ethanol production, ethanol imports could actually decrease by 174 million gallons (4.1 million barrels) by 2025 (a decrease of 19.2 percent compared to 2006)." (emphasis added)

The Energy Commission staff forecast for expanded transportation fuel storage requirements assumes that projects already in the permit approval process or those that are in the midst of construction actually would begin operations within the forecasting period. The forecasts do not project a need for new refineries but estimate that refineries in California will expand production of petroleum fuels at an average rate of 0.7 percent per year due to refinery creep (gradual increase in distillation capacity, occasionally conducted during periodic facility maintenance consistent with environmental requirements).

Energy Commission staff forecasts that expansion of the pipeline network will occur through 2025. For example, Kinder Morgan Pipeline announced recently that it has expansion plans for its pipeline between Colton, California, and Las Vegas, Nevada. The federal government is in the process of proposing designation of energy transmission corridors (which could include pipelines) generally along: the California/Mexico border; north and south of the Los Angeles area in an eastward direction; along the Interstate 80 corridor east of Sacramento; in parts of extreme Northern California; and in eastern California, roughly paralleling Highway 395. In addition, existing pipelines undergo maintenance, and, in some cases, replacement of aging lines is needed to ensure safe operation of the network. There will be a continuing need for permits for pipeline maintenance, repair, replacement, and or expansions.

Energy Commission 2007 transportation fuel demand forecasts state that the expected increase of transportation fuel imports into California will require expansion of marine terminals. Energy Commission staff is currently assessing the magnitude of the expected increase and existing spare capacity of the system. Results are expected in 2008, and the assessment will result in Energy Commission staff-projected timeframes for this projected expansion. The projections are dependent on several factors: increased use of alternative fuels, effects of refinery expansions in and outside California, effects of laws that require reduction of GHG emissions, and the size of the tankers that would be bringing product into the state, among other factors. Nevertheless, Energy Commission staff projects that total imports of all transportation fuel will continue to increase between now and 2025. In addition, marine terminal upgrades and improvement may require regulatory review.

If most of the increased supply arrives in very large crude carriers the need for new marine terminals may be limited to one new marine terminal in Southern California with the capability of handling such carriers. If increased supply arrives in smaller tankers or via barge, then more marine terminals in Southern California and the San Francisco Bay Area may be required.

Currently, the very large carriers cannot enter San Francisco Bay due to the bay's shallow water depths. The Bay's shipping channels for most refinery marine terminals are limited to handling vessels with a maximum draft (depth that a vessel sits in the water) of 40 feet. The very large carriers require a water depth of 60 feet or more. To handle the carriers, substantial dredging of existing shipping channels would be required and is unlikely due to environmental concerns and costs.

Concerns

The Energy Commission, other agencies and stakeholders (oil/gas industry, local communities, non-governmental interests) expressed the same concerns in 2006 and 2007 that they expressed in 2004 and 2005:

- Important segments of the state's existing fuels infrastructure are already being used at or near capacity.
- Current capacity of existing marine infrastructure, particularly in the Los Angeles Basin, could decline as a result of community or economic pressure to remove petroleum facilities due to local resident concerns, stakeholder interests and new laws and regulations. Such laws and regulations include AB 32 – Núñez, Chapter 488, Statutes of 2006 to reduce GHG emissions and the California State Lands Commission (CSLC) Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) to upgrade facilities to meet seismic safety standards. Although implementing these laws and regulations would result in important and necessary improvements to the infrastructure, some companies may decide the cost of upgrading facilities may not make economic sense given the current regulatory environment, land lease terms, and other circumstances.
- Petroleum marine terminal capacity, marine storage, and gathering pipelines that connect marine terminals with refineries must expand to meet expected demand for fuels. Most of this expansion would likely occur in the Los Angeles Basin.
- Expansion of transportation fuels marine infrastructure will become more difficult in the Los Angeles Basin as available land becomes increasingly scarce and subject to competing uses.
- Local community members, elected officials, and port representatives have objected to existing and proposals for modified, expanded, or new infrastructure facilities. Their concerns include increased air pollution, increased truck traffic, aesthetic impacts of storage tanks, safety threat (perceived or real) to nearby communities, and competition for diminishing spare land.

Conclusions

Conclusions from the *IEPR* process and recent discussions with agencies and stakeholders regarding petroleum infrastructure are as follows:

- California will need new/improved transportation fuels infrastructure over the next 10 to 25 years.
- There are regulatory challenges at the state, regional, and local levels of government that delay permitting of transportation fuel facilities.
- Most problems are with the permitting processes, rather than the laws that guide those processes.
- Most of the problems must be addressed by 1) clearly and accurately defining the issues and 2) balancing competing interests when designing/maintaining environmentally and technologically robust and safe infrastructure.
- There is industry and agency acknowledgement that better coordination and information sharing will facilitate permitting.
- Some agencies/local governments have best permitting practices that may serve as models for others.

Chapter 3: Regulatory Framework

Facilities and Permitting

To expand, adapt, and in some cases maintain petroleum infrastructure, project proponents must comply with a complex regulatory structure in California. The structure is complex by design to ensure numerous agency checks and balances throughout the permitting process.

Refineries and Storage Facilities Permitting

Most refineries and storage facilities require around 15 to 20 local and state permits (depending on location), in addition to certifications and decisions on state environmental documents, as required by the California Environmental Quality Act (CEQA) and related CEQA guidelines. Depending on the location of the proposed facilities and potential environmental impacts, federal permits may be required.

Each city, county, air quality management district, regional water quality control board, and special district has a different set of rules, regulations, and permitting processes. There is no standard procedure for determining which permit to apply for first. However, storage facilities and refineries require CEQA review, which must be completed before permitting agencies issue their authorizations.

Pipeline Permitting

The nearly 5,560 miles of onshore petroleum product pipelines in California cross 228 cities and 31 counties. It is not possible to state with certainty all of the permits required for new or replacement pipelines, as any pipeline could cross any number of the state's 58 counties, 478 cities, or approximately 2,300 special district boundaries. In addition, there are 107 Native American sovereign nations in California; permits and consistency determinations would be required from tribes if pipelines were to cross their nation lands.

Most pipeline permits and approvals are governed by federal and state laws and regulations. These laws and regulations may require from 30 to 50 state and federal permits (depending on location), in addition to certifications and decisions on state and federal environmental documents, as required by the National Environmental Policy Act (NEPA) and CEQA. In addition, each local government requires one or more permits and/or approvals.

Marine Terminal Permitting

Most marine terminal permits are governed by federal and state laws and regulations. These laws and regulations require as many as 20 state and federal permits (depending on location), in addition to certifications and decisions on state and federal environmental documents, as required by NEPA and CEQA.

Offshore most areas of California, no local permits are required for portions of marine oil terminal facilities that are sited on tide or submerged lands (beaches, wetlands, and the ocean out to three miles offshore of the coast), as these areas are governed by state agencies (such as California State Lands Commission [CSLC], Coastal Commission [CCC], and San Francisco Bay

Conservation and Development Commission [BCDC]). The CSLC issues a land use lease, and the CCC and BCDC issue coastal development permits.

In Southern California certain local governments, such as the cities of Los Angeles and Long Beach, were granted trusteeship of tide and submerged lands offshore of their coasts by the state. In these cases, the local governments issue the land use lease.

For onshore portions of projects, local agency permits are required. In the portion of the California Coastal Zone (Coastal Zone) administered by the CCC, local decisions are appealable to the CCC. This area is generally along the 1,100 miles of coast, excluding San Francisco Bay. Refer to www.coastal.ca.gov for a detailed definition of the Coastal Zone within the CCC's jurisdiction. For terminals in the San Francisco Bay Area, BCDC issues permits for portions of marine terminals located offshore of the mean high tide line and areas within 100 feet inland from the line. Refer to www.bcdc.ca.gov for a description of the Coastal Zone in San Francisco Bay.

Regulatory Structure and Process

Permitting Framework

Permission to build a new or expand an existing petroleum infrastructure facility would likely require between 15 to 50 non-emergency agency and local government authorizations, including permits, consultations, approvals, agreements, leases, and/or certifications. The number and type of authorizations depend on the type of facility and its location.

Generally, the regulatory framework includes the state and federal agencies and local and tribal governments shown in Figure 4.

Figure 4: General Regulatory Framework for Transportation Fuel Facilities

Source: California Energy Commission 2007, Google Earth 2007

Table 1 below summarizes the federal and state/regional agencies and types of local governments most involved in permitting these types of facilities, the authorizations required by the jurisdictions, and their respective authorities. Each type of facility will require a different combination of authorizations, depending on the complexity of the project and its location relative to the jurisdictional boundaries of the regulatory agencies and local and tribal governments.

Table 1: Liquid Transportation Fuels Facility Authorizations – Summarized

Permits		
Federal/Native American Nations	**State/Regional**	**Local**
U. S. Army Corps of Engineers -Section 10 (Rivers & Harbors Act) -Section 404 (Clean Water Act) -Nationwide (Clean Water Act) **Bureau of Land Management** -Right-of-Way (Mineral Leasing Act, Section 28) **National Park Service** -Right-of-Way (The Organic Act) **U.S. Fish & Wildlife Service** -Use permits in National Wildlife Refuges (Fish & Wildlife Coordination Act) **Federal Aviation Administration** -Proposed Construction or Alteration of Objects That May Affect Navigable Airspace **Native American Tribal Governments** -Permits analogous too many Federal environmental permits (Tribal Treaties)	**Caltrans** -Encroachment (Streets and Highway Code) **Regional Water Quality Control Boards (9)** -National Pollution Discharge Elimination System Permits (Clean Water Act; CA Porter Cologne Water Quality Control Act; CA Water Code Section 13000 et seq.) **Coastal Commission** -Coastal Development (CA Coastal Act) **Bay Conservation & Development Commission** -Coastal Development (CA McAteer Petris Act and Suisun Marsh Preservation Act) **Air Quality Management Districts (35)** -New Source Review -Prevention of Significant Deterioration (Clean Air Act; CA Health and Safety Code, Division 26; CA Public Resource Code, Division 13, Local Agencies) **Occupational Safety & Health Administration [Cal OSHA]** -Construction related (29 CFR 1910.95) **Department of Toxic Substance Control** -On-site Hazardous Waste Generation (Resource Conservation & Recovery Act; Hazardous Waste Control Law) **Department of Fish & Game** -Incidental Take Permits (CA Endangered Species Act; CA Fish & Game Code 2080.1, 2081(b); CA Code of Regulations 873.0 et seq.)	**Cities/Counties** (CA Government Code) -Encroachment -Land Use -Safety -Grading -Plumbing -Electrical -Public Works -Noise -Environmental Health -Building -Coastal Development (CA Coastal Act) **Bureaus of Sanitation** -Industrial Wastewater Discharge **Fire Departments** -Hazmat permit (CA Constitution, Article XI, Section 7) -Above Ground Storage of Hazardous/Flammable Materials **Ports/Airports** -Encroachment (CA Public Resources Code, Division 9) -See Cities/Counties, above -Land Use (CA Coastal Act) **Special Districts – Examples: Water, Flood Control, Reclamation Districts** -Encroachment (esp. for water crossings) (CA Public Resources Code, Division 9)

Table 1: Liquid Transportation Fuels Facility Authorizations – Summarized (Continued)

Consultations		
Federal/Native American Nations	**State/Regional**	**Local**
NOAA Fisheries -Essential Fish Habitat, Threatened and Endangered Species (Magnuson-Stevens Fisheries Conservation Act; Fish & Wildlife Coordination Act; Endangered Species Act) **Advisory Council on Historic Preservation** Impacts on Listed, Historic Structures (National Historic Preservation Act) **Native American Tribal Monitors** -Consistency with National Historic Preservation Act **U.S. Fish & Wildlife Service** -Threatened and Endangered Species, Migratory Birds Inter-jurisdictional Fishes Water Resources and Quality (Endangered Species Act; Migratory Bird Treaty Act; Fish & Wildlife Coordination Act) **Bureau of Indian Affairs** -Government-to-Government Consultations with Indian Tribes (Tribal Treaties) **U.S. Coast Guard** -Operations, Transportation, Safety (Oil Pollution Act; Federal Water Pollution Control Act; Clean Water Act; Water Quality Act; Resource Conservation & Recovery Act; Hazardous & Solid Waste Act; Refuse Act; CFR Titles 33 & 46)	**State Historic Preservation Officer** -Section 106 (National Historic Preservation Act) **Air Resources Board** -Statewide Portable Equipment Registrations Program (Clean Air Act; CA Health & Safety Code) **Department of Fish & Game** -Threatened and Endangered Species (CA Endangered Species Act; CA Public Resources Code 21000 et seq.; CA Code of Regulations 15000 et seq) **State Lands Commission** -Shipwrecks (CA Public Resources Code, Division 6)	**Resource Conservation Districts** -Assistance for controlling soil, erosion/runoff, stabilizing soils & improving water quality (CA Public Resources Code)

Table 1: Liquid Transportation Fuels Facility Authorizations – Summarized (Continued)

Leases/Agreements/Approvals		
Federal/Native American Nations	**State/Regional**	**Local**
Bureau of Indian Affairs -Right-of-Way approvals on lands held in trust for an Indian or Indian Tribe (Tribal Treaties) **U.S. Forest Service** -Special Use Authorizations (Mineral Leasing Act, Section 28)	**Department of Fish & Game** -Lake and Streambed Alteration Agreement (CA Fish & Game Code 1600 et seq) -Risk & Hazard Analyses; Certificates of Financial Responsibility (CA Oil Spill Prevention & Response Act) **State Fire Marshal, Office of Pipeline Safety** (U.S. Department of Transportation Agent) -Design of leak protection system -Cathodic protection -Pipeline Wellhead Protection Plan (49 CFR 190; 49 CFR 195; 40 CFR; Oil Pollution Act; Public Law 101-380; CA Government Code 51010-51019.1) **Public Utilities Commission** -Tariffs & terms of service (CA Public Utilities Code) **State Lands Commission** -Land Lease (CA Public Resources Code, Division 6) -Marine Oil Terminal Engineering & Maintenance Standards audit results & rehabilitation plans, Operations Manuals, Training & Certification Programs for personnel, Facility Security Plan (CA Oil Spill Prevention & Response Act)	**Cities/Counties** -Oil Spill Response Plans (40 CFR 300) -Land Use (CA Public Resources Code, Division 6) **Fire Departments** -Hazardous Materials Business Plan **Notification Centers** -Contract two days prior to excavation (Article 2, CA Code 4216-4216.9) **Ports** -Land Use (CA Public Resources Code, Division 6)

Table 1: Liquid Transportation Fuels Facility Authorizations – Summarized (Continued)

Certifications		
Federal/Native American Nations	**State/Regional**	**Local**
Lead Agency -Record of Decision (National Environmental Policy Act)	**Lead Agency** -Certification (CA Environmental Quality Act) **Coastal Commission** -Coastal Consistency Determination and Certification (Coastal Zone Management Act) **Bay Conservation & Development Commission** -Coastal Consistency Determination and Certification (Coastal Zone Management Act) **Regional Water Quality Control Boards (9)** -401 Certification (Clean Water Act) **State Lands Commission** -Pipeline tests (CA Oil Spill Prevention & Response Act)	**Lead Agency** -Certification (CA Environmental Quality Act)

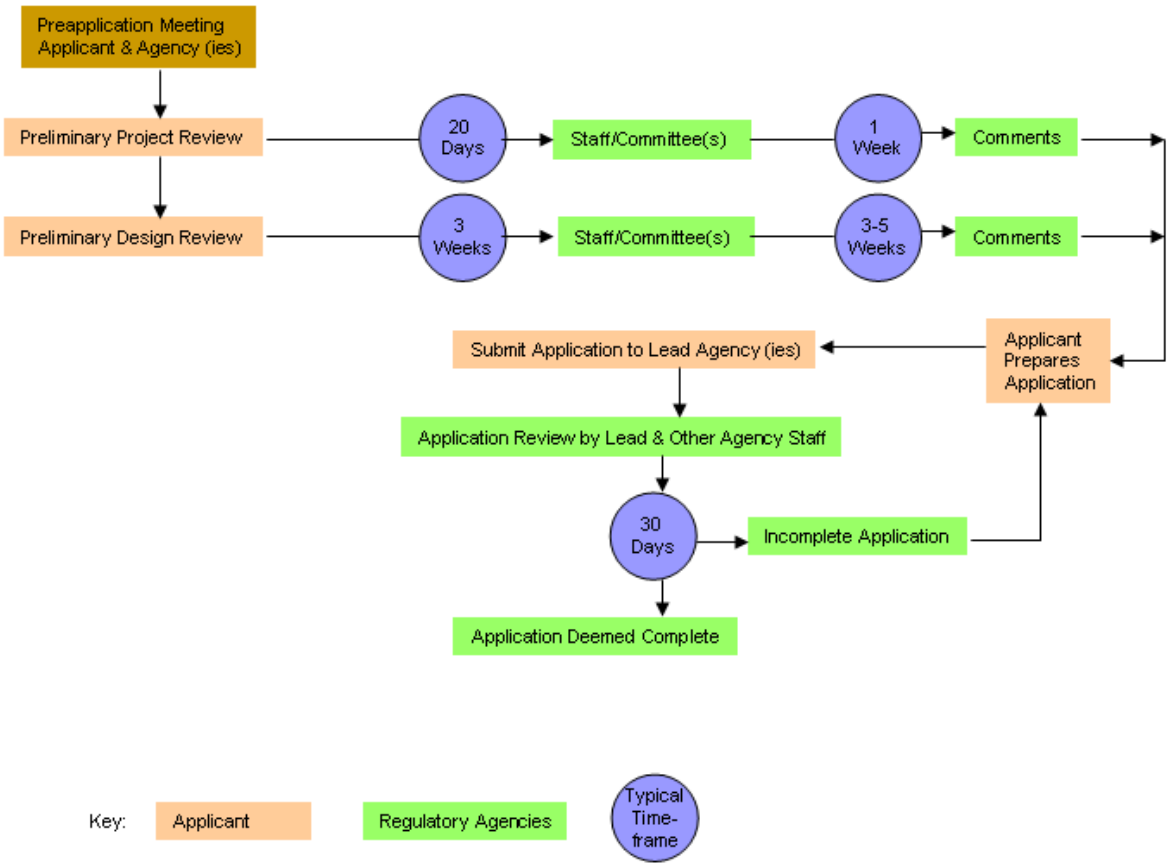
Source: California Energy Commission 2007

Typical Permitting Process

The permitting process for a project that would require some level of review consistent with CEQA would range from nearly six months (for a non-emergency project exempt from CEQA requirements) to 1.5 or more years (for a project requiring an Environmental Impact Report [EIR]). In both cases it is assumed project applicants engage in pre-permit application meetings/discussions with regulators. However, time taken for pre-application meetings is not included in the range described above.

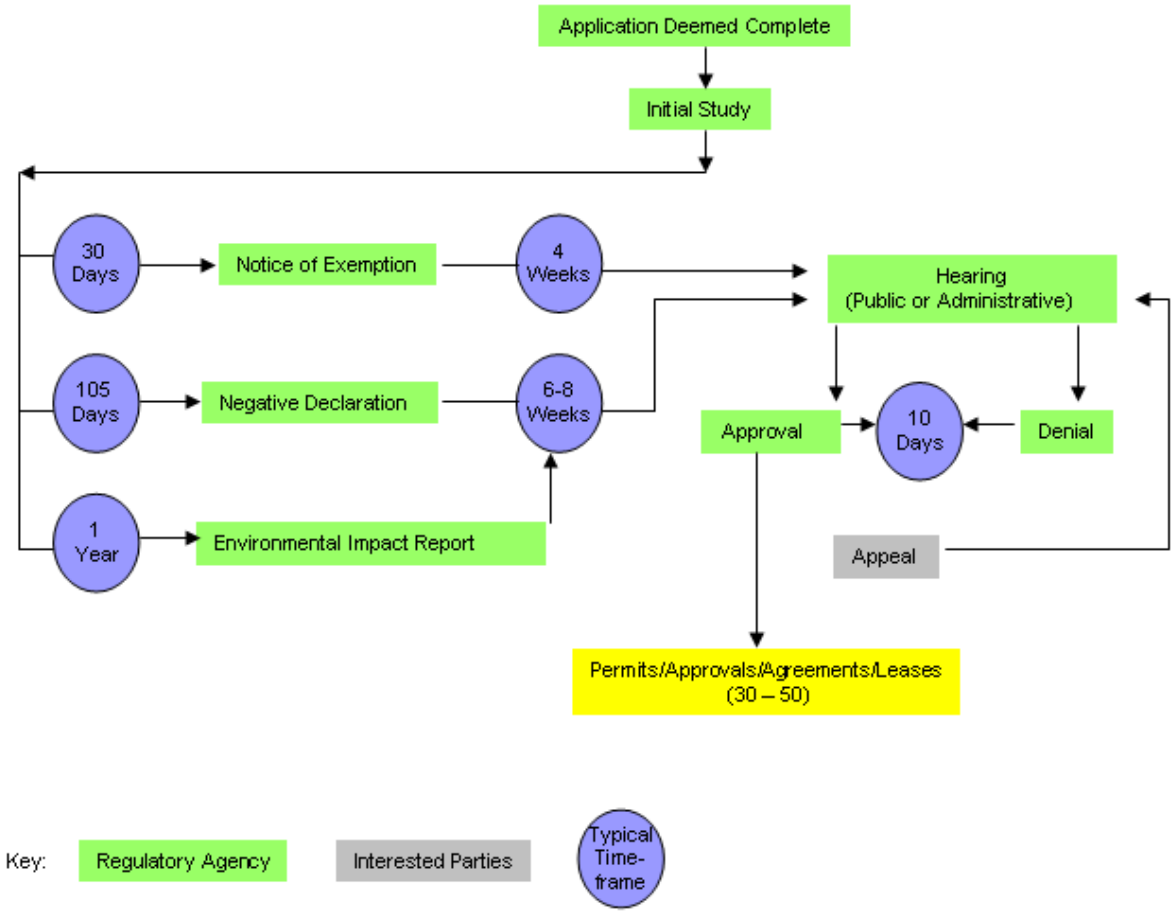
Figures 5 and 6 below depict typical permitting processes and timeframes for major industrial energy projects in California. Figure 5 depicts the steps for completing an application, including the pre-application meeting(s). The pre-application phase can take from 3.5 months to a year or more, depending on the project status and changes made as a result of the consultations between the regulatory agencies and project proponent.

Figure 5: Typical Permitting Process (Completing an Application)



Source: California Energy Commission 2007

Figure 6: Typical Permitting Process (Environmental Review)



Source: California Energy Commission 2007

The timeline for environmental review (Figure 6) is based on schedules required under state law, mainly the CEQA guidelines and the Permit Streamlining Act (PSA). The guidelines are regulations adopted by the California Resources Agency that provide detailed procedures that agencies follow to implement CEQA. The PSA requires government agencies to complete EIR preparation within one year of accepting a complete project application and to render their decisions on the permit application within 180 days of certification of the EIR. A lead agency, according to CEQA, is responsible for preparing the EIR.

Note that issuance of permits, approvals, and other regulatory authorizations occur after certification of the EIR. The schedules and timeframes for obtaining these permits are not depicted on Figure 6 but can take longer than 180 days under certain circumstances. Usually the

lead agencies will approve their permits before responsible or trustee agencies approve or issue their authorizations.

Under CEQA, a responsible agency has legal responsibility for carrying out or approving a project and a trustee agency has jurisdiction over certain resources held in trust for the people of California. There are four trustee agencies in California: California Department of Fish and Game (CDFG), CSLC, California Department of Parks and Recreation (CDPR) and the University of California. Although CEQA encourages coordination among the lead, responsible and trustee agencies, proactive participation in the preparation and review of EIRs by responsible and trustee agencies is not required. These agencies generally serve in a passive, commenting role.

Many energy-related projects require federal permits or are sponsored, in whole or in part, by federal agencies. These projects are governed by NEPA and many require preparation of an environmental impact statement (EIS). Obtaining authorizations for projects requiring EIRs and EISs may take two or more years. Joint EIR/EIS documents and reviews are encouraged by the CEQA Guidelines.

Federal lead agencies have primary responsibility for preparing EISs and issue the records of decisions on the documents. The decisions are analogous to the findings and statements of overriding consideration that accompany EIR certifications. Federal lead agencies often rely on cooperating agencies that are federal agencies with legal jurisdiction over the project, or that have special expertise on potential impacts of the project. Their NEPA role is proactive in that they are expected to participate in preparation of an EIS.

Conclusion

To ensure adequate transportation fuel supply to maintain California's growing demand, upgraded and new infrastructure will be needed over the next 25 years. The aging infrastructure will require ongoing maintenance, repairs, and replacements to insure safe operations. Future expansions or new facilities are likely due to increased imports of fuels and conversion to newer, cleaner fuels. These anticipated improvements demonstrate a continuing need for petroleum and other transportation fuel facility permits.

Designing a project to meet California's regulatory requirements, conducting environmental review, and obtaining the necessary authorizations:

- Require in-depth knowledge of the regulatory process.
- Entail a major commitment of resources and financial support.
- Necessitate careful planning.
- Require appropriate coordination between project proponents and agencies.
- Involve extensive outreach to the public and community groups.
- Can be time consuming.

As Chapter 4 explains, the permitting process can be made more efficient, while ensuring agencies retain their regulatory authority and the projects are environmentally sound and technologically robust.

Chapter 4: Issues and Recommended Guidelines

As mentioned in Chapter 1, Energy Commission staff heard from hundreds of agency, local government, and stakeholder representatives in 2006 and 2007 regarding regulatory process issues and best permitting practices for improving the efficiency of the permitting process for petroleum and other liquid transportation fuel infrastructure facilities in California. Comments from these individuals added detail to, generally supported, and updated information provided to the Commission in 2004 and 2005.

Background

In 2004 and 2005 the Energy Commission conducted public hearings on Petroleum Infrastructure Development Constraints (Order Instituting Investigation, Docket # 04-SIT-1). Results of the hearings were summarized in the *2005 IEPR*. Generally, the hearings confirmed that most regulatory challenges in California are with permitting processes, rather than with the laws that guide those processes. In addition, better coordination/information transfer and following or adapting best permitting practices used by particular entities would make the processes more efficient.

Between September 2006 and July 2007 Energy Commission staff met with state and federal agency, local government, industry, and local community representatives in the San Francisco Bay Area, Los Angeles Basin, Bakersfield, and Sacramento. These meetings were either with large groups of representatives in workshop or public meeting settings, training sessions, or during "one-on-one" or small group interviews. The purpose of the meetings was to identify:

- Specific problems or challenges with the various regulatory processes.
- The need to improve permitting processes.
- Examples of agencies or processes that have or are good permitting practices.
- How the Commission could help improve the overall process or assist organizations.

In addition to the meetings, during spring and summer of 2007 the Energy Commission and Governor's Office of Planning and Research conducted a survey of selected cities and counties in California to better understand 1) how local governments approach planning and permitting for energy infrastructure facilities (including petroleum, electrical transmission, and large-scale renewable energy facilities) and 2) how those processes might be better coordinated with State energy policy initiatives. Surveys were distributed to 24 counties and 73 cities. Six counties and 22 cities (29 percent of the total distribution) representing urban and rural local governments located throughout California responded.

In total, the Energy Commission staff outreach in 2006 and 2007 extended to more than 300 representatives. The following list of issues summarizes their comments. Following this list are recommended best permitting practices guidelines for addressing the issues. The recommendations focus on working within the existing regulatory framework and do not suggest changes to agency jurisdictions or responsibilities.

Issues/Challenges

Incomplete Applications

State agency and local government officials complained about the relatively high number of incomplete applications received from project proponents. One agency, the South Coast Air Quality Management District (SCAQMD), certifies professionals for its permitting program and a high percentage of the certified individuals continue to submit incomplete applications. Petroleum industry representatives mentioned that from their perspective incomplete applications are troublesome, as they delay the permitting process. They also stated that at least one reason for filing of incomplete applications is lack of clarity from regulators on permit application information requirements.

Another agency, the Bay Area Air Quality Management District (BAAQMD), does not discourage early, incomplete applications. They will keep such applications and work with the applicants to complete design of a project with the intent of ensuring that the facility will have the necessary equipment and processes to meet the district's air quality requirements. In these cases, an application may remain incomplete for up to a year.

Disagreement or Confusion on Applicability of Laws

Recently, the most prominent example of disagreement or confusion on applicability of laws is differences in local governments' and the State Attorney General's interpretation of the applicability of CEQA and AB 32 with respect to identifying, assessing, and mitigating impacts from GHG emissions in EIRs for local plans and projects. At this time, the Attorney General's office and local governments are settling and trying to avoid lawsuits on this issue. A settlement agreement was reached in September 2007 on the ConocoPhillips EIR for expansion of the refinery at Rodeo. The city of Los Angeles and the Attorney General signed a settlement agreement in December 2007 for certain proposed projects in the Port of Los Angeles, including the Plains All American Pipeline, L.P., Pier 400 Marine Terminal project.

Another example is applicability of CDFG lake and streambed alteration agreements to horizontal directional drilling or boring of pipelines under waterways and related riparian areas. Some project proponents argue that because a waterway environment would not be affected by routine drilling/boring (with adequate setbacks), there would be no impact, and, therefore, an agreement would not be needed. Some CDFG officials reason that drilling and boring, while not intrusive to the waterway environment, may result in fracturing of the substrate and possible leaks or spills of drilling fluids into the waterway from below the lake or streambed. According to CDFG officials, an agreement, if properly crafted, would address the possibility of spills and leaks into a waterway by including a prevention and emergency response plan, and possibly other mitigation to minimize and offset potential harm to the environment. Inclusion of such mitigation would ensure compliance with laws and regulations if a spill or leak were to occur. Currently, CDFG treats the issue on a case-by-case basis.

Lack of Coordination Among Agencies

Project proponents informed Energy Commission staff that redundant, multiple information requests from agencies leads them to think that agencies working on the same project are either not coordinating or the coordination is so minimal that information is not being shared. Conversely, agency staff points out that often there are project details important to some agencies and less important to others due to their different mandates. At times, a request that seems redundant to a permit applicant is actually asking for project details that are not available from an earlier response to another agency's request.

Lack of coordination can cause unnecessary delays in the permitting process, especially if the applicant and/or the agencies are unaware of the differing information requirements, permitting timelines and schedules. This can be a major source of delay, especially if an agency's permit is dependent on another agency issuing their permit or approval. Some projects have been delayed a year or more when agencies request environmental information, such as biological surveys, that can be obtained only during certain times of the year.

To ensure a project located in the Coastal Zone or within federal jurisdiction adjacent to the Coastal Zone (such as offshore the 3 nautical mile Coastal Zone boundary) proceeds through the permitting process promptly, regulatory agency and project proponent knowledge of the differences and similarities between the CEQA/NEPA and California Coastal Act (Coastal Act) processes is critical. The CCC will often rely on an EIR or EIS to provide a general overview of the project, environmental impacts, and mitigation measures, as there are major differences between how impacts are assessed for projects located in the Coastal Zone.

Under CEQA, impacts are defined as being significant or less than significant. Section 15358 of the CEQA Guidelines generally defines a significant effect on the environment as a substantial or potentially substantial adverse change in the physical environment. The enforceable policies of the Coastal Act, while not inconsistent with this definition, often add complexity. For example, Section 30230 of the Coastal Act (found at www.coastal.ca.gov/coastact.pdf) states, in part, " Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes."

If lead agencies and project proponents are unaware of the coastal issues while developing the project description or assessing impacts, CCC staff comments on an EIR or their letters in response to an application may come as a surprise, as some Coastal Act issues will likely not be addressed in the draft CEQA/NEPA documents. Also, all Coastal Act issues may not be addressed in the CCC comments for CEQA/NEPA documents, as Commission staff may not have the time to thoroughly review an environmental document or will often comment before a coastal development permit application is received. As a result, expensive changes to a project and delays in the permitting process may be especially troublesome to a company and lead agencies, since often the CCC and the other coastal management agency in California, BCDC, insist on conducting their permitting processes after the other agencies have rendered their decisions.

Inexperienced Staff

Preparing and reviewing permit applications, related environmental reports, and project details requires unique and specialized expertise and knowledge by engineers, scientists, land use planners, environmental, maritime affairs and public policy specialists, and air and water quality professionals. Often smaller companies, local governments, and many agencies do not employ all of the types of professionals needed to plan a project or conduct an appropriate review of the application materials.

Some agency staffs will not act on an application because they are so unfamiliar with a proposed project's technology that they do not know how to address the issues presented by the project, according stakeholders and agency representatives. A few local governments have asked the Energy Commission for financial assistance to hire the appropriate staff or for technical staff or assistance to enable them to review projects in a knowledgeable manner.

In other cases, permit applicants initiate project planning or permitting processes without the appropriate staff or consultants. Poorly designed projects, incomplete applications (as explained above), missed regulatory deadlines, and even adverse agency decisions can be the end result.

Agency Consultation/Approval Delays

While untrained/inexperienced staff may be one reason for regulatory delays, Energy Commission staff heard there are other reasons, such as lack of staff. There have been cases where a lead CEQA or NEPA agency has almost begged for an endangered species consultation from the respective fish and wildlife agency to fully address biological resource issues. Sometimes the consultation is provided; other times, it is not.

The consequences of approving an EIR, for example, without the consultation can later lead to protracted negotiations between the permit applicant and CDFG on lake and streambed alteration agreements and incidental take permits. There have been situations where CDFG staff has not conducted the consultation called for by CEQA, lacked the administrative record, leverage, or credibility to require environmentally protective measures in the agreements or permits, and, as a consequence, environmental advocates have sued or otherwise blocked projects after the permits have been issued.

Local governments have stated that permits, such as air quality permits or Caltrans encroachment permits, are crucial for issuance of building or other local permits. Project proponents and port and county officials have commented that permits have been slow in coming or the requirements are unclear because communication with agencies is limited to non-decision makers or those who do not articulate the issues critical to the agency.

For example, one company stated that it waited seven months for what agency staff described as a routine permit. They were told by the staff that all of the forms, fees, and mitigation commitments were in order and that there was no explanation why a manager would not sign the permit. The company representative made routine contacts while waiting for the permit and was reassured there was not a problem with the application. The permit was finally issued with no extraordinary conditions and no explanation for the delay.

The Energy Commission, other agencies, and stakeholders have noted what seems to be an extraordinary amount of time taken by the Port of Los Angeles to prepare an EIR for the Plains All American Pipeline, L.P., Pier 400 Marine Terminal project. The port received the initial application in 2003, and public scoping meetings for the EIR began in 2004. The EIR has yet to be issued, but port officials informed Energy Commission staff that the draft EIR is expected in February 2008. The reasons for the delay in preparing the EIR (according to port officials) include issues surrounding air emissions and changing requirements internal to the port. For example, in November 2006 the Ports of Los Angeles and Long Beach approved the San Pedro Bay Ports Clean Air Action Plan (CAAP) that integrates common goals for air quality in the South Coast Air Basin. The plan describes measures that the ports will take toward reducing air emissions related to port operations. Energy Commission staff understands the current Pier 400 project, as proposed, incorporates measures to comply with the CAAP.

Inconsistent Agency Decisions

Local governments and project proponents have received different and occasionally conflicting decisions or guidance from the same agency. In some cases it is difficult to identify the "chain of command" in an agency and, therefore, the people responsible for explaining and addressing confusing or conflicting guidance or draft decisions. In other cases, especially if an agency has regional offices that process the permits, one region's decision on an agreement or permit may be different than another region's decision for a similar type project.

Balancing Community/Environmental Impacts and the State's Continuing Need for Appropriate Supplies of Transportation Fuels

Local communities bear the brunt of impacts from petroleum-related facilities. Community representatives raise concerns with aesthetics (such as noise, lighting, odors) of projects such as refineries and storage facilities. Additional concerns include air quality, safety, security, truck traffic, among others. With pipelines, street closures, trenching, and local traffic disruption are mentioned as impacts on local neighborhoods and communities.

These issues are especially acute where there is a concentration of petroleum refineries/storage facilities in urban areas without adequate buffers or land space to separate the industrial facilities from residential neighborhoods. In many locations facilities were originally constructed far from neighborhoods. In communities such as Wilmington, Richmond, El Segundo, and other locations, housing developments were subsequently built to accommodate the population growth that occurred. In some locations, such as Richmond, residential encroachment may continue to occur.

In addition to the aforementioned impacts, environmental groups often question the efficacy of allowing or supporting expansions of such facilities. They raise these questions in light of alternatives to petroleum-based fuels, GHG emission impacts, state energy policy that encourages development and use of renewable and alternative fuels, and other statewide policy and political issues.

Acknowledging the need to balance local and statewide interests the Energy Commission's *2007 IEPR* concludes the following regarding transportation fuel supplies:

> "Over the next several decades California must pursue multiple complementary strategies that increase fuel efficiency, expand non-traditional fuel use, and ultimately realign consumer preferences to reduce demand for all transportation fuels. In the near term, California must expand its marine terminal capacity, marine storage and the pipelines connecting these facilities with the refineries and other distribution pipelines."

It is in the best interests of California for agencies and local governments to be proactive in identifying and considering state and local concerns when assessing a project's impacts and rendering decisions.

Community and Environmental Concerns Draw Out CEQA Project Review Process

The CEQA-required environmental review process:

- Disclose significant environmental impacts of proposed activities.
- Identifies ways to avoid or reduce environmental damage.
- Prevents environmental damage by requiring implementation of feasible alternatives or mitigation measures.
- Discloses reasons for agency approval of projects with significant environmental effects.
- Fosters interagency coordination in review of projects.
- Enhances public participation in the planning process.

In doing so, CEQA requires agencies responsible for certifying the documents to host public hearings and address comments on the EIRs from the public and agencies. After the document is certified, it is up to agencies to decide if the project will be constructed and operated consistent with their mandates and should or should not be approved. The EIR and permitting processes can be extraordinarily long, especially if community and environmental issues are not addressed early in the project design or review stages.

Some agencies and project proponents stated that certain EIRs are less of a decision-making document and used more as a tool by interest groups to leverage certain economic concessions. Some permit applicants have been told by local government leaders to "cut a deal" with said interest group or groups to facilitate completion of the CEQA process. When that occurs, objections to certain unrelated environmental issues are reversed, opposition disappears, and the governmental entity makes its decision on a project without threat of lawsuits or other legal actions by private groups.

Lack of Information on Statewide Importance of Projects

Several agencies and local governments told Energy Commission staff they would like information on how particular projects help to address expected transportation fuel shortages, meet state mandates, and address or support overall state energy policy. They would like this information to become better informed on statewide energy policies and issues, how those policies/issues could affect their communities and decision-making on local matters, and to balance community opposition to a project that appears to be well-designed and mitigated.

Energy Commission staff has begun responding to these requests. Comment letters on EIRs for refinery expansions, attendance at related public meetings, participation in training sessions for agency staff, and assistance with information transfer from one agency to another are continuing. Staff acknowledges that more can be done to assist cities, counties, state agencies, and others who want the help.

Recommended Best Permitting Practices Guidelines for Liquid Transportation Fuels

Energy Commission staff found through its investigations that many issues are raised on a project or permit specific basis. The identified problems and challenges can be addressed through proactive planning by project proponents and modifying or improving coordination of individual agency processes. Energy Commission staff has found that appropriate levels of information transfer and coordination between all the parties will likely make a regulatory process more efficient. Much of that efficiency would be a result of anticipating issues early in a regulatory process and addressing the issues at appropriate times. Staff continues to find that the guidance in the *2005 EIPR* is appropriate: To focus on developing permitting guidelines to streamline and coordinate petroleum infrastructure permitting processes, with no reduction in environmental standards.

The following recommended best permitting practices guidelines are offered to agencies, project proponents and stakeholders. These guidelines are recommended in the spirit of informing agencies and stakeholders of the lessons Energy Commission staff has learned over the past several years and suggesting tools that may make better use of resources, staff, and consultants. The recommendations do not suggest changes to laws, regulations, or agency jurisdictions or responsibilities.

Make Use of Pre-application Meetings

Recommendation to Regulators and Applicants

Energy Commission staff recommend applicants request and agencies offer and pursue at least one pre-application meeting before submitting a permit application for a project. Staff suggests that project applicants consider scheduling these meetings a minimum of one year and three months before the start of anticipated construction. Depending on the project's complexity and expected level of public controversy, project proponents have initiated such meetings as much as two to three years before the start of environmental review processes to allow for changes in

project design. Meetings are most productive if the scope of the project is clearly defined by the applicant.

Background

The project applicant initiates the pre-application meetings. Under the PSA an applicant can request such a meeting and, if requested, the meeting must be granted by the lead agency. Although the meetings are scheduled with the lead agency (ies) it may be important to include or schedule separate meetings with key trustee, responsible, cooperating, and other interested agencies.

When scheduling a meeting, it is good to know whom best to approach in the agency, so that the most appropriate people (representing the project proponent and the agency) attend. For the applicant, these people can include the project manager, key environmental, engineering, legal, government relations, and public affairs and/or government personnel or consultants. For agencies, the representatives can include regulatory division managers, the likely lead analyst or team who will coordinate the agency's review and prepare the decision-making documents, and key scientists and engineers. If an agency has regional offices, the agency and the applicant should clearly understand the respective roles of headquarters and the regional office during the application review and decision-making process.

About 70 percent of the local governments surveyed stated they incorporate pre-application meetings into their regulatory processes. These meetings (most often between project proponents and agency staff), if well-planned and attended by the right people, will minimize the occurrence of incomplete applications (or at least shorten the length of time an application remains incomplete) and surprises later in the regulatory process. The meetings are most productive if sufficient project detail is provided by applicants so that agencies can provide meaningful responses and guidance. The usefulness of a pre-application meeting is directly dependent on how well the project scope is defined by the project applicant. The meetings can also address questions about applicability of a law or regulations, the decision-making "history" of similar projects or important precedents, and the types of issues likely to be raised by agencies, ports, local/tribal governments, and often potentially interested stakeholders. Project proponents and agencies can also discuss the appropriate sequencing of permit applications and decision-making processes. Depending on the complexity of a project, more than one meeting may be prudent with one or more agencies.

With meetings scheduled early in project design processes, discussions can lead to project changes before expensive design investments are made, according to several representatives. Some changes have included moving project locations or have helped in identifying preferred locations of projects when several options appear to be feasible.

If a project is located in the coastal zone, meeting with either CCC or BCDC staff will likely identify issues that will not be raised by a local government or another state agency for the reasons stated earlier in this chapter (page 27).

Identify the Key Responsible, Trustee, and Cooperating Agencies

Recommendation to Regulators and Applicants

It is critical to identify the responsible, trustee, and cooperating agencies that will likely review and issue authorizations for a project. The identification can be done through pre-application meetings and using staff and consultant knowledge/experience early in the project design process.

Background

Knowing whether a project has the potential to cross a port's, tribe's, CSLC's, CDPR's, CDFG's, the University of California and/or a federal agency's jurisdiction is important. Many of these jurisdictions require land use leases, encroachment permits, agreements, consultations, and other authorizations. In addition, a project's EIR and/or EIS may not address critical issues without the review and/or comments by these entities.

In some cases, it would be prudent for a project proponent to be proactive in contacting the appropriate agencies. As discussed earlier, due to lack of staff and resources, some entities do not actively participate in the EIR review or lead agency process and instead wait to raise their issues when their authorization is needed to place a facility or conduct an activity on their land or within their jurisdiction. If an agency is unresponsive to a request, some applicants have asked other regulatory representatives to contact the agency. Sometimes, inviting an unresponsive agency to a project team meeting is the appropriate approach for getting necessary participation by the regulator.

Provide Timely CEQA/NEPA Document Consultations and Comments

Recommendation to Trustee, Responsible and Coordinating Agencies

Timely and complete environmental document consultations and comments 1) will facilitate lead agency decision-making on the documents, 2) notify project proponents of issues that will likely be raised by fish and wildlife and coastal management agencies during their permitting processes, and 3) may expedite issuance of permits.

Background

Early and consistent trustee, responsible, and coordinating agency involvement in the environmental review and permitting process is critical for informing lead agencies, project proponents, and the public on the issues (including mitigation) important to the commenting agencies. Lead agencies are required to notify trustee agencies of the availability of CEQA documents for projects or activities within the trustee agency jurisdictions.

In the case of CDFG, providing comments or an endangered species consultation allows staff biologists to review the adequacy of the environmental document's analysis of all potentially significant impacts to fish and wildlife resources and recommend necessary and appropriate mitigation measures. Providing the consultation or comments 1) gets CDFG's issues and concerns on the record, 2) provides opportunities for suggesting project modifications and informing others on potential permitting requirements, 3) increases CDFG's leverage and/or credibility if streambed alteration agreements or California Endangered Species Act (CESA)

incidental take permits (ITPs) are required later, and 4) affords a broader scope or context than the narrower regulatory role for addressing impacts on fish and wildlife, in general. Streambed agreements are limited to potential impacts on surface water bodies, and ITPs are limited to state listed threatened and endangered species.

Comments from the BCDC and CCC notify lead agencies and project proponents of coastal management issues that may not be fully addressed in the environmental documents but will likely be dealt with during the coastal permitting processes. Comments during the public scoping period prior to environmental document preparation and on the draft documents 1) give permitees a "heads up" on issues unique to the coastal management agencies, 2) allow time for gathering the extra information, and 3) better ensure complete coastal development permit applications and more timely consideration of the proposed projects.

Agency Partnering

Recommendation to Regulators

Consider partnering between the lead and a responsible agency during preparation of environmental documents and the project permitting process, especially when one or more critical issues focus on a single environmental topic, such as air quality. Partnering agreements or memorandums of understanding (MOUs) are used to formalize the relationship. These documents specify the purpose of the agreements, legal and regulatory roles of the partnering agencies, coordination of project review schedules, and other arrangements.

Background

Contra Costa County regularly partners with the BAAQMD for environmental review and decision-making on refinery and storage projects. Often the county is the lead agency and BAAQMD is one of several responsible agencies. The county and BAAQMD have found that partnering on preparation of the EIR identifies the issues and information requirements early in the environmental review process. Later in the process, they work in concert to propose mitigation or project design changes to address the issues. The partnering keeps the two regulators on the same schedule and on track as they proceed through development of the EIR and their respective regulatory processes. Comments from county and BAAQMD staff indicate that they both benefit from partnering and use of the tool generally moves the EIR preparation and review process to a speedier conclusion.

Coordinate Agency Reviews

Recommendation to Regulators

Staff recommends lead, responsible, trustee, cooperating, and interested agencies coordinate their review of projects and/or environmental documents to avoid duplication of effort and expedite decisions on the documents and related permits.

Background

The city of Benicia and others have identified this tool as particularly effective. City staff and consultants led coordination of several local lead agencies and the ARB to identify and to address common issues and solutions with The Clean Fuels Project for several San Francisco

Bay Area refineries. The coordination involved regular meetings of the ad hoc group with the purpose of establishing and maintaining a project schedule and jointly conducting the necessary environmental analysis for the project EIRs.

Coordinated agency reviews are encouraged by the CEQA guidelines. They have the added advantage of identifying and addressing agency stakeholder concerns in the draft document, rather than waiting for those stakeholders to raise the issues through the public hearing process and then addressing the issues, later, in the final document.

An example of a more formalized and long-term agency coordination program is the San Francisco Bay Long Term Management Strategy for Dredging (LTMS). The LTMS is a cooperative effort of the U. S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACOE), San Francisco Regional Water Quality Control Board, BCDC and stakeholders. The LTMS agencies completed a Final Policy EIS/Programmatic EIR and developed a management plan. The agencies also established a Dredged Material Management Office, which serves as a "one-stop shop" for Bay Area dredging permit applications and has received national recognition for streamlining the permitting process for dredging projects. More information on the LTMS can be found at www.epa.gov/region09/water/dredging.

Another form of coordination includes use of the Internet. The federal Department of Transportation Pipeline and Hazardous Materials Safety Administration (Office of Pipeline Safety) is testing use of a newly created Web-based pipeline repair streamlining process that allows, at the discretion of an applicant, agencies to coordinate their reviews and decision-making. The Pipeline Repair Environmental Guidance (PREG) System is designed to support and integrate efforts of agencies and pipeline operators to promote communication, consultation, and cooperation when approvals for non-emergency pipeline repairs are needed. Agencies post best management practices to address specific environmental circumstances and inform project operators of their requirements. The website supports a discussion board and an activity management system. The management system allows the applicant and agencies to coordinate and share information as a project proposal proceeds through the regulatory process. The PREG supplements and is used in conjunction with existing permitting processes.

Using an Internet accessible system to share information between project proponents and agencies can serve the purpose of an electronic clearinghouse and supplement or, in some cases, replace face-to-face pre-application or coordination meetings.

In some cases where coordination has been attempted, lack of staff resources and other pressing priorities prevent an agency from participating. Based on review of examples of coordinated efforts, Energy Commission staff has found that successful efforts have the following attributes in common:

- Goals are clearly articulated and achievable and address the mutual concerns of the agencies and stakeholders involved.
- The efforts are collaborative and have respected and trusted facilitators or leaders that guide the participants through agendas and the process.

- The coordinated process has a definite beginning and end and is subject to realistic schedules and deadlines.
- The decision-making process for the effort is identified and followed throughout the schedule.
- The agencies and stakeholders are specifically identified and have a clear stake or role in the process.
- The agencies and stakeholders have the financial and policy support of their respective constituents, parent agencies, and/or decision-making bodies.
- The results of the effort will serve the interests of the agencies and stakeholders. For example, permitting will be easier and more streamlined and save or make more efficient use of resources.

If it is determined that key agencies can and will participate at the appropriate levels of effort, the time and resources involved in establishing and maintaining the coordination may be worth the effort. Depending on the agencies' abilities to fully participate in a coordinated process, work well together, and keep to agreed-upon schedules, environmental review and permitting processes can be expedited and streamlined.

Establish Joint-Agency Working Groups

Recommendation to Regulators

Establishing an interagency working group can effectively educate agency staff on statewide policy issues surrounding proposed major and complex petroleum or transportation fuel projects that involve multiple regulatory jurisdictions. Staff recommends the main purpose of such a group be to inform agency staff on the policy implications of particular transportation fuel projects or activities. Successful groups have been facilitated by an agency or entity that does not have direct regulatory authority over the projects. The group could 1) facilitate communication among the regulatory staffs, 2) serve as an information transfer forum to discuss the technology and major statewide environmental and energy policy issues raised by a project, and 3) prepare agency staff for public discourse on projects.

Background

Joint-agency working groups differ from coordinated agency review forums in that often the groups are set up when a project could potentially affect or inform statewide policy making. Information developed for or outcomes of discussion can help state officials determine the efficacy of policies or actions that would allow expansions and other long-term improvements to petroleum and other transportation fuel facilities.

Although not focused on petroleum infrastructure, the LNG (liquefied natural gas) Interagency working group facilitated by Energy Commission staff is an example of such a group. The Working Group was formed in response to federal legislation that gives the Governor of California the opportunity to recommend approval or denial of LNG projects proposed offshore California in federal waters. The group is composed of the various federal, state, and local

agencies that have regulatory jurisdiction over such projects. According to group members, the meetings provide useful information to regulatory agency staff for its review and assessment of project proposals.

Establish, Coordinate and Adhere to Project Timelines/Milestones

Recommendation to Regulators and Applicants

Develop a master schedule for a project that addresses the environmental analysis and permitting phases and include dates for major milestones. Through this coordinated scheduling, regulatory agencies involved in authorizing a particular project can identify the sequencing of permits, better assure adherence to PSA time limits, and provide advice to applicants on scheduling submittal of land and water resource surveys and permit applications.

Background

Coordinated scheduling of regulatory processes can lead to consolidation of the environmental review (CEQA and/or NEPA) and permitting processes of lead and responsible agencies. Of the local governments surveyed, 75 percent said they followed this practice. CSLC, a trustee and often a lead agency, has combined its hearings to consider certifying an EIR and approving a related land lease on the same day. This practice can shorten a regulatory process by 30 to 90 days, depending on the frequency of regularly scheduled agency meetings.

Close coordination by agencies and cooperation with project applicants, if done early and promptly, can lead to scheduling different agency decisions in quick succession, saving additional time.

Also, if an agency will issue several decisions on the same project, careful and coordinated planning by the applicant and the agency staff can result in one public hearing for two or more actions. For example, the CCC may be responsible for issuing a coastal development permit, making a decision on an appeal of a city, county, or port permit action, and certifying or determining whether a project is consistent with the federally approved coastal management program. It is not uncommon for the applicant to coordinate with the local government to schedule submittal of its application and certification/determination to the CCC so that the entire package is heard by the coastal management agency at one time. Otherwise, CCC approvals can stretch over a course of months. This type of planning requires strategic decision-making on the part of the project applicant and the agencies. However, if done correctly, it can end up saving agency staff resources and time and shorten the permitting process.

Consider Expedited Agency Reviews

Recommendation to Regulators

Agencies should consider offering expedited reviews of permit applications to project proponents, when appropriate and feasible. Factors to consider may be the potential impacts on the state's supply of transportation fuels, as well as the scope and complexity of issues raised by a project.

Background

Agencies such as CDFG and SCAQMD offer or have offered this option to applicants. At SCAQMD, permit applicants pay an additional fee (currently 50 percent of the base permit processing fee) to have a staff person or consultant conduct the agency-required review during overtime hours. Alternatively, some agencies have hired temporary staff or a consultant (at the applicant's expense) to manage the permitting process and minimize delays due to competing priorities of regular agency staff.

Energy Commission staff found from project proponents that results of use of this type of tool are mixed. Expedited processing by individual agency Web-based permit tracking systems for use by applicants and internally by agency staff can occur if the systems are maintained and the system is used to move the permit through an agency's process expeditiously. Commitment to timely action on each of the steps is needed to ensure an efficient and speedier process.

Establish or Maintain Buffers Around Facilities

Recommendation to Local Governments

It may be prudent in some communities for local governments to consider limiting expansion of residential or other incompatible uses around existing, functioning, and planned facilities. Limiting such expansions may require strategic assessment of land use patterns and the need to balance approvals for transportation fuel facilities and residential, open space, recreational, and commercial development.

Background

Use of buffers reduces the likelihood that facility operations will have adverse effects on neighboring communities. The Shell Martinez refinery complex and Valero refinery across the Carquinez Strait in Benicia benefit from 1) earlier establishment of the buffers when the facilities were first built and 2) maintenance of buffers in later years. In the case of the Valero refinery, the company owns acres of surrounding open space lands.

The communities of Richmond, Wilmington, San Pedro, and Carson and the nearby transportation fuel facility operators are not as fortunate since the facilities were built closer to urban areas and those areas grew around the facilities in later years. In Southern California the Port of Los Angeles is in the process of "developing" open space buffers by not renewing expiring leases for several transportation fuel facilities along the waterfront to shield the community more from port industrial facilities and activities. Some facilities may relocate to other portions of the port, and others will cease operating. These changes, to lessen land use conflicts, may reduce the overall capacity of California's transportation fuels infrastructure.

Many factors contribute to a company's decision to relocate or cease operations in a certain area, such as the Ports of Los Angeles or Long Beach. One factor will be the costs of building and operating a new facility. An up-to-date facility would incorporate modern features and standards to increase safety, reduce environmental impacts, and possibly address land use conflicts. Those costs will be compared to the expected income and length of the lease offered by the port. If the lease terms allow adequate time for making the improvements cost-effective,

the investment may be worth the cost. If the term of the lease is too short, a company may seek an alternative location.

Facility Master Planning

Recommendation to Regulators and Applicants

Regulators and project proponents should consider approval and use of a master plan for a number of facility improvements rather than seeking permits for each improvement.

Background

Use of this tool can avoid a "piecemealing" approach to projects if a series or group of related facility improvements is anticipated over a period. The master planning process must provide tangible benefits to the applicant, such as avoiding repetitive permit processes and providing some certainty over allowable development at their facilities over time, to justify the expenditure of the required time and resources. The city of Benicia used a 13-month master plan approval process in 1999-2000 and issued a single use permit for anticipated facility improvements at the Valero Refinery. Valero has applied to amend certain elements of the project and extend the permit expiration date from 2009 to 2014. A significant portion of surveyed local governments (32 percent) reported use of facility master plans as a permitting practice.

A type of facility master planning is encouraged by CSLC for marine terminals. The terminals are undergoing MOTEMS audits to assess the safety and security of the facilities, identify improvements, and bring the facility into compliance with safety and security standards. After the audits, CSLC works with the facility operators to schedule the improvements around normal facility activities to minimize facility shutdowns and lessen the possibility that a facility will be decommissioned, due to the cost of carrying out the identified and necessary improvements.

Ensure Adequately Trained Staff

Recommendations to Regulators, Energy Commission and Applicants

- Regulatory agencies and project proponents should consider training staff if knowledge and experience levels warrant the additional education and information exchange.
- Energy Commission staff should consider facilitating workshops and training forums for agency and stakeholder participants, as appropriate.

Background

Structured training and the resultant information exchange would likely be valuable to the Commission and other agencies and for informing interested parties on the role of a robust and sound transportation energy infrastructure in the health of the California economy. Several local governments requested such training in responses to the aforementioned survey.

Several local governments and agencies stated in 2006 and 2007 that part of the reason for delaying review of projects by their respective organizations was staff inexperience and lack of knowledge of transportation fuel facility technology and regulatory issues. These challenges are

especially acute with local governments that do not routinely process permits for such facilities, agencies with constrained budgets and competing priorities, or entities that are experiencing a high turnover of staff.

Agency coordination or working groups can lead to cost-effective trainings by teaming up to take advantage of agency staff expertise. By pooling resources, often agencies can sponsor and provide curriculum, trainers, and appropriate venues for the trainees. In other cases staff members have attended conferences or trainings sponsored by private entities. With the right trainers and planners, the trainings can be focused to the intended audience, take advantage of the unique regulatory knowledge of experienced government regulators and private experts, and provide the trainees with valuable lessons that are directly relevant to their day-to-day responsibilities.

Energy Commission staff involvement as trainers can be beneficial. As pilot efforts, staff participated in two such training sessions: 1) a State Fire Marshal-sponsored public workshop on petroleum pipeline safety for agency and industry participants and 2) an invitation-only training session with CDFG for department biologists in regional offices that often review petroleum pipeline projects. The Commission staff role was to inform participants on the statewide importance of having a robust, environmentally sound, safe, and secure transportation fuel pipeline network in California, the regulatory framework for such projects, and how the regulatory agencies of interest fit into and work within that framework. Most importantly, the Commission staff-led modules included interactive discussion on permitting tools and processes that are particularly effective and others that need improvement. Staff will consider similar roles in the future, in light of its other responsibilities.

Seek Staff with Energy Facility Siting Experience During Hiring Process

Recommendation Regulators and Applicants

Consider requiring energy facility siting expertise as part of the job descriptions for certain positions within an organization.

Background

Contra Costa County, the cities of Bellflower and Stockton (11 percent of surveyed local governments), CCC, CSLC, and the Oil Spill Prevention and Response office of CDFG, as examples, have included these types of requirements in hiring processes for staff that regularly review energy facility permit applications.

For entities that process energy facility project applications very occasionally, requiring this type of expertise may not be prudent. In these cases, contracting with expert consultants, utilizing specialized staff trainings, or requiring coordination with other, more knowledgeable agencies and their staff may be effective options for efficient staff review and preparation of decision-making documents. Often the costs of hiring consultants are included in project environmental review budgets that are borne by the permit applicants.

In some cases, agencies share staff. Currently, Caltrans funds a CDFG/Caltrans liaison whose sole responsibility is to review Caltrans projects in the Fresno region. The Energy Commission

has been asked to provide grants or personnel to other agencies or local governments to assist in providing knowledgeable individuals for review of energy-related projects. The Commission may consider these types of requests, in the context of its overall responsibilities, as noted in see Chapter 5: Conclusions and Next Steps.

Clearly Identify "Chain of Command"

Recommendations to Regulators and Applications

- Identify responsible staff representatives, project managers and primary points of contact within agencies and project applicant teams before or at pre-application meetings, or as soon thereafter as possible to facilitate timely information exchange.
- Identify roles/responsibilities of staff and consultants and keep them up-to-date. Specify decision-making authorities of primary points of contact and know whom else to consult when issues or questions arise that specified individuals cannot address. Provide responses/information in a prudent, accurate, and timely manner.

Background

Several regulatory representatives and project proponents expressed frustration with a few agencies that do not clearly identify and make available the staff with authority to make decisions or provide appropriate information on the agency's regulatory requirements or policies. Such instances have led to inaccurate and inappropriate advice by lower level staff and delays in receiving critical permits.

Create and Use Clear Criteria for Regulatory Decisions

Recommendation to Regulators

Consider adopting criteria to guide decision-making on projects throughout an agency, address agency mandates and policies, and ensure consistent treatment of project proposals.

Background

Some project proponents stated that after an agency's decision they did not understand the rationale for that decision. Agency representatives also stated that due to a loss of "institutional memory" caused by staff turnover or limited communication or coordination within an agency critical background on a decision is unavailable. The tool can also help to ensure that agency actions follow legal requirements and would be less likely to lead to adverse lawsuits and other legal actions against the agency.

Publish Model Agency Decisions or Guidance Documents

Recommendation to Regulators

Agencies should consider posting on the Internet or otherwise distribute the decisions to known interested parties (including agency staff) that would serve as models for future actions on similar projects.

Background

The guidance documents would enhance interested parties' understanding of agency actions. Having this information at hand, rather than finding out about it through chance, can assist with project design and future environmental assessments.

Examples of properly crafted Lake and Streambed Alternation Agreements, CCC/BCDC decisions, air and water quality permits, Caltrans encroachment permits, and actions by other agencies would guide agencies, as well as project proponents and other interested parties.

Implement Governmental Relations and Public Outreach Efforts

Recommendation to Regulators and Applicants

Regulatory agencies and project proponents have found that robust governmental relations and public outreach programs for an organization, as a whole, and/or designed for a particular project help to identify and address community, environmental, and agency concerns.

Background

The Port of Los Angeles, city of Benicia, and the SCAQMD have established groups and outreach efforts designed to identify and address community concerns. The port established the Port Community Advisory Committee to assess impacts, review environmental documents, and provide a public forum to make recommendations to the Port Harbor Commissioners. For example, the Advisory Committee approved Wilmington's waterfront plan, which was adopted by the Harbor Commissioners Board.

SCAQMD relies on the Ethnic Community Advisory Group to identify opportunities and evaluate strategies for working with and educating ethnic businesses and communities. Under the auspices of the group, several efforts are underway to improve air quality for residents.

The city of Benicia has a MOU with the Valero refinery located within its boundaries. The MOU calls for coordination with a citizen advisory committee and commits the refinery to a number of "Good Neighbor" actions related to refinery safety, air quality monitoring, water supply and quality, and cooperation with city government.

Several project proponents reported having established strategic programs that establish and maintain communications with regulatory agency staff and reach out to the public to gauge reaction to projects or activities, address identified concerns in early project design stages, and keep interested parties informed on the progress of a project.

Continue and Expand the Energy Commission's Participation in Project Regulatory Processes

Recommendations to the Energy Commission

Consider expansion of the Energy Commission's efforts to inform regulatory agencies of transportation fuel demand, supply and infrastructure forecasts, and related statewide energy policies including sound environmental and security measures that meet regulatory agency mandates. Consider having Energy Commission staff available to work with ports, other local

governments, local permit appeal entities, and state and federal regulators to address the identified challenges and issues in a balanced manner.

Background

Often public and agency comments on projects focus solely on adverse environmental impacts and do not consider the implications of disallowing a project on California's economy or transportation fuel network. Several entities, including the State Fire l (Office of Pipeline Safety), CDFG, BAAQMD, Contra Costa County, cities of Benicia, Palm Springs, and Stockton have asked that the Energy Commission either provide them with information or conduct public outreach in their communities focusing on the statewide needs for transportation fuel infrastructure.

Energy Commission participation in an interagency working group on transportation fuel infrastructure (recommended above) and/or port, other local government, state and federal regulatory processes would inform the concerned entities of the importance of the transportation fuel infrastructure as they try to balance local and statewide interests and implementation of seemingly conflicting policies.

Chapter 5: Conclusions and Next Steps

Petroleum and other transportation fuel facility maintenance, upgrade, and expansion projects will continue to be required and proposed in California. New requirements to deal with climate change and other issues, rather than eliminating the need for processing, storage, and import facilities, are more likely to result in operators proposing improvements to (not decommissioning of) most facilities.

Facility improvements will prevent adverse impacts on the state's economy and respond to changes in transportation fuel technologies, environmental standards, continuing public demand for transportation fuels and population growth. The regulatory process for these types of projects involves many governmental entities and incorporates opportunities for public participation in project planning. Thus, the common themes in the recommended best permitting practices guidelines in Chapter 4 are:

- Project proponents and regulatory agencies share responsibility for carrying out best permitting practices for petroleum and other transportation fuel facility regulatory processes.
- Opportunities for streamlining are enhanced when project proponents take a pro-active role in ensuring projects meet California's stringent permitting requirements.
- Efficiency in and streamlining of such processes requires agency cooperation and coordination.

It is no surprise that many tools described in the recommended guidelines are encouraged by CEQA and the CEQA guidelines. In-depth knowledge of the law and its implementation are strongly advised before embarking on a project and the related regulatory review. Choosing the most appropriate tools and approaches for such an endeavor takes careful planning and will depend on the specifics of proposed projects and the agencies involved in authorizing the projects.

Proactive planning and participation in environmental review and regulatory processes is essential for anticipating issues and addressing them in an appropriate manner. In general, addressing the issues closer to the beginning of project design and permitting will lead to a more streamlined and efficient process.

The guidelines recommend that the Energy Commission be an active participant in petroleum and other transportation fuel infrastructure regulatory processes. The Energy Commission is considering the following proposed next steps for carrying out the recommendations:

- Establish an Energy Commission-led interagency working group for addressing major statewide petroleum and other transportation fuel infrastructure issues. The Energy Commission may serve as an effective facilitator and/or "clearinghouse" for information transfer among affected agencies as it does not have a regulatory role. In addition, the Commission's jurisdiction is statewide and personnel have expertise in petroleum and

other transportation fuel infrastructure technology, environmental, land use and economic issues.

- Assess the Energy Commission's resources for an expanded and continuous informational transfer role in petroleum and other transportation fuel project environmental and regulatory processes. The purpose would be to ensure that a particular facility's role in meeting the state's transportation fuel needs and overall energy policy is appropriately described in environmental documents and considered by decision-makers. Information on the importance of secure, environmentally safe, and technologically robust petroleum and other transportation fuel facilities and infrastructure would be provided. These potential Energy Commission staff activities could occur during review of environmental documents, local government hearings, and appeals of local government decisions to state agencies and other higher authorities.
- Consider local agency requests for financial assistance or training to enhance their regulatory staff capabilities. Local governments suggested use of grants or Energy Commission staff to assist their regulatory efforts.
- Assess the Energy Commission's role in promoting land use policies that address balancing approvals for transportation fuel facilities and potentially incompatible development and land uses. This assessment should be conducted along with the Energy Commission's efforts in studying opportunities and barriers to integrated energy and land use planning.

References, Contacts and Major Meeting Venues

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Key Report Contacts

Bay Area Air Quality Management District: Brian Bateman and Barry Young

Bay Conservation Development Commission: Linda Scourtis

Calfire: Bob Gorham, State Fire Marshal, Office of Pipeline Safety

California Coastal Commission: Al Padia, South Coast District Office

California Department of Fish and Game: Dave Blurton, Office of Oil Spill Prevention and Response; Marilyn Fluharty, South Coast Region; Kathleen Jennings, Office of Oil Spill Prevention and Response; and, Jennifer DeLeon, Headquarters

California Department of Housing and Community Development: Cathy Creswell and Linda Wheaton

California State Lands Commission: Gary Gregory, Martin Eskijian, and Kevin Mercier

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Key Report Contacts (Continued)

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City of Brea: David Crabtree

City of Cypress: Kori Nevarez

City of El Cajon: James Griffin

City of Lawndale: Otis Ginoza

City of Lynwood: Grant Taylor

City of Ontario: Jerry Blum

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City of Redding: James Felder

City of Sacramento: T. Pace

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City of South Gate: Steve Lefever

City of Stockton: Jenny Liaw

City of Taft: Mike Lee

City of Vallejo: Brian Dolan

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Key Report Contacts (Continued)

Port of Long Beach: Karl Adamowicz, Larry Cottrill, Matt Golden, Al Moro, and Douglas Thiessen

Port of Los Angeles: Mike Christensen, Tony Gioiello, Ping Lit, and Dave Mathewson

Redwood City: T. Passanisi

San Diego County: Dag Bunnemeyer and Patricia Laybourne, AICP

Santa Clara County: Michael Lopez

South Coast Air Quality Management District: Mohan Balagopaian, Jay Chen, and Mohsen Nazemi

Town of Mammoth Lakes: William T. Taylor

Tuolomne County: Mike Laird

U.S. Department of Transportation: Michael J. Khayata, Pipeline and Hazardous Materials Safety Administration

Valero Wilmington Refinery: Stephen Faichney

Ventura County: Mike Laird

Major Meeting Venues

Calfire, Office of State Fire Marshal, Pipeline Safety Division. "2007 Spring Pipeline Safety Workshop," Bakersfield, California, May 31, 2007.

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Acronyms and Definition of Terms

APCD	Air Pollution Control District
AQMD	Air Quality Management District
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BCDC	Bay Conservation Development Commission
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CA	California
CAAP	San Pedro Bay Ports Clean Air Action Plan
Cal EPA	California Environmental Protection Agency
CalOSHA	California Occupational Safety and Health Administration
CalTRANS	California Department of Transportation
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CDPR	California Department of Parks and Recreation
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
Coastal Act	California Coastal Act

Coastal Zone	California Coastal Zone
CPUC	California Public Utilities Commission
CSLC	California State Lands Commission
DHS	Department of Health Services
DPC	Delta Protection Commission
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
Energy Commission	California Energy Commission
FAA	Federal Aviation Administration
GHG	Greenhouse gases
IEPR	Integrated Energy Policy Report
ITP	Incidental Take Permit
LNG	Liquefied Natural Gas
LTMS	Long Term Management Strategy
MOTEMS	Marine Oil Terminal Engineering and Maintenance Standards
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NOAA	National Oceanographic Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
NPS	National Park Service
OSHA	Occupational Safety and Health Administration

PREG	Pipeline Repair Environmental Guidance
PSA	Permit Streamlining Act
RCD	Resource Conservation District
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SHPO	State Historic Preservation Office
USACOE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United Stated States Forest Service
USFWS	United States Fish and Wildlife Service

CALIFORNIA ENERGY COMMISSION

2009 INTEGRATED ENERGY POLICY REPORT

CEC-100-2009-003-CMF

ARNOLD SCHWARZENEGGER
GOVERNOR

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PREFACE

The 2009 Integrated Energy Policy Report was prepared in response to Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002), which requires that the California Energy Commission prepare a biennial integrated energy policy report that contains an integrated assessment of major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code § 25301[a]). This report fulfills the requirement of SB 1389.

The report was developed under the direction of the Energy Commission's 2009 Integrated Energy Policy Report Committee. As in previous Integrated Energy Policy Report proceedings, the Committee recognizes that close coordination with federal, state, and local agencies is essential to adequately identify and address critical energy infrastructure needs and related environmental challenges. In addition, input from state and local agencies is critical to develop the information and analyses that these agencies need to carry out their energy-related duties. This *2009 Integrated Energy Policy Report* reflects the input of a wide variety of stakeholders and federal, state, and local agencies that participated in the Integrated Energy Policy Report proceeding. The information gained from workshops and stakeholders along with Energy Commission staff analysis was used to develop the recommendations in this report. The Committee would like to thank participants for their thoughtful contributions of time and expertise to the process.

The *2009 Integrated Energy Policy Report* proposes policy and program direction to address the many challenges facing California's energy future that are discussed throughout the body of the report. Specific recommendations are presented in Chapter 4, but the Energy Commission believes that certain policies and programs have priority and even urgency if California is going to address its diverse set of energy goals. The Executive Summary therefore identifies those actions and policies that the Energy Commission considers to be of highest importance.

Total Electricity System Power

2010 Total System Power in Gigawatt Hours

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	California Power Mix (GWh)	Percent California Power Mix
Coal	3,406	1.7%	783	18,236	22,424	7.7%
Large Hydro	29,861	14.6%	-	1,333	31,194	10.8%
Natural Gas	109,481	53.4%	1,330	10,625	121,436	41.9%
Nuclear	32,214	15.7%	-	8,211	40,426	13.9%
Oil	52	0.0%	-	-	52	0.0%
Other	0	0.0%	-	-	0	0.0%
Renewables	30,005	14.6%	7,586	2,205	39,796	13.7%
Biomass	5,745	2.8%	1,149	-	6,894	2.4%
Geothermal	12,740	6.2%	-	673	13,413	4.6%
Small Hydro	4,441	2.2%	554	-	4,995	1.7%
Solar	908	0.4%	-	51	959	0.3%
Wind	6,172	3.0%	5,883	1,481	13,536	4.7%
Unspecified Sources of Power *	0	0.0%	14,978	19,881	34,859	12.0%
Total	205,018	100.0%	24,677	60,492	290,187	100.0%

Source:

QFER and SB 1305 Reporting Requirements. In-state generation is reported generation from units 1 MW and larger

*Note: Due to legislative changes required by Assembly Bill 162 (2009), the California Air Resources Board is currently undertaking the task of identifying the fuel sources associated with all imported power entering into California.

Previous year's information (2009 Total System Power)

Electricity Consumption
- Electricity Consumption by Entity
- Electricity Consumption by County
- Electricity Consumption by Planning Area

Natural Gas Consumption
- Gas Consumption by Entity
- Gas Consumption by County
- Gas Consumption by Planning Area

Electricity Consumption by County

Select at least one choice per category, then press "Create Report"

County

RIVERSIDE
SACRAMENTO
SAN BENITO
SAN BERNARDINO
SAN DIEGO
[illegible]
CONTRA COSTA

ALL CLEAR

Sector

Non-Residential
Residential
Total

ALL CLEAR

Year

2007
2008
2009
2010

ALL
CLEAR

Create Report

Export to Excel | Export to CSV | New Request

All Usage Expressed in Millions of kWh

County	Sector	2010	Total Usage
RIVERSIDE	Total	13765.315060	13765.315060

Adopted

STATE OF CALIFORNIA

CONSUMER POWER AND CONSERVATION FINANCING AUTHORITY

ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

PUBLIC UTILITIES COMMISSION

ENERGY ACTION PLAN

California is a diverse and vibrant society. The fifth largest economy in the world, California's population is expected to exceed 40 million by 2010. California's economic prosperity and quality of life are increasingly reliant upon dependable, high quality, and reasonably priced energy. Following the biggest electricity and natural gas crisis in its history, the state is well aware of the need for stable energy markets, reliable electricity and natural gas supplies, and adequate transmission systems. Looking forward, it is imperative that California have reasonably priced and environmentally sensitive energy resources to support economic growth and attract the new investment that will provide jobs and prosperity throughout the state.

California's principal energy agencies have joined to create an Energy Action Plan. It identifies specific goals and actions to eliminate energy outages and excessive price spikes in electricity or natural gas. These initiatives will send a signal to the market that California is a good place to do business and that investments in the more efficient use of energy and new electricity and natural gas infrastructure will be rewarded. This approach recognizes that California currently has a hybrid energy market and that state policies can capture the best features of a vigorous, competitive wholesale energy market and renewed, positive regulation. This approach will be ever mindful of the need to keep energy rates affordable, and is sensitive to the implications of energy policy on global climate change and the environment generally.

While this Plan lays out specific actions, it is a living document. It is a blueprint that is subject to change over time. The agencies will use it to give their efforts direction, focus, and precision, but some of the specific actions cited are subject to further proceedings so may need to be fine-tuned or changed to best meet the overall goals.

Energy Action Plan Goal

The goal of the Energy Action Plan is to:

> **Ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies, including prudent reserves, are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers.**

The energy agencies intend to achieve this through six specific means:

- Meet California's energy growth needs while optimizing energy conservation and resource efficiency and reducing per capita electricity demand.
- Ensure reliable, affordable, and high quality power supply for all who need it in all regions of the state by building sufficient new generation.
- Accelerate the state's goal for renewable resource generation to 2010.
- Upgrade and expand the electricity transmission and distribution infrastructure and reduce the time before needed facilities are brought on line.
- Promote customer and utility owned distributed generation.
- Ensure a reliable supply of reasonably priced natural gas.

The Agencies are Accountable for Stewardship of California's Energy Future

The state's principal energy agencies are committed to active and continued cooperation. This is unprecedented. To implement this Energy Action Plan agencies pledge:

- To discuss critical energy issues jointly through open meetings and ongoing informal communication.
- To share information and analyses to minimize duplication, maximize a common understanding and ensure a broad basis for decision-making.
- To bring joint policy recommendations about major energy issues to the Governor and Legislature.

The state needs to guide development of the energy system in the public's best long-term interest, to anticipate potential problems, and to make timely decisions to resolve problems. Specifically, the agencies commit to:

- Provide decision-makers impartial assessments of the state's immediate and long-term electricity and natural gas demands, resources, and prices.
- License and, where necessary, fund construction of new energy facilities that are consistent with the reliability, economic, public health, and environmental needs of the state.
- Ensure that the utilities are able to carry out their obligation to serve, including having adequate reserves, recognizing this is a critical component of the current hybrid energy system.
- Restore investor and private sector confidence in California's energy markets.

- Develop an "early warning" system to alert policy makers of potential future problems.
- Work with FERC to redesign market rules and prevent manipulation of the energy markets.
- Partner with governmental and other groups in western North America to pursue commonly held energy goals.
- Make continuing progress in meeting the state's environmental goals and standards, including minimizing the energy sector's impact on climate change.

Shared Principles and Strategies Will Guide this Stewardship

Achieving the overall goal and implementing the proposed actions require close cooperation between the state's energy agencies and means establishing and following common principles and strategies. In particular, the agencies intend to use market forces and regulatory approaches to operate the system in the best, long-term interest of the public: the consumers, the ratepayers, and the taxpayers. This means agency actions will attract private investment into California's energy infrastructure to stretch and leverage public funds and consumer dollars. The agencies must also provide appropriate regulatory guidance, price signals, and incentives to all Californians to use energy efficiently. The agencies will achieve rate stability and provide affordable energy, particularly for low-income consumers, through progressive rate design.

To protect the public's health and safety and ensure our quality of life, the agencies support the most cost-effective and environmentally sound strategies, including consideration of global climate change. The agencies also will work to ensure that low-income populations do not experience disproportionate adverse impacts from the development of new energy systems.

The Agencies' Approach Will be Open and Timely

Achieving the overall goal requires thoughtful planning, followed by specific, timely actions. This process begins with an ongoing assessment of the current and future energy system and the state's economic needs. It must consider a range of risks and uncertainties and must identify and inform policy makers of potential shortfalls and vulnerabilities. The agencies and state policy makers need to respond by carefully considering available options, balancing costs and benefits to meet state goals, selecting policy choices, and devising actions to implement those policy choices.

The result must be a set of interrelated actions that complement each other, provide risk protection, and eliminate the costs and conflicts that would occur if each agency pursued isolated, uncoordinated objectives. Each agency will need to implement the action plan in its individual proceedings but in concert with each other.

For the action plan to achieve the desired outcomes, it must rely on a common vision and be based on an integrated energy resource plan indicative of the state's future energy needs. The Energy Commission's integrated energy assessment process, as set forth by the Governor and Legislature last year in SB 1389, represents a critical

step in identifying future statewide energy needs. The agencies will participate in this process, assessing demand growth and available supply, and balancing various state policy objectives to determine the combination of conservation and infrastructure investments that best meet California's short- and long-term needs. The Public Utilities Commission and the Power Authority will carry out their energy-related duties and responsibilities based upon the information and analyses contained in the assessment.

The Action Plan envisions a "loading order" of energy resources that will guide decisions made by the agencies jointly and singly. First, the agencies want to optimize all strategies for increasing conservation and energy efficiency to minimize increases in electricity and natural gas demand. Second, recognizing that new generation is both necessary and desirable, the agencies would like to see these needs met first by renewable energy resources and distributed generation. Third, because the preferred resources require both sufficient investment and adequate time to "get to scale," the agencies also will support additional clean, fossil fuel, central-station generation. Simultaneously, the agencies intend to improve the bulk electricity transmission grid and distribution facility infrastructure to support growing demand centers and the interconnection of new generation.

Energy Services are Growing, are Essential, and the Delivery Systems are Complex

As a context for this plan, Californians must understand the essential and complex nature of the state's energy resources. Currently the state uses 265,000 gigawatt-hours of electricity per year. Consumption is growing 2 percent annually. Over the last decade, between 29 percent and 42 percent of California's in-state generation used natural gas. Another 10 - 20 percent was provided by hydroelectric power that is subject to significant annual variations. Almost one third of California's entire in-state generation base is over 40 years old. California's transmission system is aging also. While in-state generation resources provide the majority of California's power, California is part of a larger system that includes all of western North America. Fifteen to thirty percent of statewide electricity demand is served from sources outside state borders.

Peak electricity demands occur on hot summer days. California's highest peak demand was 52,863 megawatts and occurred July 10, 2002. Peak demand is growing at about 2.4 percent per year, roughly the equivalent of three new 500-megawatt power plants. Residential and commercial air conditioning represent at least 30 percent of summer peak electricity loads.

California's demand for natural gas also is increasing. Currently the state uses 2 trillion cubic feet of natural gas per year. Historically the primary use of this fuel was for space heating in homes and businesses. Electricity generation's dependence on relatively clean-burning natural gas now means that California's annual natural gas use by power plants is expected to increase. Overall, natural gas use is growing by 1.6 percent per year. Eighty-five percent of natural gas consumed in California is supplied by pipelines from sources outside the state.

Six Actions

The agencies propose six sets of actions of critical importance that need to be undertaken now. These are:

I. Optimize Energy Conservation and Resource Efficiency

California should decrease its per capita electricity use through increased energy conservation and efficiency measures. This would minimize the need for new generation, reduce emissions of toxic and criteria pollutants and greenhouse gases, avoid environmental concerns, improve energy reliability and contribute to price stability. Optimizing conservation and resource efficiency will include the following specific actions:

1. Implement a voluntary dynamic pricing system to reduce peak demand by as much as 1,500 to 2,000 megawatts by 2007.[1]
2. Improve new and remodeled building efficiency by 5 percent.[2]
3. Improve air conditioner efficiency by 10 percent above federally mandated standards.[3]
4. Make every new state building a model of energy efficiency.
5. Create customer incentives for aggressive energy demand reduction.
6. Provide utilities with demand response and energy efficiency investment rewards comparable to the return on investment in new power and transmission projects.
7. Increase local government conservation and energy efficiency programs.
8. Incorporate, as appropriate per Public Resources Code section 25402, distributed generation or renewable technologies into energy efficiency standards for new building construction.
9. Encourage companies that invest in energy conservation and resource efficiency to register with the state's Climate Change Registry.

II. Accelerate the State's Goal for Renewable Generation

In 2002, the Governor signed the Renewable Portfolio Standard (RPS), SB 1078. This standard requires an annual increase in renewable generation equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. The state is aggressively implementing this policy, with the intention of accelerating the completion date to 2010, and will:

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[1] . California is actively evaluating and implementing such pricing systems in a CPUC rulemaking (R.02-06-001).

[2] The Energy Commission's 2005 building standards, to be adopted in 2003, when combined with training and enforcement, are expected to reduce energy needs in new buildings by approximately 5 percent.

[3] New federal appliance standards will increase air conditioner efficiency by approximately 20 percent, but if California were granted a waiver from federal standards, by 2007 California air conditioner efficiency would increase another 10 percent.

1. Add a net average of up to 600 MW of new renewable generation sources annually to the investor-owned utility resource portfolio.[4]
2. Establish by June 30, 2003, key RPS implementation rules, including market price benchmarks, standard contract terms, flexible compliance and penalty mechanisms, and bid ranking criteria under the "least cost-best fit" rubric. Other key RPS rules will be developed and refined throughout 2003.
3. Facilitate an orderly and cost-effective expansion of the transmission system to connect potential renewable resources to load.
4. Initiate the development of RPS compliance rules for energy service providers and community choice aggregators.
5. Coordinate implementation with all relevant state agencies and with municipal utilities to facilitate their achievement of the standard.

III. Ensure Reliable, Affordable Electricity Generation

The state needs to ensure that its electrical generation system, including reserves, is sufficient to meet all current and future needs, and that this reliable and high quality electricity comes without over-reliance on a single fuel source and at reasonable prices. To these ends the state will:

1. Add new generation resources to meet anticipated demand growth, modernize old, inefficient and dirty plants and achieve and maintain reserve levels in the 15 percent-18 percent range.[5] Current estimates show a statewide need for 1500 - 2000 MW per year.[6]
2. Finance a few critical power plants that the agencies conclude are necessary and would not otherwise be built. An estimated 300 MW of peaking capacity located in critical areas is needed to provide local reliability, help achieve adequate reserves, and reduce congestion and the need for new transmission lines.[7]
3. Work with the California Independent System Operator (CAISO) to implement generator maintenance standards and an oversight process to support coordinated availability of generation.[8]

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[4] Electricity sales by the Investor-owned utilities totaled about 169,000 GWh in 2001. The renewables portfolio standard requires an annual increase in renewable generation equivalent to 1 percent of sales, or about 1,700 GWh. Assuming a capacity factor of about 50 percent, this is roughly equivalent to 385 MW. Accelerating achievement of the RPS goal to 20 percent by 2010 would mean adding 4,200 MW of renewables over 7 years, or 600 MW (1.6 percent) per year. California is implementing the Renewable Portfolio Standard for the Investor-owned utilities in a PUC rulemaking (R.01-10-024).

[5] The Western Electricity Coordinating Council (WECC) has established minimum operational requirements of loss-of-load probability of no more than one day in ten years. Current information suggests that the WECC criteria can be met with approximately 15 – 18 percent reserve margins.

[6] Peak demand growth is expected to be approximately 1,400 MW per year for the next two years, depending on weather and other factors. California is evaluating statewide generation resource needs in the CEC development of the Integrated Energy Policy Report (02-IEP-01).

[7] The CAISO in 2002 identified generation-deficient areas and sub-areas within its control area, such as the greater Bay Area, Humboldt, Battle Creek and Vaca Dixon. Although some of these constraints may be solved by transmission improvements, it may prove more cost-effective to add new generation in some areas perhaps utilizing the CPA's authority to finance new power plants.

[8] California is undertaking this effort in a PUC rulemaking (R.02-11-039).

4. Work with the CAISO to ensure the development of a workable, competitive wholesale energy market that has meaningful market power mitigation rules.
5. Monitor the electricity market to identify any exercise of market power and manipulation, and work to improve FERC-established market rules to correct any observed abuses.

IV. Upgrade and Expand the Electricity Transmission and Distribution Infrastructure

Reliable and reasonably priced electricity and natural gas, as well as increasing electricity from renewable resources, are dependent on a well-maintained and sufficient transmission and distribution system. The state will reinvigorate its planning, permitting, and funding processes to assure that necessary improvements and expansions to the distribution system and the bulk electricity grid are made on a timely basis:

1. The agencies will collaborate, in partnership with other state, local, and non-governmental agencies with energy responsibilities, in the California Energy Commission's integrated energy planning process to determine the statewide need for particular bulk transmission projects. This collaboration will build upon the California Independent System Operator's annual transmission plan and evaluate transmission, generation and demand side alternatives. It is intended to ensure that state objectives are evaluated and balanced in determining transmission investments that best meet the needs of California electricity users.
2. The Public Utilities Commission will issue an Order Instituting Rulemaking to propose changes to its Certificate of Public Convenience and Necessity process, required under Public Utilities Code § 1001 et seq., in recognition of industry, marketplace, and legislative changes, like the creation of the CAISO and the directives of SB 1389. The Rulemaking will, among other things, propose to use the results of the Energy Commission's collaborative transmission assessment process to guide and fund IOU-sponsored transmission expansion or upgrade projects without having the PUC revisit questions of need for individual projects in certifying transmission improvements.
3. The Public Utilities Commission will ensure that IOUs build out and properly staff and maintain distribution systems to meet California's growth, provide reliable service, and stand ready to restore service after unplanned distribution system outages.
4. The Energy Commission will work with municipal utilities to help ensure completion of transmission expansion or upgrade projects in their systems for which the collaborative transmission assessment process finds a need.

V. Promote Customer and Utility Owned Distributed Generation

Distributed generation is an important local resource that can enhance reliability and provide high quality power, without compromising environmental quality. The state is promoting and encouraging clean and renewable customer and utility owned distributed generation as a key component of its energy system. Clean distributed generation should enhance the state's environmental goals. This determined and

aggressive commitment to efficient, clean and renewable energy resources will provide vision and leadership to others seeking to enhance environmental quality and moderate energy sector impacts on climate change. Such resources, by their characteristics, are virtually guaranteed to serve California load. With proper inducements distributed generation will become economic.

1. Promote clean, small generation resources located at load centers.
2. Determine whether and how to hold distributed generation customers responsible for costs associated with Department of Water Resources power purchases.
3. Determine system benefits of distributed generation and related costs.
4. Develop standards so that renewable distributed generation may participate in the Renewable Portfolio Standard program.
5. Standardize definitions of eligible distributed generation technologies across agencies to better leverage programs and activities that encourage distributed generation.
6. Collaborate with the Air Resources Board, Cal-EPA and representatives of local air quality districts to achieve better integration of energy and air quality policies and regulations affecting distributed generation.
7. The agencies will work together to further develop distributed generation policies, target research and development, track the market adoption of distributed generation technologies, identify cumulative energy system impacts and examine issues associated with new technologies and their use.

VI. Ensure Reliable Supply of Reasonably Priced Natural Gas

The high and volatile price of natural gas contributed significantly to the energy crisis in 2000-2001, and concerns about manipulation of the market and scarcity persist. The Governor's Natural Gas Working Group was formed to monitor natural gas demand, supply and price issues and facilitate the construction of California infrastructure projects. Yet California remains vulnerable to the volatile spot market. The agencies will pursue the following actions:

1. Identify critical new gas transmission, distribution and storage facilities needed to meet California's future needs.
2. Monitor the gas market to identify any exercise of market power and manipulation, and work to improve FERC-established market rules to correct any observed abuses.
3. Evaluate the net benefits of increasing the state's natural gas supply options, such as liquefied natural gas.
4. Support electric utilities and gas distribution companies entering into longer-term contracts as a hedge against volatile and high spot market prices.

In implementing this plan, the agencies are mindful that energy services – both natural gas and electric – are essential to every Californian's general welfare and to the health of California's economy. As actions to improve the reliability of these services are considered, the agencies will each take into account the effect the action will have on energy expenditures, the environment and climate change, and the overall economy. Alternatives to proposed actions will be evaluated in an integrated

fashion, consider the cost of action or inaction, and consider the equitable distribution of costs among customer classes and groups.

While implementation of this Action Plan represents a challenge, it is an important step for the agencies to take together to help achieve the state's overall goal of adequate, reliable, and reasonably priced electrical power and natural gas supplies.

Adopted May 8, 2003 by a 3-2 vote of the CPUC. Dissent of Commissioners Lynch and Wood attached.

Adopted April 30, 2003 by unanimous vote of the CEC.

Adopted April 18, 2003 by unanimous vote of the CPA.

Dissent of Commissioners Lynch and Wood to the Energy Action Plan, May 8, 2003, Item CR-2

Coordination among agencies is good. Cooperation among agencies is good. Planning is good. All of these aspects of the Action Plan are positive. However, there is a difference of emphasis and philosophy that makes the document unsupportable at present. Our focus is on consumers. The Plan's focus is on competition. We want stability, predictability, consumer protection, low prices, environmental preservation, and regulatory fairness. The Plan talks about markets. We want to re-establish and strengthen the utilities' obligation to serve. The Plan wants to cultivate hybrid markets. We want to promote distributed renewables and new efficient, low-polluting, utility-owned generating plants. The Plan offers generic support for customer-owned generation in any form.

We want to ensure that utilities make wise economic choices when procuring or generating power. The plan wants to use "proper inducements" to help various kinds of distributed generation technologies to become economical. This is a euphemism for ratepayer provided subsidies. We want to restore investor confidence in California's regulated utilities. The plan talks of restoring investor confidence in California's energy markets. Stable energy markets, reliable energy supplies and adequate transmission systems are all admirable goals, standing alone, they miss the point if they do not explicitly address the needs of the California consumers.

We want to vigorously oppose FERC's efforts to invade areas of state jurisdiction. The Plan wants to work with FERC to redesign markets. We want to use the tools of regulation to provide consumers with the products and prices they desire. The Plan talks about continuing to rely on market forces to provide at least part of the answer.

Where one stands on these issues makes all of the difference when answering fundamental questions about energy planning and service. Someone who looks at an inkblot and sees markets will argue for higher reserve margins and redundant transmission facilities – adding billions of dollars in cost. One who looks at the same image and sees the face of a consumer will be searching for ways to keep costs low and stable, make supplies efficiently reliable, and support integrated planning and least-cost dispatch. It is this fundamental difference that drives the debate about such things as transmission adequacy and ISO rule changes. None of us may be so wedded to one vision that all of our choices will be true to a single course. However, the proposed Energy Action Plan steers straight down a path leading to deregulated energy markets. We do not agree that the Commission should take California consumers down this road and will not vote to support the Action Plan in its current form.

We have a further concern involving process that is fundamental. Where the Energy Plan reflects the expression of goals and an approach for moving forward, it is welcome, appropriate and even necessary. However, where it

attempts to prescribe specific outcomes for matters that require evidentiary records and careful scrutiny, it goes too far.

What is good and appropriate in terms of coordination and planning is perhaps reflected best by the section that addresses gas reliability and prices. In this section, the agencies commit to identify needed new facilities, monitor the market to guard against the exercise of market power, evaluate the net benefits of new supply options such as LNG, and support the appropriate use of long-term supply contracts to stabilize prices. These are broad goals that could appropriately frame the activities of the agencies without prejudging the outcome of formal proceedings.

But what the ad hoc subcommittee and this commission cannot do is to form advance commitments to decide in a certain way matters that must come before the agency. This is not a limitation of philosophy or style. It is a limit imposed by law.

Here are some examples of ways in which the Plan moves beyond appropriate planning and coordination. It sets goals for peak demand reduction through a variable pricing system. It does this, although it acknowledges that the Commission is actively evaluating such pricing systems in a pending proceeding. It declares an appropriate capacity range for new electric resource additions and an appropriate range for reserve margins although the Commission has yet to take the steps required by AB 57 before establishing such goals. Similarly, it jumps ahead of the AB 57 process to declare a level of needed new peaking capacity.

It declares that three specific new transmission projects are needed even though the Commission is required by law to make record-based needs assessments under Section 1001 and CEQA. One of the projects, the Path 15 upgrade, is the subject of two draft decisions that are currently pending before the Commission. The other two – a second Palo Verde-Devers line and an expansion to serve wind farms in Tehachapi -- are as-of-yet not even the subject of formal applications. It announces that sufficient new transmission must be built to ensure high quality power supply throughout the state, although those nice-sounding words suggest that the entire state should be wired as if it is the Silicon Valley. It prejudges the Commission's decision about departing load customers and pledges the adoption of exemptions for various technologies at levels not represented by any Commission orders.

We fear that some commissioners show an impatience for action that reflects more than a desire for government to act quickly. We are concerned that it reflects a desire to lock the agency into positions and commitments before it is burdened by such niceties as the facts in an evidentiary record and parties' interpretations of the law and policy.

In an apparent effort to answer this concern, the current draft contains a warning label, declaring that specific proposed actions may need to be fine-tuned or changed. However, this message is transparent. If the subcommittee did not intend for specific numbers to have meaning, then it would not have included them in the document. If the signers did not intend for certain construction projects to be

approved, then they would not have included words calling for their approval. As the disclaimer further states, this is a "blueprint", intended to provide "direction, focus, and precision". The obvious goal is to predetermine either the specific outcome or the substantive direction of various proceedings currently pending, or expected to be filed. We cannot pledge, in advance, to lower someone's rates in a certain way, deny someone's complaint, or approve someone's petition. Nor can we skirt around pending proceedings to create new programs, set reserve margins or declare that certain new facilities are needed. To do so would be unfair. It would breed cynicism and it would violate the law. For these reasons, we cannot and will not support the adoption of the Energy Action Plan.

/s/ LORETTA M. LYNCH
Loretta M. Lynch
Commissioner

CARL WOOD
Carl Wood
Commissioner

San Francisco, California
May 8, 2003

STATE OF CALIFORNIA

ENERGY COMMISSION

PUBLIC UTILITIES COMMISSION

ENERGY ACTION PLAN II

IMPLEMENTATION ROADMAP FOR ENERGY POLICIES

September 21, 2005

I. INTRODUCTION AND SUMMARY

In 2003, the three key energy agencies in California – the California Energy Commission (CEC), the California Power Authority (CPA), and the California Public Utilities Commission (CPUC) – came together in a spirit of unprecedented cooperation to adopt an "Energy Action Plan" (EAP)[1] that listed joint goals for California's energy future and set forth a commitment to achieve these goals through specific actions.

The EAP was a living document meant to change with time, experience, and need. The CPUC and the CEC have jointly prepared this Energy Action Plan II to identify the further actions necessary to meet California's future energy needs.[2] EAP II supports and expands the commitment to cooperation among state agencies embodied in the original EAP and reflected in the State's coordinated actions over the past two years. The development of EAP II has benefited from the active participation of the Business, Transportation, and Housing Agency, the Resources Agency, the State and Consumer Services Agency, the California Independent System Operator (CAISO), the California Environmental Protection Agency (Cal EPA), and other agencies with energy-related responsibilities.

EAP II describes a coordinated implementation plan for state energy policies that have been articulated through the Governor's Executive Orders, instructions to agencies, public positions, and appointees' statements; the CEC's Integrated Energy Policy Report (IEPR); CPUC and CEC processes; the agencies' policy forums; and legislative direction. This document also is intended to be consistent with the energy policies embodied in the Governor's August 23, 2005, response to the 2003 and 2004 IEPRs.[3] We expect to update or revise this action plan to reflect any changes needed to further implement the Governor's 2004 IEPR response, future energy policies, and decisions related to the forthcoming 2005 IEPR, as well as other relevant events that may arise in the future.

In preparing EAP II, we do not assume that work undertaken in EAP I is complete or, conversely, to dismiss the accomplishments to date of EAP I. Rather, EAP II is intended to look forward to the actions needed in California over the next few years, and to refine and strengthen the foundation prepared by EAP I. Appendix A provides a status report on the progress of the EAP I activities to date.

Our overarching goal is for California's energy to be adequate, affordable, technologically advanced, and environmentally-sound. Energy must be reliable – provided when and where needed and with minimal environmental risks and impacts. Energy must be affordable to

[1] EAP I can be viewed at the CPUC's website at <http://www.cpuc.ca.gov/PUBLISHED/REPORT/28715.htm> or at the CEC's website at <http://www.energy.ca.gov/energy_action_plan/2003-05-08_ACTION_PLAN.PDF>.

[2] The Consumer Power and Conservation Financing Authority was a co-agency in EAP I. Funding for the agency was eliminated in SB 1113 (Chesbro) Chapter 208, the 2004-2005 budget. No additional funding is proposed in the Governor's 2005-2006 budget.

[3] Governor Schwarzenegger's "Review of Major Integrated Energy Policy Report Recommendations" in his August 23, 2005, letter to Senator Don Perata, President pro tempore of the California State Senate.

households, businesses and industry, and motorists – and in particular to disadvantaged customers who rely on us to ensure that they can afford this fundamental commodity. Our actions must be taken with clear recognition of cost considerations and trade-offs to ensure reasonably priced energy for all Californians. We need to develop and tap advanced technologies to achieve these goals of reliability, affordability and an environmentally-sound energy future. These goals affirm the original objectives of EAP I.

The State will achieve these goals by taking specific and measurable actions throughout California's energy sector. To do this we have expanded the scope of the EAP. The fuels used in the transportation of California's goods and population constitute a third energy sector, in addition to electricity and natural gas. We have incorporated into EAP II specific actions reflecting the importance of transportation fuels to California's economy and the need to mitigate the environmental impacts caused by their use. EAP II further expands the scope of the original EAP to describe research, development and demonstration activities that are critical to realizing our energy goals. In addition, EAP II highlights the importance of taking actions in the near term to mitigate California's contributions to climate change from the electricity, natural gas and transportation sectors.

EAP II continues the strong support for the loading order – endorsed by Governor Schwarzenegger – that describes the priority sequence for actions to address increasing energy needs. The loading order identifies energy efficiency and demand response as the State's preferred means of meeting growing energy needs. After cost-effective efficiency and demand response, we rely on renewable sources of power and distributed generation, such as combined heat and power applications. To the extent efficiency, demand response, renewable resources, and distributed generation are unable to satisfy increasing energy and capacity needs, we support clean and efficient fossil-fired generation. Concurrently, the bulk electricity transmission grid and distribution facility infrastructure must be improved to support growing demand centers and the interconnection of new generation, both on the utility and customer side of the meter.

We also see the need to provide open, transparent, and compelling information and education to all stakeholders and consumers in the State. The agencies are committed to providing more effective information dissemination through increased cooperation among all branches of government, businesses, and energy organizations. In particular, we pledge to remove the remaining barriers to transparency in the electricity resource procurement processes in the State and to increase outreach to consumers by providing improved education and services regarding energy efficiency, demand response, rates, climate change, and opportunities to reduce the environmental impacts of energy use.

The EAP II is intended as an implementation roadmap for the entire State. While some of the electricity and natural gas actions are described in the context of the investor-owned utilities, in general they should be seen as applying equally to all load serving entities, such as customer-owned utilities and energy service providers.

Once this new EAP is adopted, our next step will be to prepare a workplan that ascribes responsibility for each of these key action items, determines the specific roles that will be played by each agency, and develops a timeline that ensures the agencies' prompt attention.

II. SPECIFIC ACTION AREAS

1. Energy Efficiency

As stated in EAP I and reiterated here, cost effective energy efficiency is the resource of first choice for meeting California's energy needs. Energy efficiency is the least cost, most reliable, and most environmentally-sensitive resource, and minimizes our contribution to climate change. California's energy efficiency programs are the most successful in the nation and we want to continue to build upon those successes.

For the past 30 years, while per capita electricity consumption in the US has increased by nearly 50 percent, California electricity use per capita has been approximately flat. This achievement is the result of continued progress in cost-effective building and appliance standards and ongoing enhancements to efficiency programs implemented by investor-owned utilities (IOUs), customer-owned utilities, and other entities. Since the mid-1970s, California has regularly increased the energy efficiency requirements for new appliances sold and new buildings constructed here. In addition, in a creative and precedent-setting move, the CPUC in the 1980s de-coupled the utilities' financial results from their direct energy sales, facilitating utility support for efficiency programs. These efforts have reduced peak capacity needs by more than 12,000 MW and continue to save about 40,000 GWh per year of electricity. Most recently, in September 2004, the CPUC adopted the nation's most aggressive energy savings goals for both electricity and natural gas. In achieving these targets, the IOUs will save an additional 5,000 MW and 23,000 GWh per year of electricity, and 450 million therms per year of natural gas by 2013.

However, to achieve the full energy efficiency potential that exists in California, we must continue to ratchet up our efforts. We need to focus not only on developing and supporting programs, but also on increasing public outreach and education; promoting research, development, and demonstration; and improving the evaluation, measurement, and verification of efficiency programs.

KEY ACTIONS:

1. Require that all cost-effective energy efficiency is integrated into utilities' resource plans on an equal basis with supply-side resource options.
2. Adopt 2006-2008 energy efficiency program portfolios and funding by late 2005.
3. Expand efforts to improve public awareness and adoption of energy efficiency measures.
4. Promote a balanced portfolio of baseload energy, demand, and peak demand reductions to obtain both reliability and long-term resource benefits of energy efficiency for both electricity and natural gas.
5. Integrate demand response programs with energy efficiency programs.

6. Implement actions outlined in the Governor's Green Buildings Action Plan to improve building performance and reduce grid-based electrical energy purchases in all State and commercial buildings by 20 percent by 2015.[4]
7. Work with customer-owned utilities in the implementation of all cost-effective energy efficiency programs so that they treat energy efficiency savings as a resource and help California reach its goal of a reduction in per capita electricity use.
8. Adopt new appliance standards by 2006, supplementing those adopted in December 2004.
9. Adopt new building standards for implementation in 2008 that include, among other measures, cost effective demand response technologies and integrated photovoltaic systems.
10. Increase the availability of State-sponsored low-interest loans for energy efficiency and clean distributed generation projects.
11. Improve energy efficiency programs for low income, non-English speaking, and other hard-to-reach communities.
12. Adopt verifiable performance-based incentives in 2006 for IOU energy efficiency investments, with risks and rewards based on performance that will align the utility incentives with customer interests.
13. Update and augment, as necessary, utility evaluation, measurement and verification protocols to assure that energy efficiency continues to be fully integrated into resource planning, emission reduction benefits are quantified, and compliance goals are verified.
14. Identify opportunities and support programs to reduce electricity demand related to the water supply system during peak hours and opportunities to reduce the energy needed to operate water conveyance and treatment systems.
15. Adopt a report on improving efficiency in existing buildings, as required by Assembly Bill 549, and pursue legislation and regulations to implement its recommendations.

2. Demand Response

California is in the process of transforming its electric utility distribution network from a system using 1960s era technology to an intelligent, integrated network enabled by modern information and control system technologies. This transformation can decrease the costs of operating and maintaining the electrical system, while also providing customers with accurate information on energy use, time of use, and cost. With the implementation of well-designed dynamic pricing tariffs and demand response programs for all customer classes, California can lower consumer costs and increase electricity system reliability. To achieve this transformation, state agencies will ensure that appropriate, cost-effective technologies are chosen, emphasize public education regarding the benefits of such technologies, and develop tariffs and programs that result in cost-effective savings and inducements for customers to achieve those savings.

[4] See Executive Order S-20-04, dated December 14, 2004, at <http://www.dot.ca.gov/hq/energy/ExecOrderS-20-04.htm>.

KEY ACTIONS:

1. Issue decisions on the proposals for statewide installation of advanced metering infrastructure for all small commercial and residential IOU customers by mid-2006 and expedite adoption of concomitant tariffs for any approved meter deployment.
2. Expedite decisions on dynamic pricing tariffs to allow increased participation for summer 2006 for customers with installed advanced metering systems and encourage load shifting that does not result in increases in overall consumption.
3. Identify and adopt new programs and revise current programs as necessary to achieve the goal to meet five percent demand response by 2007 and to make dynamic pricing tariffs available for all customers.
4. Educate Californians about the time sensitivity of energy use and the ways to take advantage of dynamic pricing tariffs and other demand response programs.
5. Create standardized measurement and evaluation mechanisms to ensure that demand response savings are verifiable.
6. Provide that the utilities' demand response investment opportunities offer returns commensurate with investments in traditional plant.
7. Integrate demand response into retail sellers' electricity resource procurement efforts so that these programs are considered equally with supply options.
8. Provide customer access to their energy use information and allow participation in demand response programs, regardless of retail provider.
9. Evaluate and, if appropriate, incorporate demand response technologies such as programmable communicating thermostats into the 2008 building standards.
10. Incorporate demand response appropriately and consistently into the planning protocols of the CPUC, the CEC, and the CAISO.
11. Encourage the integration of demand response programs into a capacity market or other mechanisms.
12. Coordinate IOU demand-response programs with customer-owned utility demand-response efforts to provide a comprehensive, statewide contribution to California's resource adequacy portfolio.

3. Renewables

California can reduce its greenhouse gas emissions, moderate its increasing dependence on natural gas, and mitigate the associated risks of electricity price volatility by aggressively developing renewable energy resources to meet the Renewables Portfolio Standard (RPS) requirements. As originally established, the RPS requires 20 percent of electricity sales to come from renewable sources by 2017. In the first EAP, we set a goal of accelerating the 20 percent target from 2017 to 2010. We are now identifying the steps necessary to achieve that target, as

well as higher goals beyond 2010, such as Governor Schwarzenegger's proposed goal of 33 percent of electricity sales by 2020. To reach these goals, we must streamline and make transparent all of our approval processes, provide funding for renewable resources that reflects these policy priorities, and establish the necessary infrastructure for delivery of power from new renewable projects. We intend that our increasing reliance on renewable resources within California and from the western region will help mitigate energy impacts on climate change and the environment. We expect that all California load serving entities will contribute to these goals.

KEY ACTIONS:

1. Expeditiously approve contracts from the initial IOU RPS solicitations and interim renewable solicitations, and approve agreements for any necessary supplemental energy payments.
2. Expeditiously approve the IOU RPS solicitations for 2005 and the next three years so that California IOUs will meet the accelerated RPS goal of 20 percent renewables by 2010.
3. Consider improvements to the renewables solicitation process.
4. Ensure that operations protocols and tariffs do not discriminate against renewable resources and study the effects of increasing penetration of renewable resources on the reliable operation of the electricity grid.
5. Evaluate and develop implementation paths for achieving renewable resource goals beyond 2010, including 33 percent renewables by 2020, in light of cost-benefit and risk analysis, for all load serving entities.
6. Monitor and support existing renewable resources, including facilitating re-powering projects and addressing contract renewals in a timely fashion.
7. Ensure new transmission lines are built to access renewable resources through a comprehensive, integrated transmission planning process, including the creation of state-led study groups to examine tapping particular resource regions.
8. Implement a cost-effective program to achieve the 3,000 MW goal of the Governor's "Million Solar Roofs" initiative.[5]
9. Implement RPS standards for energy service providers and community choice aggregators so that all load serving entities are contributing proportionally to California's renewable goals.
10. Work with customer-owned utilities in the development of their renewable plans and incorporate their results into a comprehensive statewide RPS review.
11. Complete the Western Renewable Generation Information System to accurately account for renewable generation through an electronic certificate tracking system.
12. Implement a renewable energy certificates trading system for meeting RPS goals.

[5] View the Governor's press release at <http://www.governor.ca.gov/state/govsite/gov_htmldisplay.jsp?sCatTitle=Press%20Release&sFilePath=/govsite/spotlight/august20_update.html>.

13. Assist local permitting agencies in implementing methods of mitigating the avian impacts of wind energy generation.
14. Develop and implement forestry, agriculture, and waste management policies to encourage the generation of electricity from landfills, biomass and biogas.

4. Electricity Adequacy, Reliability and Infrastructure

Significant capital investments are needed to augment existing facilities, replace aging infrastructure, and ensure that California's electrical supplies will meet current and future needs at reasonable prices and without over-reliance on a single fuel source. Even with the emphasis on energy efficiency, demand response, renewable resources, and distributed generation, investments in conventional power plants will be needed. The State will work to establish a regulatory climate that encourages investment in environmentally-sound conventional electricity generation resources.

An expanded, robust electric transmission system is required to access cleaner and more competitively priced energy, mitigate grid congestion, increase grid reliability, permit the retirement of aging plants, and bring new renewable and conventional power plants on line. Streamlined, open and fair transmission planning and permitting processes must move projects through planning and into construction in a timely manner. The state agencies must work closely with the CAISO to achieve these objectives and to benefit from its expertise in grid operation and planning. Finally, the distribution system, which has the most direct effect on reliable service for consumers, must be continually upgraded and reinforced.

KEY ACTIONS:

1. Ensure that all load serving entities meet the state's adopted reserve and resource adequacy requirements of a 15-17 percent planning reserve no later than June 2006, through a reasonable mix of short-, medium- and long-term resource commitments.
2. Provide for the continued operation of cost-effective and environmentally – sound existing generation needed to meet current reliability needs, including combined heat and power generation.
3. After incorporating higher loading order resources, encourage the development of cost-effective, highly-efficient, and environmentally-sound supply resources to provide reliability and consistency with the State's energy priorities.
4. Establish appropriate incentives for the development and operation of new generation to replace the least efficient and least environmentally sound of California's aging power plants.
5. Evaluate the potential for California's access to clean coal energy resources and recommend a California clean coal policy in the 2005 IEPR.
6. Manage California's aging electricity infrastructure to coordinate maintenance and outages and to provide orderly retirements.

7. Adopt a long-term policy for existing and new qualifying facility resources, including better integration of these resources into CAISO tariffs and deliverability standards.
8. Promote adequate investment in the utility distribution system, with an emphasis on translating those expenditures into higher levels of reliability.
9. Develop tariffs and remove barriers to encourage the development of environmentally-sound combined heat and power resources and distributed generation projects.
10. The CEC supports legislation to consolidate the permitting process for all new bulk transmission lines within the CEC, while the CPUC believes existing permitting authority should remain in place. Irrespective of the status of legislative efforts, the two Commissions agree to continue to work together to improve the transmission planning and permitting processes under existing authorities.
11. Improve the State's transmission line planning and permitting processes by integrating the CAISO's transmission planning and modeling capabilities, the CEC's power plant licensing, environmental and planning expertise, and the CPUC's ratemaking function and by ensuring that the processes are adaptable, flexible and representative of broad stakeholder input.
12. Adapt the state's transmission planning process to better evaluate strategic benefits, as well as economic costs and benefits, of proposed projects over multiple decades, including recommending a range of discount rates to be used to evaluate transmission lines.
13. Support legislation to expand the CEC's transmission corridor planning process, coordinated with applicable federal and state agencies, local governments and other stakeholders, to designate and preserve critical corridors for potential development in the future.
14. Coordinate the state's transmission planning process with regional efforts in the interconnected western states and identify and recommend means to increase California's participation in the broader western regional energy planning efforts.
15. Apply the GHG adder as a resource selection criterion in IOU procurement decisions to more appropriately value the risk of future environmental regulation in long-term investment decisions made now.
16. Acknowledge the interdependent nature of the energy needs among all the Western states, Canadian provinces, and Mexico by collaborating with our regional partners on regional resource and transmission planning, in particular by addressing overall resource adequacy and deliverability in the West, including cost allocation, planning, and routing of inter-regional transmission projects.

5. Electricity Market Structure

To promote dependable, affordable, environmentally-responsible wholesale and retail markets, the agencies must foster sound market rules, increase regulatory certainty, and improve coordination with the rest of the West's electrical system. These goals are not possible without working closely with the CAISO, which plays the fundamental role of operating most of California's electricity grid and its critical energy markets. The agencies will continue to cooperate with and assist the CAISO in its core missions.

Californians pay some of the highest utility rates in the nation and the State must take action to decrease overall retail energy bills and to reform rate structures while providing consumers tools to manage their energy usage. The agencies will work to reduce total retail energy bills by supporting programs for energy efficiency, demand response, and self-generation; ensuring that utilities' supply portfolios promote the delivery of energy at the least cost; and increasing education and outreach about energy usage. Partnering with private industry, the State will also identify, assess, and, where appropriate, implement actions, such as the development of capacity markets, to enhance reliability, and promote investment in energy infrastructure serving California.

KEY ACTIONS:

1. Restructure the IOU rate-making process to reduce the number of proceedings, create more transparency in consumer electricity rates, adopt rates based on clear cost-causation principles, and identify steps to reduce electricity costs.
2. Complete and refine, as necessary, the current IOU electricity procurement process to provide that it is competitive, transparent, fair, proceeds in a timely fashion, and achieves California's resource adequacy requirements.
3. Complete and implement, by February 2007, the CAISO's Market Redesign and Technology Upgrade to reform California's wholesale electricity market and to ensure adequate market power mitigation to protect California consumers.
4. Promote the continued viability and efficient operation of the existing direct access market for retail electricity supply.
5. Develop rules to promote an effective core/non-core retail market structure, including mechanisms to guard against cost-shifting, preserve reliability, pursue energy efficiency goals, achieve RPS goals, and maintain the loading order for all load serving entities.
6. Develop capacity markets, with tradable capacity rights and obligations, to create appropriate incentives and flexibility for power plant development and utility procurement.

6. Natural Gas Supply, Demand, and Infrastructure

To ensure reliable, long-term natural gas supplies to California at reasonable rates, the agencies must reduce or moderate demand for natural gas. Because natural gas is becoming more

expensive, and because much of electricity demand growth is expected to be met by increases in natural gas-fired generation, reducing consumption of electricity and diversifying electricity generation resources are significant elements of plans to reduce natural gas demand and lower consumers' bills. California must also promote infrastructure enhancements, such as additional pipeline and storage capacity, and diversify supply sources to include liquefied natural gas (LNG).

KEY ACTIONS:

1. Adopt additional natural gas and electric efficiency programs and standards to reduce the reliance on natural gas for various end uses.
2. Establish a program to encourage solar hot water heating to reduce the reliance on natural gas for water heating.
3. Provide that the natural gas delivery and storage system is sufficient to meet California's peak demand needs.
4. Encourage the development of additional in-state natural gas storage to enhance reliability and mitigate price volatility.
5. Continue the State's LNG Interagency Permitting Working Group and develop a process to facilitate the prompt and environmentally-sensitive evaluation and siting of needed LNG facilities.
6. Establish standards for the timing of and payment for new transmission and storage capacity additions and for access to natural gas transmission systems.
7. Evaluate the appropriateness of current rules for natural gas quality.
8. Provide ongoing assessments of global natural gas markets.

7. Transportation Fuels Supply, Demand, and Infrastructure

The fuels used in the transportation of California's goods and population constitute a third facet of our energy sector, in addition to electricity and natural gas. Today, California's gasoline and diesel markets are characterized by increasing demands, tight supplies, and volatile and record high prices. California imports more than half of its crude oil and over 15 percent of its refined products and its dependence on this increasingly expensive energy resource continues to grow. Moreover, fossil fuel-based transportation of products and people is a major contributor of carbon dioxide, the principal catalyst to climate change. While we must ensure sufficient and economic supplies of gasoline and diesel to sustain California's economic vitality, we also must take steps to build an efficient, multi-fuel transportation market to serve the future needs of its citizens. Governor Schwarzenegger has tasked the Energy Commission to take the lead in crafting, by March 31, 2006, a workable long-term plan to achieve significant reductions in gasoline and diesel use and increase the use of alternative fuels so that California is working toward a set of realistic, achievable objectives with identifiable and measurable milestones. It is expected that the plan will include actions to be undertaken by state agencies.

KEY ACTIONS

1. Prepare by March 31, 2006 a long term transportation fuels plan to increase the use of alternative fuels, increase vehicle efficiency, increase the use of mass transit, reduce dependence on petroleum fuels, and improve land use planning.
2. Increase coordination of petroleum infrastructure permitting among state, local, and regional agencies, including developing guiding principles for approval of new petroleum facilities.
3. Continue to work with other states and stakeholders to convince the federal government to double the Corporate Average Fuel Economy (CAFE) standards.
4. Work in conjunction with Cal EPA to implement the California Hydrogen Highway Blueprint.
5. Increase the use of high-efficiency, fuel flexible vehicles, and dedicated non-petroleum-fueled vehicles in the state's fleet of passenger cars and light-duty trucks. Increase the use of non-petroleum fuels in the state's fleet of medium- and heavy-duty on-road and off-road vehicles.
6. Complete testing to evaluate tire rolling resistance and fuel economy potential, establish standards, and implement a voluntary reporting program. Consider a rulemaking for mandatory reporting in the event voluntary compliance is inadequate.
7. The CPUC, in conjunction with the CEC, Cal EPA, and local air districts, will continue to evaluate and implement policies to promote the development of equipment and infrastructure needed to facilitate the use of electric power and natural gas to fuel low-emission vehicles as required by Public Utilities Code sections 740.3, 740.8, and 451.

8. Research, Development and Demonstration

California's continued success in supplying an efficient and diverse mix of resources to meet our energy needs is dependent upon technological innovations. The agencies are committed to encouraging research, development, and demonstration (RD&D) projects in technologies that will allow California to achieve its policies to make energy efficiency, demand response and renewable resources more effective and cost-competitive. We must also encourage RD&D for conventional generation sources and transportation fuels to reduce emissions, increase efficiency, and mitigate environmental impacts.

KEY ACTIONS

1. Transform RD&D projects on energy efficiency technologies into energy efficiency tools and standards.
2. Allocate and prioritize RD&D funding for energy efficiency and demand response, including new communication and control technologies, planning models, end-use technologies, and validation methodologies.

3. Align RD&D funding with public policy goals for new renewable technologies and greenhouse gas mitigation technologies, including efficiency, renewable generation technologies, and energy storage.
4. Align public purpose funded natural gas RD&D to reflect supply policies affecting biogas and syngas; to improve long-term storage reservoir management, safety and efficiency; and to ensure high quality natural gas.
5. Support RD&D to improve the efficiency of petroleum-fueled vehicles and to reduce the cost and promote the availability of non-petroleum fuels.
6. Support clean coal technology research and development, and continue to develop methods for capturing and storing significant amounts of CO_2, either as an integral part of the energy conversion process or in pairing with external CO_2 sequestration.
7. Encourage the development of cost-effective dry-cooling technologies and reduce once-through cooling practices to minimize the impact of new generation on California's water resources.
8. Align RD&D funding with public policy goals for transmission technology development to maximize efficient use of the bulk electricity grid.
9. Support and the Interagency Working Group in developing an integrated and comprehensive state policy on biomass that encompasses electricity, natural gas and transportation fuel substitution potential, and encourage the participation of the Biomass Collaborative.

9. Climate Change

Governor Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, clearly establishing California's leadership in and commitment to the fight against climate change. The Executive Order establishes greenhouse gas (GHG) emission reduction targets that call for a reduction of GHG emissions to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050. The Executive Order also directs Cal EPA to lead a multi-agency Climate Action Team to conduct an analysis of the impacts of climate change on California and to develop strategies to achieve the targets and mitigation and adaptation plans for the State.

Joining Cal EPA on the Climate Action Team are high-level representatives from the Business, Transportation and Housing Agency, CPUC, CEC, Department of Food and Agriculture, and Resources Agency. The Team is responsible for developing a plan to achieve the Governor's GHG emissions targets by implementing state agency programs that reduce or avoid greenhouse gas emissions. The Climate Action Team has established subgroups specifically to evaluate options for a statewide "cap-and-trade" program and adaptation and mitigation scenarios.

Climate change is the most serious threat to our environmental future, and demands immediate action. Its symptoms are already evident in California. The transportation sector is the primary source of our GHG emissions in California. An important step in reducing GHG emissions from this sector was the adoption by the Air Resources Board in December 2004 of its motor vehicle GHG emission regulations. Increasing energy efficiency, demand response, and renewable resources to the maximum extent possible in California and the western region will further

reduce our contribution to climate change. Due to the strong connection between energy use and climate change, many necessary actions to reduce greenhouse gas emissions have already been outlined in previous sections.

KEY ACTIONS:

1. Implement the motor vehicle greenhouse gas regulations.
2. Implement all strategies identified by the Climate Action Team as needed to meet the Governor's GHG emission reduction goals, including recommendations developed as part of the 2005 IEPR.
3. Report to the Governor and the Legislature in January 2006, and biennially thereafter to provide regular updates on the progress made toward meeting the Governor's target and other directives in Executive Order S-3-05.
4. Report to the Governor on the findings of the Climate Action Team subgroup on cap and trade options for the State.
5. Consider 2010, 2020, and 2050 GHG reduction targets for retail sellers of electricity to contribute to meeting the Governor's GHG emission reduction targets.
6. Coordinate with the Climate Action Team on the regulatory proceeding that is considering establishment of a cap and trade program for IOUs.
7. Ensure that energy supplies serving California, from any source, are consistent with the Governor's climate change goals.
8. Require reporting of GHG emissions as a condition of state licensing of new electric generating facilities.
9. Participate in public outreach efforts to educate the public and businesses in California on climate change impacts and actions to mitigate emissions and encourage stakeholder participation in the development of programs to meet California's climate change goals.
10. Encourage all participants in the electricity, natural gas, and transportation fuels industries, as well as other regulated industries, to participate in the California Climate Action Registry and to improve reporting of GHG emissions.
11. Identify western state policies and strategies to achieve production of 30,000 MW of clean energy across the west by 2015, consistent with the Western Governors' Association Clean and Diversified Energy Advisory Committee and West Coast Climate Initiative goals.[6]
12. Identify methodologies to quantify the expected costs and benefits of climate change policies.

[6] See WGA Policy Resolution 04-14, June 22, 2004, at http://www.westgov.org/wga/policy/04/clean-energy.pdf and WGA's Clean and Diversified Energy Initiative webpage at <http://www.westgov.org/wga/initiatives/cdeac/index.htm>. Also see <http://www.climatechange.ca.gov/westcoast/index.html> for information on the West Coast Governors' Initiative.

13. Continue research performed by the California Climate Change Center in evaluating the economic and ecological consequences of climate change and adaptation and mitigation strategies to preserve and improve quality of life.

APPENDIX A

EAP I Progress Report

Since 2003, California has worked diligently to implement EAP I, which contained both overall policy objectives for the State's energy sector while also proposing a series of specific action items for the agencies to undertake. While we have been successful in accomplishing many of the action items we proposed in EAP I, we recognize that much more work remains to be done in California to ensure a reliable, affordable and environmentally-sound energy industry. A complete assessment of our response to the specific actions items prescribed in EAP I is provided below.

I. Optimize Energy Conservation and Resource Efficiency

1. **Implement a voluntary dynamic pricing system to reduce peak demand by as much as 1,500 to 2,000 megawatts by 2007.**

   Status: In Progress

   - The CPUC authorized voluntary demand response programs for large customers, with statewide potential estimated at 520 MW, and a statewide two-year pilot program to study the demand response capability of residential and small commercial customers.
   - The CEC provided funding to install 23,300 interval meters on large customers starting in 2001, and the CPUC directed the IOUs to complete the process and authorized funding when general funds were exhausted.
   - Pursuant to CPUC directions, the IOUs have submitted plans to deploy advanced metering infrastructure (AMI) systems or to develop them for all customers for consideration in 2005 and 2006.

2. **Improve new and remodeled building efficiency by 5 percent.**

   Status: Achieved

   - The CEC adopted building energy efficiency standards for existing and new buildings, effective October 2005, and adopted appliance standards effective mid-April 2005, and subsequent years.
   - The CPUC and the CEC approved programs to provide standards for building tune-ups and retro-fits, and to install and to retrofit efficient lighting and HVAC systems.

3. **Improve air conditioner efficiency by 10 percent above federally mandated standards.**

   Status: Achieved

   - The CEC supported the successful multi-state lawsuit against the Federal Department of Energy's rollback of air conditioner standards through the state Attorney General's office, allowing all states to implement the ten percent higher standards.

- The CPUC approved programs to install energy efficient air conditioners, to improve ventilation, and to promote upgrades and enhancements in codes and standards.

4. **Make every new state building a model of energy efficiency.**

   Status: In Progress

   - The CPUC ordered IOUs to emphasize commercial and state building efficiency programs in their 2006-2008 program cycle as a step in implementing the Governor's Green Building Action Plan.
   - The CEC is developing a benchmarking methodology that would apply to all commercial buildings in California. The CEC is scheduled to submit the proposed methodology and implementation schedule to the Governor in September 2005.

5. **Create customer incentives for aggressive energy demand reduction.**

   Status: In progress

   - The CPUC established demand response and interruptible programs that provide customer incentives through bill credits or discounted rates, with 1,590 MWs of interruptible load available.
   - The CPUC established free energy audit services to help customers evaluate their demand response capability.
   - The CPUC authorized programs for IOUs and 3rd parties to offer rebates for energy efficient products such as lighting, fixtures, windows, coolers, HVAC and refrigeration systems, programmable thermostats, pool pumps and motor replacements.

6. **Increase local government conservation and energy efficiency programs.**

   Status: Achieved

   - The CPUC approved $49 million of partnership programs for local governments and schools to provide energy efficiency incentives, services, and education for customers in 2004 and 2005.
   - The CEC completed two bond issuances totaling $66 million to finance energy efficiency projects for local governments and schools.

7. **Incorporate, as appropriate per Public Resources Code section 25402, distributed generation or renewable technologies into energy efficiency standards for new building construction.**

   Status: In Progress

   - The CEC is investigating how solar generation can be included in the 2008 Building Energy Efficiency Standards.

II. Accelerate the State's Goal for Renewable Generation

1. **Add a net annual average of up to 600 MW of new renewable resources to the IOU's portfolios.**

   Status: In Progress

- IOU contracts filed in 2005 add between 285-586 MW[7] of new renewable generation, with contracts in negotiation for 2005 and 2006 pushing the total well over 600 MW.
- The 2002 and 2003 interim renewable solicitations resulted in over 620 MW in contracted capacity from existing renewable generation facilities.

2. **Establish key RPS implementation rules for IOUs by June 30, 2003.**

   Status: Achieved

   - The CPUC issued a decision on June 2003, that laid the foundation for the RPS program, and issued four additional decisions by July 2004, that set standard contract terms and conditions, established a benchmark price for contracts, created a methodology for calculating transmission costs, and developed an evaluation methodology for ranking RPS bids.

3. **Facilitate an orderly and cost-effective expansion of the transmission system to connect potential renewable resources to load.**

   Status: In Progress

   - In conjunction with the CEC's report on the location of renewable resource potential in California, the CPUC prepared a comprehensive transmission plan for conceptual facilities for wind, solar, geothermal and biomass renewable electricity generation.
   - Pursuant to CPUC order, SCE filed an application to build transmission to the Tehachapi region in anticipation of tapping 4,000 MW of wind resource potential. The CPUC is now processing the request.
   - The CPUC and the CEC established working groups to facilitate transmission projects to access renewable resources in the Tehachapi and Imperial Valley areas.

4. **Initiate the development of RPS compliance rules for energy service providers and community choice aggregators.**

   Status: In Progress

   - The CPUC held legal briefing and evidentiary hearings regarding ESP and CCA participation in the RPS, and posted a draft framework decision in June 2005.

5. **Coordinate implementation with all relevant state agencies and with municipal utilities to facilitate their achievement of the standard.**

   Status: In Progress

   - The CEC, CPUC, CPA and CAISO initiated a statewide renewables forum in 2004 and have held three coordination meetings.

[7] Some contracts allow the generators to increase output in an incremental fashion. Final output is determined by how many units are brought on line per contract.

- The CEC provides assistance to municipal utilities on an ad hoc basis and is tracking their progress towards meeting the EAP goals for renewables.

6. **Encourage companies that invest in energy conservation and resource efficiency to register with the state's Climate Change Registry.**

   Status: Achieved

   - The CEC and CPUC joined the Registry in order to lead by example.
   - In conjunction with other state agencies, the CPUC held an en banc in February 2005, to explore climate change issues and sent letters to CPUC-regulated entities encouraging them to join the Registry.
   - The CPUC issued a decision in April 2005, directing the IOUs to include marketing and outreach activities to support the Registry in their energy efficiency program plan applications.
   - The CEC provides technical assistance to the Registry on its reporting and certification protocols.

III. Ensure Reliable, Affordable Electricity Generation

1. **Add new generation resources to meet anticipated demand growth, modernize old, inefficient and dirty plants and achieve and maintain reserve levels in the 15 percent-18 percent range. Current estimates show a statewide need for 1500 – 2000 MW per year.**

   Status: In Progress

   - Since the EAP was adopted in March 2003, the CEC permitted 8,505 MW of new power plants, 6,269 MW of re-powered and new plants became operational, and 559 MW more will be online by the end of September 2005.
   - In January and October 2004, the CPUC adopted resource adequacy requirements for the IOUs and ESPs to secure a 15-17 percent planning reserve margin by June 2006.

2. **Finance a few critical power plants that the agencies conclude are necessary and would not otherwise be built. An estimated 300 MW of peaking capacity located in critical areas is needed to provide local reliability, help achieve adequate reserves, and reduce congestion and the need for new transmission lines.**

   Status: Achieved

   - Through the CPUC's procurement process, 500 MW of previously mothballed generation has returned to service in Southern California under IOU contracts.
   - Significant new generation is now under construction after timely contract and permit review and approval by the CPUC and CEC, respectively, including Mountainview (1,056 MW), Palomar (546 MW), and Otay Mesa (590 MW).

3. **Work with the CAISO to ensure the development of a workable, competitive wholesale energy market that has meaningful market power mitigation rules.**

   Status: In Progress

   - State agencies participate in the CAISO's Market Redesign and Technology Upgrade (MRTU) process scheduled to be implemented in February 2007, and have supported at FERC the CAISO's development of a new market model based on locational marginal pricing (energy pricing that incorporates the cost of transmission congestion) and which includes extensive market power mitigation.

4. **Monitor the electricity market to identify any exercise of market power and manipulation, and work to improve FERC-established market rules to correct any observed abuses.**

   Status: In Progress

   - State agencies participate in FERC proceedings, the CAISO Market Surveillance Committee, the Seams Steering Group of the Western Interconnection Market Monitoring Group to further the development of and to ensure adequate monitoring of electricity markets and to identify abuses of market power.

IV. Upgrade and Expand the Electricity Transmission and Distribution Infrastructure

1. **The agencies will collaborate, in partnership with other state, local, and non-governmental agencies with energy responsibilities, in the California Energy Commission's integrated energy planning process to determine the statewide need for particular bulk transmission projects. This collaboration will build upon the California Independent System Operator's annual transmission plan and evaluate transmission, generation and demand side alternatives. It is intended to ensure that state objectives are evaluated and balanced in determining transmission investments that best meet the needs of California electricity users.**

   Status: In Progress

   - The CPUC granted regulatory approval for construction of additional transmission on Path 15, the major interconnection between northern and southern California, and approved several other major transmission upgrades, including Miguel-Mission and Otay Mesa in San Diego and Jefferson-Martin on the San Francisco Peninsula.
   - State agencies collaborated on the CEC's 2003–2004 IEPR energy planning processes, which provided policies to improve the transmission planning and permitting processes.
   - State agencies are collaborating in the 2005 IEPR process to prepare a strategic transmission grid plan for the State with recommendations for transmission infrastructure investments.

- The CPUC and the CEC participate in the CAISO's annual transmission planning process of quarterly stakeholder meetings where projects are studied for one, five and ten year horizons, as proposed by PG&E, SCE, SDG&E, or by the CAISO.

2. **The Public Utilities Commission will issue an Order Instituting Rulemaking to propose changes to its Certificate of Public Convenience and Necessity process, required under Public Utilities Code § 1001 et seq., in recognition of industry, marketplace, and legislative changes, like the creation of the CAISO and the directives of SB 1389. The Rulemaking will, among other things, propose to use the results of the Energy Commission's collaborative transmission assessment process to guide and fund IOU-sponsored transmission expansion or upgrade projects without having the PUC revisit questions of need for individual projects in certifying transmission improvements.**

   Status: In Progress

   - The CPUC opened this rulemaking in January 2004, but the methodology to coordinate need determination between agencies remains under development in CAISO and CPUC forums.

3. **The Public Utilities Commission will ensure that IOUs build out and properly staff and maintain distribution systems to meet California's growth, provide reliable service, and stand ready to restore service after unplanned distribution system outages.**

   Status: In Progress

   - The CPUC authorized the IOUs in their recent general rate cases to increase spending by four to seven percent on capital additions for distribution infrastructure over the next three years, with an emphasis on improving reliability.

4. **The Energy Commission will work with municipal utilities to help ensure completion of transmission expansion or upgrade projects in their systems for which the collaborative transmission assessment process finds a need.**

   Status: In Progress

   - The CEC is assessing municipal utilities' transmission expansion plans and will recommend actions on near-term transmission projects (including municipal utility projects) in its November 2005 Strategic Transmission Investment Plan.

V. Promote Customer and Utility Owned Distributed Generation

1. **Promote clean, small generation resources located at load centers.**

   Status: Achieved

   - The CPUC adopted favorable rate policies for DG, including exemptions from stand-by and departing load charges, and expanded net metering.

- State incentive programs paid rebates leading to 116 MW of renewable and clean DG from the CPUC's Self Generation Incentive Program and 53 MW of primarily solar from the CEC's Emerging Renewables Program.
- The CPUC and the CEC streamlined interconnection rules, resulting in 487 MW of interconnected DG since January 2001, and resulting in an 80 percent reduction in the time to interconnect new distributed generation.

2. **Determine whether and how to hold distributed generation customers responsible for costs associated with Department of Water Resources power purchases.**

   Status: Achieved

   - The CPUC adopted a DG cost responsibility surcharge in April 2003, and provided exemptions for a capped amount of clean and large-scale DG, which the CEC manages, monitors, and publicly reports.

3. **Determine system benefits of distributed generation and related costs.**

   Status: In Progress

   - The CEC Public Interest Energy Research Program has invested over $19 million to quantify the system benefits and effects of interconnecting DG to the electric grid.
   - The CPUC and the CEC are developing a common DG cost-benefit methodology for utility procurement and planning processes, and for setting incentive levels for renewable and clean DG, with evidentiary hearings held in May 2005, and a decision expected by the end of 2005.

4. **Develop standards so that renewable distributed generation may participate in the Renewable Portfolio Standard program.**

   Status: Achieved

   - The CPUC determined that the owner of renewable DG facilities owns the renewable energy credits associated with the generation of electricity from those facilities and is eligible to participate in the RPS program.

5. **Standardize definitions of eligible distributed generation technologies across agencies to better leverage programs and activities that encourage distributed generation.**

   Status: In Progress

   - The CEC developed a working definition in the 2005 IEPR-related proceedings and the CPUC is developing a formal definition through evidentiary hearings, with a decision expected by the end of 2005.

6. **Collaborate with the Air Resources Board, Cal EPA and representatives of local air quality districts to achieve better integration of energy and air quality policies and regulations affecting distributed generation.**

   Status: In Progress

- The agencies are participating in the Cal EPA process to implement a 2007 DG Emission Standard.
- The CPUC adopted in May 2005 a program to encourage IOU agricultural customers to convert diesel pumping engines to electric service to improve air quality in the Central Valley.

7. **The agencies will work together to further develop distributed generation policies, target research and development, track the market adoption of distributed generation technologies, identify cumulative energy system impacts and examine issues associated with new technologies and their use.**

   Status: In Progress

   - EAP I formalized a long-standing CPUC/CEC Distributed Generation Collaborative.
   - The CEC completed a comprehensive set of recommendations to revise California's interconnection rules, and submitted them to the CPUC for public comment in February 2005. The CPUC expects to issue a decision on the recommendations in the third quarter of 2005.

VI. Ensure Reliable Supply of Reasonably Priced Natural Gas

1. **Identify critical new gas transmission, distribution and storage facilities needed to meet California's future needs.**

   Status: Achieved

   - The CEC initiated its 2005 Integrated Energy Policy Report, which includes an assessment of long-term natural gas infrastructure needs.
   - The CPUC adopted flexible interstate pipeline capacity contract approval procedures, and approved interstate pipeline capacity requirements for the Southern California Gas Company, San Diego Gas and Electric Company, and Pacific Gas and Electric Company.
   - Over 1,000 MMcfd of interstate pipeline capacity to California has been added, mainly due to Kern River expansion in May 2003.
   - Over 20 Bcf of storage capacity has been added since early 2002, and more capacity is expected in the next few years.
   - The CPUC and the CEC established a natural gas research and development program to facilitate more efficient use of natural gas.

2. **Monitor the gas market to identify any exercise of market power and manipulation, and work to improve FERC-established market rules to correct any observed abuses.**

   Status: In Progress

   - The CPUC and CEC have joined FERC investigations of price rises in early 2003, and early 2004, conduct monthly meetings to monitor infrastructure and market conditions, and prepare monthly reports summarizing California's natural gas infrastructure and operations.

- Agencies' efforts contributed to the FERC conclusion of the El Paso market manipulation case, resulting in customer refunds of hundreds of millions of dollars.

3. **Evaluate the net benefits of increasing the state's natural gas supply options, such as liquefied natural gas (LNG).**

   Status: In Progress

   - The CPUC adopted policy rules in September 2004 that establish a level playing field for consideration of new natural gas supplies from LNG, and adopted procedures by which natural gas utilities would obtain new contracts with LNG suppliers.
   - The CEC prepared a report in early 2005 of existing safety rules and regulations governing LNG terminals, and updated its long-term outlook on natural gas demand and supplies available to California.
   - The CEC chairs monthly meetings of the LNG Interagency Working Group to ensure a smooth flow of information from all perspectives on LNG issues affecting California.

4. **Support electric utilities and gas distribution companies entering into longer-term contracts as a hedge against volatile and high spot market prices.**

   Status: In Progress

   - The CPUC has not taken specific actions to encourage additional long-term physical natural gas supply contracts as a policy and instead has encouraged natural gas and electric utilities to use financial instruments and storage to hedge against volatile spot market natural gas prices in order to meet this policy objective.

2008 UPDATE

ENERGY ACTION PLAN

State of California

Arnold Schwarzenegger, Governor

February 2008

February 2008

In 2003, the California Public Utilities Commission, the California Energy Commission, and the California Power Authority adopted an *Energy Action Plan* that was, in essence, a post-energy-crisis call-to-action. It articulated a single, unified approach to meeting California's electricity and natural gas needs. That plan had an enormous impact – it represented the first time the energy agencies had described a common, unified approach to further the state's energy policy goals.

In 2005, the Energy Commission and the Public Utilities Commission adopted a second plan, *Energy Action Plan II*, to reflect the policy changes and actions of the ensuing two years.

Now, at the beginning of 2008, we don't find it necessary or productive to create a new *Energy Action Plan*. The state's energy policies have been significantly influenced by the passage of Assembly Bill 32, the California Global Warming Solutions Act of 2006. The Energy Commission's *2007 Integrated Energy Policy Report (IEPR)* advanced policies that would enable the state to meet its energy needs in a carbon-constrained world. The report also provides a comprehensive set of recommended actions to achieve these policies.

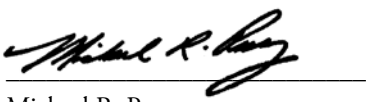
The Public Utilities Commission has a number of proceedings before it that will define its post-AB 32 energy strategies. In addition, the two agencies will, within a matter of months, make a joint recommendation to the California Air Resources Board on the implementation of AB 32 in the electricity sector.

Rather than produce a new *Energy Action Plan*, we have prepared instead an "update" that examines the state's ongoing actions in the context of global climate change. We prepared the update using the information and analysis prepared for the recent *IEPR*, as well as recent Public Utilities Commission decisions.

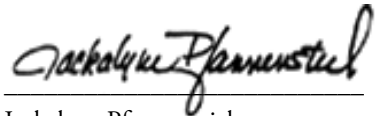
With California's commitment to reducing greenhouse gas emissions as the backdrop, we examined needed changes in the following policy areas:

- Energy efficiency
- Demand response
- Renewable energy
- Electricity reliability and infrastructure
- Electricity market structure
- Natural gas supply and infrastructure
- Research and development
- Climate change

We look forward to our agencies continued work together to accomplish our goals in all of these areas. This joint *EAP Update* serves as a guidepost to help us chart a course to a lower-carbon energy future.



Michael R. Peevey
President
California Public Utilities Commission



Jackalyne Pfannenstiel
Chairman
California Energy Commission

Energy Action Plan 2008 Status Update

Introduction and Summary

The first Energy Action Plan (EAP) emerged in 2003 from a crisis atmosphere in California's energy markets. The state's three major energy policy agencies (the California Public Utilities Commission, the California Energy Commission, and the Consumer Power and Conservation Financing Authority [established under deregulation and now defunct]) came together to develop one high-level, coherent approach to meeting California's electricity and natural gas needs.

There were several reasons for the impact of the original *EAP*: it was the first time that energy policy agencies formally collaborated to define a common vision and set of strategies. It was also the first time a "loading order" to address California's future energy needs was articulated. The "loading order" established that the state, in meeting its energy needs, would invest first in energy efficiency and demand-side resources, followed by renewable resources, and only then in clean conventional electricity supply. This concept is now widely understood and respected both nationally and internationally. Further, the *EAP* was the first joint energy document that emphasized the importance of the impacts of energy policy on the California environment, although energy policy and the environment have long been closely intertwined.

The *EAP* was and is a "living" process, subject to change and updating over time. More than just a document, the *EAP* initiated a collaborative governmental process among the relevant institutions, to cooperate and coordinate activities in support of common goals.

In the October 2005 *Energy Action Plan II*, the Energy Commission and the Public Utilities Commission updated their energy policy vision by adding some important dimensions to the policy areas included in the original *EAP*. The emerging importance of climate change was first highlighted in *EAP II*; transportation-related energy issues and research and development activities were also added. In addition, with *EAP II*, the California Independent System Operator (California ISO) began a collaborative role with the Energy Commission and the Public Utilities Commission.

The *EAP II* brought together a coordinated implementation plan for state energy policies that had been articulated in various Governor's Executive Orders, the Energy Commission's *Integrated Energy Policy Report (IEPR)*, Public Utilities Commission and Energy Commission proceedings, and legislative direction.

This update keeps the *EAP* process alive and current. As in the past, it is not assumed that the work undertaken in *EAP I* or *EAP II* is complete. Further, this document does not supersede or replace the extensive efforts in the *2007 IEPR* or Public Utilities Commission proceedings. The *IEPR* remains the overall guiding document on energy policy. The *EAP* is intended to capture recent changes in the policy landscape and describe intended activities to accomplish those policies.

At the end of each section below, we provide a snapshot of our recent accomplishments and our remaining challenges and next steps is provided.

Climate Change

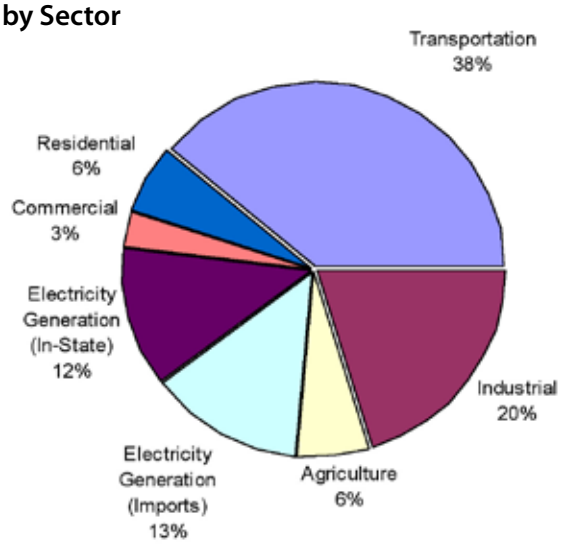
The most important development in California energy policy in the past two years, if not the past several decades, is the arrival at consensus that California must act to decrease its greenhouse gas emissions to reduce the impact of climate change. In 2006, the Legislature passed and the Governor signed two landmark pieces of legislation with far-reaching implications for energy policy.

The most comprehensive is the Global Warming Solutions Act of 2006, Assembly Bill 32, (Núñez, Chapter 488, Statutes of 2006) which sets an economywide cap on California greenhouse gas emissions at 1990 levels by no later than 2020. This is an aggressive goal that represents approximately an 11 percent reduction from current emissions levels and nearly a 30 percent reduction from projected business-as-usual levels in 2020. Figure 1 illustrates that 25 percent of the state's greenhouse gas emissions is attributable to electricity generation while 38 percent is attributed to the transportation sector.

Meeting this goal requires the cooperation and teamwork of multiple sectors of the California economy, including the electricity, natural gas, and transportation sectors.

The second important piece of climate change legislation from 2006 is Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006), which requires the Public Utilities Commission and the Energy Commission to implement an emissions performance standard for all retail providers of electricity in the state. For any long-term commitment (five years or longer) to buy or build generation to serve California retail customers, emissions must be limited to 1,100 pounds of carbon dioxide (CO_2) per megawatt-hour of electricity delivered. This is roughly equivalent to the emissions from a new combined-cycle natural gas turbine. The law also provides for the possibility that the CO_2 emissions from a generator could be permanently captured and stored, thus not counting toward the performance standard limit for that generator.

figure 1
California 2005 Greenhouse Gas Emissions by Sector



Source: California Air Resources Board

Both of these laws acknowledge what California energy regulators have known for years: that energy policy and environmental policy are inextricably linked. For more than 30 years, California has had aggressive energy efficiency and renewable energy policies to minimize the impact of energy consumption on the environment. California's aggressive motor vehicle air quality standards have long exceeded the minimum federal requirements, and the state continues to push the federal government to allow us to keep exceeding those standards.

In large measure, California's programs have been motivated by concerns about the environment. Those concerns are embodied in the context of global climate change. California's Climate Change Research Center states that during the last 50 years, winter and spring temperatures have been warmer, spring snow levels in lower and mid-elevations have dropped, the snowpack has been melting one to four weeks earlier, and sea levels are projected to rise. Not only will there be a change in average temperatures, but there is a projected increase in extreme conditions such as a rising incidence of "heat storms." While these trends will impact all of us, they will have an especially large consequence for California's agricultural industry.

The impact on the energy infrastructure in the state is likely to be significant as well. Lower levels of snowpack and associated decreases and changes in the spring runoff will affect hydroelectric generation. A large number of critical power plants are located at sea level along the California coast to take advantage of nearby cooling water, and even small rises in sea level will affect those facilities. Increased use of air conditioning in homes, especially those built farther inland and away from coastal areas, creates rising demand for electricity, as well as additional load on transmission and distribution lines to transport power to these areas. This increase in inland home construction also creates a feedback effect in terms of increasing emissions from automobiles traveling greater distances to transport people to work in urban coastal areas.

In addition to all of these local impacts, Californians are increasingly cognizant of the emerging impacts of climate change on the whole planet. As a coastal state, a significant majority of the world's population lives close to the sea in urban areas that are both vulnerable to weather patterns and highly dependent on agricultural production to sustain their lives.

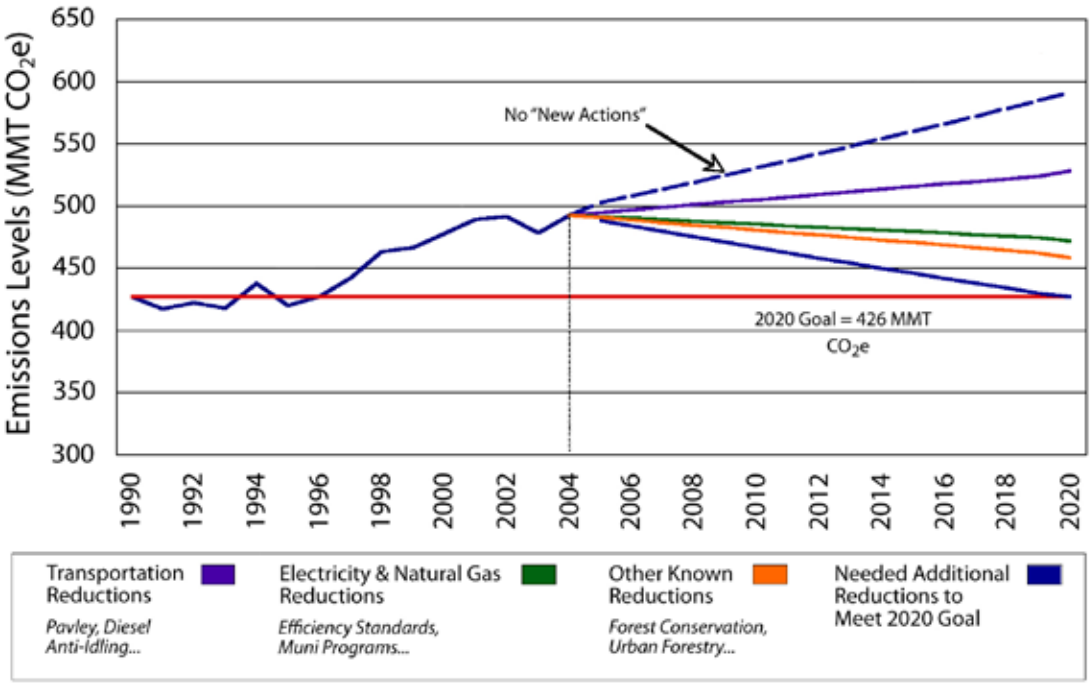
Given the emerging impact of climate change on California, and our history as environmental leaders in energy policy, we are well-positioned to take action now to mitigate our greenhouse gas emissions. Some have downplayed the impact that one state can have on such a global problem, especially a state that already has relatively low emissions. But the state's efforts should be placed in context.

The United States is the single largest emitter of greenhouse gases in the world. China is a fast-growing second. If California were itself an independent country, depending on the year, it would be somewhere between the ninth and sixteenth largest emitter in the world.

California per capita emissions are roughly five times that of China and twelve times that of India, though still only two-thirds of the U.S. average.

Although California's electricity-related emissions are significantly lower on a per capita basis than the U.S. average, our vehicle-related emissions are about the same as the nation's. Implementing the Low Carbon Fuel Standard, the state's Alternative's Fuels Plan, and the tailpipe emission reduction regulations called from in Assembly Bill 1493 (Pavely, Chapter 200, Statutes of 2002) will help to reduce the transportation sector's impact on climate change.

Figure 2.
Reaching for the AB 32 Target



Source: California Energy Commission

What all of this means is fairly simple: we are a significant part of the problem and can be a significant part of the solution. In general, our clean energy policies, begun more than 30 years ago and already reflected in the first two *Energy Action Plans*, are now even more important as strategies to reduce greenhouse gas emissions. Our involvement in and governance of all activities in the regulated energy sectors in California now operate within the context of their impact on climate change context. Decisions about issues seemingly unrelated to environmental issues, such as market structure or pricing considerations, must now be made with an eye toward their impact on climate change.

In addition, our activities are now more interrelated. Particularly in the electricity industry, regulatory structure differences are increasingly taking a back seat to our pursuit of a common goal. Investor-owned utilities, publicly owned utilities, electric service providers, independent generators, and many other industry players all have important and similar roles to play in reducing California's electricity-related greenhouse gases. We are increasingly moving to an industry in which environmental responsibility will be a condition of delivering energy services to consumers, regardless of regulatory structure.

In the remaining sections of this document, we put our activities in this climate change context and articulate our commitment to concrete actions, now and in the future. These actions will help us lower greenhouse gas emissions from the use of energy in California and adapt the energy sectors to the impacts of climate change already occurring.

Specific Action Areas

Below, we describe the nine major action areas called out in the previous *EAP*, including:

- Energy efficiency
- Demand response
- Renewable energy
- Electricity adequacy, reliability, and infrastructure
- Electricity market structure
- Natural gas supply, demand, and infrastructure
- Transportation fuels supply, demand, and infrastructure
- Research, development, and demonstration
- Climate change

Need for coordination and integration

In this update, we note that there is an increasing need for coordination and integration our agencies' overall actions across all of the targeted resource areas. A number of these areas involve strategies that individual consumers can use to manage their energy expenditures, as well as reduce their individual contributions to greenhouse gas emissions.

Some of the areas for coordination and integration are obvious. For example, consumers make decisions about the types of appliances to purchase for their homes, as well as when to use them. Therefore, coordination among our energy efficiency and demand response programs makes sense. Consumers also make decisions about investing in clean distributed generation, such as solar hot water or solar photovoltaic systems. Thus, integrating and coordinating energy efficiency and distributed generation programs is essential to allow customers to gain the largest benefit from their expenditures. In many cases, consumers can take advantage of financial assistance for these types of investments that are being offered through their local utility companies under the leadership of the Energy Commission and the Public Utilities Commission.

Broadening perspectives and the focus of action

Some emerging needs for integration, however, are more complex. Increasingly, we realize that overall societal and demographic trends can dwarf our efforts to encourage individual consumer investments in clean and efficient energy services. To truly reduce our energy and transportation-related greenhouse gas impacts, we need to change the way we think about our approach to community development and economic growth.

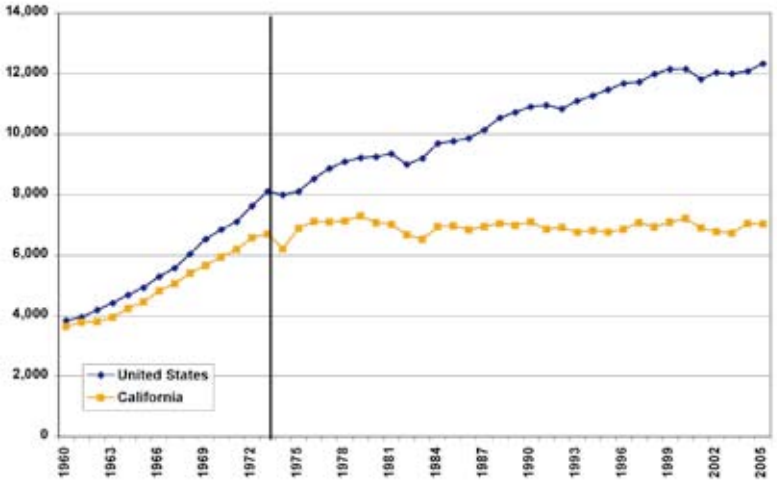
Decisions about community planning and land use, as well as transportation infrastructure and electricity infrastructure, have a dramatic impact on our ability to decrease our greenhouse gas emissions. Many of these types of long-term infrastructure decisions are made at the local level and are not governed by our energy agencies. Truly reducing our greenhouse gas footprint will require new and strengthened partnerships with local governments, as well as developers and builders in the private sector.

Leverage through partnerships

In addition, partnerships with industry in California will become increasingly important. Although most state industrial production is dominated by relatively light industry, some energy-intensive industries still remain, including cement and glass production, as well as agricultural processing and petroleum refining. By encouraging utilities to partner with these types of energy consumers, we can increase our chances of meeting our greenhouse gas goals together.

In addition, there is an unprecedented amount of collaboration occurring among not only California's energy agencies, but also with other agencies such as the California Air Resources Board and California Environmental Protection Agency, as we jointly seek methods to reduce greenhouse gas emissions in the state.

Figure 3
U.S. v. California Per Capita Electricity Sales



Source: California Energy Commission

Cross-sectional options

Finally, the climate change challenge is encouraging us to break out of our "silos" like never before. Investment in conventional transmission infrastructure is crucial to helping the state meet its renewable energy goals. One of the most promising solutions to transportation emissions involves using plug-in hybrid electric vehicles and all-electric vehicles to reduce transportation emissions, but it will simultaneously increase electricity load in the state. These and many other integrated and interactive effects will be crucial to our understanding and success at achieving our goals.

Energy Efficiency

The most important tool for addressing greenhouse gas emissions in the energy sector is energy efficiency. Of the strategies identified in the April 2006 *California Climate Action Team Report*, nearly one-quarter of the emissions reductions identified from existing or known strategies in 2020 would come from some form of energy efficiency investment, either through improved building codes or appliance standards, utility energy efficiency programs, or smart growth strategies.

By definition, energy efficiency is a zero-emissions strategy, and also a least-cost strategy. Requirements for building codes, appliance standards, and utility energy efficiency investments must be cost-effective. Theoretically, as the provision of energy becomes more expensive, and as the price of greenhouse gas emissions reductions is increasingly incorporated into the cost of energy, more energy efficiency and demand-side investments will become cost-effective.

Meeting our AB 32 goals will require, under any scenario, unprecedented levels of energy efficiency investment. This necessitates a more rigorous examination of our energy efficiency options and the setting of more aggressive energy efficiency goals.

Below we have included one of California's famous graphics of success in energy efficiency. As Figure 3 indicates, electricity use per person in California has remained relatively stable over the past 30 years, while nationwide electricity use has increased by about 50 percent.

While this stabilization of per capita electricity use is something we are proud of, it is not nearly enough to meet our AB 32 goals. To address this emissions reduction challenge for electricity, we will need to bend this curve downward, because, among other reasons, the population of California continues to grow rapidly, causing overall electricity use in the state to continue to rise by between one and two percent every year.

Assembly Bill 2021 (Levine, Chapter 734, Statutes of 2006) required the Energy Commission, in collaboration with the Public Utilities Commission and the publicly owned utilities, to set statewide energy efficiency targets for 2017. After consideration in the 2007 IEPR process, the Energy Commission concluded that the goal for the state should be to achieve all cost-effective energy efficiency.

It should also be noted that energy efficiency is also our most powerful strategy for addressing greenhouse gas emissions from the natural gas sector. In addition to the natural gas burned to produce electricity in California, a great deal of natural gas is also burned in the industrial, commercial, and residential sectors in the state. Emissions from these sources can be reduced substantially through increased energy efficiency.

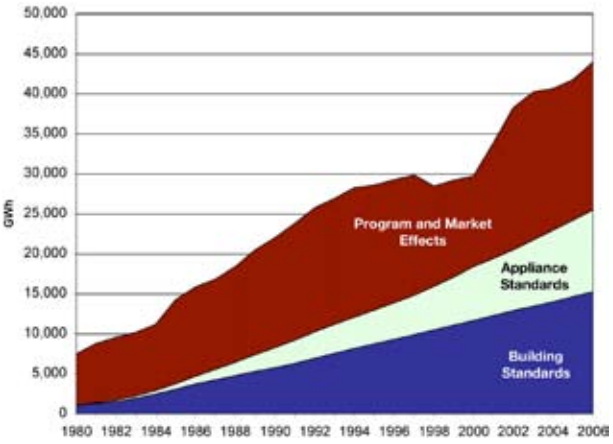
As noted below, our three most powerful strategies for increasing energy efficiency have been: building codes, appliance standards, and utility energy efficiency programs. Figure 4 below shows the contribution that each of these three strategies has made to overall energy savings from 1975 to 2006.

As Figure 4 indicates, while both appliance and building standards are wedge-shaped and have continued to grow in size since their adoption, the contribution from utility energy efficiency programs has remained about the same since the mid-1980s. This suggests several things. First, utilities have likely invested in relatively short-lived energy efficiency measures such as lighting that need to be replaced more frequently, such that the cumulative energy efficiency savings is not that great. Second, as with the per-capita trend in Figure 3, to meet the AB 32 emissions reduction goals, our success with these programs will need to increase more rapidly in the next few years.

It should also be noted that Figure 3 above includes data only from investor-owned utilities. While some publicly owned utilities have meaningful energy efficiency programs and success rates, others do not, and their service areas may represent the largest untapped potential for energy savings in the state.

In addition, it will not be enough to replicate current strategies for delivery of energy efficiency options to consumers. To meet the AB 32 goals, we will need to employ new and innovative approaches not yet

Figure 4
Cumulative Conservation Savings 1980–2006



Source: California Energy Commission

tried. Toward this end, the Public Utilities Commission launched a strategic planning process to develop comprehensive, long-term strategies for sustainable energy efficiency savings to achieve the ultimate goal of making energy efficiency a way of life for Californians. The Public Utilities Commission and the Energy Commission envision "big, bold" programmatic initiatives within the overall statewide strategic plan designed to achieve zero-net-energy homes by 2020 and zero-net-energy commercial buildings by 2030. This will be a huge challenge by itself, but it may be one of the easier ones we will take on. The community of builders and developers in California is relatively discrete, and we can envision partnerships to make these goals happen for new buildings.

Improving the efficiency of existing buildings will be an even bigger challenge. Current rebate programs have not been adequate to capture all cost-effective energy savings in the existing building stock. Increasingly, utilities will need to present their customers with comprehensive packages and strategies that address all of their energy needs. Consumers will need information, audits, appliances, insulation, ventilation system upgrades, renewable self-generation, solar hot water heating, cool roofs, or many other options. Many state and local governments have set targets to achieve efficiency in their own buildings. The advent of the U.S. Environmental Protection Agency ENERGY STAR® and the U.S. Green Building Council LEED designation for existing buildings both lend substantial support to the slow emergence of market demand to own and operate efficient buildings. In addition, the Legislature is expected to consider whether to require energy efficiency upgrades for buildings at the time of sale. We should also note the emergence of new legislative initiatives such as prohibiting inefficient lighting sales and requiring building owners to give energy efficiency benchmark data to buyers and tenants starting in 2010.

To ensure that the investor-owned utilities meet these energy efficiency goals and challenges, the Public Utilities Commission recently authorized a risk/reward mechanism to allow utilities to earn financial rewards for meeting or exceeding their goals and includes penalties for not reaching goals. This regulatory approach should give utilities a strong incentive to go beyond traditional approaches to energy efficiency to achieve even greater savings. This mechanism will give utilities equal opportunities to earn profit, whether they are investing in energy efficiency or supply resources to create a truly level playing field.

Finally, with the population and economic growth occurring in California, it simply will not be enough to be more efficient with energy use. We actually need to reduce overall energy use. Making this happen will require better planning and smart growth strategies, in partnership with local governments. We will also need the help of local governments to ensure that more stringent building codes adopted by the Energy Commission are enforced.

Table 1
Energy Efficiency Accomplishments and Next Steps

Accomplishments

Adoption of aggressive energy efficiency goals by both agencies

Institution of long-term strategic planning for energy efficiency programs

Energy Commission building and appliance standards being upgraded on a regular schedule

Endorsement by both agencies of zero net energy homes by 2020 and zero net energy commercial buildings by 2030

Adoption of a risk-reward mechanism for investor-owned utilities to earn incentives for investment in energy efficiency

Adoption of energy efficiency requirements for customers participating in solar incentive programs

Next Steps

Statewide strategic plan that will service as a "roadmap" of actions needed to achieve all cost-effective energy efficiency potential in California

Strategies to achieve targets for "big bold" initiatives in residential and commercial new construction, and in heating, ventilation, and air conditioning systems

New strategies to address existing buildings, going beyond current utility programs and emphasizing a more comprehensive approach

Partnerships with local governments on energy efficiency delivery, as well as enforcement of building codes

Utility 2009-2011 efficiency program portfolios consistent with and supportive of the statewide strategic plan

Energy savings goals through 2020, consistent with AB32, for both IOUs and POUs

Additional, more stringent, codes and standards for appliances and buildings and the associated technology and design research and development to support them

Local government support in building code enforcement

Additional low-income energy efficiency initiatives

Demand Response

According to Energy Commission forecasts, while energy usage in the state is growing at 1.25 percent per year, peak demand is growing even faster, at 1.35 percent annually. This means that the need is increasingly for peaking generation that runs only a small number of hours every year, primarily during the summer months. Such generation is typically less efficient than most base load power plants. This means that peaking units contribute disproportionately not only to greenhouse gas emissions but to local air pollution because they operate during hot summer afternoons when local air quality can be poor. Thus, our emissions reduction mandates clearly require the consideration of more demand response options to help meet our AB 32 goals.

Since *EAP II*, we have made significant progress toward providing the metering infrastructure required to support stronger demand response policies. Two of our major investor-owned utilities are installing advanced metering infrastructure throughout their territories, and the third has made a proposal that is under evaluation. Some publicly owned utilities are also making or exploring investments in advanced metering infrastructure in their service areas. Around 2010, the majority of consumers in the state will have meters that can measure electricity, and in some cases natural gas, use every 15 minutes or at least every hour.

To meet our policy goals, it is imperative that we develop understandable and transparent dynamic pricing tariffs and demand response programs that operate with these tariffs. The first *EAP* set a goal of five percent of peak demand to come from price response from consumers by 2007. We are nowhere near that goal and must reinvigorate our efforts in this area.

The investor-owned utilities have also made strides in recent years to improve their demand response program offerings to consumers. Because air-conditioning use is the primary contributor to the growth in peak electricity demand, the utilities have increased their emphasis on air conditioner cycling programs. Heat storms in recent years have also emphasized the importance of load-shedding programs that relieve stress on overheated transmission and distribution infrastructure.

The availability of advanced meters is a necessary underpinning for more sophisticated approaches to demand response. The communications infrastructure to support the advanced meters is also important to provide two-way information to and from consumers about their energy use.

Many challenges lie ahead in tapping the demand response potential in the state. Some of those challenges and opportunities are discussed below.

As with energy efficiency, participation by publicly owned utilities will be very important to shaving overall peak demand. In addition, the California Independant System Operator (ISO) can be instrumental in incorporating demand response policies and appropriate operational rules at the wholesale level thereby allowing aggregated demand-side resources to be scheduled on the system along-side conventional generation. The California ISO has made some initial progress in this area, and more is anticipated in the short term.

In addition, more can be done to pair advanced meters with communications and other automatic infrastructure that allow consumers to more easily adjust their appliances in homes and buildings.

Finally, the area of greatest remaining challenge for demand response policy is in the development of dynamic pricing tariffs. Generating electricity at peak times is more expensive than base load power. Therefore, if consumers were required to pay more for electricity at peak times, it would produce an incentive

to reduce use during those periods. However, some of our other policies are potentially dampening this effect. In our efforts to ensure reliability and electric resource adequacy, we are requiring reserve margins and capacity under contract that may reduce the cost increases and volatility of prices at peak times.

In addition, and most importantly, most consumers are currently on tariffs that bear no resemblance to the actual cost of providing their electricity. Most residential consumers, in particular, see no increase in energy costs at peak times. Although they are encouraged to conserve energy overall through tiered tariffs where higher usage costs more, there is no time dimension to their prices that would help encourage reducing usage at peak times when electricity is the most expensive.

There is a serious legislative impediment to moving residential customers onto dynamic rates. Enacted during the height of the energy crisis of 2000/2001, AB 1X caps residential electricity usage under 130 percent of baseline amounts at the then-existing rates. This was motivated by a desire to protect vulnerable consumers from potential rate increases but instead has had the effect of moving residential tariffs farther away from their relationship to underlying costs. Under this provision of AB 1X (now Water Code 80110), the Public Utilities Commission is constrained in modifying rate structures to have a time variable dimension. This impedes efforts to encourage demand response from customers who should participate. We believe the Legislature can modify this provision to allow time-differentiated rates while still protecting the most vulnerable consumers.

We also should be moving toward more time-differentiated default rates for larger consumers, with the ability of those customers to opt out of these types of rates if they are willing to pay a higher flat rate (essentially a slight premium for the insurance of predictability in their tariffs).

The Energy Commission has opened a proceeding to examine how its legislative authority to adopt load management standards for the state can be used to accelerate our pace of demand response. In addition to being able to integrate technology and tariff innovations, the Energy Commission's standards would be applicable to publicly owned utilities.

Table 2
Demand Response Accomplishments and Next Steps

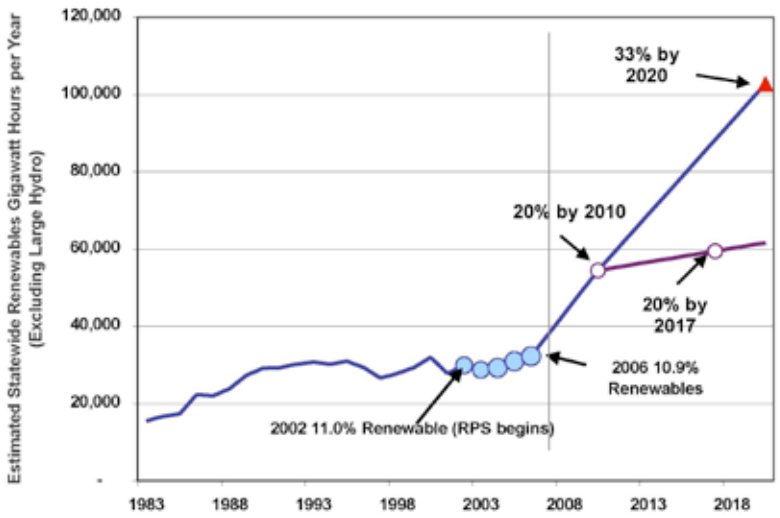
Accomplishments

- Advanced metering installation in progress
- Investor-owned utility continuous improvement in demand response program offerings

Next Steps

- Adopt load-management standards to establish a demand-response infrastructure
- Legislative authorization for time-varying pricing for residential consumers
- More progress on dynamic pricing rate design reform for all types of consumers
- Programs that utilize advanced metering, tariff, and other automated demand response infrastructure
- Modify retail programs so that they can more fully participate in the California ISO's new wholesale market structure
- Develop a load impact and cost-effectiveness protocol for demand response programs

Figure 5
Progress Toward California's Renewable Energy Goals



Source: 2007 *Integrated Energy Policy Report*

Renewable Energy

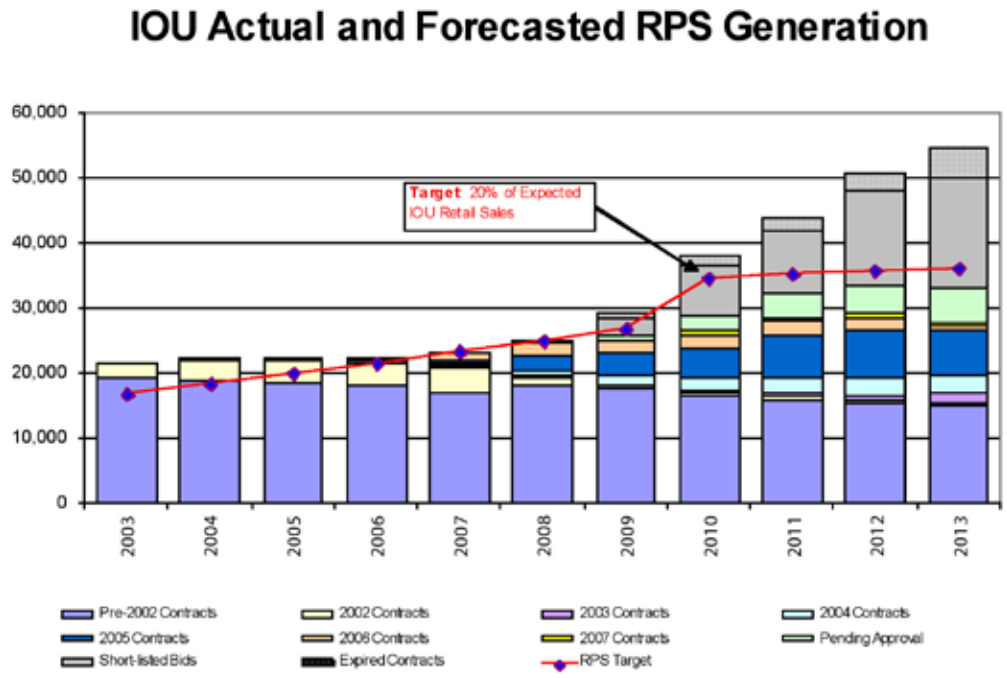
Renewable energy policy is a cornerstone of our approach to reducing greenhouse gas emissions in the electricity sector. In the first *EAP*, we committed to reaching 20 percent renewables in California by 2010, seven years ahead of the statutory deadline at that time. The Legislature agreed and moved up the deadline for investor-owned utilities. In *EAP II*, we are committed to working together to evaluate the potential for making 33 percent of the power delivered in California renewable by 2020.

Today, we strengthen our commitment to increasing the electricity generation from renewable energy in California and throughout the West. Since our Renewable Portfolio Standard (RPS) was adopted, most other states in the West have also adopted RPS requirements. To meet the AB 32 emissions reduction goal in 2020, or the even more aggressive goal suggested by the Governor's executive order S-3-05 for 2050, we will need to maximize the development of renewable resources throughout the West.

Figures 5 and 6 detail our progress toward our RPS goals so far. Figure 5 shows that while the amount of renewables has increased, so has the load, so we are at about the same percentage of renewables as we were when the program began.

Figure 6 indicates that while we will likely not make 20 percent renewables by 2010, we will be close if the generation under contract is achieved. Furthermore, many of the approved projects still must successfully overcome project development obstacles, such as permitting, siting, and the development of new transmission. To achieve a 33 percent goal, we need to implement some aggressive programmatic changes.

Figure 6
RPS Generation Forecast



Source: California Public Utilities Commission

The *2007 IEPR* describes a number of obstacles that impede our ability to reach our RPS targets and makes recommendations for their removal. The first obstacle that was highlighted was the lack of transmission access from the areas rich in renewable resources to the load centers. The *IEPR* noted a number of efforts underway to mitigate the problems with transmission siting, most encouragingly, the creation of the Renewable Energy Transmission Initiative, which is a statewide planning collaborative among the Public Utilities Commission, Energy Commission, California ISO, and a number of public power entities to identify and plan for the development of renewable energy zones within California. Further, the *IEPR* urged a joint consideration by our two agencies of a feed-in tariff for all renewable energy projects to replace the cumbersome, opaque contracting process that renewable developers face.

To help us, the Legislature must remove the prohibition against any requirement for the utilities and other electric service providers to go beyond 20 percent renewables, and publicly owned utilities also must be part of the RPS program. The Sacramento Municipal Utility District has always been a leader in the use of renewable resources. The Los Angeles Department of Water and Power and the Imperial Irrigation District have also made recent commitments to increasing renewable generation. Other publicly owned utilities should be required to follow suit.

To meet our ambitious goals, we will need to include new renewable technologies. We will discuss this more below in the section on research, development, and demonstration. Meanwhile, several existing technologies promise to become even more important. Very important among those is solar, since California has an abundance of powerful sunlight.

First, we have made a large investment in solar photovoltaic potential through the California Solar Initiative. With our move to a stand-alone solar program for consumers in 2007, we have already received applications this year alone for more capacity than had been installed in California to date. We stand to nearly double California's photovoltaic stock by mid-2008. In addition, we have adopted guidelines that reflect the state's loading order and newly adopted goals aspiring to zero-net energy buildings by requiring significant investments in energy efficiency as part of our solar investment. This is an encouraging start to our newly revamped distributed solar approach.

We also believe there is a great deal of potential for solar water heating. In 2007, the Solar Water and Heating Efficiency Act of 2007, was passed to create a broad market for solar water heating technologies by offering $250 million in rebates for the state's consumers over the next ten years that will be implemented by the Public Utilities Commission. This year we will evaluate the creation of a program to encourage installation of solar water heating systems throughout the state.

There is also a tremendous potential for utility-scale solar facilities in California. The Energy Commission and the Federal Bureau of Land Management have signed a memorandum of understanding to facilitate permitting of these facilities. Projects representing more than 30,000 megawatts of solar have initiated discussions about development. A number of these projects have agreements with utilities to provide power under RPS contracts and have begun the licensing process at the Energy Commission. As many of the best wind energy and geothermal energy sites in California become built out, we expect increasingly to be relying on large-scale solar energy to meet our renewable goals.

Table 3
Renewable Energy Accomplishments and Next Steps

Accomplishments

Strong progress in contracting resources to achieve 20% renewables in 2010

Launch of interagency Renewable Energy Transmission Initiative

Surge in applications to install solar photovoltaics in 2007

Growing participation of utility-scale solar thermal in RPS solicitations

Enrollment of 1,777 MW statewide in emergency demand response programs and 1,106 MW in price-triggered demand response programs

Next Steps

Examine adoption of load-management standards to establish a demand-response infrastructure

Seek Legislative authorization for time-varying pricing for residential consumers

Implement dynamic pricing rate design reform for all types of consumers

Consider programs that utilize advanced metering, tariff, and other automated demand response infrastructure

Modify retail programs so that they can more fully participate in the California ISO's new wholesale market structure

Develop a load impact and cost-effectiveness protocol for demand response programs

Issue decisions on remaining advanced metering proposals.

In addition, due to our abundant agricultural activity in California, we also benefit from the availability of biomass and biogas resources that can be used for energy production. Governor Schwarzenegger recognized the important benefits of bioresources by signing Executive Order S-06-06, setting a target for biomass to comprise 20 percent of the state's Renewables Portfolio Standard for 2010 and 2020, and requiring minimum percentages of biofuels be produced within the state. The Energy Commission reported on progress on these targets in the *2007 IEPR*.

We face operational challenges in achieving our renewable energy goals. Wind energy comprises a significant amount of the new renewable resources being developed but is intermittent in nature, which presents integration issues that the California ISO can help solve.

Finally, we face some key policy design questions as we contemplate increasing our reliance on renewable energy. For a number of years, the Public Utilities Commission and the Energy Commission have been considering the use of renewable energy credits or certificates (RECs) to help facilitate compliance with the RPS. Questions also remain about the potential overlap between a carbon market and a REC market in California that will need to be thoughtfully addressed.

Electricity Adequacy, Reliability, and Infrastructure

As we seek a cleaner energy future in pursuit of our AB 32 goals, we remain cognizant of our responsibility to ensure the reliability of our system. Even with energy efficiency, demand response, and renewable resources, investments in conventional power plants and transmission and distribution infrastructure will still be needed.

So far, we have succeeded in putting into place a resource adequacy framework for the state. We have also streamlined transmission-permitting processes and established an approach to corridor designation. In addition, the Public Utilities Commission recently resolved its pricing policy for qualifying facilities (QFs).

Considerable work remains in a number of areas. In *EAP II*, we identified the desirability of repowering aging power plants in the state, using access to existing transmission while upgrading the efficiencies of the plants. There are significant potential benefits to California from both a reliability and a greenhouse gas emissions perspective.

In addition, new combined heat and power applications could play a large part in avoiding future greenhouse gas emissions due to the combined efficiency of the heat and power portions of the project. The *2007 IEPR* contains policy support for such installations. Other forms of distributed generation, even if not renewable, can also have benefits over centrally

Table 4
Electricity Adequacy, Reliability, and Infrastructure Accomplishments and Next Steps

Accomplishments

- Resource adequacy framework for IOUs and POUs
- QF pricing policy for IOUs
- Transmission corridor designation process

Next Steps

- Evaluating the need for a combined heat and power policy
- Encouraging technological development for carbon capture and sequestration

located generation that suffers from transmission and distribution line losses. Distributed generation can also help support grid reliability.

Finally, we recognize that some new fossil-fueled generation is probably in our future as well. Over the last decade and at present, the majority of such generation under development is natural gas. But we recognize that our goals become more stringent after 2020 and we will need to continue reducing our emissions until 2050 and probably beyond. Investments we make now will have long lifetimes, and we need to ensure that their emissions are as low as possible. Therefore, we hope that advances can be made over the next few years in the utilization of carbon capture and sequestration techniques, to ensure that even when a power plant emits greenhouse gases, they can be captured permanently without being allowed to escape into the atmosphere. We support the development of carbon capture and sequestration technologies through additional policies and demonstration efforts, as well as continued research and development. This breakthrough is crucial given the abundance of coal generation worldwide.

Electricity Market Structure

A number of initiatives on electric market structure are underway in California; we remain committed to completing them although, being cognizant that Californians pay some of the highest utility rates in the nation, we are equally committed to holding down customers' costs. Below, we discuss three activities that are helping to moderate the cost pressures.

First, the California ISO is about to implement its Market Redesign and Technology Upgrade to reform California's wholesale electricity market and to ensure adequate market power mitigation to protect California consumers.

Next, the Public Utilities Commission is investigating the potential to reopen the retail market for direct access to allow consumers to choose electricity providers. That option already exists for cities to undertake community choice aggregation for electricity services.

Finally, the Public Utilities Commission and California ISO are investigating the potential for the development of a centralized capacity market for California, which could create tradable capacity rights and obligations, and incentives and flexibility for power plant development and utility procurement in the state.

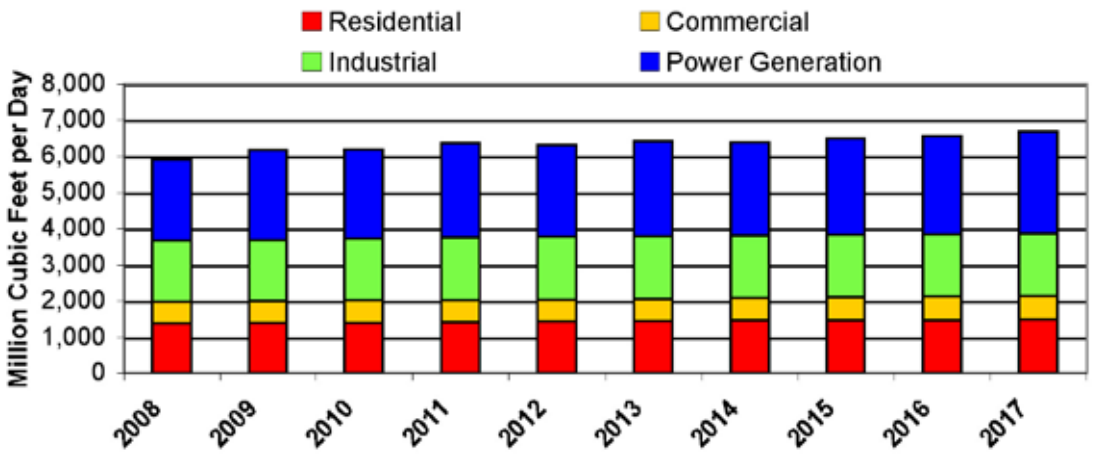
Table 5
Electricity Market Structure Accomplishments and Next Steps

Next Steps
Launching market redesign and technology update
Evaluating reopening of direct access market (retail competition)
Evaluating development of centralized capacity market

Natural Gas Supply, Demand, and Infrastructure

Natural gas provides a significant portion of California's energy requirements and its use in California is expected to remain relatively flat in the near term. Natural gas prices remain much higher and more volatile compared to the last decade, and there is little expectation in the market that prices will significantly decrease within the next few years. Higher prices and volatility are primarily related to production difficulties in the United States and Canada, higher production costs, and falling imports of natural gas from Canada. Diversifying our natural gas sources

Figure 7
Projected California Demand by Sector 2008-2017



Source: California Energy Commission

to include liquefied natural gas (LNG), as well as promising sources of domestic supplies, and ensuring adequate natural gas transmission and storage infrastructure are important to ensuring the reliability of California's natural gas supplies. A diverse portfolio of natural gas supplies and reliable deliveries of those supplies will be particularly important as we increasingly rely on natural gas as the lowest-emission fossil fuel for thermal power plants and other industrial, commercial, and residential applications.

California's initial receipts of LNG supplies are expected to occur in 2008, but regular, reliable cargoes are not expected until later years. As California's natural gas supplies will increasingly be part of a global market, we will need to:

- Continue to monitor and assess that market and its impact on California consumers.
- Examine whether and how California utilities should enter into contracts for LNG supplies.
- Ensure that California has adequate access to those supplies.

In addition, proposals for significant expansion of pipeline capacity from the Rocky Mountains to California have been announced in recent months. California will need to assess the impact these expansions could have on the western natural gas market and determine whether California utilities should enter into contracts for pipeline capacity rights with any of these projects. A new intrastate gas transmission framework will be implemented in Southern California in 2008, and California will need to follow closely the progress of that framework and market impacts. Finally, current and new independent storage providers are proposing expansions of their storage capacity, and in some cases have already requested approval from the Public Utilities Commission for these projects.

While natural gas is a cleaner fuel than coal or petroleum, we also recognize that natural gas contributes a portion of California's total greenhouse gas emissions, due to emissions from electric generation, industrial, residential, and commercial use. California needs to consider means by which natural gas usage can be minimized to reduce total greenhouse gas emissions,

while still meeting California's overall energy needs. Energy efficiency and renewable energy production are the most important tools for reducing California's dependence on natural gas and also decreasing the contribution of the electric generation and natural gas sectors to greenhouse gas emissions. Significant reduction of natural gas use could also contribute to a moderation of natural gas prices.

We also note that methane is a greenhouse gas, which has 23 times the global warming potential of carbon dioxide in the atmosphere. Thus, minimizing leaks from gas pipelines, compressor stations, and storage facilities is extremely important in reducing emissions from the natural gas sector. Increasing the use of certain biofuels, such as methane from cattle farms, not only can help reduce California's dependence on imports of natural gas, but can also significant reduce methane releases to the atmosphere.

Table 6
Natural Gas Supply, Demand, and Infrastructure Accomplishments and Next Steps

Accomplishments

Aggressive energy efficiency goals set for both IOUs and POUs

Developed biogas projects under RPS

Reviewed overall adequacy of infrastructure, established reliability standards for gas transmission

Established procedures under which local gas transmission system would be expanded in Southern California, and approved investment for Northern California local transmission projects

Adopted rules to facilitate the receipts of LNG deliveries

Adopted agreement under which storage capacity development could occur in Southern California

Improved transmission access terms for California gas producers

Next Steps

Monitoring and assessing the global natural gas market and its impacts on LNG deliveries and prices

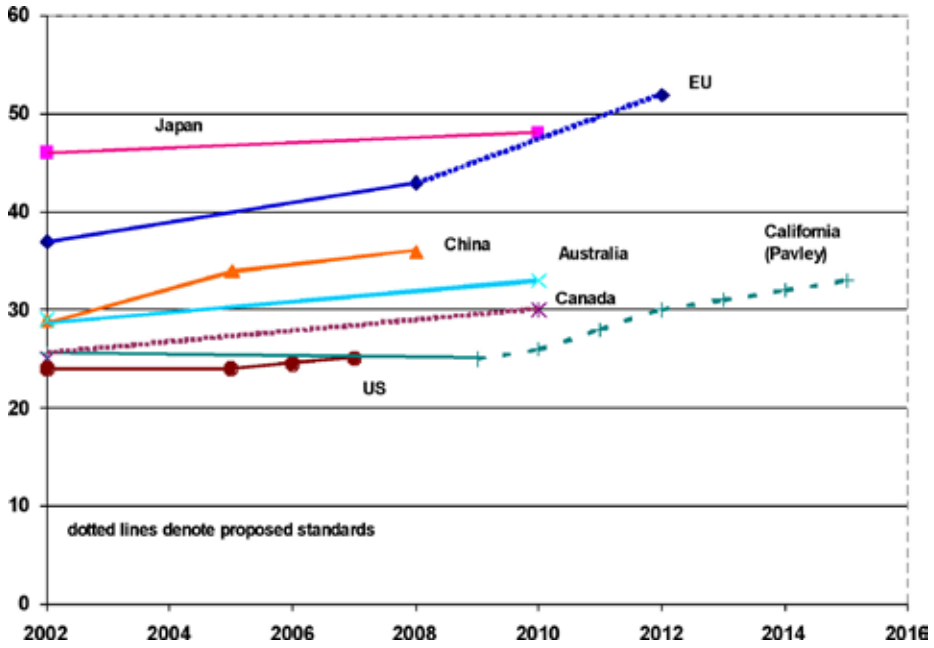
Examining whether and how California utilities should enter into contracts for LNG supplies

Examining the need for development of additional storage and pipeline infrastructure

Examining whether increased deliveries of Rocky Mountain supplies are appropriate

Implementing incentives for solar water heating

Figure 8
Comparison of Fuel Economy of Passenger



Source: Pew Center on Global Climate Change, *Comparison of Passenger Vehicle Fuel Economy and Greenhouse Gas Emission Standards Around the World*, December 2004.

Transportation Fuels Supply, Demand, and Infrastructure

In the transportation sector, our gasoline and diesel markets in California continue to be characterized by increasing demands, tight supplies, and volatile and high prices. In addition, the transportation sector is the single largest contributor to California's greenhouse gas emissions. For these reasons, this area is one of increasing focus in the state. A number of initiatives are underway to help address this crucial policy area.

Assembly Bill 1493 requires a 30 percent reduction in greenhouse gas emissions from vehicles sold in California by 2016, Although California has consistently received waivers to enforce more stringent emissions standards in the state, the federal government recently denied a waiver required for California to enforce the regulations developed under that law. In response, California has sued to overturn that denial.

The most recent activity is around the development of a Low-Carbon Fuel Standard for California. This initiative encompasses both the development of alternative fuels and alternatively fueled vehicles, including the potential for electric, natural gas, and hybrid vehicles. Governor Schwarzenegger initiated the effort for a Low Carbon Fuel Standard (LCFS) in California through Executive Order S-01-07. The California Air Resources Board is scheduled to develop regulations to implement the LCFS in 2008. In support of the LCFS and under Assembly Bill 1007 (2005), in 2007 the Energy Commission developed a full fuel cycle assessment of the greenhouse gas implications of transportation fuel alternatives and adopted a State

Alternative Fuels Plan. Recently, Assembly Bill 118 was signed into law, providing an ongoing funding source for programs to enhance the development and use of alternative fuels in the state.

After initial analysis, one the most promising options for reduction of greenhouse gases from transportation involves the increasing penetration of plug-in hybrid electric vehicles and all-electric vehicles. If such technologies become commercially viable, they would reduce emissions from the burning of gasoline but offset those emissions with those from the production of electricity. Key to minimizing the impact of this cross-sector approach is ensuring that the electricity for the powering of plug-in hybrid electric vehicles is from clean or renewable energy. Most appealing is the option to charge vehicles at night using the output of off-peak wind energy.

These and many other technology and fuel options for the transportation deserve increasing attention to help reduce our emissions overall. Coupled with these initiatives, we also stress the importance of smart growth and land-use policies by local governments. This is analogous to energy efficiency, where it is not enough to make our fuel use more efficient. We actually need to reduce our use of fuel overall. To accomplish this, we need to begin reducing the number of vehicle miles traveled in the state, locating our homes closer to workplaces, and increasing our public transportation options and use.

Table 7
Transportation Fuels Supply, Demand, and Infrastructure Accomplishments and Next Steps

Accomplishments

Developed and Adopted State Alternative Fuels Plan

Next Steps

Continue to monitor and recommend enhancements to transportation fuel infrastructure needs

Adopt regulations to implement the Low Carbon Fuel Standard

Begin Implementation of Transportation Incentive Programs funded by AB 118

Develop a strategic investment plan for alternative fuel and vehicle incentives

Research, Development, and Demonstration

As we have mentioned several times, to meet our long-term greenhouse gas goals, we will likely need the development of new technologies in at least the following areas:

- Energy efficiency technologies
- Renewable generation
- Clean fossil generation (including carbon capture and sequestration)
- Transportation fuels and vehicles
- Bioenergy

There may be additional key energy areas for research and development that emerge over the next decade. In addition, we see a need to emphasize the demonstration of and the feasibility of new technologies to build confidence in our ability to meet our aggressive goals.

Natural gas research and development (R&D), administered under the Energy Commission's natural gas R&D program, is expected to be conducted in coming years in the above areas, as well as others including:

- LNG quality and interchangeability
- Solar thermal technologies
- Natural gas storage impacts and conditions needed for investment
- Efficient interface of electricity and natural gas infrastructure
- Improved technologies and tariffs for demand response
- Reduction of greenhouse gas emissions associated with natural gas

Table 8
Research, Development, and Demonstration Accomplishments and Next Steps

Accomplishments

Development of cool roof technologies allowing incorporation in building standards

Development of super-efficient lighting systems for offices and residential kitchens

Development of technology for automating demand response

Development of ultra-clean fossil fuel generation systems

Research on climate change impacts and solutions

Next Steps

Particular focus on bioenergy, energy efficiency, renewable energy, transportation fuels and vehicles, and carbon capture and storage technology development

LNG quality and interchangeability

Natural gas storage options

Climate Change

To conclude, as mentioned at the beginning of this document, how we address the climate change challenge will define this generation and those to come. AB 32 requires that we chart a course to reduce the state's greenhouse gas emissions and reduce dependence on fossil fuels.

Many policy questions remain to be answered. We are pledged to work closely with the California Air Resources Board as it fulfills its responsibility under AB 32. Indeed, we are already partnering to design a framework for regulating the electricity and natural gas sectors under the law. In a joint proceeding, the Public Utilities Commission and Energy Commission are working together to provide recommendations for addressing these sectors, including developing a system popularly called "cap and trade."

We are also supporting the development of the Western Climate Initiative (WCI), which is designing a "cap and trade" system for the West. Governor Schwarzenegger helped initiate the WCI with representatives from five other Western states and two Canadian provinces. Since the initial formation, two other Western states have joined the WCI, and it is hoped that more partner states will join the effort. Ultimately, we need a national program for reducing greenhouse gases. All single-state or even regional approaches suffer from some shortcomings and would benefit from a national strategy. However, we cannot wait for the national government to act. We will continue to lead in this crucial policy area and make sure that California, given its past history and the knowledge and talent in our universities and private sector, leads in reducing emissions.

As alluded to several times, although AB 32 and the 2020 emissions reduction goal is a crucial first step. Ultimately we must keep our eye on the longer-term goal that Governor Schwarzenegger outlined for 2050 of reducing our greenhouse gas emissions to 80 percent below 1990 levels. This level of reductions is necessary worldwide to stabilize concentrations of carbon dioxide in the atmosphere and minimize the global change rise in sea level and ambient temperatures.

We, too, believe these levels of greenhouse gases will be necessary. Therefore, although we are focused on the 2020 goals, we are mindful that our actions for reductions in 2020 may not be enough for 2050, and indeed may actually undermine our ability to reach the 2050 goals. This could happen if we invest in mediocre solutions now and leave the hardest reductions until later. Avoiding such a suboptimal outcome is why we are motivated to act aggressively now to ensure that our long-term future environment in California, and in the world, is the best it can possibly be. We look forward to working with all stakeholders in California to make a low-emission future a reality.

Table 9
Climate Change Accomplishments and Next Steps

Accomplishments

Implemented SB 1368, the Emissions Performance Standard, for both IOUs and POUs

Next Steps

Making recommendations to the Air Resources Board for how electricity and natural gas sectors should be included in AB 32 framework

Planning for emissions reduction goals in 2050

Expanded scenario analysis efforts to evaluate the impact of high energy efficiency and 33 percent renewables on greenhouse gas emissions

California Energy Commission

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Dian M. Grueneich
Timothy Alan Simon

CEC-100-2008-001

Self-Generation Incentive Program

The CPUC's Self-Generation Incentive Program (SGIP) provides incentives to support existing, new, and emerging distributed energy resources. The SGIP provides rebates for qualifying distributed energy systems installed on the customer's side of the utility meter. **Qualifying technologies include wind turbines, waste heat to power technologies, pressure reduction turbines, internal combustion engines, microturbines, gas turbines, fuel cells, and advanced energy storage systems.**

Learn more about the SGIP in general, or follow the links to explore specific resources and recent developments.

Applying for SGIP Incentives

For information on how to apply for incentives in your area, please contact the Program Administrator for your utility:

- Pacific Gas & Electric Company
- Southern California Edison
- Southern California Gas Company
- California Center for Sustainable Energy

Staff Products

- Staff Proposal and Workshops
- Summary of SGIP Program Impacts
- CPUC Regulator Process and the SGIP

SGIP Handbook

To view the latest edition of the Self Generation Incentive Program Handbook, click here.

Self Generation Incentive Program Reports

The SGIP conducts regular reports to monitor and evaluate the impact of the program and the administrative processes of the Program Administrators. The most recent report and highlights may be found below:

- 10th Year Impact Study Presentation
- 10th Year Impact Study Report
- Cost-Effectiveness Report
- 9th Year Market-Focused Process Evaluation Report
- Ninth Year Impact Study
- Semi-Annual Renewable Fuel Use Report
- Market Characterization Report
- Combined Heat and Power Performance Investigation
- Photovoltaic Performance Investigation

To view prior-year impact reports, click here.


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CALIFORNIA

Data

Last Update: September 22, 2011
Next Update: October 20, 2011

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- Economy
- Prices
- Reserves & Supply
- Distribution & Marketing
- Consumption

per Capita	California	U.S. Rank	Period
Total Energy	217 million Btu	47	2009

by Source	California	Share of U.S.	Period
Total Energy	8,006 trillion Btu	8.5%	2009
Total Petroleum	657.2 million barrels	9.6 %	2009
» Motor Gasoline	357.7 million barrels	10.9 %	2009
» Distillate Fuel	90.4 million barrels	6.8 %	2009
» Liquefied Petroleum Gases	17.1 million barrels	2.3 %	2009
» Jet Fuel	98.0 million barrels	19.3 %	2009
Natural Gas	2,328,506 million cu ft	9.6 %	2009
Coal	2,173 thousand short tons	0.2 %	2009

by End-Use Sector	California	Share of U.S.	Period
Residential	1,527,311 billion Btu	7.3 %	2009
Commercial	1,578,660 billion Btu	8.8 %	2009
Industrial	1,769,997 billion Btu	6.2 %	2009
Transportation	3,129,539 billion Btu	11.6 %	2009

for Electricity Generation	California	Share of	Period

Print this state
(includes overview, data, & analysis)

Updates
as of September 22, 2011

New statistics for June 2011:

- Price of coal delivered to the electric power sector
- Prices of electricity sold to the residential, commercial, and industrial sectors
- Total net electricity generation and net electricity generation by fuel
- Fuel stocks at electric power producers
- Consumption for electricity generation by fuel

View all updates »

Notes & Sources

Maps
Quick Facts & Analysis
Data

Related Information

California State Energy Data System ›
California Electricity Profile ›
California Nuclear Profile ›
California Renewable Electricity Profile ›

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		U.S.	
Petroleum	6 thousand barrels	0.2 %	Jun-11
Natural Gas	38,150 million cu ft	5.2 %	Jun-11
Coal	67 thousand short tons	0.1 %	Jun-11

for Home Heating (share of households)	California	U.S. Avg.	Period
Natural Gas	71 %	51.2 %	2000
Fuel Oil	0 %	9.0 %	2000
Electricity	22 %	30.3 %	2000
Liquefied Petroleum Gases	4 %	6.5 %	2000
Other/None	3 %	1.8 %	2000

See more Consumption data for all States >

Environment

— = No data reported.
* = Number less than 0.5 rounded to zero.
NA = Not available.
NM = Not meaningful due to large relative standard error or excessive percentage change.
W = Withheld to avoid disclosure of individual company data.
Note: Small differences between source data and values displayed here may be due to independent rounding.

Click the icon next to a data series to see State rankings for that series.

Table 1. Number and Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 2011

PAD District and State	Number of Operable Refineries			Atmospheric Crude Oil Distillation Capacity					
				Barrels per Calendar Day			Barrels per Stream Day		
	Total	Operating	Idle [a]	Total	Operating	Idle [b]	Total	Operating	Idle [b]
PAD District I	**14**	**10**	**4**	**1,617,500**	**1,205,000**	**412,500**	**1,708,500**	**1,273,500**	**435,000**
Delaware	1	0	1	182,200	0	182,200	190,200	0	190,200
Georgia	1	1	0	28,000	14,000	14,000	32,000	16,000	16,000
New Jersey	5	3	2	548,000	398,000	150,000	574,000	416,000	158,000
Pennsylvania	5	5	0	773,000	773,000	0	819,500	819,500	0
Virginia	1	0	1	66,300	0	66,300	70,800	0	70,800
West Virginia	1	1	0	20,000	20,000	0	22,000	22,000	0
PAD District II	**27**	**25**	**2**	**3,721,200**	**3,647,700**	**73,500**	**4,022,327**	**3,943,127**	**79,200**
Illinois	4	4	0	973,600	917,600	56,000	1,014,400	955,500	58,900
Indiana	2	2	0	431,500	431,500	0	457,500	457,500	0
Kansas	3	3	0	339,200	339,200	0	347,500	347,500	0
Kentucky	2	1	1	217,500	212,000	5,500	252,300	246,000	6,300
Michigan	1	1	0	106,000	106,000	0	114,000	114,000	0
Minnesota	2	2	0	336,000	336,000	0	404,500	404,500	0
North Dakota	1	1	0	58,000	58,000	0	60,000	60,000	0
Ohio	4	4	0	524,400	524,400	0	589,500	589,500	0
Oklahoma	6	5	1	520,700	508,700	12,000	554,627	540,627	14,000
Tennessee	1	1	0	180,000	180,000	0	190,000	190,000	0
Wisconsin	1	1	0	34,300	34,300	0	38,000	38,000	0
PAD District III	**56**	**54**	**2**	**8,646,219**	**8,515,919**	**130,300**	**9,266,062**	**9,126,955**	**139,107**
Alabama	3	3	0	120,100	120,100	0	130,000	130,000	0
Arkansas	2	2	0	82,500	82,500	0	87,700	87,700	0
Louisiana	19	18	1	3,219,520	3,164,520	55,000	3,388,355	3,332,355	56,000
Mississippi	3	3	0	364,000	364,000	0	397,500	397,500	0
New Mexico	3	2	1	142,900	126,100	16,800	156,107	138,000	18,107
Texas	26	26	0	4,717,199	4,658,699	58,500	5,106,400	5,041,400	65,000
PAD District IV	**17**	**16**	**1**	**623,900**	**620,300**	**3,600**	**665,700**	**661,700**	**4,000**
Colorado	2	2	0	103,000	103,000	0	109,500	109,500	0
Montana	4	4	0	187,600	187,600	0	195,800	195,800	0
Utah	5	5	0	167,200	167,200	0	176,400	176,400	0
Wyoming	6	5	1	166,100	162,500	3,600	184,000	180,000	4,000
PAD District V	**34**	**32**	**2**	**3,127,551**	**2,948,105**	**179,446**	**3,290,600**	**3,104,600**	**186,000**
Alaska	6	6	0	389,980	295,034	94,946	419,700	323,700	96,000
California	20	18	2	1,959,271	1,874,771	84,500	2,059,900	1,969,900	90,000
Hawaii	2	2	0	147,500	147,500	0	152,000	152,000	0
Nevada	1	1	0	2,000	2,000	0	5,000	5,000	0
Washington	5	5	0	628,800	628,800	0	654,000	654,000	0
U.S. Total	**148**	**137**	**11**	**17,736,370**	**16,937,024**	**799,346**	**18,953,189**	**18,109,882**	**843,307**
Virgin Islands	1	1	0	500,000	500,000	0	525,000	525,000	0

Table 1. Number and Capacity of Operable Petroleum Refineries by PAD District and State as of January 1, 2011

PAD District and State	Downstream Charge Capacity (Barrels per Stream Day)							
	Vacuum Distillation	Thermal Cracking	Catalytic Cracking		Catalytic Hydro-Cracking	Catalytic Reforming	Hydrotreating/ Desulfurization	Fuels Solvent Deasphalting
			Fresh	Recycled				
PAD District I	**677,900**	**103,500**	**709,700**	**7,700**	**45,300**	**293,250**	**1,349,600**	**20,000**
Delaware	104,600	54,500	82,000	4,000	22,300	43,800	155,500	0
Georgia	0	0	0	0	0	0	0	0
New Jersey	244,000	27,000	275,000	0	0	62,000	409,500	20,000
Pennsylvania	276,200	0	324,500	1,000	23,000	171,800	692,500	0
Virginia	44,500	22,000	28,200	2,700	0	11,700	73,500	0
West Virginia	8,600	0	0	0	0	3,950	18,600	0
PAD District II	**1,588,612**	**412,176**	**1,312,410**	**16,550**	**286,000**	**928,573**	**3,548,157**	**17,850**
Illinois	403,400	146,400	321,800	3,000	74,000	262,400	880,650	0
Indiana	259,100	37,000	183,600	7,200	0	78,500	380,800	0
Kansas	147,500	66,000	102,000	500	36,000	81,000	356,700	0
Kentucky	117,500	0	104,000	0	0	53,500	269,300	13,000
Michigan	55,000	0	32,500	0	0	21,500	102,500	0
Minnesota	218,500	67,000	115,500	0	44,000	69,300	403,000	0
North Dakota	0	0	27,000	3,600	0	12,500	34,900	0
Ohio	158,500	58,000	200,000	0	102,000	167,500	460,500	0
Oklahoma	208,612	37,776	145,010	2,250	30,000	138,373	462,507	4,850
Tennessee	0	0	70,000	0	0	36,000	164,600	0
Wisconsin	20,500	0	11,000	0	0	8,000	32,700	0
PAD District III	**4,498,375**	**1,467,400**	**3,114,405**	**50,000**	**922,100**	**1,760,890**	**8,718,480**	**242,900**
Alabama	48,000	32,000	0	0	18,500	37,300	98,000	0
Arkansas	48,500	0	21,000	0	0	14,800	91,300	7,400
Louisiana	1,648,500	545,300	1,162,200	13,500	322,500	581,600	2,800,600	63,500
Mississippi	338,875	105,000	88,000	0	74,000	95,600	295,300	0
New Mexico	29,600	0	41,500	3,500	0	36,300	158,300	0
Texas	2,384,900	785,100	1,801,705	33,000	507,100	995,290	5,274,980	172,000
PAD District IV	**240,100**	**88,100**	**199,206**	**4,990**	**29,800**	**132,300**	**556,260**	**6,000**
Colorado	33,500	0	30,000	500	0	21,900	85,000	0
Montana	99,300	47,100	60,000	990	6,200	39,050	204,810	0
Utah	32,500	8,500	57,400	3,000	8,000	37,300	133,200	6,000
Wyoming	74,800	32,500	51,806	500	15,600	34,050	133,250	0
PAD District V	**1,645,256**	**601,200**	**884,000**	**16,400**	**572,400**	**605,600**	**2,510,400**	**96,000**
Alaska	31,500	0	0	0	12,500	14,200	24,500	0
California	1,250,656	506,900	716,000	13,400	474,900	430,500	2,063,700	66,000
Hawaii	71,300	11,000	22,000	0	20,000	13,000	16,500	0
Nevada	5,000	0	0	0	0	0	0	0
Washington	286,800	83,300	146,000	3,000	65,000	147,900	405,700	30,000
U.S. Total	**8,650,243**	**2,672,376**	**6,219,721**	**95,640**	**1,855,600**	**3,720,613**	**16,682,897**	**382,750**
Virgin Islands	225,000	102,000	149,000	0	0	107,000	503,000	0

[a] Refineries where distillation units were completely idle but not permanently shutdown on January 1, 2011.
[b] Includes capacity from refineries that are either completely or partially idle.

Source: Energy Information Administration (EIA), Form EIA-820, "Annual Refinery Report."

FUEL ECONOMY OF HEAVY-DUTY TRUCKS IN THE U.S.A.

K.G. DULEEP
MANAGING DIRECTOR
EEA-ICF

OVERVIEW OF PRESENTATION

- Commercial trucks over 5 tons GVW account for 17% of total transport fuel consumption in USA, and consumption is growing at 2% per year, faster than any other segment.
- Historical data are analyzed to examine growth rates in fuel economy
- Preliminary results of NPC analysis of new technology to improve fuel economy by sub-class is provided. Detailed studies are in progress to estimate fuel economy to 2030.

CLASSES OF HEAVY-DUTY TRUCKS IN USA

- Heavy trucks typically divided into three GVW sub-classes:

  -light-heavy (4.5 to 9 tons) with engines of 6.5 $\pm$ 0.5 L

  -medium-heavy (9 to 25 tons) with engines on 8.5 $\pm$ 1L and

  -heavy-heavy (25+ tons) with engines from 11 to 15L.

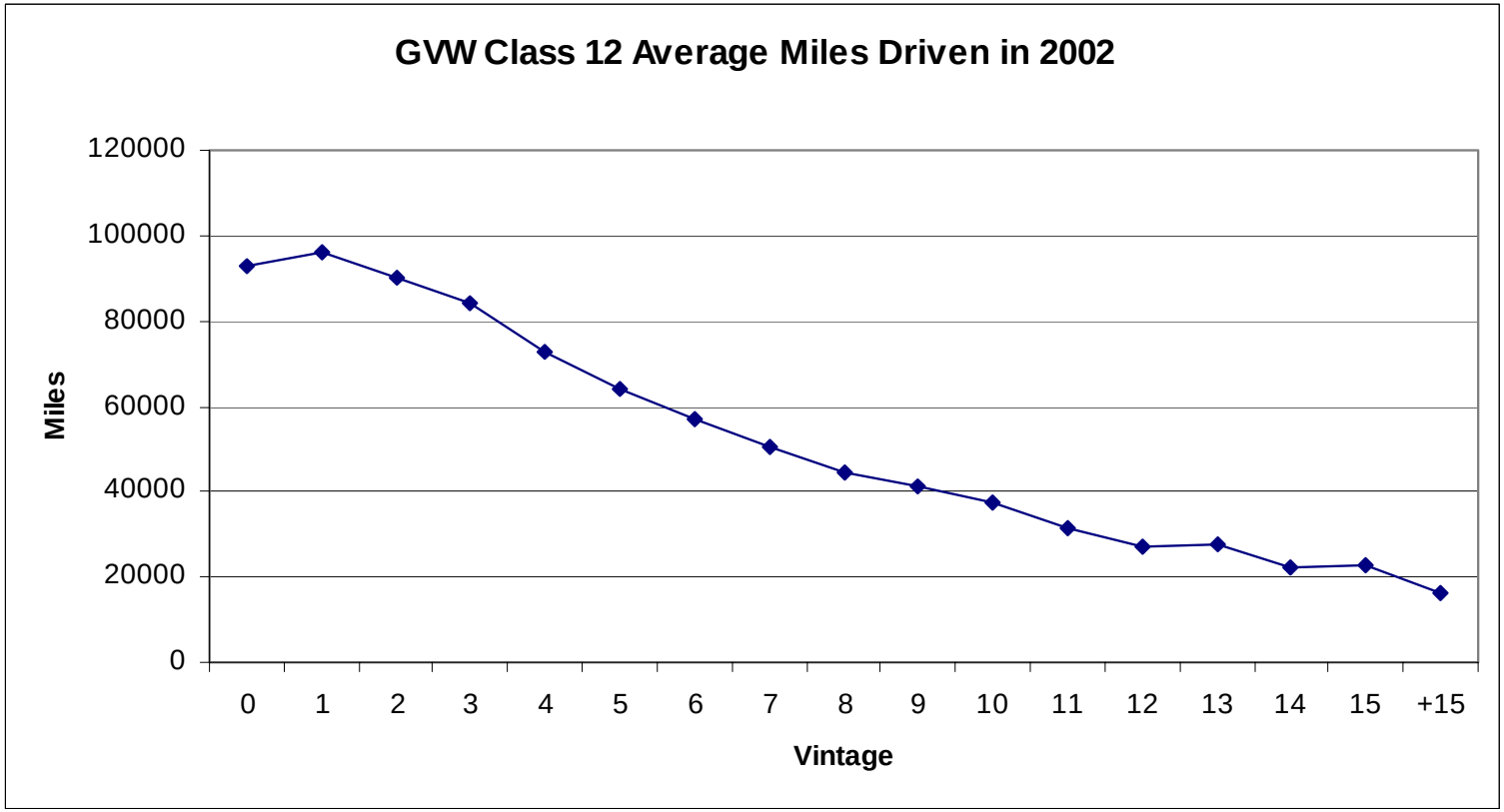
CLASSES OF HEAVY-DUTY TRUCKS IN USA

- Light –heavy vehicles typically used in short haul operation and is now about 80% diesel, but many gasoline engine vehicles in fleet.
- Medium-heavy used in both short and medium haul applications. This segment has been 100% diesel since the early 1990s
- Heavy-heavy used primarily in long-haul or mining/ construction. This segment has always been 100% diesel.

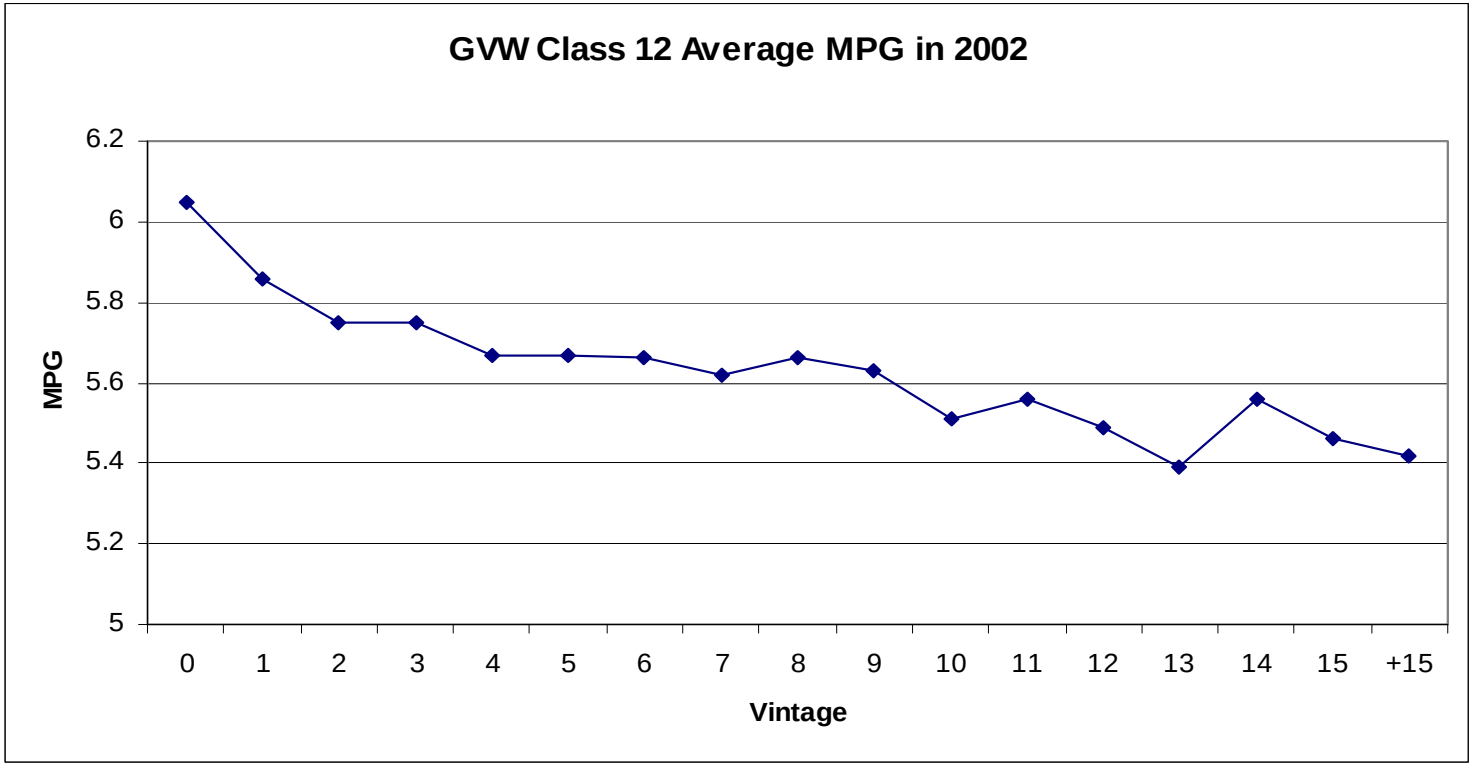
HISTORICAL FUEL ECONOMY GROWTH : HEAVY-HEAVY

- Average new vehicle fuel economy in 2003 was 6.1 mpg (38.6 l/100km).
- Annual growth rate in FE over 15 years was 0.88%, with about 0.6% from engine and transmission, 0.3% from aero/ tires.
- Engine technology primarily in electronic fuel injection and combustion improvements, friction reduction.
- Almost all long haul vehicles have cab fairing, spoilers and second-generation radial tires

ANNUAL MILES BY VINTAGE: HHDT



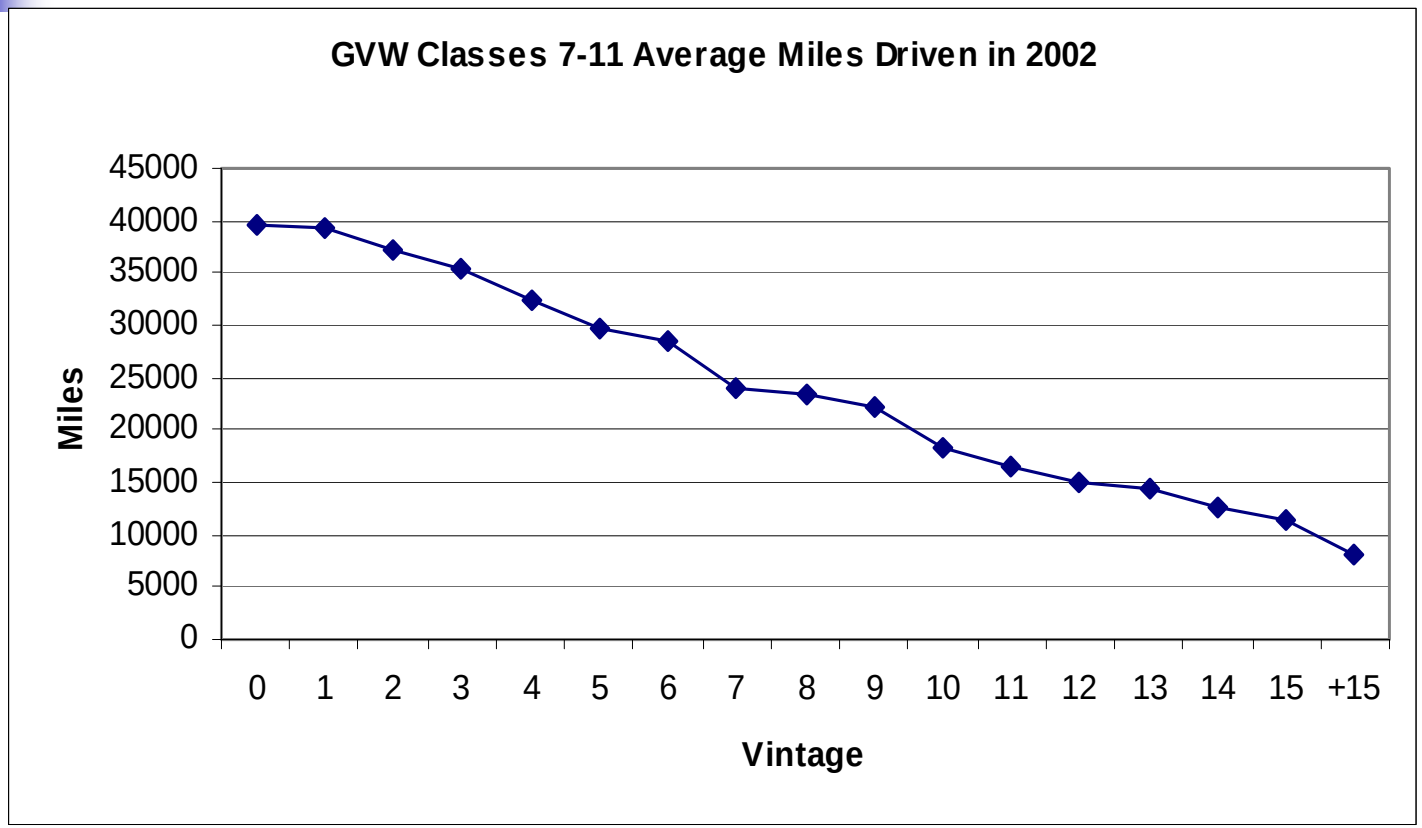
FUEL ECONOMY BY VINTAGE: HHDT



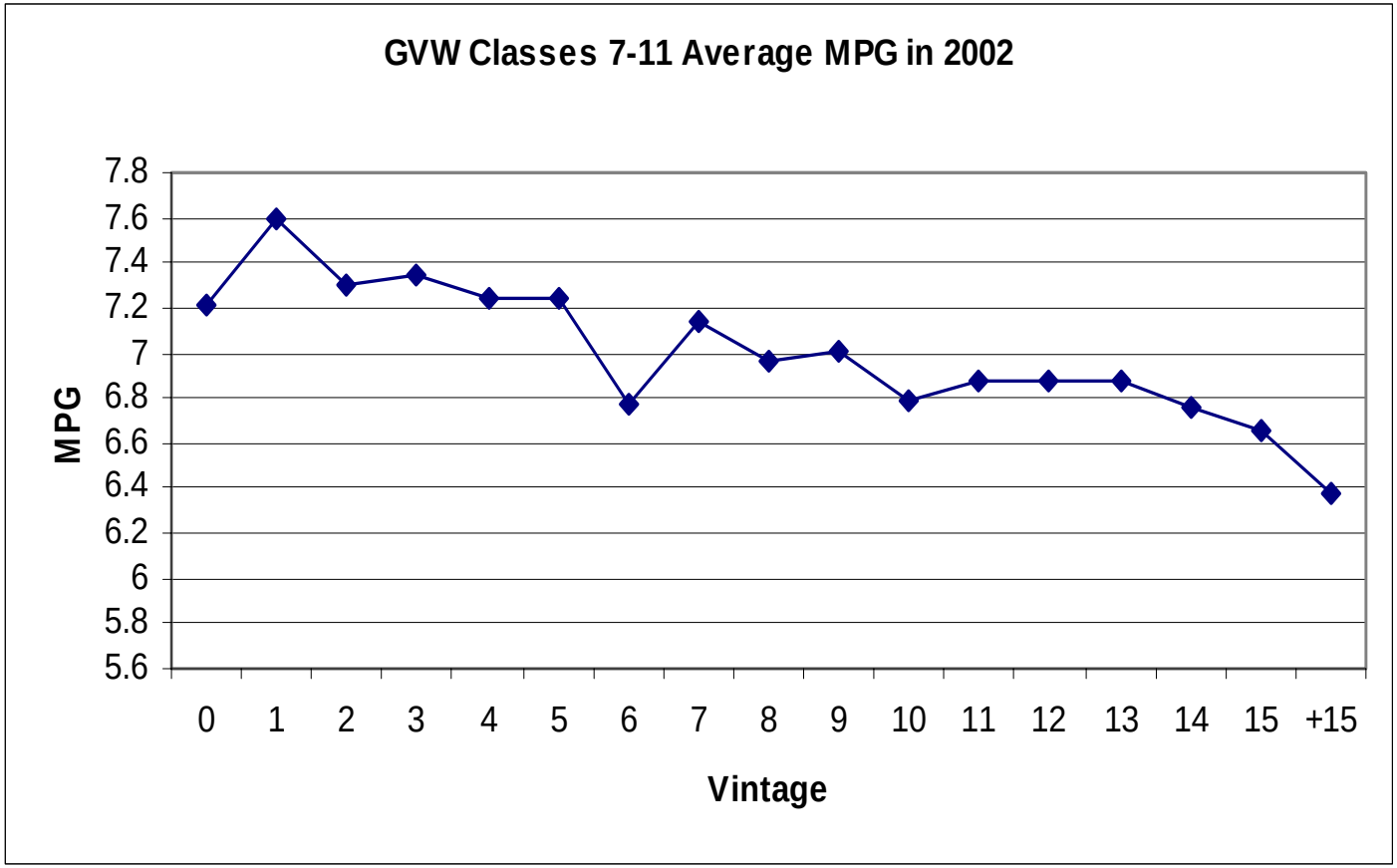
HISTORICAL FUEL ECONOMY GROWTH : MEDIUM-HEAVY

- New truck fuel economy is about 7.6 mpg (31 L/100km). Increase from HHDT small due to different duty cycle (more short-haul).
- Annual fuel economy growth rate slightly higher at 0.97%, with about 0.75% from engines, rest from aero and tire improvement
- Engine changes have included move to 4-valve heads, higher levels of turbo-charging and engine downsizing

ANNUAL MILES BY VINTAGE: MHDT



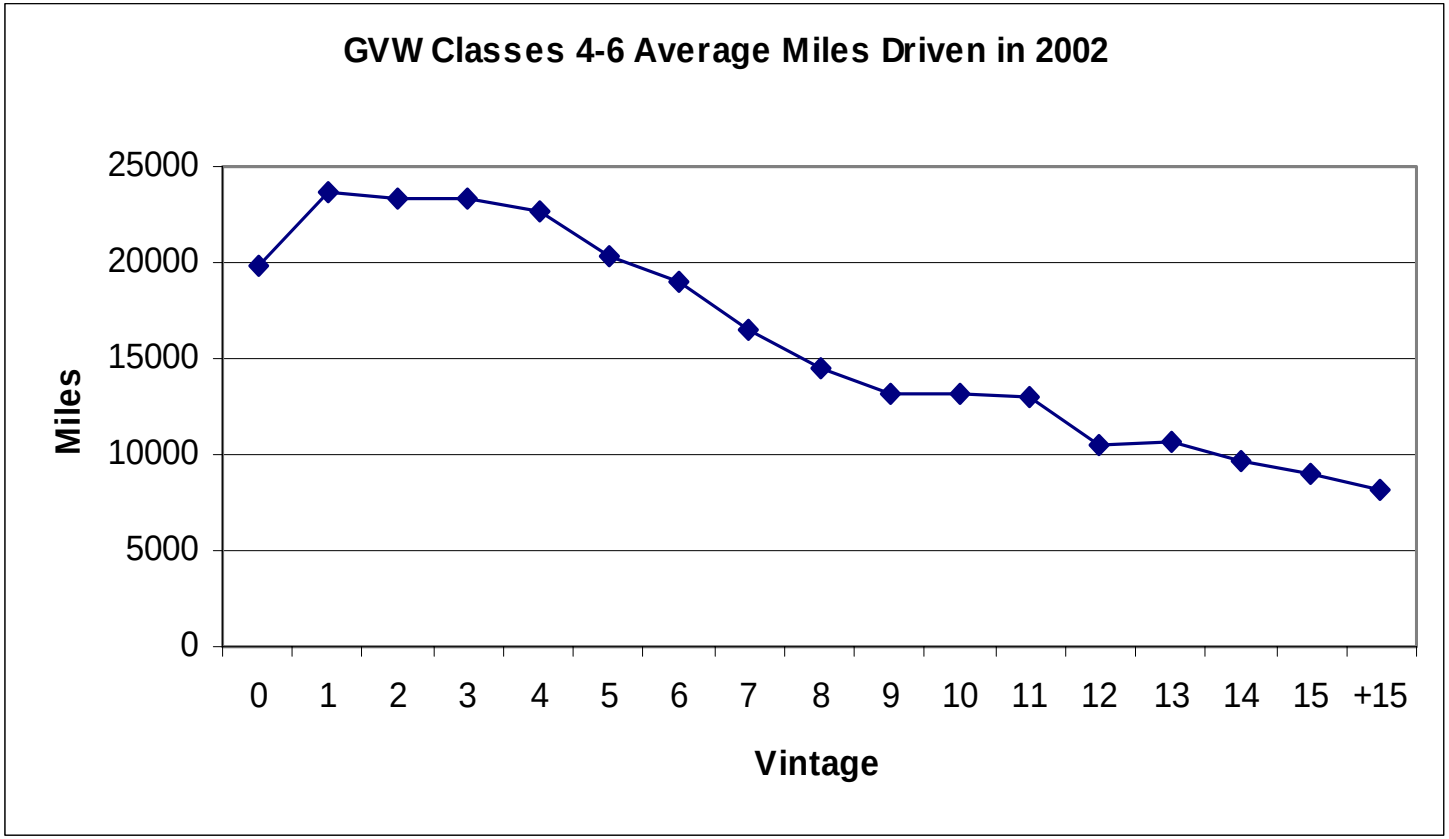
FUEL ECONOMY BY VINTAGE: MHDT



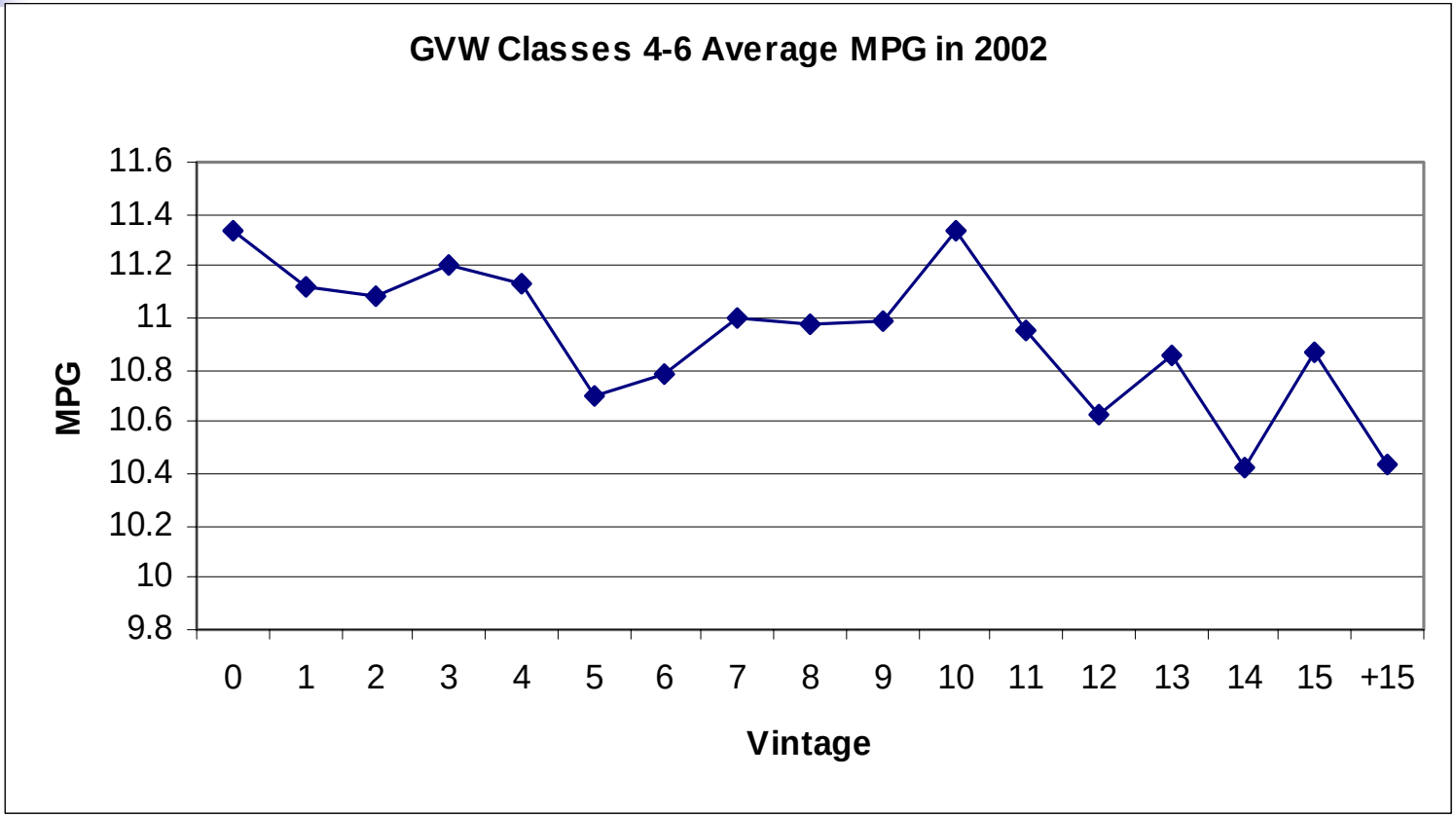
HISTORICAL FUEL ECONOMY GROWTH : LIGHT-HEAVY

- New light –heavy truck fuel economy is 12.4 mpg (19L/100km), mostly large pick-up and van with only small fraction of Japanese delivery trucks with 3L to 4L engines.
- Annual fuel economy growth rate is 1.3% almost all from engine technology.
- Big change is move from naturally aspirated IDI diesels to Turbo-DI in 1990-1995 time frame, significant HP improvements recently.

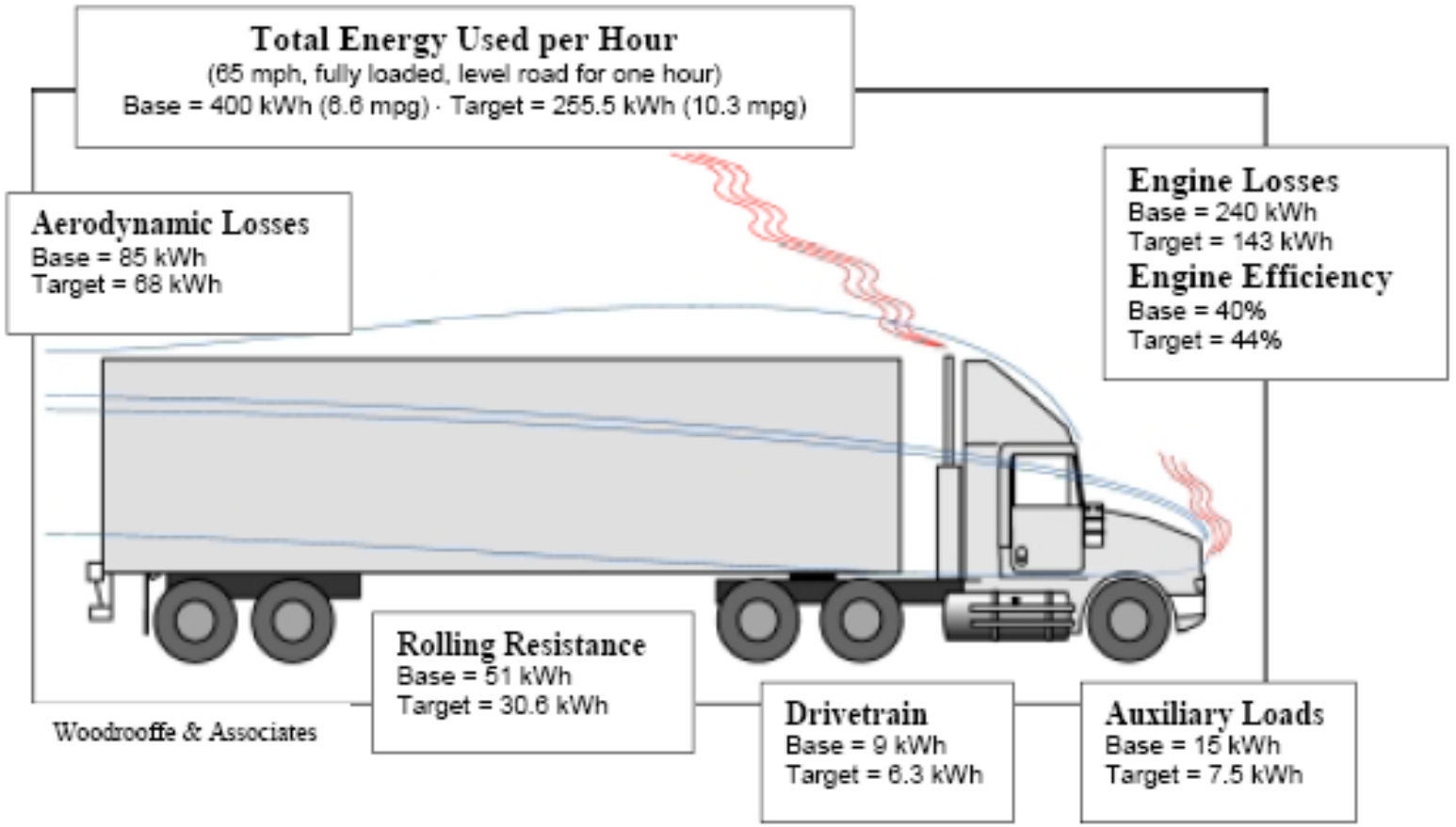
ANNUAL MILES BY VINTAGE: LHDT



FUEL ECONOMY BY VINTAGE: LHDT



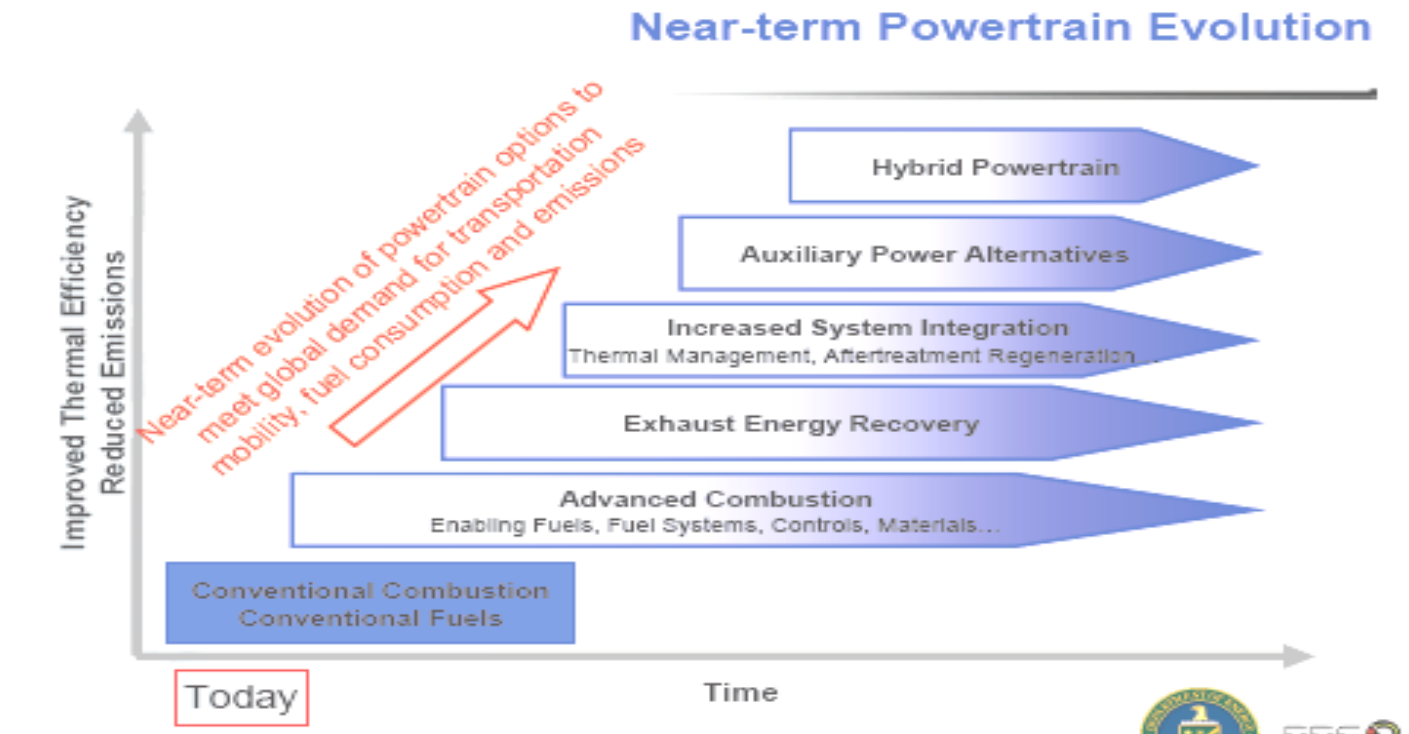
PROSPECTS FOR EFFICIENCY IMPROVEMENT : HHDT



ENGINE PEAK BRAKE THERMAL EFFICIENCY IMPROVEMENT

- Current peak efficiency is about 42% with DOE goal of 50%
- Near term roadmap includes:
  - urea – SCR NOx control
  - series turbo-charging with variable geometry and inter-cooling
  - turbo-compounding (electric?)
  - advanced combustion, higher pressure

ENGINE & SYSTEM THERMAL EFFICIENCY IMPROVEMENT



HYBRID TECHNOLOGY FOR HEAVY-DUTY TRUCKS

- Many hybrid demonstration projects are in progress around the world, mostly for buses.
- Fuel economy benefits form 25% to 45% depending on duty cycle demonstrated in projects for urban vehicles.
- Both mild and “full” hybrids being considered by industry, with mild being more likely.
- Even long haul HHDT can benefit from mild hybrid technology with electrical accessories.

DRAG AND ROLLING RESISTANCE REDUCTION

- Drag reduction potential expected to focus on tractor-trailer integration and more aerodynamic trailers (side skirts and rear spoilers) to 2025.
- Continued progress in tire technology with new polymers and tread designs expected to reduce RRC at same rate as 1995-2005
- Idle reduction with improved engine start ability by plug-in electrical supply likely.

FUTURE SCENARIOS FOR FC REDUCTION TO 2030

- Near term, new emission standards in the US will lead to a fuel economy loss of about 4% due to PM-NOx reduction technology.
- Preliminary classification of technology cost as low (payback less than 3 years), medium (4 to 6 years) or high (>6 years)
- Hybrids appear to be very high cost now but mild hybrids could be a medium cost technology by 2020 with 10 to 12% FE improvement.

COMPOSITE FE IMPROVEMENT BY COST CATEGORY: HHDT

		2010		2020		2030	
		FC %	COST	FC %	COST	FC %	COST
ENGINE		-4	NA	+4	LOW	+6	LOW
		+2	MED	+8	MED	+10	MED
				+13	HIGH	+17	HIGH
AERO		+3	LOW	+6	LOW	+6	LOW
		+5	MED	+10	MED	+10	MED
RRC		+2	LOW	+4	LOW	+6	LOW
ACCESSORY		+1	MED	+3	MED	+3	MED
				+5	HIGH	+5	HIGH

COMPOSITE FE IMPROVEMENT BY COST CATEGORY: MHDT

		2010		2020		2030	
		FC%	COST	FC%	COST	FC%	COST
ENGINE		-4	NA	+3	LOW	+4	LOW
		+2	MED	+7	MED	+8	MED
				+12	HIGH	+15	HIGH
AERO		+1	LOW	+2.5	LOW	+2.5	LOW
		+2	MED	+4	MED	+4	MED
RRC		+2.5	LOW	+5	LOW	+7	LOW
ACCESORIES		+1.5	MED	+3	MED	+3	MED
				+5	MED	+5	MED

CONCLUSIONS

- In the short term (2010) fuel economy of heavy and medium trucks will not improve due to penalty of new emission standards.
- In the mid-term (2020), there is enough low cost conventional technology to continue FE improvement at historical pace of 0.8 to 1 % per year.
- Slowdown inevitable in long term (2030) as low cost conventional technology runs out.

CONCLUSIONS (continued)

- Medium and high cost technologies will not be introduced unless fuel prices become much higher or new policies make introduction mandatory.
- Mild hybrid technology (medium cost) could allow pace of FE growth to be maintained to 2030 if incentives or policies require their introduction

Energy Policies and Their Consequences After 25 Years

*Paul L. Joskow**

Hans Landsberg and Sam Schurr each led research teams that produced two important energy futures policy studies that were published in 1979. The conclusions, policy recommendations, and energy demand, supply, and price forecasts contained in these studies are reviewed. Developments in U.S. energy policy over the last 25 years are discussed and compared with the recommendations contained in the two studies. The projections of energy demand, supply, and prices for 2000 contained in the studies are presented and compared to actual realizations. The nature, magnitudes, and reasons for the differences between the studies' forecasts and what actually emerged 25 years later are discussed. All things considered, the Landsberg and Schurr studies have stood the test of time very well.

I. INTRODUCTION

About 25 years ago several comprehensive "energy futures" policy studies were released to the public.[1] They were released just as the disruption in oil supplies from Iran was causing oil prices to rise to unprecedented levels, the accident at the Three Mile Island nuclear power plant was shaking the nuclear power industry, and President Carter was preparing the public to respond to a long term energy crisis requiring efforts of a magnitude that would be the "moral equivalent of war" (Stagliano, 2001, pp. 31-33). These energy futures studies endeavored to identify the nation's energy problems and to propose public policies to help to ameliorate them. The leaders of the teams responsible for two of these studies were Sam Schurr and Hans Landsberg.

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1. These studies included Schurr (1979), Landsberg (1979), Stobaugh and Yergin (1979) and National Academy of Sciences (1979).

This is a good opportunity to look back at the energy policy recommendations, forecasts and supporting analysis contained in the two studies led, respectively by Sam Schurr (the "RFF study") and Hans Landsberg (the "Ford Study")[2] with the benefit of nearly 25 years of policy experience and realizations of energy demand, supply, and prices. As Jonathan Koomey et al. argue in their paper in this volume, retrospective studies can be very useful from a number of different perspectives. This paper reflects this general view. The paper proceeds in the following way. I first review the major conclusions of the two studies and their explicit or (sometimes) implicit policy recommendations. Second, I offer a brief and necessarily incomplete review of the major features of U.S. energy policy over the last 25 years in the context of the policy recommendations made in these studies. Finally, I examine the patterns of energy consumption and energy supply anticipated by the RFF and Ford studies, compare them with the actual supply and consumption patterns realized in 2000, and discuss how they have been affected by policy decisions and unanticipated changes in the structure of the U.S. economy. There is much wisdom contained in these two studies that both reflect "lessons learned" from experience with energy policies over the decades before the studies were conducted (Goodwin, 198 1) and are still relevant today.

II. THE RFF AND FORD STUDIES: REALITIES AND POLICY PRESCRIPTIONS

To fully appreciate the studies prepared by the teams led by Schurr and Landsberg we must recall the context in which they were written (Stagliano, 2001, pp. 19-43). In the 1977-79 period when the studies were being prepared, there was widespread public concern about additional disruptions in world oil supplies, energy shortages, rising energy prices, slow economic growth and rapid inflation. Prices for virtually all sources of energy were regulated by the federal government. Shortages of natural gas in particular were growing and the gasoline lines of 1973-74 were hard to forget. Many opinion makers pitched the ideas (individually or in combination) that the world was running out of energy, that energy markets could not be trusted to work well, and that various evil doers in the energy industry were conspiring to keep prices high while thwarting cheap "soft energy path" opportunities from being made available to the public. At the same time, coal and nuclear power were facing increasing challenges on environmental and safety grounds. President Carter's first energy plan, and the

2. This "Ford Study" should be distinguished from the Ford Foundation Energy Policy Project led by S. David Freeman which released its conclusions about energy policy in "A Time to Choose, America's Energy Future," in 1974. Indeed, ***Energy: The Next Twenty Years, the*** Ford Study discussed here, and another Ford Foundation sponsored study ***Nuclear Power: Issues and Choices,*** published in 1977, were in part a reaction to the view that the conclusions of the 1974 study paid too little attention to the role of market forces.

legislation that flowed from it, reflected the view that there was a very serious energy crisis facing the country, that markets were the problem rather than the solution, and that what was needed were massive government initiatives to subsidize alternative energy supply sources and to mandate end-use efficiency standards while shielding the public from higher energy prices. The RFF and Ford studies were a reaction to the hysteria and the flawed policy initiatives that were rampant in the late 1970s.

In 1979, a Resources for the Future (RFF) research team, led by Sam Schurr as Project Director, published the book ***Energy in America's Future*** (the "RFF Study"). The book begins with the following insightful observations regarding the challenges confronting energy policy implementation:

> There are many reasons why U.S. energy policy remains in dispute, but at least four problems come to mind in explaining the specific motivations that gave rise to this book and the basis on which its contribution to policy dialogue might be judged:
>
> 1. There is disagreement – and even some ignorance – about some fundamental facts.
> 2. There is great uncertainty about what results the most commonly suggested energy policies might produce.
> 3. It is painful to choose between short-term and long term objectives. What is best for us this year may make things very unpleasant in 1990 – and vice versa.
> 4. There is no clear national consensus on what the major long-term goals of U.S. energy policy should be. (RFF Study, p. 1)

The RFF study endeavored to address all of these "..barriers to a workable, acceptable energy policy for our nation," (RFF Study, p. 1). The study contains a comprehensive empirical analysis of energy consumption drivers, the relationships between energy consumption and economic growth, and technological opportunities to use energy more efficiency (technically and economically). It contains a detailed discussion of mineral resource and production cost information; conventional electricity supply technologies, focusing on nuclear and coal; and non-conventional supply alternatives, focusing on synthetic fuels, solar and other renewable and decentralized "alternative" supply technologies. It clearly recognizes the interdependencies between energy consumption and production choices and their environmental impacts.

While the RFF study does not recommend a set of "best policies" it provides a thoughtful framework for considering energy policy choices in the context of uncertainty and the international setting in which U.S. energy choices and consequences are embedded. According to the RFF study, a primary motivation for energy policy actions is to reduce dependence on imported oil and natural gas from unstable areas of the world and to move the country gradually

on to a path that can adapt to what were anticipated to be significant long run increases in the prices of oil and natural gas reflecting the higher costs of extracting oil and natural gas and the costs of meeting tighter environmental regulations.[3] However, the RFF study rejected the "we are running out of energy" perspective that was popular at the time. It took the clear view that the resource base was adequate to support growing world oil and gas consumption for at least a decade "… at cost levels not much higher than current prices. " (RFF Study, p. 425).

Among the policies discussed favorably in the RFF study are strategic storage, diversifying the sources of oil and gas supplies, reducing petroleum demand to lower the probability of disruption, policies to remove market and non-market barriers to expand domestic fuel supplies (nuclear, synthetic fuels, solar energy) and to encourage more efficient use of energy by consumers ("conservation"). The book emphasizes the importance of relying primarily on price signals and removing the then prevailing price controls on oil and natural gas and the desirability of targeting government interventions at market failures. Finally, the RFF study envisions a future energy system that involves a balanced combination of increased supplies from a variety of domestic conventional and some new sources plus significant improvements in energy efficiency.

The RFF study forecasts that aggregate energy consumption will continue growing, but at a slower rate than in the past, reflecting higher energy prices and increases in economical energy efficiency opportunities. The RFF study is particularly optimistic about efficiency improvements in residential heating, automobiles, process steam, and cogeneration. On the supply side it views the economics of nuclear vs. coal electricity generation as being reasonably favorable to nuclear, implicitly assuming that oil and natural gas will be too costly to use in the generation of electricity. While the book has a very positive assessment of the economic prospects for cogeneration, it is not particularly bullish about widespread economical use of solar heating, photovoltaics, or wind except in a few locations with favorable technical and economic attributes. The book recognizes that these supply resources are unlikely to be economical unless real oil prices double from the level prevailing at the time. The study is sympathetic to government subsidies to advance the development of commercial synthetic fuel technologies based on the belief that these subsidies are justified by a variety of market failures, while recognizing that the costs of synthetic fuels are likely to be double the real price of oil prevailing in 1979. Indeed, synthetic fuels and shale oil appear to be the "backstop" technologies that cap oil prices at about twice the then prevailing levels.

3. Though the RFF study took the clear view that the resource base was adequate to support growing world oil and gas consumption for at least a decade "… at cost levels not much higher than current prices." (RFF Study, p. 425).

At about the same time in 1979, a Ford Foundation Study *Energy: The Next Twenty Years* was published. The study group made up of distinguished economists, was chaired by Hans Landsberg. This study had the same goals and came to similar conclusions as did *Energy in America's Future*, though the former contains more detailed empirical analysis of resources, costs and technological options than the latter. However, the Ford study, clearly more concerned about the perceived gridlock in energy policy formation, probably reflecting Landsberg's frustrations about energy policy formation (Landsberg, 1983), focuses more on identifying a set of crisp "realities" and promoting a specific set of policy recommendations. Both the realities and the policy recommendations are worth noting (my paraphrasing):

Reality One: The world is not running out of energy. There are abundant energy resources at prices not much more than double those prevailing in 1979.

Reality Two: Middle East oil holds great risks, but is so valuable that the world will be dependent on it for a long time. The U.S. and its allies are vulnerable to serious economic disruptions due to supply disruptions in the Middle East. Dependence on the Middle East can only be reduced slowly.

Reality Three: Higher energy costs cannot be avoided, but can be contained by letting prices rise to reflect them. The higher costs need not have severe effects on economic welfare or lifestyles if they are properly managed. It is a dangerous misconception to think that government can somehow provide dependable, clean and plentiful energy cheaply. Most importantly, energy prices must be allowed to rise to reflect economic realities. In its internal discussions, the Ford team used the assumption that real world oil prices would double from their mid-1979 level by 2000, but oil prices could be anywhere in the $20 to $30/barrel range (in $1979 – roughly $40 to $60 per barrel in 2002 prices).

Reality Four: Environmental effects of energy use are serious and hard to manage. The need to reduce environmental costs will be a major cause of rising energy costs.

Reality Five: Conservation is an essential "source" of energy in large quantities. Energy conservation cannot be mandated or managed centrally, but requires that information and incentives be provided to energy users who make their own adjustments.

Reality Six: Serious shocks and surprises are certain to occur in the form of short-term supply interruptions and price instability in world oil markets. But there will also be pleasant surprises, regarding new supply and conservation technologies.

Reality Seven: Sound R&D policy is essential, but there is no simple technical fix.

In light of these "realities," the Ford study made nine major policy recommendations:

Recommendation 1: Decontrol oil and gas producer prices.

Recommendation 2: Make regulated electricity prices to consumers better reflect real costs, by applying marginal cost pricing principles and pricing backup capacity economically.

Recommendation 3: Use science and technology to generate and define basic options, while relying primarily on the private sector to develop and deploy technology. Pursue large-scale government financed demonstration projects selectively and with great care.

Recommendation 4: Adopt a different approach to air pollution control. "Air pollution control should focus on providing incentives for making progress toward cleaner air in a way that is cost-effective over time. Emissions charges, marketable discharge permits, and similar market-like devices should be used."

Recommendation 5: Prepare for disruption in world oil markets by developing an effective stockpile program and by using market forces to manage stockpiles and crises.

Recommendation 6: Continue efforts to reduce the problems associated with nuclear power and improve long run nuclear options. Reprocessing nuclear fuel and breeder reactors will not be economical for many years into the future.

Recommendation 7: Work to improve the acceptability of coal, facilitate its use in industry and electricity generation, and learn as much as possible as soon as possible about the carbon dioxide problem.

Recommendation 8: Vigorously pursue conservation as an economical energy source. Temporarily subsidize energy conservation investments until energy supplies are properly priced. Increase "non-hardware" research to better understand the barriers faced by consumers in making wise appliance/equipment choice and energy consumption decisions. Aggressively market energy conservation to consumers.

Recommendation 9: Remove impediments to use of solar energy.

As I will discuss in more detail below, many of these recommendations were reflected in energy policy initiatives over the last 25 years.

III. WHY DO WE NEED NATIONAL ENERGY POLICIES?

The RFF and Ford studies were both motivated, in part, by the view that sensible energy policy was being thwarted by the absence of a clear articulation of energy policy goals and by conflicting views about the underlying attributes of energy supply and demand and their associated uncertainties upon which energy policy must be based. This state of affairs is not surprising for at least two sets of reasons. First, interest in energy policy does in fact reflect multiple goals whose relative importance has ebbed and flowed over time.

Second, energy policies can have very significant distributional impacts – on different industries, different regions of the country, on the well-being of Americans in different income groups, and on different countries around the world. The large and multidimensional distributional impacts inevitably stimulate complex and aggressive interest group politics to influence public perceptions about the nature of energy policy problems, to promote policies that favor one interest group over another, and to make the definition and efficient implementation of sound energy policies difficult.

Even after 25 years, there is still not widespread agreement about the absolute or relative importance of various energy policy goals. Energy policies are derivative policies reflecting a number of higher level policy objectives and considerations .[4]

a. ***Important infrastructure sectors essential for economic growth and development:*** While interest in energy policy issues increased significantly after the oil shocks in the 1970s and 1980s, energy resource and policy issues attracted scholarly research and policy interest long before then. Sam Schurr, Hans Landsberg, the staff at RFF and many other scholars and policymakers pursued work on energy and related natural resource issues long before the U.S. imported significant quantities of oil, before OPEC existed, and before Persian Gulf supply disruptions led to price spikes, recessions and public concerns about the "energy crisis."[5] Economical and reliable supplies of energy play an important role in fostering economic growth and development. Energy, like transportation and telecommunications services, is a key intermediate input into most sectors of a developed economy. Distortions in prices, consumption, supply, or reliability of energy infrastructure services can lead to large economic and social costs.

b. ***Energy Security Concerns:*** National security considerations have served as a rationale for energy policy initiatives going back to the period before World War II (Goodwin, 1981). As imports of foreign oil increased, the potential adverse economic impact of oil supply disruptions in particular clearly has been a primary

4. The list is not meant to be exhaustive. Clearly, income distribution concerns have played a role in energy policy formation and implementation. So too have market imperfections which may make it difficult for consumers to make rational investments in energy-using structures, equipment and appliances. This section draws heavily on Joskow (2002). Goodwin (1981) contains a very interesting set of essays about U.S. energy policy from the 1930s until 1979, focusing primarily on the post World War II period. Stagliano (2001) briefly reviews this earlier history as well, but focuses on the development of energy policy in the early 1990s.

5. For example, President's Materials Policy Commission (1952)., "Resources for Freedom: A Report to the President," U.S. Government Printing Office, 1952.

motivation for interest in energy policy since the mid-1970s. The Ford and RFF studies reflected and reinforced these economic concerns. However, empirical studies of the business cycle and economic welfare costs on the U.S. economy of energy supply disruptions are not consistent with the view that these costs are enormous.[6] Nevertheless, even if these costs are not as large as many policymakers seem to think, government policies that anticipate or respond to energy price shocks can still affect their magnitude either positively or negatively depending on the wisdom of the policies that are implemented.

c. Environmental Impacts: The combustion of fossil fuels is the primary source of air pollution targeted by environmental policies aimed at cleaning the air (NO_x, SO_2, CO_2 etc.) and accounts for most of the production of CO_2, a greenhouse gas generally thought to be a major contributor to global climate change.' The RFF and Ford studies both clearly recognized the importance of the interactions between energy and environmental policies and took the position that there was no fundamental conflict between increased energy consumption and improving environmental quality. The Ford study emphasized the desirability of relying more on market-based instruments to internalize environmental externalities and identified CO_2 emissions as an emerging environmental challenge.

d. Competition Policy: Important segments of the U.S. energy sector, in particular electric power and natural gas, have been subject to price and entry regulation for almost a century. These regulatory institutions have important implications for the performance of these important infrastructure sectors and, therefore, for the performance of the economy U.S. competition policies continually reexamine the rationale for and performance of price and entry regulation. Poor sector performance, as well as technological and economic changes that undermine the case for price and entry regulation, can make it desirable to design and implement competition policies that restructure regulated industries to expand opportunities for competition and shrink the expanse of price and

6. For example, Bohi and Toman (1993). and Bohi (1991). However, a recent study by de Miguel, Manzano and Martin-Moreno (2003) finds that oil price shocks imposed significant costs on the Spanish economy.

7. Energy production and delivery also have significant potential impacts on water quality, water temperature, and land use. Environmental policies necessarily affect energy markets and energy policies necessarily have environmental effects.

entry regulation. However, aside from the recommendations to decontrol oil and natural gas prices, the Ford and RFF studies give essentially no consideration to more fundamental changes in the structure and role of competition in the gas and electricity sectors.

e. ***Use of Publicly-owned Resources:*** A significant fraction of domestic energy resources lie on or under land that is controlled by the federal government (and to a lesser extent state governments) and this fraction has been increasing. Hydroelectric resources lie on rivers and in locations subject to state or federal jurisdiction. The federal government has no choice but to develop and implement policies which define how these lands can be used for energy exploration and production. These policies also have impacts on the environment that further complicate the interactions between energy and environmental policies. The RFF and Ford studies recognized the need to optimize the use of energy resources on federal lands in an environmentally sensitive manner.

The energy policy-making and implementation process has several enduring features that have limited its success in achieving these and other sensible goals. First, there has never been ***sustained*** national leadership to develop and pursue a long-term energy policy program or to convince Americans that energy supply and demand are things that they should be concerned about. Instead, policy initiatives have been stimulated by short term supply shocks that have led to public concern about rising prices or shortages of fuel. These concerns stimulate demands (or opportunities) for something to be done by government, policy proposals are made and sometimes implemented, the impacts of the supply shocks and public reaction abate and the interest in energy policy quickly fades away soon after.

Second, the one proven way to reduce energy demand in the long run is to raise energy prices by allowing energy markets to function with unregulated prices and to reflect energy security and environmental externalities in energy prices by applying taxes or tradeable permits mechanisms to internalize the associated externalities. But the interest of Americans in energy policy issues is triggered by price increases and the public expects that policies will reduce prices. Politicians generally view supporting policies that would transparently increase energy prices as not being career enhancing decisions. Indeed, at the time the Ford and RFF studies were released, decontrol of oil and natural gas prices had only limited public support, despite the fact that there was growing evidence that the price controls on petroleum and the associated entitlements system were not constraining consumer prices significantly and that natural gas price controls were responsible for growing shortages (Arrow and Kalt, 1979; Smith and Phelps, 1978; and Rogers, 2003). Accordingly, energy policy initiatives have tended to rely on the provision of targeted financial incentives

of various kinds, R&D funds, and mandatory energy efficiency standards applicable to automobiles, appliances, new buildings, and industrial equipment.

Third, energy policy debates are always extremely contentious and tend to reflect regional interests at least as much as partisan Democrat vs. Republican politics. They pit energy production states against energy consuming states. They pit big oil, gas, and utility companies against consumer groups – including industrial consumer groups – fighting for lower prices. The unfortunate history of natural gas price controls during the 1960s and 1970s is perhaps the clearest example of a contest between energy consuming and energy producing states (MacAvoy, 2000). And increasingly over time, energy policy debates have become intertwined with environmental policy debates since energy production and use is a major contributor to air pollution, hazardous waste depositions, and land and water use issues. The confrontations between traditional "supply side" policies focused on increasing domestic energy supplies and "demand-side" policies built around energy conservation, renewable energy, and alternative vehicle initiatives, has continued to intensify over time.

IV. THE LAST 25 YEARS OF ENERGY POLICY THROUGH THE LENS OF THE RFF/FORD STUDIES

As discussed above, the Ford Study made a set of nine major policy recommendations. These recommendations are generally consistent with those made or implied, less crisply, in the RFF study. How do these recommendations compare *to* the actual course of energy policy since 1978? I will focus here on a subset of these recommendations:

a. Decontrol oil and natural gas prices: The deregulation of oil and natural gas prices was accomplished, quickly in the case of oil and more slowly in the case of natural gas. Price controls on oil were implemented as part of President Nixon's anti-inflation policies prior to the first oil shock in 1973-74. In 1975, President Ford signed the Energy Policy and Conservation Act, extending price controls on oil and implementing the crude oil entitlements program to allocate "old" price controlled oil (Kalt, 1981). Controls on the field price of natural gas sold in interstate commerce began in the 1950s, with regulatory obligations thrust on the Federal Power Commission by federal court decisions reinterpreting the provisions of the Natural Gas Act of 1938. By the mid-1970s, these price controls had created increasingly severe shortages of natural gas (MacAvoy and Pindyck, 1975).

In late 1978 Congress passed the Natural Gas Policy Act (NGPA). The NGPA, began the deregulation of "new gas" supplies while continuing price regulation of "old gas" supplies. Two months after President Carter signed the NGPA into law along with several other pieces of energy policy legislation, Iran ceased exporting oil following the Shah's overthrow, leading to an explosion in world oil prices. In April 1979, President Carter, responding to growing oil and gas shortages in the U.S., announced the gradual decontrol of oil prices. Then

in early 1981, President Reagan responded to the oil crisis of 1978-1980 by removing remaining price and allocation controls on the oil industry. The Natural Gas Wellhead Decontrol Act of 1989 completely removed the price controls on wellhead prices of natural gas with the last vestiges of field price regulation ending in January 1993.

The deregulation of natural gas prices went even further (beyond the "field") than the authors of the RFF and Ford studies had contemplated. Beginning in 1985, a series of Federal Energy Regulatory Commission (FERC) initiatives led to the unbundling of interstate pipeline transportation of natural gas from the sale of commodity natural gas itself, ultimately making it possible for local distribution companies, electricity generators and large industrial users to purchase commodity natural gas directly from producers or through intermediaries in unregulated competitive natural gas markets, purchasing transportation service separately at prices that were capped by FERC regulation. These restructuring, deregulation and regulatory reform initiatives led to the development of competitive markets for natural gas at a growing number of trading hubs, markets for gas storage, secondary markets for pipeline capacity, the development of a vibrant gas marketing industry, and the creation of financial derivatives markets giving wholesale gas consumers a wide range of contracting and risk management options.

b. Regulated electricity prices should more closely reflect the marginal cost of supplying electricity: Retail electricity prices are regulated by the states through their public utility commissions. At the time the RFF and Ford studies where written, it was widely believed that cost-of-service regulation was keeping electricity prices below the marginal supply cost of electricity and that electricity prices generally did not properly reflect variations in marginal cost between peak and off peak periods. Title I of the Public Utility Regulatory Policies Act of 1978 (PURPA) required states to determine whether they would introduce new pricing mechanisms to encourage more efficient utilization of electricity. Title II of PURPA obligated electric utilities to purchase power from cogeneration plants and small power production facilities using renewable and waste fuels. At the time PURPA was passed, Title I received much more attention than did Title II. In response to Title I, and after the RFF and Ford studies were published, each of the states went through a process to determine whether and how they would adjust electric and gas utility rate structures to provide better incentives to consumers, including the consideration of marginal cost pricing. Relatively little came of these proceedings, with a few states implementing voluntary time-of-use pricing tariffs and Title I has now largely been forgotten.

Title II of PURPA has had a much more significant effect on the organization and regulation of the electric power industry which, in the long run, should ensure that retail prices reflect the competitive market value (marginal cost) of electricity. Title II of PURPA required electric utilities to purchase electricity supplied by "Qualifying Facilities" (QF) producing

electricity using cogeneration technology, renewable and waste fuels.[8] Consistent with the Ford and RFF studies, the objective of Title II of PURPA was to stimulate electricity production from more thermally efficient cogeneration plants and to encourage the use of renewable and waste fuels in the production of electricity. The states were required to develop regulations to ensure that electric utilities would stand ready to purchase power from QFs at prices reflecting their "full avoided costs." After various court challenges, in the early 1980s, several states, including California, New York, all of the New England states, New Jersey and Pennsylvania, embraced PURPA with great enthusiasm, requiring utilities to pay high prices for QF power under 20 to 30 year contracts.

As with natural gas, policies affecting the electricity sector have gone much further than the RFF and Ford studies had anticipated. Provisions of the Energy Policy Act of 1992, subsequent initiatives by FERC, and initiatives by several states has placed the electric power industry on a difficult and ongoing path of restructuring to support competitive wholesale and retail markets for electricity (Joskow, 2003). Importantly, both the RFF and Ford studies completely missed the increasingly important role of natural gas and the central role of efficient combined-cycle gas turbine (CCGT) generating technology using natural gas in electricity generation and its role in evolving competitive wholesale power markets. These developments in turn were stimulated by the decontrol of natural gas prices and the subsequent restructuring of the natural gas industry.

c. ***Vigorously pursue energy conservation:*** There has certainly been no shortage of efforts to encourage energy efficiency improvements in the last 25 years. Whether they are exactly what the Ford and RFF studies had in mind is hard to say. Energy efficiency or conservation policies have relied on a combination of building and appliance efficiency standards, tax subsidies, direct subsidies implemented through utility energy efficiency programs, and other means. The National Energy Policy and Conservation Act (NEPCA) was passed by Congress and signed by President Carter in late 1978, required the Department of Energy (DOE) to issue appliance efficiency standards for household appliances and charged the FTC with issuing appliance energy efficiency labeling rules. However, the Reagan administration opposed setting appliance efficiency standards required by this legislation and eventually promulgated "no-standard standards." The DOE was then sued for failing to enforce the National Energy and Conservation Act of 1978 and a Court of Appeals ruled against the Reagan administration.

Little progress was made in enacting federal appliance efficiency standards until the late 1980s, when new federal legislation was passed in response to a growing number of states enacting their own appliance efficiency

8. A more detailed discussion can be found in Joskow (1989).

standards and manufacturer concerns about the prospect of manufacturing appliances meeting numerous state-specific energy efficiency standards. The proliferation of different individual state standards then led appliance manufacturers to seek uniform national appliance efficiency standards. Manufacturers and energy efficiency advocates (environmental groups) negotiated what became the National Appliance Energy Conservation Act in 1987. This Act contains specific efficiency standards for 12 types of home appliances that are supposed to be updated from time to time by the DOE. The first standards became effective in 1988 and 1990 and the DOE has revised the statutory standards since then. President Clinton approved new standards for air conditioners and other appliances near the end of his second term.[9]

The Energy Policy Act of 1992 (EPAct92) was passed in October 1992. It was the only piece of major energy policy legislation passed during the 1990s. It grew out of legislation proposed by Congressman Phil Sharp entitled "The National Energy Efficiency Act of 1991" that was shaped and managed through the Congressional political thickets by Senators Johnston and Wallop. Unlike the supply-side program oriented proposals focused on increasing supplies of conventional fossil fuels submitted to Congress in early 1991 by the G.H.W. Bush administration, and rejected by Congress in June 1991, EPAct92 paid much more attention to promoting energy conservation and renewable energy. Among other things, EPAct92 provides tax and direct subsidies for energy efficiency and renewable energy technologies, requires new energy efficiency standards for buildings and industrial equipment, expands energy efficiency labeling requirements, and creates programs to improve energy efficiency in federal buildings. EPAct92 also made important changes in the Federal Power Act (FPA) and the Public Utility Holding Company Act (PUHCA) which helped to make subsequent electricity industry restructuring and competition initiatives feasible.

Improving automobile fuel efficiency plays a big role in the RFF study. Automobile fuel efficiency standards were first established by the federal government in the Energy Policy and Conservation Act of 1975 and a "gas guzzler" tax was included in the Tax Act of 1978, before the RFF and Ford studies were completed and the anticipated effects are incorporated in both studies. The 1975 Act established Corporate Average Fuel Economy (CAFE) standards for each automaker, with domestically produced and imported vehicles counted as separate fleets. For passenger cars, the CAFE standards started at 18 miles per gallon with the 1978 model year and gradually increased to 27.5 miles per gallon for the 1985 model year. For light trucks, including SUVs, the CAFE standard began at 17.2 miles per gallon in 1979 and rose to 20.5 miles per gallon by 1987. These standards are based on laboratory tests that follow EPA

9. Though the standard for central air conditioners were partially roiled back later by the G.W. Bush administration.

guidelines and have not changed since 1985 and 1987 respectively. Efforts to tighten the CAFE standards have been opposed successfully by domestic automobile manufacturers for the last two decades, supported by scholarly studies that indicate that the implementation of the standards was very costly.

d. Nuclear Power: The RFF and Ford studies were just being completed when the accident at the Three Mile Island Nuclear Plant (TMI) occurred in March 1979. This reinforced already significant public opposition to nuclear power, leading to a temporary moratorium on the completion of new nuclear plants, and a temporary closure of some operating nuclear plants, pending a review of safety issues raised by the TMI accident. Delays and design changes following these reviews contributed to the already escalating costs of building nuclear power plants. While acknowledging the escalation in costs, lengthening licensing and construction times, and poor operating performance of nuclear plants, both the RFF and Ford studies are quite favorable toward nuclear power, viewing it as being very competitive with new coal plants, and arguing that constraints on expanding nuclear power would be costly. The RFF study seems to accept the DOE's range of estimates for installed nuclear generating capacity of 256 - 396 GWe (p. 423) in 2000 and an overnight construction cost of about $530/kW in 1975 prices (about $1500/kW in 2002 prices) as being reasonable. The RFF study recommends that the United States continue efforts to reduce the problems confronting expansion of nuclear generating capacity. It also argues that reprocessing nuclear fuel and breeder reactors will not be economical for many years into the future. Finally, it recommends a continuation of efforts to define and improve long run nuclear options, to resolve waste disposal issues and has a thoughtful discussion of nuclear proliferation issues.

Federal policy toward nuclear power during the 1980s and 1990s was primarily a policy of benign neglect, nether aggressively promoting nor actively discouraging construction of new nuclear power plants. Legislation was passed in 1982, 1987 and 1992 to identify and develop a site for storing waste fuel from civilian nuclear reactors consistent with the RFF studies' recommendations. Until the mid-1970s, U.S. energy policy assumed that separated plutonium from reprocessing would be recycled as a commercial nuclear fuel source. However, concerns about the potential for plutonium to be diverted and converted to weapons material, which could lead to the proliferation of nations with nuclear weapons, resulted in a 1977 presidential ban on reprocessing used nuclear fuel in this country. This ban and the supporting recommendations of the Ford study were very controversial at the time. Although the ban was subsequently lifted, the high cost of reprocessing and the availability of cheap uranium continue to drive decisions not to reprocess in the United States.[10] Federal funding for the development of the Clinch River Breeder Reactor was terminated in 1983 and

10. Nuclear Energy Institute Web Site. http://www.nei.org/doc.asp?docid=663.

the project cancelled due to technical problems, high construction costs, and the view – shared with the RFF study – that reprocessing nuclear fuel to recycle plutonium would not be economical for many years.

While the Clinton Administration was not a big booster of nuclear power, it supported a number of "pro-nuclear" initiatives, including developing and applying re-licensing procedures for nuclear plants reaching the end of their initial license period and pre-certification of three new prototype nuclear plant designs. Nevertheless, although EPAct92 provides funds for R&D on advanced nuclear technologies, the Clinton administration gradually reallocated R&D funding and policy initiatives away from coal and nuclear R&D programs toward programs focused on promoting energy efficiency and renewable energy supplies, and the development of more efficient vehicles that use fuels other than petroleum – electricity, natural gas, and ethanol, The George W. Bush administration has announced its intention to promote investments in new nuclear power plants more aggressively and to increase research funding for advanced nuclear technologies.

e. ***Synthetic Fuels from Coal, Solar Energy, and other alternative domestic energy resources:*** In addition to nuclear, both the RFF and Ford studies supported carefully crafted government policies to stimulate development of alternative domestic energy resources. They focus in particular on the production of synthetic fuels from coal[11] and expanded use of solar energy, including wind. They recognized that the production costs associated with these resources would be significantly higher than the then prevailing cost of oil, but they recommended a variety of basic research and modest demonstration initiatives to develop these technologies and to remove market and regulatory barriers to their deployment. The studies also recognized that the prospects for these alternative resources depended on both technological developments and the anticipated increase in prices for oil and natural gas materializing. The Ford study was unsympathetic to large scale federal demonstration projects.

In the last 25 years there has been a plethora of federal policies to encourage alternative fuels and fuel-use technologies with little to show for the efforts. In June 1980 President Carter signed the Energy Security Act, consisting of six pieces of legislation: U.S. Synthetic Fuels Corporation Act, Biomass Energy and Alcohol Fuels Act, Renewable Energy Resources Act, Solar Energy and Energy Conservation Act, Geothermal Energy Act, and Ocean Thermal Energy Conversion Act. These laws all provided an array of tax subsidies and direct subsidies for alternative energy supplies and to encourage energy efficiency. From an economist's perspective this was probably the low point in contemporary **U.S.** energy policy. However, the synthetic fuel and shale

11. By this time, the U.S. already had significant experience with failed synthetic fuels programs and one wonders how much this experience affected the studies' policy recommendations.

oil programs, to which President Carter had committed $88 billion, were later abandoned as costs rose and oil and natural gas prices fell during the 1980s.[12]

In addition to promoting energy efficiency as discussed above, EPAct92 includes a number of new programs to encourage renewable energy and alternative fuels. Among other things the Act provides various tax subsidies to encourage electric vehicles, solar and geothermal energy production, alcohol fuels, and R&D funding for the commercialization of renewable energy technologies, including electric and hybrid vehicles, and various technologies for the generation of electricity from renewables on-grid and off-grid – fuel cells, heat engines, superconductors and other technologies. The Act also authorizes R&D expenditure for specified "clean coal" technologies.

Energy policy during the Clinton administration was guided by the framework established in the Energy Policy Act of 1992 and was heavily influenced by the Administration's environmental policy agenda, including concerns about global climate change. It gradually reallocated R&D funding and policy initiatives away from coal and nuclear R&D programs toward programs focused on promoting energy efficiency and renewable energy supplies, and the development of more efficient vehicles that use fuels other than petroleum. Federal expenditures supporting energy efficiency, renewables, and alternative fuel vehicles increased significantly while funding for coal and nuclear technology declined. However, the Clinton administration's efforts in these areas were first hampered by federal budgetary constraints that placed pressure on the DOE's budget. After 1994, these initiatives were impeded by a Republican Congress that was hostile to the DOE in general and the Clinton administration's favorite energy programs in particular. Congress prohibited federal agencies from even studying tightening the existing vehicle fuel efficiency standards, placed roadblocks in the way of evaluating and tightening appliance efficiency standards as required by EPAct92, and rejected or cut back Administration proposals for tax subsidies for renewable energy and alternative fuel vehicles. Congress also slowed down efforts by the Administration to shift funds toward renewable energy and energy efficiency programs.

f. Rely on economic instruments – emissions taxes and tradeable emissions permits – to internalize environmental externalities. Until the 1990s, there was little policy interest in using economists' preferred instruments to control pollution. However, the Acid Rain Title of the Clean Air Act Amendments of 1990 created a cap and trade system for emissions of sulfur dioxide from electric generating units. Moreover, in response to obligations to reduce regional emissions of NO_X provided for in the 1990 Clean Air Act, an emissions trading system has been introduced in the Northeast and other regions of the country to control NO_X emissions as well. In the early 1990s, California

12. A modest amount of research and development activity on coal gasification continues in connection with the integrated gas combined cycle technology that would use synthetic gas produced from coal in a combined cycle gas turbine as part of the Clean Coal Program.

also created a cap and trade system to control NO_X and SO_2 emissions (RECLAIM) in the South Coast Air Quality Management District. These programs are generally viewed as having been successful in reducing costs while meeting environmental goals (Ellerman et al. 2000; and Ellerman, Joskow and Harrison, 2003). Economic instruments, especially cap and trade programs, to internalize environmental externalities are now widely accepted as attractive mechanisms to control pollution.

The Ford study was clearly way ahead of its time in recognizing the need to better understand the effects on CO_2 emissions on climate change. After 25 years of research, most developed countries' energy policies are now closely linked with programs to control emissions of CO_2. Cap and trade programs are likely to play an important role in CO_2 emissions control programs in Europe and (eventually) in the United States and provide a framework for integrating developing countries into global CO_2 emissions control program.

g. ***Prepare for oil supply disruptions: The*** Ford study recommended that the U.S. lead a world effort to prepare for short-term disruptions in world oil markets by developing an effective stockpile program and by using market forces to manage stockpiles and crises. The establishment of a U.S. strategic petroleum reserve predates the RFF and Ford studies. The Energy Policy and Conservation Act signed by President Ford in 1975 authorized the creation of a Strategic Petroleum Reserve (SPR) containing up to 1 billion barrels of petroleum.[13] The SPR is located in underground salt caverns along the Gulf of Mexico and now has an authorized capacity of about 700 million barrels of oil with about 600 million barrels actually in storage as of June 2003. The Act gives the President the authority to authorize releases from the SPR when the President determines that there is a severe supply interruption leading to a "national energy shortage" (full drawn down) or other circumstances that the President determines are likely to lead to significant domestic or international shortages of significant duration that would have adverse effects on the economy (limited drawdown). Through the International Energy Agency, the U.S. has agreements to coordinate withdrawals from reserves with other countries.

Oil has been withdrawn from the SPR in response to international oil supply disruptions only once – during Operation Desert Storm in 1991 when 17.3 million barrels were sold from the Reserve. Oil has also been withdrawn in two test sales (1985 and 1990) and six times in the form of oil exchange arrangements authorized by the 1975 Act.[14] Most of the oil exchange actions have been in response to localized domestic supply disruptions, the latest in 2002 in response to disruptions in commercial oil shipments to Gulf Coast ports caused by Hurricane Lili. Non-emergency sales from the Reserve were also authorized by Congress in 1996 to raise revenues for the Federal government.

13. http://www.eia.doe.gov/cabs/usa.html
14. http://www.fe.doe.gov/spr/

The SPR is not exactly what the RFF study had in mind. The RFF study favored more reliance on private stockpiles. It also recommended the development of protocols for withdrawing oil from any strategic reserves that were based on other than hypothetical quantity measures of "shortfalls." Instead, the study recommended basing releases on large increases in prices from recent historical levels to cushion the effects of supply disruptions on prices. It also recommended the development of clear release criteria before new international oil disruptions occur. Both of these recommendations were and are controversial and have largely been ignored, as have more recent analyses supporting similar decision rules.

V. ENERGY DEMAND AND SUPPLY 25 YEARS LATER

a. Energy Consumption

Both the RFF and Ford studies were (wisely) cautious about making projections of the future paths of energy supply and demand under alternative policy scenarios. Yet both studies offer some forecasts for energy consumption and supply in 2000. In the spirit of the paper by Koomey et al. in this volume, it is very instructive to compare what these studies thought would happen with what actually did happen and to try to understand the sources of the differences. The RFF study focused on the "Mid-range" projections of energy consumption by sector for the year 2000 displayed in Table 1 and I will focus on it here as well.[15] The forecasts are based on a detailed analysis of a few sectors, less detailed analyses of others, the assumption that real GDP would grow at an average rate of 3.2% per year, and the Census' mid-range population forecast of a 260.5 million person U.S. population in 2000. In RFF mid-range forecast is for 114 quads of energy consumption in 2000.

The Ford study took a more aggregate "top-down" approach based on assumptions about future energy prices, demand elasticities, GDP growth, and reductions in the energy/GDP ratio to come up with an aggregate projection for U.S. energy consumption in 2000. For example, assuming real GDP would growth at 3 % per year, that real energy prices would increase by nearly 50 %, that the energy to GDP ratio would fall to about 22 BTU per dollar of GDP (at 1978 price levels) by the year 2000. The Ford study forecasts total U.S. energy consumption of about 120 quads in 2000, very close to the aggregate consumption forecast provided by the RFF study. Both recognize that such forecasts have large uncertainties associated with them.

15. The RFF study (page 203) suggests a lower bound of 100 quads and an upper bound of 140 quads for total U.S. energy consumption in 2000.

Table 1. RFF Study Forecast of Energy Consumption in 2000

Sector	RFF Forecast (Quads)	2000 Actual (Quads)
Residential		
Space heating	8.0	6.2
Other	14.0	14.3
TOTAL	22.0	20.5
Commercial	21.8	17.2
Industrial		
Process Steam	16.4	4.1 (1998)
Other	31.0	28.5
TOTAL	47.4	32.6
Transportation		
Passenger vehicles	7.0	15.0
Freight	5.3	6.0
Air	3.3	3.6
Other		2.0
TOTAL	15.6	26.7
Other	7.0	2.0
TOTAL	114	99

Sources: Schurr et al. (1979), Table 6-3; ***Annual Review of Energy 2001*** and ***Annual Energy Outlook 2003,*** U.S. Energy Information Administration.

Actual U.S. energy consumption in 2000 was just under 100 quads. [16] Thus, the RFF and Ford forecasts were 15% to 20% too high in the aggregate. At first blush, given the uncertainties and long forecast period, the forecasts do not seem to be too far off the mark. However, the studies forecast that energy consumption would grow by 40 to 45 quads between 1976 and 2000, while it actually grew by only 25 quads. So, in terms of *growth* in energy consumption, the forecasts were high by 60 to 80 %. The difference cannot be explained by economic and population growth drivers. Real GDP increased by an average of about 3.2 % per year during this period which is consistent with the assumptions underlying the RFF forecast (3 % real GDP growth rate in the Ford forecast) and population grew faster (280 million rather than 260 million people in 2000) than the RFF study assumed. Moreover, the differences between the forecasts and actual energy utilization for some of the individual consuming sectors are even larger. These differences are instructive both with regard to the effects of energy policies and unanticipated changes in the structure of the U.S. economy on energy consumption patterns.

16. Actual U.S. energy consumption in 2000 was at the low end of the forecasts made by energy studies released in the late 1970s (Schurr, 1979 pp. 204-217).

The RFF forecast for residential sector consumption in 2000 is off (high) by only about 10 % . RFF anticipated significant improvements in the efficiency of home heating systems, forecasting a 10% reduction in energy used for space heating despite increasing population and per capita real income. In fact, residential space heating use declined by about 23%, twice the decline reflected in the RFF forecast, despite population growth greater and price increases smaller than assumed there.[17] Thus, energy efficiency improvements have been greater than expected, probably reflecting appliance efficiency standards, energy efficiency labeling and new building codes, since realized energy prices were lower than forecast (see below). The forecast for other residential energy uses, based on an assessment of other studies and incorporating significant improvements in energy efficiency are right on target.

The RFF forecasts for industrial energy consumption in 2000 are about 30% higher than the realized level of energy consumption in the industrial sector. The RFF study examines process steam use (about 35% of industrial energy use in 1976) in detail to yield a mid-range forecast of about 16 quads of energy associated with process steam in 2000. For the rest of the industrial sector, the forecasts simply assumed that the manufacturing sector would grow at a rate 20% faster than GDP and that energy efficiency would continue to improve at the pre 1973-74 embargo rate.

The difference between actual industrial energy consumption and what was forecast by RFF is probably due primarily to changes in the structure of the economy. The manufacturing sector did not grow faster than GDP as was assumed, but more slowly. In 1978, manufacturing accounted for 22.5% of GDP while in 2000 it accounted for 15.8% of GDP. Moreover, the share of some of the most energy intensive sectors (primary metals, paper and allied products, lumber and wood products, stone, clay and glass) shrunk from 26% of manufacturing GDP in 1980 to 18 % of manufacturing GDP in 2000. It is likely that improvements in energy efficiency were also greater than had been anticipated.

The RFF forecast for energy consumption in the commercial sector in 2000 is about 25% higher than realized consumption. The RFF forecasts were based on Oak Ridge National Laboratory (ORNL) studies which incorporated assumptions consistent with a 3.2 % real GDP growth rate and real energy price increases of 1.6% per year. Without going back into the details of the ORNL model, it is hard to know where the sources of the difference lie. Higher prices than forecast or slower economic growth do not explain the difference since actual prices were lower and actual growth of the Commercial sector higher than forecast. Commercial energy consumption reflects energy consumption decisions by a wide range of industries, including wholesale and retail trade, finance,

17. To 1997, the last year for which EL4 data are available. I cannot reproduce the residential space heating numbers from the RFF study. They report 8.8 quads in 1976. The EL4 reports about 7.4 quads in 1978 and 6.0 quads in 2000, assuming that electricity is produced with 10,000btu/kWh.

insurance and real estate, and "services." The share of these components of GDP as a whole increased significantly between 1978 and 2000 (from 43% to 57% of GDP). As with the residential sector, the commercial sector should have benefited from improvements in space heating, cooling and lighting efficiency in buildings. The changing mix of commercial activity and greater improvements in energy efficiency also probably account for a significant fraction of the difference.

Finally, turning to transportation, the RFF study projected a decline of about 30 % in energy used by passenger vehicles and an increase of about 33 % in energy used in freight transport with overall energy consumption in transportation being flat between 1978 and 2000. In fact, energy consumption in the transportation sector increased by about 30% between 1978 and 2000.[18] This is the ***only*** sector where the RFF forecast was too low. Most of the difference is associated with energy consumed in personal transportation vehicles. The RFF forecasts are based on a series of assumption about growth in the number of vehicles per capita, miles traveled per vehicle, and vehicle fuel efficiency that lead to the projection that vehicle miles traveled would increase by 38% between 1976 and 2000. In fact, vehicle miles traveled increased by 150 % between 1977 and 2001 based on U.S. Highway Administration data. [19] The number of passenger vehicles per capita and the average miles driven per passenger vehicle are all much higher than assumed by RFF. In addition, the RFF study assumed that the 27.5 mile per gallon CAFE standard would be achieved by all passenger vehicles by 2000. While new passenger vehicles have met the 27.5 mile/gallon CAFE standard (based on laboratory tests) when they are sold, in practice passenger vehicles got only 22.0 miles per gallon in actual use. Moreover, while the RFF study clearly noted the existence of the "light truck loophole" (page 151) and even the potential increased popularity of "trucklike" vehicles for personal transportation use, the shift to SUVs, with lower fuel economy standards, was not reflected in the forecasts.

In summary, the RFF and Ford studies used mid-range forecasts that implied that aggregate U.S. energy utilization per dollar of real GDP would fall by about 1/3 between the late 1970s and 2000. In fact energy utilization per dollar of GDP fell by about 10% more than predicted (36% vs. 33%). As we can see from Figure 1, however, the ratio fell more quickly from 1978 to 1985 (when energy prices were very high and the effects of the CAFE standards were

18. The energy consumption for transportation reported in the RFF study do not match the EIA numbers. For 1976 (the year used in the RFF study), RFF report transportation sector consumption of about 15.6 quads while EIA reports 19 quads. So, to the extend that RFF was forecasting from a different base this explains part of the difference between the forecast and actual numbers. Accordingly, I will focus on the differences between the forecast and actual percentage changes in consumption.

19. http://nhts.ornl.gov/2001/html_files/trends_ver6.shtml. Accessed June 8, 2003.

kicking in) than it has fallen since 1985 (as energy prices have fallen). The accuracy of the forecasts for the individual sectors is much more variable.

b. Fuel Use

The RFF study also contains a breakdown of the projected use of primary fuels and electricity by end-use consumers consistent with the consumption forecast (page 195). Table 2 compares the projected breakdown with the actual breakdown in 2000.

Table 2. Primary Energy Consumption by Source in 2000

	1976	RFF 2000	ACTUAL 2000
Coal	5.5%	10%	2%
Gas	23.1%	17%	19%
Oil (liquids)	42.6%	33%	38%
Electricity	28.7%	40%	39%

Note 1: Electricity's share is based on primary inputs into the production of electricity
Note 2: 1976 and RFF columns from RFF study Table 64.
Note 3: Actual 2000 column calculated from Annual ***Review of Energy 2001***, U.S. Energy Information Administration.

The overall trend toward electrification of the economy envisioned by the RFF study has been realized. However, the utilization of coal in end-use applications (i.e., aside from the production of electricity) has fallen rather than increased, reflecting the changing composition of the economy discussed earlier, environmental regulations, and the availability of relatively inexpensive natural gas as a boiler fuel in industry. Accordingly, natural gas use is higher than predicted. As discussed previously, petroleum consumption is significantly higher than the RFF study projected, due primarily to much higher than predicted petroleum use in personal transportation.

Neither the RFF study nor the Ford study provides a prediction for the primary fuels that would be used to generate electricity in 2000. However, the focus of both studies is on nuclear and coal as being the primary economical alternatives for generating electricity, combined with industrial cogeneration, and with some longer run possibilities for renewable (wind and solar) applications. Neither study saw any future for natural gas in the generation of electricity, and while combined-cycle gas turbine (CCGT) generating technology is mentioned in the RFF study, it does not play a significant role in the visions of the future offered by the RFF and Ford studies. I do not think that the RFF study's perspective on the use of natural gas to generate electricity reflected the widespread view prevailing at the time that natural gas was a "premium fuel" that should not be "wasted" to generate electricity. Rather, it reflected the view that coal and nuclear power would be less costly sources of electricity.

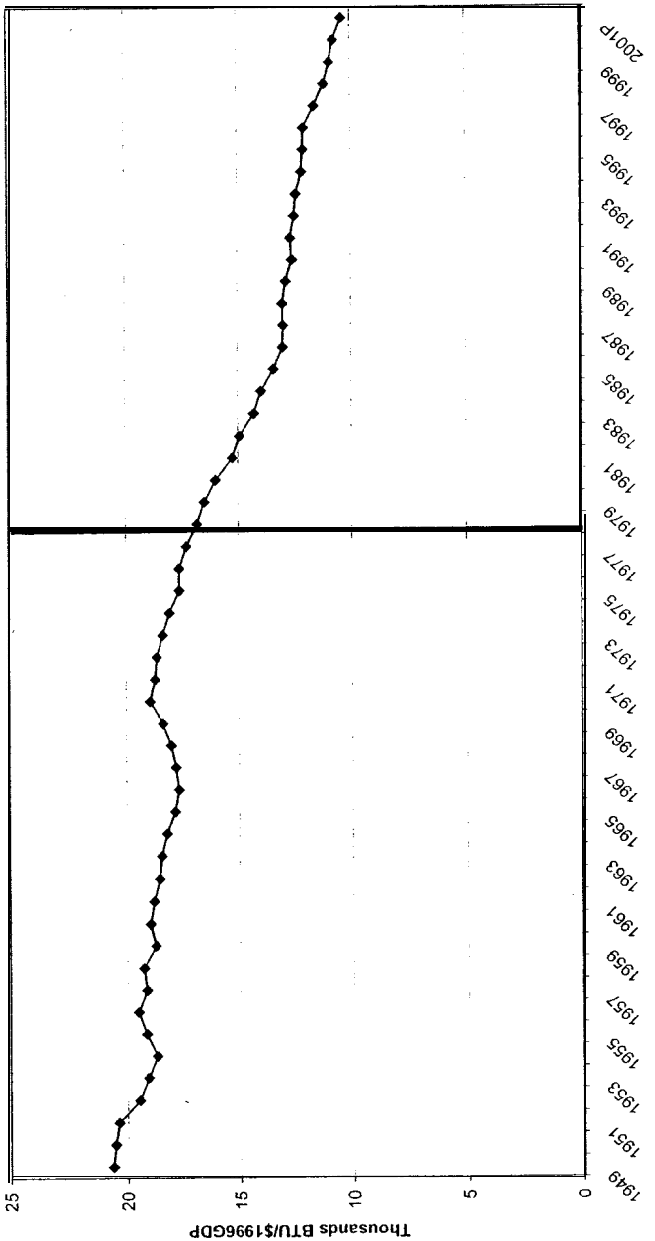


Figure 1. Energy Consumption per Dollar of Real GDP

Source: *Annual Review of Energy 2001*, Energy Information Administration

Table 3 provides the breakdowns of fuels used to generate electricity in 1978 and 2001. The fuel use in the generation of electricity is broadly consistent with the policy recommendations in the RFF and Ford studies. Despite tougher environmental requirements, coal use in electricity generation has risen steadily since 1978. Coal and nuclear have increased their shares of electricity generation from 47 % to 72 % , while petroleum has almost disappeared as a fuel for generating electricity. However, natural gas' share of electricity generation is higher than it was in 1978 and is projected to continue to rise in the next 25 years to about 30 % in 2025 (U.S. Energy Information Administration [EIA] 2003). About 150,000 MW of new generating capacity has been completed in the U.S. in the last five years, almost all of it CCGT or single-cycle gas turbine generating facilities (Joskow, 2003). The important role of natural gas, combined-cycle gas turbine generating capacity, and the restructuring of the electricity industry to rely on competitive wholesale markets are developments that were missed completely by both the Ford and RFF studies but are, in a sense, a direct but unforeseen consequence of the recommendations to decontrol oil and natural gas prices, to bring electricity prices to market levels, to stimulate cogeneration," and to rely more on competitive market forces.

Table 3. Fuels Used to Generate Electricity

	1978	2001
Coal	44%	51%
Natural Gas	14%	16%
Oil	17%	3%
Nuclear	13%	21%
Hydro	13%	6%
Renewable	1.8% (1989)	2.1%
Cogeneration	7.3% (1989)	9.7%

NOTE 1: Consistent data for renewable energy sources other than conventional hydro and for electricity produced as part of a cogeneration process are not available prior to 1989.
NOTE 2: The renewable row excludes conventional hydro.
NOTE 3: The fuels used for cogeneration are included in the fuel categories above. 62% of the cogenerated electricity is produced with natural gas.
Source: *Annual Review of Energy 2001*, Energy Information Administration.

20. PURPA stimulated investment cogeneration facilities which in turn stimulated interest in the development of combined cycle generating technology. These developments stimulated interest in expanding competitive opportunities for independent power producers (Joskow, 2000). However, the penetration of cogeneration in 2000 is significantly lower than RFF's assessment of its economic potential.

The quantity of electricity generated from nuclear power has increased significantly over the last twenty years as 45 plants under construction or announced in 1979 were completed and as nuclear plant operators were able to increase the operating performance of the nuclear plants from average capacity factors of 65% in 1978 to average capacity factors of 89% in 2001. However, all of these post-1979 plants had been announced by the time that the Ford and RFF studies were released. No new plants were announced after 1979, about half of the nuclear plants that were under construction or had been announced by 1979 were subsequently cancelled, and about a dozen operating nuclear plants were closed during the 1980s and 1990s. Current nuclear generating capacity is less than half of the lower bound government forecasts cited in the RFF study. The nuclear plants that were completed during this period were wildly over budget and, contrary to the forecasts in the RFF and Ford studies, investments in new nuclear plants are now widely perceived to be uneconomical compared to coal and gas-fueled alternatives. No nuclear power plants are under construction in the U.S. and few are under construction elsewhere in the world. As a result, nuclear's share of electricity production is projected by EIA (2003) to fall from 20% to about 15 % by 2025.

The RFF study contains detailed analyses of synthetic fuels and solar energy applications (including wind) and the Ford study devoted a lot of attention to solar energy's potential. Both studies recognized that costs would have to fall and/or the prices of substitute energy supply sources rise for renewable energy to be competitive absent special subsidies. Public policies were subsequently implemented to promote both synthetic fuels and solar energy, as well as other renewable energy supply technologies. As already noted, the synthetic fuels program was largely abandoned in the mid-1980s. Its remnants can be found in the clean coal program's initiatives on coal gasification for use in combined-cycle power stations and some controversial tax subsidies for synthetic fuel technology. A variety of tax and direct subsidies have been given to solar and other renewable energy sources and these sources were favored for use in generating electricity through the implementation of PURPA.

Despite all of these policy initiatives, renewable energy, excluding conventional hydroelectric energy, accounts for only about 3% of total energy supplied to consumers today. About 2/3 of this is accounted for by wood used primarily in space heating. Solar and wind energy account for only 0.1% of energy supplied in the U.S. However, renewable energy supplies, especially from wind, are growing rapidly as a consequence of various subsidies provided in EPAct92 and state-mandated purchase obligations, and supplies are projected to rise to about 6% of total energy consumed by 2025 (EIA 2003).

c. Energy Prices

The Ford and RFF studies were motivated primarily by three interrelated problems: increasing dependence on imports of petroleum, a long run trend of rising energy prices, and the impacts of energy production and use on the environment. Both studies envisioned energy prices rising over the following 20 years, but to a long run level no more than double the prices prevailing in 1979. Soon after the studies were published, energy prices began to rise rapidly in response to disruptions in oil supplies from Iran. However, energy prices peaked in the mid-1980s and then fell rapidly. Overall, energy prices were at about the same real level in 2000 as they were in 1979. EIA projects real annual end-use energy prices to be about constant over the next 25 years and oil prices to stay below the $40-$60 range (2002 price levels) projected by the Ford study (EIA 2003, p. 123). Figure 2 displays the real price of crude oil, natural gas, and a fossil fuel price index over time. Following the price break around 1984-85, prices have moved around their 1979 levels, with considerable volatility. Figure 3 displays a similar pattern for retail gasoline prices. Real retail electricity prices display similar patterns, with less volatility. In summary, contrary to expectations in 1979, real delivered energy prices were about the same in 2000 as they were in 1979.

d. Environmental Indicators

The impacts of energy production and use and the interactions between energy and environmental policies were a central concern of both studies. They both argued that it would be feasible to accommodate increased energy consumption without increasing damage to the environment and to do so without dramatically increasing the cost of energy to consumers. Table 4 provides data on emissions and air quality for the primary criterion pollutants covered by the Clear Air Act. It is clear that air quality has improved significantly over the last 20 years in almost all dimensions.[21] The Ford study recognized that CO_2 emissions associated with the combustion of fossil fuels was a potential, though highly uncertain, source of climate change. The study recommended more study of the relationship between CO_2 emissions and global climate change. It also recommended putting off any policies to restrict coal use on account of CO_2 emissions. The U.S. has followed both components of this recommendation. U.S. CO_2 emissions have increased by over 20 % since 1980 with most of the increase occurring after 1990.

21. Air quality and emissions patterns may differ because air quality is monitored primarily in dense urban areas. Acidic deposition has also declined significantly since 1995 when the new SO_2 cap and trade program went into effect.

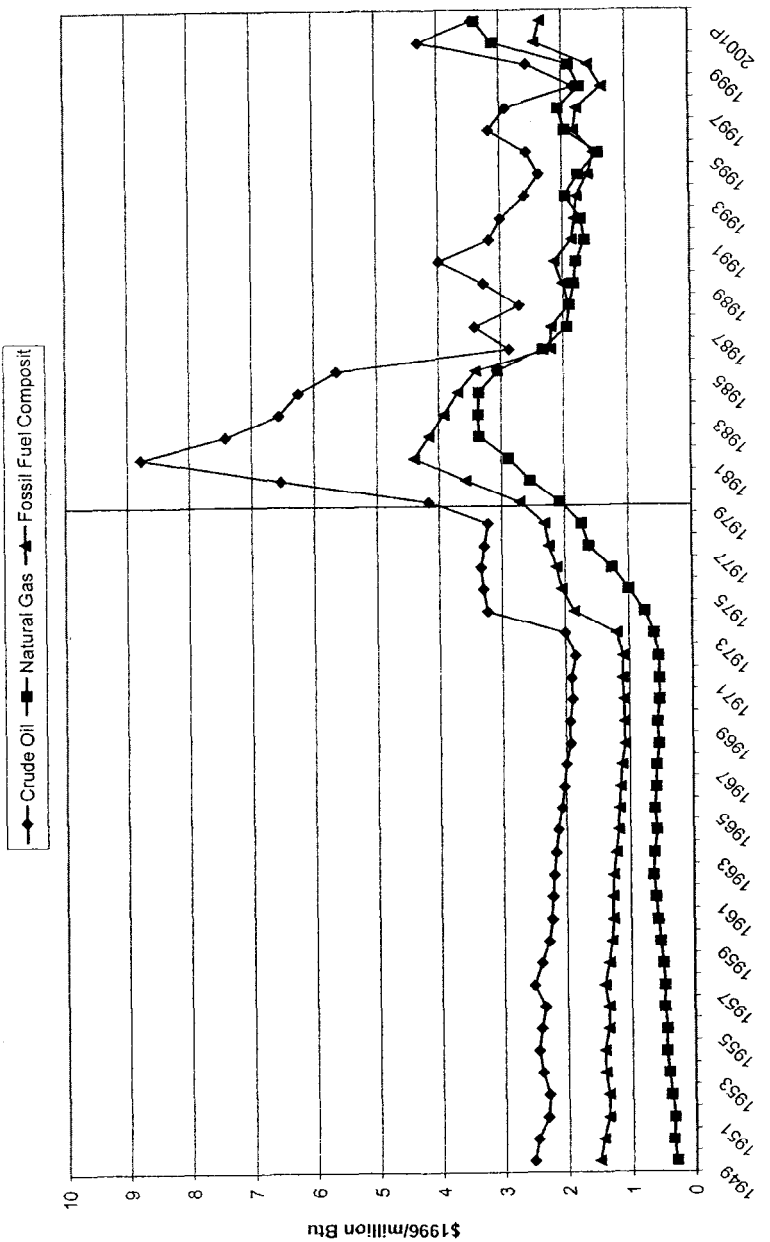


Figure 2. Real Production Price for Fossil Fuel

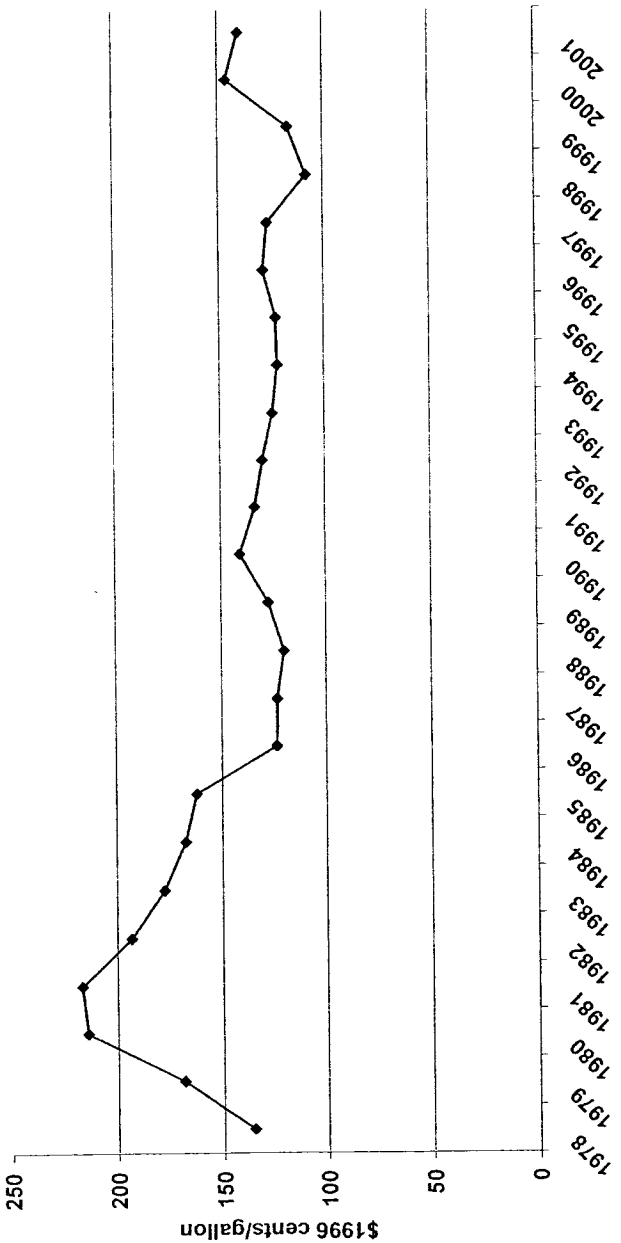
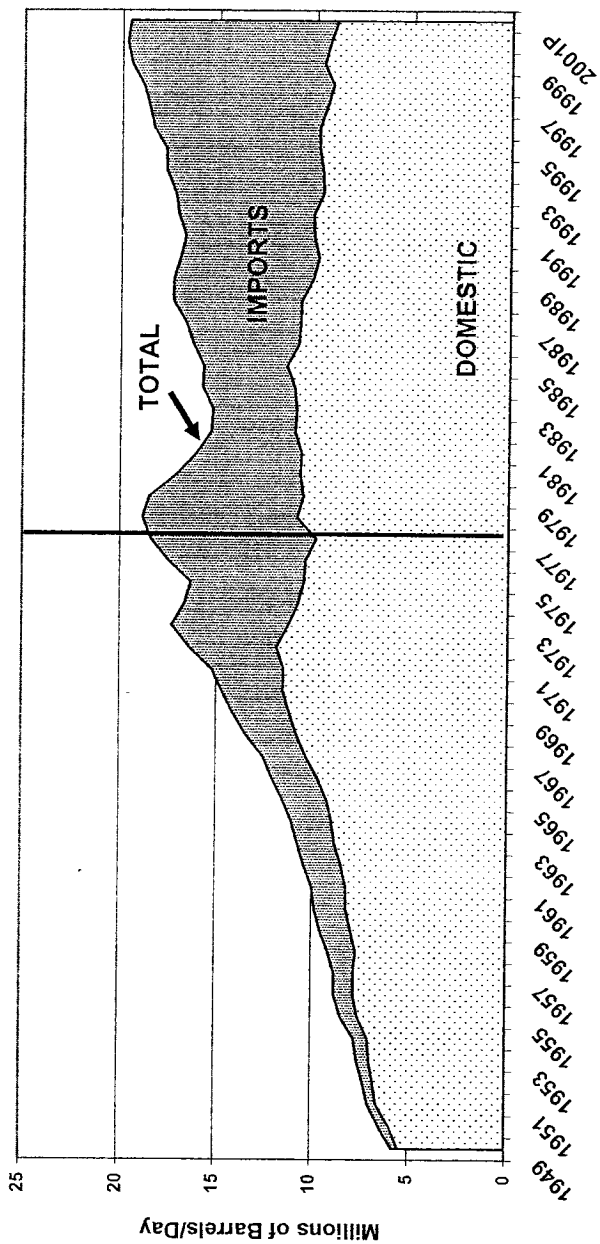


Figure 3. Real Retail Gasoline Prices (All Grades)

Source: *Annual Review of Energy 2001*, Energy Information Administration

Figure 4. Petroleum Supplies



Source: *Annual Review of Energy 2001*, Energy Information Administration

e. Oil Imports

The RFF and Ford studies were very concerned about rising dependence on foreign oil. In 1979 the U.S. was importing about 8 million barrels per day of petroleum. In 2001, the U.S. imported 10.6 million barrels of petroleum per day, a trend that the studies did not have in mind. As world oil prices rose after 1979, domestic petroleum production increased slightly, petroleum demand fell significantly and imports fell to about 4 million barrels per day. As world oil prices then fell during the second half of the 1980s these supply and demand patterns reversed. See Figure 4. At the same time, imports of natural gas, primarily from Canada have increased significantly as well.

Table 4. Air Quality and Emissions 1982-2001

	Air Quality (Percent Change)	
Pollutant	1982-2001	1992-2001
NO_2	-24%	-11%
O_3 1-hour	-18	-3
O_3 8-hour	-11	0
SO_2	-52	-35
PM_{10}	n/a	-14
CO	-62	-38
P_b	-94	-25
	Emissions (Percent Change)	
Pollutant	1982-2001	1992-2001
NOx	+9%	-3%
VOC	-16	-8
SO_2	-25	-24
PM_{10}	-51	-13
CO	0	+6
P_b	-93	-5

Source: *Latest Findings on National Air Quality: 2001 Status and Trends,* U.S. EPA. September 2002.

If one were to judge the success of U.S. energy policy over the last 20 years solely by looking at whether oil imports had increased or decreased, one would have to conclude that it has been a failure. However, this is too narrow a perspective even if we focus only on the "energy security" goal among the broader set of goals for energy policy. While oil imports have increased, the importance of oil in the economy has declined dramatically. About 50% less oil per dollar of real GDP is consumed in the U.S. today than was the case in 1979.

Almost no oil is used to generate electricity or to heat homes and businesses. Moreover, the relative importance of oil produced in the Persian Gulf has declined since 1979 as oil producing areas were developed in other parts of the world. We have a Strategic Petroleum Reserve, though it has been used rarely and erratically. Finally, we have had two disruptions in oil supplies in the last dozen years due to war in the Persian Gulf region. Oil prices rose in connection with both of them, but (apparently) the damage to the economy was not significant or long lasting. Indeed, many economists have questioned whether the economic costs of oil supply disruptions, in terms of macroeconomic and associated aggregate welfare impacts, are nearly as large as policymakers and the public have generally assumed.

VI. CONCLUSIONS

The RFF and Ford studies have stood the test of time quite well; and "quite well" is hardly a poor grade when projecting trends and articulating policy recommendations and their effects predicated on the complex interplay of demographic, economic, technological, and environmental factors over long time periods. The framework and policy perspective remain relevant today. There are few things in this book that one looks back on and says "big mistake." Many of the studies' recommendations have been reflected in national energy policies. The country is now reaping the benefits of the end of many inefficient energy policies first implemented during the 1970s and early 1980s and subsequently abandoned: oil and gas price controls, fuel-use restrictions, protectionist policies for oil refiners, and publicly funded mega-projects to promote specific supply sources all came to an end. Because much of the regulatory apparatus of the 1970s and early 1980s had been dismantled by 1990, some of the tools for doing mischief in response to energy supply and price shocks were not readily available to respond (inefficiently) to oil price shocks in 1990-91 and oil and gas price shocks in 2000, 200 1, and 2002. This made it easier for the economy to adapt smoothly to changes in supply and demand conditions. Environmental policies are being implemented more efficiently than could have been imagined in 1979.

There are important energy consumption and use trends that the studies got right. Significant opportunities to reduce the energy intensity of the economy have been demonstrated. This was accomplished with much smaller price increases than the studies anticipated. Coal use has steadily increased in the generation of electricity while air quality has improved. Nuclear energy plays a significant role in supplying electricity, though the studies underestimated the costs of building nuclear power plants and overestimated investment in new nuclear capacity. The studies were probably too optimistic about the costs of synthetic fuels and solar energy, though they included little of either in their 2000 supply forecasts. They were not optimistic enough about the positive effects on supply and prices of natural gas price decontrol and the subsequent

restructuring of the natural gas industry. They did not see the dramatic changes in the electric power industry, driven in part by the availability of cheap natural gas and the technological innovations making it economical to use natural gas efficiently to generate electricity. The study leaders' primary disappointments would probably be with the large increase in consumption of petroleum in personal transportation and the increasing dependence on foreign oil produced in unstable areas of the world. These studies continue to contain much wisdom that is relevant today as we embark on another round of energy policymaking and implementation.

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Company Overview

Today's Southern California Edison is the product of more than a century of providing reliable electric service to central, coastal and southern California.

We help our customers stretch their energy dollars through rebates, which they can receive through SCE's award-winning energy efficiency programs. Customers can receive incentives for helping to control power demand through "demand-response" programs, which help to keep wholesale supplies and prices under control.

As part of our commitment to environmental protection, the electric power we provide for our customers includes more alternate and renewable energy (16.7%), from a greater variety of resources, than nearly any other utility in the world. We have been active in efforts to improve Southern California air quality since the 1940s.

SCE is also an active donor to community and educational causes. SCE employee volunteers annually donate more than 700,000 hours of work to community and non-profit organizations.

SCE's ethnically and culturally diverse customer base contains one of the largest concentrations of non-English speaking residents in California. Our company celebrates and accommodates the diversity of the community it serves through in-languages services and special programs. An emphasis on diversity strategies, operational goals and accountability helped SCE maintain its rank in the top tier of Fortune magazine's annual list of the top 50 companies in America for ethnic minorities, placing high on the list at number eight. This is SCE's seventh consecutive year receiving this recognition, which highlights the company's commitment to develop a work force of first-rate professionals that embraces diversity and reflects the customers it serves.

On an average day SCE provides power to:

- Nearly 14 million people
- 180 cities in 50,000 square miles of service area, encompassing 11 counties in central, coastal and Southern California
- Commercial industrial and nonprofit customers, including:
- 5,000 large businesses
- 280,000 small businesses

To deliver that power, it takes:

- 16 utility interconnections
- 4,990 transmission and distribution circuits
- 425 transmission and distribution crews
- The days and nights of more than 15,500 employees
- More than a century of experience

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STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine the Commission's post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification, and Related Issues.	R.09-11-014 (Filed April 13, 2006)
Order Instituting Rulemaking to Examine the Commission's post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification, and Related Issues.	R.06-04-010 (Filed April 13, 2006)

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) 2010 ANNUAL REPORT FOR 2009 ENERGY EFFICIENCY PROGRAMS

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Dated: **June 30, 2010**

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine the Commission's post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification, and Related Issues.	R.09-11-014 (Filed April 13, 2006)
Order Instituting Rulemaking to Examine the Commission's post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification, and Related Issues.	R.06-04-010 (Filed April 13, 2006)

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) 2010 ANNUAL REPORT FOR 2009 ENERGY EFFICIENCY PROGRAMS

Southern California Edison Company (SCE) hereby submits its 2010 Annual Report for 2009 Energy Efficiency Programs and Results, Attachment A, hereto. The Annual Report is filed and served in this proceeding pursuant to the Administrative Law Judge's Ruling Adopting Annual Reporting Requirements for Energy Efficiency and Addressing Related Reporting Issues dated August 8, 2007.

This report is normally due on May 1 of the year following the end of a program year. However, via E-Mail dated April 30, 2010, Executive Director Paul Clanongranted the Investor-Owned Utilities (IOUs) an extension of time to file their 2010 Annual Report until June 30, 2010. The additional time would allow the Energy Division to update gas and electric avoided cost in the 2009 E3 calculators consistent with Decision 10-04-029 and allowed the IOUs enough time to incorporate revisions and produce their Annual Report and associated updates to the 2009 4th quarter reports.

Respectfully submitted,

JENNIFER TSAO SHIGEKAWA
LARRY R. COPE

/s/ LARRY R. COPE
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June 30, 2010

cc: Service lists: R.06-04-010
R.09-11-014
R.09-09-019
Administrative Law Judge Pulsifer (hard copy)
Administrative Law Judge Gamson (hard copy)
Administrative Law Judge Ferrar (hard copy)
Julie Fitch, Director Energy Division CPUC (hard copy)
Assigned Commissioner Grueneich (hard copy)

Attachment A

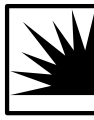
2010 Annual Report for 2009 Energy Efficiency Programs

2010 Energy Efficiency Annual Report

- Summary Report
  2009 Program Overview & Strategies

- Technical Appendix
  2009 Results

June 2010



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I. EXECUTIVE SUMMARY

Southern California Edison (SCE) delivered a portfolio of energy efficiency programs to its customers in 2009 that provided cost-effective resource benefits to ratepayers and the state. In addition to helping customers save money and live more comfortably, SCE's energy efficiency programs significantly contributed to California's goal of reducing greenhouse gas emissions.

With over three decades of leadership in energy efficiency solutions, SCE's 2009 programs continue to exemplify our nationally recognized leadership, innovation, and success. SCE's 2009 programs created considerable ongoing resource benefits to all ratepayers by providing over 1.7 billion kilowatt-hours (kWh) of annualized energy savings, nearly 317 megawatts (MW) of peak demand reduction, and over $675 million of resource benefits. In addition, SCE's energy efficiency programs avoided more than 865,000 tons of CO2, a key component of California's commitment to lower greenhouse gas emissions and contribute to the global effort to address climate change.

SCE's 2009 energy efficiency programs were designed around an integrated, customer-focused set of program offerings. Coordination between local and institutional partners, third party offerings, and core segment programs enabled SCE to maximize energy savings, demand reduction, and resource benefits for customers.

In 2009, SCE continued to test new approaches for reaching markets that traditionally have been underserved. To ensure that energy savings opportunities were available to Californians who typically have not participated in energy efficiency programs, SCE leveraged resources through community partnerships and creative targeted outreach techniques to enable many of these customers to participate in programs for the first time.

SCE continues to work closely with the Commission, state, regional, and other stakeholders to achieve the State's Strategic Vision and Goals to ensure that: (1) all cost+effective, reliable and feasible energy efficiency measures and actions are implemented in an integrated approach, (2) strategies, programs, measures and institutional structures must provide long-term energy savings and (3) energy efficiency will generate significant reductions in greenhouse gas emissions, as adopted in the California Energy Efficiency Long-Term Strategic Plan.

This report describes the successful energy efficiency program activities SCE administered and implemented during 2009.

II. 2009 ENERGY EFFICIENCY PROGRAM OVERVIEW

RESIDENTIAL PROGRAM AREA

SCE's residential program portfolio promotes energy efficiency and use of energy-efficient measures by consumers. SCE's residential programs include: lighting and appliances incentives, new construction incentives and design assistance, audits, and energy efficiency information. SCE's residential portfolio focuses on the maximization of energy efficiency as an energy resource. The following programs make up the 2009 residential program portfolio, and the program strategies implemented.

APPLIANCE RECYCLING PROGRAM

Program Description
The Appliance Recycling Program is a program designed to reduce energy usage by allowing residential and nonresidential customers to dispose of their operational inefficient refrigerators and freezers in an environmentally safe manner. Customers receive a $50 incentive for each qualifying refrigerator or freezer.

Strategies implemented in 2009

- Held an Appliance Recycling Program "Summer Campaign" to promote the benefits of the program. This campaign resulted in a significant increase in program participation and was a major factor in the program reaching record participation levels.
- Placed increased marketing emphasis on the money saved by customers by participating in the program and environmental benefits by properly recycling the appliance.
- The continued use of PDAs utilizing real-time software by the recycling service contractors and Appliance Recycling support staff has proved successful operationally and administratively and has continued to drive high customer satisfaction results.
- Beginning July 1st, program administrators were given the opportunity to donate their monetary incentives to SCE's Energy Assistance Fund (EAF), which helps customers in financial need pay their electric bill. A total of $51,000 was donated to EAF by ARP Participants in 2009.

RESIDENTIAL ENERGY EFFICIENCY INCENTIVE PROGRAM

HOME ENERGY EFFICIENCY REBATES

Program Description

The Residential Energy Efficiency Incentive Program offers incentives for single family residential customers to purchase energy efficient products when it comes time to replace high electric end-use products in the home. Products eligible for this incentive include: refrigerators, room air conditioners, whole house fans, attic and wall insulation, pool pumps and motors, water heaters and evaporative coolers.

Strategies implemented in 2009

- A $100 pool pump contractor incentive was promoted to encourage contractors to install two-speed and variable-speed pool pumps.
- Point-of-sale rebate relationships were established with retailers which were attributed to over 50% of applications and savings.
- A point-of-sale gift card was offered to customers to volunteer their contact information at their point-of-sale activity. This technique greatly improved the program's ability to contact participants and get their input on the program.

RESIDENTIAL UPSTREAM LIGHTING AND TORCHIERE AND PLUG-IN LAMP EXCHANGE PROGRAM

Program Description

The bulk of energy savings and demand reduction comes from the Residential Lighting Incentive Program, which includes both the upstream lighting component and the Torchiere and Lamp-Exchange Program.

The Residential Lighting Incentive Program paid incentives to consumer end-users in the form of reduced retail prices, passed on to customers through manufacturers and retailers, for products such as ENERGY STAR® labeled light bulbs, lamps, and fixtures.

SCE's Torchiere and Plug-in Lamp Exchange Program held highly publicized events in which members of the community could bring their incandescent lamps and exchange them for high efficiency lamps at no additional cost.

Strategies implemented in 2008

- In 2009, the program continued its emphasis toward increased specialty bulbs, like reflectors, globes, A-lines, and dimmable compact fluorescent lamps (CFLs) at big box and home improvement retailers. The program concurrently reduced incentives and quantities allocated for basic bare spiral CFLs at those stores. The 2008 allocations were extended into 2009 to complement the bridge funding protocols. In the third quarter, bare spiral CFL per-unit incentives were increased at big box and home improvement retailers, while continuing to operate well below the published incentive rates. This helped to enhance portfolio cost-effectiveness. New retailers were also welcomed into the program at that time to help achieve our targets in a timely manner. Controls to prevent leakage were successful throughout the year. The program emphasized its "ZIP Codes To Pursue List" to participating manufacturers, placing high priority on allocation requests to ZIP Codes in our service territory that had been poorly saturated with program products.
- The Exchange Events maintained the Energy Expo theme. It allowed a great deal of cross promotion of other SCE programs as it kept participants entertained with displays and working models during their time standing in line. This theme increased customer satisfaction with the event experience.

MULTIFAMILY ENERGY EFFICIENCY PROGRAM

Program Description

SCE's Multifamily Energy Efficiency Rebate Program offers rebates to multifamily property owners and managers to install energy efficient products. This program offers rebates for fifteen (15) energy efficient measures that are available for common area and tenant dwelling units of apartment complexes or the common areas of condominiums and mobile home parks.

Strategies implemented in 2009

- Worked with market actors to gain program understanding and promote the program offering. As a result, high customer participation levels were achieved.
- Marketed monthly advertisements in five different apartment industry trade magazines covering the majority of the multifamily population in SCE's service territory.
- To increase exposure, program management exhibited the program at apartment industry trade shows.

- Reservation caps were increased to allow for larger reservation queuing by independent installation contractors working for program customers—resulting in higher rebate volumes.
- Routinely met with other California investor-owned utilities to ensure program policy, design and implementation remained consistent statewide.
- Worked internally with SCE partnership programs to leverage and/or funnel offerings.
- Continued to improve communication methods by utilizing e-mail to effectively provide program information to independent installation contractors working on behalf of the customer.

The Multifamily Energy Efficiency Rebate Program also provides direct services to mobile home residents, which include: air conditioning diagnostic, tune-up services and the direct installation of lighting fixtures through the "Comprehensive Mobile Home" program component.

Strategies implemented in 2009

- Actively outreached to targeted parks and solicited program participation with both park management and individual residents.
- Conducted targeted direct mailing to manufactured/mobile home residents and park management to promote the program.
- Conducted on-site presentations to park managers and site residents to gain program participation.
- Developed a post-installation inspection process to verify and ensure the product was installed and functional.

HOME ENERGY EFFICIENCY SURVEY

Program Description

The Home Energy Efficiency Survey (HEES) program fills the gap between consumer awareness and adoption of opportunities for energy and water efficiency. HEES offers similar services as Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Gas Company (SCG) which provides a consistent and recognizable program throughout California. The program provides customers with information, at no charge, to help them become familiar with ways to reduce energy usage in their homes.

SCE also collaborates with regional and local water agencies to offer information on electric, natural gas, and water efficiency.

HEES is delivered through four primary program approaches:

- **Mail-In Energy Survey** – provides a self-completed questionnaire and personalized energy and water report mailed directly to the home.
- **On-Line Energy Survey** – provides customers with instant access to energy and water efficiency information and incentives to the home.
- **In-Home Energy Survey** – provides face-to-face consultation on ways to save energy and water.
- **Phone Energy Survey** – provides a convenient alternative service for customers unable to complete energy surveys by mail, internet, or in the home.

Strategies implemented in 2009

- **Mail-In Energy Survey:** Launched one Mail-in Survey campaign in late November 2009. The HEES Program mailed out 115,000 Mail-in Survey questionnaires and received 14,527 responses (12.6%) through March 2010. The HEES program completed a total of 5,953 Mail-in Surveys during 2009.
- **On-line Survey:** The HEES On-line survey landing pages were available for Spanish, Korean, Vietnamese, and Chinese speaking customers. The HEES program completed a total of 11,2010 On-line surveys during 2009.
- **In-Home/Phone Survey:** In-home/Phone surveys are available in multiple languages including English, Spanish, Vietnamese, Chinese and Korean. All customers who received an In-home survey received an EE Kit in 2009. The HEES program completed a total of 10,260 In-home surveys, and 1,584 phone surveys during 2009.
- **Fulfillment Update:** The EE Kits is sponsored jointly by SCE and SCG. The EE Kits used in 2009 included (1) 23-Watt CFL, (1) Low Flow Showerhead & (3) Sink Aerators. The CFL was later replaced by a LED Nightlight. The HEES program worked with CEM to expand and redesign the EE Kit. The newly redesigned EE Kit now housed in a bigger box with colorful marketing pieces contains (1) 14-Watt CFL in blister wrapped packaging, (1) LED Nightlight, (1) Low Flow Showerhead & (3) Sink Aerators. The program distributed a total of 17,050 EE Kits to HEES participants in 2009.

INTEGRATED SCHOOL-BASED PROGRAM

Program Description

The Integrated School-Based Program is delivered through three coordinated program strategies to address all aspects of the schools market through an integrated approach that promotes energy efficiency, demand response, renewable energy, and water conservation opportunities to decision makers. Each program component will leverage

existing incentives, available through energy efficiency and demand response programs, to achieve immediate and long-term energy savings and demand reduction in schools, universities and homes. The four programs include: LivingWise, PEAK, Green Schools, and Green Campus.

The primary goals of the program are to:

1) Inform K-12 and college students about the science of energy, energy and water conservation, and how to apply this information at home and in their communities.
2) Work with schools to infuse energy efficiency into their curriculum to assure that students learn about demand side management, green house gas, and also learn about green campuses.
3) Ensure that these programs are made available to minority, low income, and disadvantaged communities.
4) Improve public education facilities and inform facility operators and administrators about the benefits of energy efficiency equipment and operation practices.

LivingWise

The LivingWise strategy provides classroom learning activities and take-home kits to elementary and middle school classes. The kit contains energy and water-saving products such as CFLs, high efficiency showerheads, water aerators, and air filters to introduce energy and water conservation to children and their parents.

To promote energy efficiency and demand response, this program features a blend of classroom learning activities, a hands-on energy survey, and installation projects that students complete in their homes with parental assistance. These activities empower sixth (6^{th}) grade students to become advocates of smart energy management in their homes, schools, and communities. This knowledge of energy conservation measures will create a new generation of Californians who understand and advocate the significance of energy in their lives and their role in its efficient use.

Strategies implemented in 2009

- SCE and LivingWise continued working with Water Agencies to incorporate water measures into the program and secure funding from Water Agencies.
- SCE and SCG continued with the practice of incorporating gas measures into the program and securing funding in return for Therm savings.
- SCE and LivingWise continued to improve program tracking to better reflect both program performance and savings.

- SCE continued efforts to include some discussion of green house gas, demand side management and green careers into their presentations.

PEAK

PEAK staff meets with school district representatives, such as principals, to plan a customized program for their schools, targeting 4th through 7th grade levels. PEAK then trains teachers through its curriculum, hands-on lab activities, and toolkits. In turn, teachers educate their students about the science of energy. Using service-learning as a framework, students are promoted to apply their knowledge to real-life situations in their homes, schools, and communities. Throughout the school year, students and teachers are supported in a variety of ways, such as: products distributions, educational assemblies, interactive website and software, e-newsletters, contest, community recognition, and field trips to power plants. Via the website, PEAK participants are offered structured course curricula recommendations on a variety of energy efficiency savings topics including: electric, gas, water and renewable energy use. PEAK's diverse offerings foster strong relationships with schools and school districts, as well as a positive connection between the end-user, the community, and the utility.

Strategies implemented 2009

- Continued efforts to ensure curriculum contains energy efficiency language: The PEAK Teacher Guide Book enables teachers to meet academic content standards in science, math, and language arts for grades three through seven. Lessons are designed to be fully comprehensive and contain the following: student learning objectives, lab instructions, post-activity reflection questions and suggested community activities. In addition, each lesson (electricity, gas and renewable energy) emphasizes one or more of the PEAK Student Energy Actions, compelling students to apply their classroom learning to real-life situations and behaviors.
- Continued efforts to ensure teachers are effectively trained in energy efficiency, renewable energy, green house gas and green careers: PEAK teachers participate in a day-long professional development seminar on PEAK's academic content and how to deliver the curriculum in the classroom. Teachers are encouraged to utilize lesson plans and form each segment (electricity, natural gas, renewable resources, GHG, careers in the green workforce) of the program curriculum.
- Classroom Lab Toolkit: PEAK teachers receive a toolkit that contains the supplies needed to complete each hands-on lesson for a class of students. Toolkit supplies are replenished on an as-needed basis.

Green Schools

Green Schools reduces energy costs in schools and educates students and their families about energy and the link between efficiency, the environment and finances. It is a comprehensive and long-term approach to school efficiency, and brings together the facilities, instructional, and administrative staff in a cooperative effort to improve education using energy as a tool. Its unique approach integrates school facility energy-savings with energy saving action and instruction in school, homes and the community. This knowledge of energy conservation measures will create a new generation of Californians who understand and advocate the significance of energy in their lives and their role in its efficient use.

Strategies implemented in 2009

- Continued education and awareness for energy efficiency through program implementation at approximately fifty (50) K-12 schools annually.
- Continued providing guidance, support and energy lesson plans to participating schools for student learning. Students received hands-on lessons in energy conservation that prompted further discussion on energy efficiency and changed energy usage behavior.
- Continued to provide school administrators with energy audits of their schools to show areas of energy improvement. Administrators and school energy managers were informed of ways to use energy more efficiently through basic changes in operations, product retrofits, energy efficiency attitudes, and individual behavior.
- Continued to work with school faculty to include demand side management, green house gas and career discussions in the classrooms.
- Continued efforts to work with other SCE departments to promote and facilitate Residential Incentive Programs (e.g. demand response, appliance rebates, etc.).

Green Campus
Modeled after the Green Schools program, Green Campus: (1) realizes immediate energy savings on college campuses, particularly in dorms; (2) educates the campus community on the importance and methods of saving energy and other resources and integrates resource efficiency into students' academic learning; and (3) talks to students about courses in energy, energy conservation, environmental and careers in the new green economy. The program uses student interns, who recruit and work with an advisory committee of administrators, faculty, and staff to plan and carry out activities, such as energy-savings competitions or "decathlons." This knowledge of energy conservation measures will create a new generation of Californians who understand and advocate the significance of energy in their lives and their role in its efficient use.

Strategies implemented in 2009

- Continued education and awareness of energy efficiency through program implementation at fourteen (14) UC/CSU campuses.
- Continue to provide program guidance and support to approximately six campus interns per campus.
- Campus interns continued to provide awareness of energy efficiency and green careers to the student body through various energy fairs and competitions throughout the school year.
- Campus interns continued to work with University Energy Managers to identify areas of energy efficiency improvement throughout the campus to reduce campus energy expenses.
- Incorporated efforts to work with other SCE departments to promote and facilitate Business and Residential Incentive Programs (e.g. demand response, appliance rebates, etc.).

CALIFORNIA NEW HOMES PROGRAM

Program Description
The California New Homes Program (CANHP) provides comprehensive services throughout the SCE service territory for the residential new construction market. CANHP offers incentives to single- and multi-family builders of all production volumes for achieving a variety of energy efficiency goals. The program offers two options for participation:

1. **The Performance Option**
   - Encourages builders to exceed California's energy efficiency standards for new construction (2005 Title 24) by a minimum of 15 percent (Tier I NSHP);

- Offers an increased incentive to builders for exceeding Title 24 by 20 percent (inland climate zones only, with ENERGY STAR® certification required for single-family projects); and
- Offers an additional incentive to builders for exceeding Title 24 by 35 percent (Tier II NSHP, solar required for single-family projects).

2. The Prescriptive Option

- Provides additional incentives for non-building-related measures such as appliances and lighting; and
- Provides prescriptive options for projects that are not used to qualify for the performance thresholds by offering stand-alone incentives for Quality Insulation Installation (QII) and verified ducting systems (tight ducts).

Strategies implemented in 2009

- Worked with builders to help them find the most cost effective energy efficiency measures based upon their particular building practices and relationships with suppliers.
- Worked with internal staff as well as third party consultant to streamline and improve the processes that builders went through to participate in the program.
- Made presentations to the builders to help them understand the program as well as give them ideas on how to cost effectively meet the program requirements.
- Worked with builders to help them with sales and marketing of their energy efficient homes. This included model opening support as well as website and flyer recognition.
- Partnered with key building industry groups for various events that helped educate the building community on how to build more energy efficient sustainable homes. These programs were very successful and plan to be continued in the future.

NONRESIDENTIAL PROGRAM AREA

SCE's 2009 nonresidential programs are designed to: (1) increase the level of retrofit and new construction energy efficient investments in commercial, industrial, and agricultural end-users; (2) educate nonresidential customers on the value of energy efficiency and on existing and new opportunities for implementing energy efficiency in their facilities; and (3) promote an integrated portfolio of energy efficiency, demand response, and distributed generation technologies and services to nonresidential customers. SCE's nonresidential portfolio has been designed to focus on these goals and to maximize the use of energy efficiency in the nonresidential sector as an energy resource. The following programs make up the 2009 nonresidential program portfolio, and the program strategies implemented.

COMPREHENSIVE HVAC PROGRAM

Program Description

The Comprehensive Packaged Air Conditioning Systems (CPACS) Program targets HVAC systems in retrofit and new construction areas. It employs techniques in a broad array of categories, combining resource acquisition with market transformation. CPACS is designed to optimize all HVAC efficiency through quality installation and maintenance to obtain the highest savings and to best leverage administration and customer acquisition costs.

Strategies implemented in 2009

- Managed core group of participating contractors with necessary administrative and technical support resources.
- Implemented quality control processes to ensure measures delivered were consistent with HVAC industry standards.
- Provided program-specific training to contractors on the proper design and installation of HVAC systems.
- Managed key program processes to ensure that results met minimum program standards.

RETRO-COMMISSIONING

Program Description
Retro-Commissioning (RCx) targets buildings that have never gone through any type of commissioning or quality assurance process and are therefore performing below their potential. Building commissioning is a cost-effective process to improve building performance, reduce energy use, increase equipment life, improve indoor air quality and improve occupant comfort and productivity. This program provides incentives and services to optimize the operation of existing building energy using systems.

Strategies implemented in 2009

- Stopped enrolling customers in 2009, the program focused on finishing out 2006-2008 projects.
- Successfully closed out all projects from 2006-2008.
- Started implementing recommendations from process evaluation, including standardizing calculation methods, and revising program documents.
- Began the transition from a third-party program to an SCE-implemented program in 2010-2012.

INDUSTRIAL ENERGY EFFICIENCY PROGRAM

Program Description
The Industrial Energy Efficiency (IEE) Program targets industrial customers and identifies opportunities for the customer to realize energy savings, as well as product output and quality, through equipment retrofits and enhancements, adjustments, and improvements to processes. The IEE Nonresidential Audit Program involves 'onsite' audits performed by SCE.

Strategies implemented in 2009

- SMART is the IEE contractor tool for tracking project progress; tracking customer project activity; tracking energy savings towards targets. SMART replaced the ACT spreadsheet system previously used through early March 2009.
- The Contractor method of payment in 2009 was Pay for Performance which is a change from time and material format in 2008.
- The IEE program ended in 2009 exceeding its kWh goal by over 60%.

The implementation strategy continued to be highly effective. This strategy matched the specific needs of the customer segment with the specific skill set of the industrial vendor. This approach is inline with a key objective of the Industrial program.

AGRICULTURAL ENERGY EFFICIENCY PROGRAM

Program Description

The Agricultural Energy Efficiency Program (AEEP) 2009 is a portfolio of products and services designed to enhance adoption of energy efficient equipment and practices among agricultural customers. This program addresses two characteristics of the sector that have historically been a stumbling block to adoption of energy efficiency throughout all regions of the country, and California in particular: diversity of the customer base and the relatively small role of electricity in their costs.

Strategies implemented in 2009

- Implemented stage 1 approved non-incented pump test energy savings results calculation modification. The modification centered around the addition of a 65% diversity factor to calculate KW reductions. This Diversity factor was applied to past reported energy savings retroactively to January 2009 and will apply to future demand reduction results.
- Program focus was to increase communication efforts with customers and SCE account Executives in order to facilitate the processing of completed customer projects. Energy Efficiency met with Business Customer Division (BCD) each week to review open applications and assign deliverables. This effort cleaned up the project pipeline and allowed account representatives to focus on active projects.
- SCE sponsored the 16th annual water conference at AgTAC and CTAC.

The AEEP program met the 2009 kWh goal and exceeded the kW goal by year end. This success was due to the coordinated effort between BCD and EE to identify those projects in the pipeline that were on schedule to finish. This was not a managed program in 2009 and many of the incomplete files were due to documents the customer was to provide. It was up to the BCD representative to follow up with the customer and assist them in getting those documents submitted.

NONRESIDENTIAL DIRECT INSTALLATION

Program Description

The Nonresidential Direct Installation Program delivers energy efficiency hardware retrofits through installation contractors to reduce peak demand and energy savings to very small and small commercial customers. The program targets the entire service territory in a staged delivery approach that provides program services in specific geographic areas at different times allowing for a more concentrated, directed, and yet comprehensive program. In addition, SCE will continue coordination with community based organizations and faith based organizations to offer job creation opportunities for local youth in economically challenged areas of SCE's service territory.

The On-Bill Financing Pilot program provides installation of efficient lighting, refrigeration, and air conditioning equipment to qualified grocery and convenience store customers. Potential customers must have a monthly demand of less than 500 kW, and be in good credit standing, based on payment history with SCE. The program is offering a combination of incentives and no-interest loans. Loan payments will be repaid over a 2-5 year term at 0% interest as an additional charge on customers' utility bills.

Strategies implemented in 2009

- Provided implementer with list of target customers for each community. The implementers were assigned one to two weeks prior to their scheduled start date in that community.
- Contractor's marketing staff contacted customers through a door-to-door, face-to-face approach to promote the program, provide information, obtain participating authorization and provide language-appropriate brochures and flyers.
- Direct implementation activities occurred with customer enrollment, installation, inspections, and invoice submissions in 2009.

BUSINESS INCENTIVES & SERVICES

Program Description

Business Incentives & Services is an integration of three previous stand-alone programs: Standard Performance Contract, Express Efficiency, and Non-residential Audits.

STANDARD PERFORMANCE CONTRACT (SPC)

Program Description

The SPC program strategy offers cash incentives for the installation of high efficiency equipment or systems. Incentives are based on annual energy savings (kWh) and paid upon completion and inspection of the project. All nonresidential customers are eligible to participate and all projects require both a pre- and post- installation inspection. Projects are typically customized equipment or systems for commercial, industrial, or agriculture facilities that fall outside the standard offer incentive programs.

Strategies implemented in 2009

- The statewide team actively engaged in evaluating implementation issues that affect statewide consistency.
- The statewide team reached consensus on 2009 incentive structure and the Program Guide, Policies/Procedures, Application, Website and Marketing information were updated and delivered in January 2009.
- LED – Energy Star developed LED luminar criteria in April, Statewide team implemented criteria for LED Fixtures, following review, Statewide teams worked with engineering groups and expanded the criteria for LED fixtures and Incentive eligibility was made available for customers in May.
- LED – Energy Star developed integral lamp criteria in September, SCE implemented criteria for LED integral lamps.
- Program Guide, Policies/Procedures, Application, Website and Marketing information begun updates for LED which was delivered in 4th quarter.
- Third party consultants continue to verify energy savings calculations and inputs.
- Program Guide, Policies/Procedures, Application, Website and Marketing finalized changes for the 2010 DSM rollout.

EXPRESS EFFICIENCY

Program Description

The Express Efficiency program strategy provides itemized energy efficiency measures to all nonresidential customers on a seamless statewide basis. Offering itemized measures and a simplified process for customers to apply for and receive a prescribed rebate makes it attractive for firms to invest in energy efficiency. Firms invest in the short-term in order to lower energy costs in the long-term.

Strategies implemented in 2009

- Program management continues to review measures, working closely with the statewide team to identify new energy saving opportunities and sponsor engineering evaluations of emerging technologies.
- Bi-weekly Statewide meetings set-up to evaluate and prioritize measure opportunities.
- Statewide team began planning and collaborating for measures to add to program:
    - LED Fixture for Refrigerated Display Case
    - Bi-Level Fixtures
    - Refrigerated Display Cases
    - High Efficiency Commercial Dishwashers
    - Pizza Deck Ovens
    - T8 32 watt lamp replacement to T8 28 or 25 watt lamp
- Statewide teams discussed and analyzed technologies to assess program feasibility:
    - LED Outdoor and Area Lighting
    - LED MR16
    - LED Downlights
    - LED PAR Lamps

NONRESIDENTIAL AUDITS

Program Description

The Nonresidential Audits (NRA) program strategy is to deliver valuable energy efficiency information and education primarily to business customers. An energy audit serves as an effective tool to identify energy efficiency opportunities and to influence customers to participate in energy efficiency incentive programs. Business Incentives Services audits are conducted on-site at the customer facility, which have been described in studies as an effective means to reach very small and small use customers.

Strategies implemented in 2009

- Increased 2009 program effectiveness by targeting specific customer segments. Such strategy increases the auditor's ability to identify opportunities, awareness of effective technologies, and comprehension of how to identify and overcome customers' barriers to implementation.
- Continued program audit enrollments by leveraging community partnerships, municipalities, chambers of commerce and trade organizations. Engaging these organizations also has improved the effectiveness of other energy efficiency programs such as SCE's Direct Install program.
- Revised original strategy based on direct energy savings to one measuring the influence audit activities have on moving customers to implement energy efficiency opportunities. This strategy will be implemented in 2010.

SAVINGS BY DESIGN

Program Description

Savings By Design provides the nonresidential new construction industry with a broad spectrum of technical and financial resources to assist in the design of new facilities that maximize cost-effective electric energy efficiency integration as a primary consideration.

Strategies implemented in 2009

- Continued to target new construction in order to maximize efficiency opportunities and minimize the cost.
- Continued to offer a full spectrum of technical analysis and design assistance to:
    - Building owners
    - Architects
    - Engineers and other specialized consultants
- Emphasized use of an integrated design process to achieve high performance buildings. Integrated design means:
    - Early involvement before key design decisions are made;
    - Parallel instead of linear design process between architects and mechanical/electrical/plumbing engineers; and
    - Produces interactive benefits between properly designed systems.
- Emphasized "right-sized" systems because they can often be incorporated at little or no incremental cost.

SUSTAINABLE COMMUNITIES

Program Description

The Sustainable Communities Program serves both non-residential and residential sectors by developing processes to more effectively address mixed-use, multiple-building developments. Project types in the pilot include: redevelopment and infill efforts, master-planned communities with integrated town centers, transit-oriented development, and high-rise residential with ground floor retail, among others.

Strategies implemented in 2009

- The Sustainable Communities Program operated at a reduced capacity during the bridge funding period. Program is not conducting any proactive marketing or accepting new projects during this period.
- The program provides technical assistance to the five (5) active projects engaged previously. There are seventeen (17) projects that were engaged and received stop-work orders or are progressing only very slowly due to the current economic uncertainty.
- Continued to optimize protocols process flows and integration issues with existing programs to ensure smooth hand off between resource and non-resource programs.
- The program continues to develop educational materials and sample documents to support project teams.
- Team transitioned two customers to core program, one each for Savings By Design and Residential New Construction.

PARTNERSHIP PROGRAM AREA

COMMUNITY AND INSTITUTIONAL PARTNERSHIP PROGRAM OVERVIEW

The Energy Efficiency Partnership Program is a dynamic program created to bring vitality and a keen awareness of energy efficiency best practices to a range of local/state government, and institutions. The program partners with universities and colleges, cities, counties and state entities, with the intent and purpose of executing substantive, municipal, business and community projects that save energy, money and the environment.

SCE's Energy Efficiency Partnership Program fortifies and invigorates business relationships with local government and institutional customers. Our programs advance long-term state and local government energy policies that encourage adoption of energy efficiency and green practices, ultimately influencing behavior that produces a renewed appreciation for and stewardship of our resources.

In 2009, Partnership Programs continued to be very successful working with these entities to create awareness and overcome barriers to energy efficiency. Institutional and local government buildings were retrofitted and participation in residential and nonresidential energy efficiency programs, demand response, self-generation and income qualified programs were encouraged

The 2009 Partnership Portfolio includes the following programs:

Local Government

- Local Government Energy Action Resources – Mammoth Lakes Partnership
- Local Government Energy Action Resources – City of Ridgecrest Partnership
- Local Government Energy Action Resources – San Joaquin Valley Partnership
- Local Government Energy Action Resources – Orange County Cities Partnership
- Local Government Energy Action Resources – City of Long Beach Partnership
- Local Government Energy Action Resources – City of Redlands Partnership
- Local Government Energy Action Resources – City of South Gate Partnership
- Local Government Energy Action Resources – City of Beaumont Partnership
- Local Government Energy Action Resources – Desert Cities Partnership
- Local Government Energy Action Resources – City of Simi Valley Partnership
- Ventura County Partnership
- South Bay Partnership (South Bay Cities of Council of Governments)

- Bakersfield and Kern County Partnership
- Santa Barbara Partnership (South Coast Energy Efficiency Partnership)
- Community Efficiency Partnership (Non-resource/Resource)
- San Gabriel Valley Energy Efficiency Partnership Program
- Santa Ana Partnership
- Palm Desert Demonstration Partnership

Institutional

- California Community Colleges-IOU Partnership
- California Department of Corrections and Rehabilitation Partnership
- SCE-SoCalGas and County of Los Angeles Partnership
- County of Riverside Partnership
- UC-CSU-PG&E-SCE-SoCalGas-SDG&E Partnership
- State of California Partnership
- County of San Bernardino Partnership

Strategies implemented in 2009

Customer Outreach

- Met with State Agencies to discuss energy efficiency opportunities and participation in the partnership programs to implement projects in support of the Governor's Executive Order, Green Building Initiatives.
- Continued to co-brand marketing materials and energy efficiency messages to leverage local government's communications infrastructure disseminating the message of energy efficiency, savings, and the environment to residents and businesses.
- Advertised community and media events on local cable television, city newsletters, city scrolls and to Partners' employees to support local governments' desire to provide leadership to their communities.
- Continued to use community events to 'funnel' energy programs such as the Nonresidential Direct Install, Appliance Recycling, Multi-family rebates, Mobile Home, and Operation Lamp Exchange which included the holiday LED light exchanges.
- Continued to work in tandem with gas and water utilities reinforcing our message of managing all scarce resources for the environment.
- Maintained implementation of 'mini expo' workshops that directly connected workshop participants with available program exhibits and vendors of relevant energy efficient devices.

- Outreach Committee continued to foster development of outreach plans designed to provide program information and technical assistance to facilitate participation in the Program and create a pool of potential projects for implementation.
- Periodic communications related to Partnership implementation activities disseminated through a local government's existing communication channels were continued throughout 2009.
- The Palm Desert partnership continued to co-brand marketing material and energy efficiency messages to leverage local government's communications infrastructure.
- The Palm Desert partnership continued to use community events to encourage interest about and direct participation in energy efficiency programs such as Non-residential direct install, appliance recycling and holiday LED light exchanges

Program Administration

- Worked with SCE program managers, to coordinate existing energy efficiency core programs in response to community needs.
- Added eight (8) new partnerships, representing twenty (20) cities, under the Local Government Energy Action Resources model.
- Developed a Partnership Memorandum of Understanding or Master Agreement that outlines roles, responsibilities, commitments, and terms and conditions between the program Partners, where applicable.
- Project Agreement used as the contractual vehicle to secure commitment for the implementation of individual energy projects.
- Implemented a partnership team to manage program activities. The team consists of a management team having overall program oversight, and a group of subcommittees to work in specific program areas (project guidelines, review and approval, website development, and outreach, training & education).
- Developed and implemented program processes and procedures, decision making authority, process flowcharts, responsibility matrices, and a documentation package which includes project application forms, project review documentation, reporting tools, Action Item tracking tools, and various other program forms and templates for energy project review, approval, progress tracking, and reporting.
- Collaborated with internal organizations to bring a shared vision and unified support team for the Partnership programs.
- Established a management team with IOUs, Department of General Services, and multiple state agency representatives. This management team works on process, legal and procurement issue resolution to enable project implementation. The management team is also chartered to build a project pipeline to ensure a sustainable process is in place.

- In Palm Desert, the working group consisting of SCE, SCG, and the Energy Coalition continued to meet weekly to plan, implement and review progress toward achieving program results.

Program Implementation

- Conducted audits and indentified potential projects for seven State Correctional facilities in order to assist the California Department of Corrections & Rehabilitation (CDCR).
- AB900 Legislation passed by the State Assembly will allocate state dollars to build new prisons and expand existing facilities. Strategies to coordinate these future projects are being developed in order to assure that energy efficient new construction is utilized.
- Project packages completed with life cycle cost analysis conducted and submitted for financing through Energy Smart Financing program (formerly GS$ Mart).
- Created Statewide master list of proposed projects of Sate of CA EE partnerships activities to be shared and discussed with Green Action team.
- Connected the New Construction and Savings By Design program group with partnerships to collaborate on current policy initiative for sustainable communities. This will ensure that SCE is on board with any proposed future activities that impacts building codes and standards.
- Provided audits, technical assistance, as well as enriched incentives to help overcome barriers to implementing energy efficiency projects. This further assisted local governments and institutions to demonstrate environmental stewardship.
- Ramped up the County of San Bernardino partnership. Identified and implemented projects to achieve program goals.
- Continued direct delivery programs that provide an introduction to very cost-effective measures for installation in public facilities, thus paving the way for more expensive measures requiring customer investment.

Education and Training

- Continue to establish goals for a Training & Education program in coordination with the institutional Partnership where applicable.
- Conducted four (4) week training session for California Community Colleges on Energy Efficiency topics.
- Participated in UC/CSU/CCC Sustainability Conference Best Practices candidate selection and award process.
- Used IOU Energy Resource Centers to conduct training.

- Held All Partners Meeting as a forum for SCE and the Partners to share best practices.
- Developed and disseminated Partnership newsletter for all SCE partners.

IDEEA AND INDEE PROGRAM AREA

IDEEA and InDEE Programs Portfolio overview

While SCE's Innovative Design for Energy Efficiency Applications (IDEEA) program focus is on different marketing or delivery methods, different market segments, and/or different technologies from those offered in the SCE portfolio, the Innovative Design for Energy Efficiency (InDEE) program's solicitation is designed to draw proposals that place emphasis on innovation, market introduction, promotion, and other assistance to the commercialization process of promising new and/or different energy-efficient technologies from those offered in SCE's portfolio of energy efficiency programs. The goal of the portfolio is to find, fund, and field test the best third party implemented energy efficiency programs in the nation.

During the 2009 bridge funding period, no new programs were solicited. However, the following programs were mainstreamed into SCE's program portfolio:

The 2009 IDEEA Portfolio
In 2009, the following 2006-2008 IDEEA Programs were mainstreamed during the bridge funding period in SCE's energy efficiency portfolio:

Residential

- Southern California Comprehensive Home Performance Program
- High Efficiency Pool Pump Program measures were mainstreamed into an existing program

Non-Residential

- Healthcare Energy Efficiency Program
- Energy Efficiency Program for Entertainment Centers
- California Preschool Energy Efficiency Program
- Management Affiliate Partnership Program

The 2009 InDEE Portfolio:
No programs were operated during the year.

FUTURE IDEEA SOLICITATIONS

Strategies implemented in 2009

- The following IDEEA programs were negotiated in 2009 for operation in the 2010-2012 program period:
  - Monitored Based Commissioning Program
  - Data Center Energy Efficiency Program
- New Integrated Demand Side Management Programs. The following former IDEEA and InDEE programs were the initial candidates for energy efficiency and demand response integration where the Consultant would be conducting integrated audits and installation of both energy efficiency and demand response measures.

CROSSCUTTING PROGRAM AREA

SCE's 2009 Crosscutting Programs primarily focus on providing energy efficiency information, but also seeks to accelerate the introduction of energy efficient technologies, applications, and analytical tools. The programs target both residential and nonresidential customer segments, including retrofit and new construction opportunities. The following programs make up the 2009 Crosscutting Program portfolio and the program strategies implemented.

EDUCATION, TRAINING, AND OUTREACH

Program Description
Education, Training, and Outreach (ETO) is a family of educational programs that promotes energy efficiency to a variety of customer segments.

The ETO Portfolio includes the following programs:

- Energy Centers
  - Customer Technology Application Center
  - Agricultural Technology Application Center
- Technology and Test Centers (TTC)
- Energy Design Resources (EDR)
- Nonresidential Remote Energy Audits (NRREA)
- Mobile Energy Unit (MEU)
- Building Operator Certification (BOC)
- Custom Language Efficiency Outreach (CLEO)

ENERGY CENTERS (EC)

The EC's serves as an important delivery channel for information concerning Energy Efficiency programs. EC's offers a place where customers can see, hear, touch, and learn about the latest energy efficient technologies. The EC's also promote Energy Efficiency programs in coordination with business and community based organizations by holding seminars and supporting outreach events outside of the centers.

CUSTOMER TECHNOLOGY APPLICATION CENTER (CTAC)

SCE's Customer Technology Application Center (CTAC) is an impressive 51,000 square foot, state-of-the-art facility located just east of Los Angeles in the city of Irwindale. It houses eight technology centers, three classrooms, a computer lab and a 103 person theater-style conference center. CTAC offers customers, architects, engineers and

contractors an extensive array of programs and services that can help save energy, money and the environment. CTAC offers residential, commercial, and industrial customers educational services including: seminars, workshops, displays, demonstrations, technical consultations, and facility presentations.

CTAC is a source of information about energy management and efficiency that provides solutions tailored to business needs by:

- Promoting energy solutions and customer competitiveness
- Staying abreast of new energy trends
- Providing education and consultations, displays, and equipment demonstrations

Strategies implemented in 2009

- CTAC EE Consultants in 2009: 233
- CTAC EE Equipment Demonstrations and/or Tours in 2009: 115 demos/89 tours (combined total = 204)
- CTAC EE Seminars in 2009: 204
- CTAC Seminars on the Road: 40
- Highlights include:
  - **Western Restaurant Show Exhibit**
    Working jointly with PG&E, SDG&E, and The Gas Company, a graphic was developed for the joint utility Western Restaurant Show exhibit booth. The design utilized an updated version of The Gas Company "Smart Owl" logo. The booth promotes energy savings programs and offerings sponsored through each of the utilities. The exhibit had its first showing at the Western Restaurant Show in San Diego from August 30 to September 1.
  - **CTAC Offsites continuing to Grow**
    The CTAC off-sites continue to grow as customers begin to watch for workshops in their area. Thanks to the collaborative efforts between CTAC's marketing and various BCD segments, most off-site workshops are seeing full registration with sizeable waiting lists. The Ventura area witnessed record attendance at the Pump Plant Efficiency workshop, thanks in part to the collaboration and cooperation of the Ventura Government and Institution account representatives. Customer appreciation and satisfaction is growing along with registration numbers, as many customers express an interest that they can come and are also sending their employees to learn about energy efficiency at a more convenient site.
  - **Statewide Foodservice Meeting**
    CTAC hosted this year's first quarterly statewide Foodservice meeting in March. Attendees included water utilities from Southern California, the three other Investor Owned Utilities and members of the California Energy

Commission. The two-day session provided new members a chance to see how CTAC operates and how the Joint Investor Owned Utilities work together across all fields of planning and marketing for seminars, programs, events, and trade shows. This team is the example of how the CPUC wants the statewide utilities to collaborate on customer behavior and testing of equipment. The session also included tours of CTAC, the Refrigeration Technology Testing Center, the Southern California Lighting Technology Center, and topics covered, included PIER-Commercial Cooking Appliance Inventory, Customer Outreach, Education, What's Working & What's Not?, Upcoming Testing, New Measures for 2009-2011 program, and changes to the Energy Star program. The next meeting will be held at the end of the 2nd quarter at San Diego Gas & Electric.

- **Utility Collaboration**
  In early 2009, CTAC's Technical Services met with the Lighting and HVAC staff from PG&E Pacific Energy Center, SMUD Energy Center, California Lighting Technology Center and Western Efficiency Cooling Center. Lighting and HVAC curricula was discussed, along with Lighting and HVAC best practices, CTAC's proposed lighting classroom remodel project, and forthcoming EE technology for lighting and HVAC.
- **4th Annual Asian Pacific American Heritage Month**
  On May 1, 2009, SCE highlighted the importance of diversity through the celebration of Edison's 4th Annual - Asian Pacific American Heritage Month – Mosaic of a Community: Rich History, Culture, and Heritage held at CTAC in Irwindale. SCE recognized various leaders who have made significant contributions to the Asian Pacific American community. SCE is committed to educating its Asian Pacific American customers about energy efficiency through relationships with community leaders within SCE's service territory. A total of 388 people, including customers, SCE officers, executives, and employees attended this event, an 18% increase over last year's attendance.
- **CTAC Foodservice Technology Center Remodel**
  The newly remodeled CTAC Foodservice Technology Center hosted its first seminars and Foodservice equipment demonstrations for customers in April 2009. Those visiting the center included Foodservice Equipment Agents, Ventura Foods, Mayekawa USA, and Wolfgang Puck restaurants. A newly updated joint utility seminar entitled "Preventative Maintenance Leads to Energy Efficiency in Foodservice" was also held.
- **Partnerships in the Food Industry**
  The Food Industry Business Roundtable (FIBR) Association, in partnership with SCE, LADWP, SoCalGas, and the California Manufacturing Technology Consulting organizations hosted a "Saving Green by Greening Your Plant"

seminar. Among the topics covered were: T24 Refrigerated Warehouses, Green Manufacturing and utility incentive programs.

- **North American Technician Excellence (NATE) Training**
  For the second year, CTAC, along with the Institute of Heating and Air Conditioning Industries, Inc., (IHACI) hosted NATE training throughout the year. The evening sessions were held twice a week for four consecutive weeks with the NATE Exam culminating on a Saturday in each quarter. NATE training is the leading certification program for heating, ventilation, air conditioning and refrigeration technicians and is the only test supported by the entire industry. These series of workshops are designed to help HVAC technicians prepare for the NATE Certification Exam. The class attendance averages 90 attendees for each of the eight sessions. The interest of becoming NATE certified is evident in the interest shown by those who registered and those who have asked for future classes.
- **Energy Center Offsite Expands to the Wildomar Service Center**
  The new Wildomar Service Center was showcased at the offsite workshop, Introduction to Life Cycle Costing, on May 20, 2009. Currently under review by the USGBC for LEED Platinum Award, the Wildomar Service Center was the perfect example for a workshop focused on the importance of looking beyond simple pay back when selecting energy efficient equipment in building design. The award winning Center and the informative kiosk designed by CTAC's graphic team informed and impressed the customers in attendance. CTAC is excited to have expanded the offsite locations to include the Wildomar Service Center, and looks forward to many more successful offsite workshops in the San Jacinto Valley.
- **CTAC Collaborates with California New Homes Programs in Successful Workshop**
  In May, CTAC partnered with Edison's California New Homes Program in the successful delivery of California Green Builder's Workshop. Hosting a dynamic speaker from ConSol, this workshop touched on topics such as AB32, 'Green' programs, California Codes & Standards, effective energy measures for residential construction, and directed customers to think larger than the bottom-line cost when selecting energy efficient measures in sustainable design. This new workshop was well received by the 71 customers in attendance, achieving a Customer Satisfaction Score of 97.88%.
- **CalPortland Energy Summit**
  CTAC in collaboration with the Industrial Segment and Market Segment Solutions hosted CalPortland's Energy Summit on September 24. CalPortland is one of SCE's major cement customers. CalPortland invited their industrial partners to hear about their energy management practices and energy savings'

success stories. Elizabeth Dutrow, EPA Director, ENERGY STAR, Industrial Sector was a guest speaker. SCE's John Fielder welcomed the participants and gave a brief overview of SCE's rates, system reliability, and transmission and distribution issues.

- **Endesa Latinoamerica, S.A.**
  CTAC hosted executives from Endesa Latinioamerica in Madrid, Spain for a benchmarking and fact finding tour. They were accompanied by representatives from Navigant Consulting. There was an hour of presentation and discussion followed by a tour of the facility. ENDESA is the leading utility in the Spanish electricity system and the number one private electricity company in Latin America. The electricity companies controlled by ENDESA had a total installed capacity of 39,656 MW at the end of 2008, with annual generation of 149,830 GWh and total electricity sales of 172,788 GWh to 24.4 million customers.
- **Career Expo**
  CTAC provided support for the College Expo event held on August 1. The expo focused on career internships and vocational opportunities for high school seniors and college students. Workshop sessions were held for how to prepare for careers, such as Resume Writing, Dress for Success, and Professional Etiquette. There were thirty-nine (39) companies that participated in the vendor booths, including aerospace, banking, and fire and police departments and 260 in attendance.
- **2010 Foodservice Calendar**
  Along with the four IOUs, CTAC is involved in the design and development of a Food Service calendar. The joint IOUs use this combined promotional calendar to highlight Foodservice events, programs, training classes and customer energy saving success stories. The calendar title this year is "Be Energy Wise". The calendar will include Foodservice rebate information, energy savings tips, and contact & registration information for each utility. Over 26,000 copies will be mailed to customers from the four IOUs. The 2010 Foodservice calendar is currently in final review and will be ready for printing in late 2009.
- **Energy Center's 2010 Customer Satisfaction Exit Survey**
  The Energy Centers customer satisfaction survey has been updated for 2010. The 2009 preparation for the new program cycle was based on recommendations from the Measurement and Evaluation group to update questions that would respond to CPUC reporting directives and requirements. The Design Team enhanced the survey by giving the form an updated look and feel. The IT department implemented the changes in the Energy Centers Database and the new form was due to go live on January 1, 2010.

- **Highlights of Partnerships in 2009**
    - CTAC partnered with the Institute for Research and Technical Assistance, as well as the Industrial and Government & Institutions segments to host a Laser Paint Stripping seminar on 10/21/09. This newly developed method of stripping paint uses light as the stripping medium which eliminates or minimizes the pollution that current methods utilize. Four case studies were discussed and results shared on this new technology.
    - CTAC assisted Economic Development Services to host Surviving Turbulent Times for the Plastic Industry. Partners in this event included the Society of Plastics Industry, California Manufacturing Technology Consulting and the Society of Plastics Engineers. Discussion topics included how to maximize profits and productivity for the plastics industry, access to capital, and SCE's programs.
    - Edison International is partnering with the UCSB Bren School of Environmental Design to transform the Bren School Visitors Center in to the SCE/EIX Visitor Center. The team from SCE is lead by Jack Sahl and includes Tom Cohenno from TDBU Training, Tammy Tumbling and Sergio Islas from Community Involvement, and Doug Campbell from the Energy Centers. SCE is looking to the Energy Centers for their technical expertise in Energy Efficiency, Sustainability, and exhibit design.
- **The 16th Annual Water Conference** Both Energy Centers, CTAC and AgTAC, corroborated in late 2009 on this two-day event, focused on educating water and wastewater agencies on how to save energy, money, and the environment. The first day general session was a video conference to AgTAC and featured guest speakers Glen Peterson, President, Association of California Water Agencies (ACWA); Martha Davis, Executive Manager of Policy Development, Inland Empire Utilities Agency; and Cynthia Truelove, Senior Policy Analyst, California Public Utilities Commission. Concurrent seminars followed in the afternoon of day one and all day on day two. The Water Conference is a collaborative effort between the Energy Centers, Government & Institutions, Energy Efficiency, and Demand Response groups. Total number of attendees for this two-day event was 533 – a 32% increase over last year's conference.
- **New Technology Center Planned for 2010** As part of the planning stage for the new "Technology" center at CTAC, it was determined that it will feature a "smart" home, complete with solar panels, electric vehicle, an apartment complex with advanced meters, a substation, and a utility operations service with real-time monitoring capabilities. The new center will demonstrate how the new Edison Smart Meter in conjunction with advanced appliances will empower customers to manage their energy on a more reliable grid. This exhibit environment also includes the "Garage of the Future", photovoltaics, solar energy storage, and the "Avanti Circuit" or smart

grid technology. The overall exhibit and demonstration will encompass nearly 2,000 sq. ft. and is planned for completion in early 2010.

- **2009 California Community College/IOU EE Partnership Sustainability Series** This year's partnership series provided an excellent opportunity for Edison's Energy Centers to integrate and expand the joint utility partnership project to reach more customers across the State and achieve goals towards the California Long-Term EE Strategic Plan in working with the California Community Colleges. The 2009 CCC/IOU four-course series focused on sustainability. Each utility (SCE, PG&E, SDG&E and SCG) was responsible to sponsor one workshop and host all four on a campus within the California Community College System through video conferencing. Seven campuses participated in this year's series with Citrus College and College of the Sequoias as the host sights for CTAC and AgTAC. Valuable lessons were learned and will be shared in future joint utility/partnership meetings to strive for continued improvement in 2010.

AGRICULTURAL TECHNOLOGY APPLICATION CENTER (AgTAC)

Southern California Edison's AGTAC is a state-of-the-art energy center that promotes energy efficiency and energy management. The AGTAC Energy Center provides efficiency solutions tailored to business customers that enhance customer competitiveness by informing on and demonstrating the latest efficient technologies and practices through its renowned education and training courses, technical consultations, hands-on-displays, and equipment demonstrations.

SCE's AGTAC has 30,000 square feet of facility space equipped with video conferencing capabilities, conference rooms, a computer lab, and a lighting lab. At AGTAC you will find hands-on displays and exhibits to support the free EE seminars offered on topics such as: HVAC, lighting, building envelope technologies, energy management systems, electric motors, pumping & irrigation, programmable logic controllers (PLC's), foodservice equipment, and refrigeration. AGTAC also offers basic electricity and electrical safety classes.

In addition, AGTAC also has 3.5 acres of outdoor demonstration grounds (ODG) with several types of pumping and irrigation exhibits including a low pressure pumping station and a well pumping station. You will also find test plots of grapes, almonds and peaches that demonstrate EE irrigation technologies including special soil sensors and emitters to maximize irrigation efficiency. The ODG also includes a variety of energy efficient street lights exhibits showing the different types of lamps and poles available to city officials, developers, and contractors interested in implementing energy efficient

technologies into new sub-divisions, shopping malls, or retrofits. The ODG also exhibits two solar displays, including a photovoltaic solar array.

Strategies implemented in 2009

- AgTAC EE Consultations in 2009: 477
- AgTAC EE Equipment Demonstrations and/or Tours in 2009/18 tours (combined total = 22)
- AgTAC EE Seminars in 2009: 100
- AgTAC Seminars on the Road: 4
- 2009 Highlights
  - **North American Technician Excellence Training (NATE)**
    For the first time**,** AGTAC and the Institute of Heating and Air Conditioning Industries, Inc. (IHACI), hosted the North American Technician Excellence (NATE) training through the month of April. The evening sessions were held twice a week for four consecutive weeks. NATE training is the leading certification program for heating, ventilation, air conditioning and refrigeration technicians, and is the only test supported by the entire industry. These series of workshops are designed to help HVAC technicians prepare for the NATE Certification Exam, which was held at AGTAC on Saturday, May 2. The class attendance averaged approximately 100 attendees each of the eight sessions.
  - **Farming Clean Energy Conference**
    In December, the "Farming Clean Energy Conference" hosted by the San Joaquin Valley Clean Energy Organization was held at AGTAC with nearly 140 in attendance. The conference was designed to catalyze the adoption of clean energy within the agricultural sector of California's San Joaquin Valley. The primary focus targeted farmers and agri-business owners. The agenda included numerous breakout sessions concerning clean energy regulations, solar and renewable energy technologies, planning farm-based clean energy projects from the federal and state perspectives and from the utility and private sector perspectives. AGTAC's Manager participated as a panelist in the breakout session on Energy Efficiency.
  - **Piensa Verde Event – "Think Green"**
    The first annual Hispanic Heritage event, Piensa Verde "Think Green," was a great success for a first-time cultural signature event for AGTAC and this community. The event brought greater awareness and resources available to the community through the Energy Center, and SCE's commitment to serve our customers and the community. The event was tailored primarily for business customers, however there was a diverse mix of SCE business customers, community organizations, SCE employees, and vendors that offer

energy efficient or renewable power products. The event included tours of AGTAC, demonstrations of the energy efficient combination oven, and a shortened "Save Energy, Save Money" workshop.

- **AGTAC Hosts Visitors from China**
  AGTAC hosted three tours in April. One tour was for five college presidents from China who spent two weeks observing the operations at College of the Sequoias in Visalia. While working with COS President and administrators they discovered opportunities about collaboration between the college and business industries. The AGTAC tour illustrated what the center has to offer in both displays and seminar offerings.
- **World Agricultural Expo**
  AGTAC partnered with other internal departments to represent SCE at the World Ag Expo. This annual international farm equipment show attracts over 200,000 visitors to Tulare over a 3-day period. AGTAC staff members were part of the planning committee, assisted in the setup/teardown of the two exhibit booths, and represented AGTAC at the show distributing seminar calendars and promoting workshops. The AGTAC facility was booked night and day during the 3-day event with many agri-business and statewide association events. California's Lt. Governor, John Garamendi, California's Secretary of Agriculture, A. G. Kawamara and California Assemblyman, Danny Gilmore were guest speakers at several of the events at AGTAC. Over 400 Energy Efficiency tip cards were distributed to those attending these events.
- **Low Pressure Pumping Exhibit**
  The automated test programming has been completed for the Low Pressure Pumping Exhibit at AGTAC. This added feature will allow for an easier demonstration for customers wanting to understand the savings potential of using Variable Frequency Drives (VFDs) versus the traditional method of throttling valves. The display will be available soon for customers to see the difference in pumping costs between the two methods
- **AGTAC Video Conferencing Project**
  State-of-the-art video conference equipment was installed at AGTAC. In addition, a mobile video conference unit was also commissioned giving AGTAC superb capabilities to meet the distance learning needs of our customers and facilitate communication throughout SCE. Utilizing video conference technology to broadcast EE seminars from CTAC to AGTAC is proving to be a success for customers. These additional opportunities will give local Central Valley SCE customers access to valuable EE information, helping them make better informed business decisions to save money and energy.

- **SCE Solar Information Sessions offered at AGTAC**
  In collaboration with SCE's California Solar Initiative group, AGTAC hosted Solar Information Sessions for customers to learn more about the benefits of installing a solar energy system in their home. The workshops were well attended and will continue going forward
- **Educational Partnership with University of California Merced**
  In March, SCE's Energy Centers, Local Public Affairs, and Engineering management met with UC Merced Engineering Department officials to discuss forming an educational partnership to promote Energy Efficiency, Sustainability, and Renewable Energy programs. Presentations and discussions focused on utilizing UC Merced instructors to teach these seminars either in person or via webcast/videoconference to AGTAC or allowing AGTAC to webcast to their UC Merced campus and have students participate as a course requirement. The group will continue to meet to discuss items such as cost sharing in the development of courses, marketing, speakers, and displays, as well as sharing the latest in EE technology research and course curriculum.
- **AGTAC/College of Sequoias Partnership**
  College of Sequoias Community College and AGTAC have tentatively agreed to a collaborative partnership which would require students to take a specific number of EE seminars at AGTAC and classes at the college to earn a Certificate of Sustainability. The college is currently advertising the certificated program to the public.
- **AGTAC Hosts and Participates in College of the Sequoias Tech Prep Consortium Meeting**
  In December, AGTAC staff presented to the College of the Sequoias (COS) Tech Prep Consortium at their meeting about energy and utilities. The COS Tech Prep Consortium consists of local high school, adult school and community college educators and administrators specializing in the areas of technology and vocational careers. AGTAC staff presented on the education and training resource the Energy Center offers to the educational community and the support the Center can play as they're looking to build curriculum and training opportunities for students wanting to pursue green jobs and career pathways.
- **AGTAC to Support New VIEW EE Partnership in Central Valley Region**
  In December, AGTAC made a presentation to the new 2010-2012 Valley Innovative Energy Watch EE Partnership. AGTAC updated the council of governments on the resource that AGTAC provides to their jurisdictions, and the education and training available to support attainment of their jurisdictions' energy efficiency goals. VIEW partners would like to take

advantage of 'On-Location' opportunities and partner to bring seminars and workshops to their facilities and communities in 2010. AGTAC is working with the partners to identify seminars and locations for 2010 in support of their education and training needs.

- **Workforce Education and Training Public Meeting**
  In December, SCE Energy Centers participated in the California Public Utilities IOU Workforce Education & Training Public Meeting held in San Francisco. The meeting provided an update on the IOU 2010-2012 WE&T programs. Representatives of the IOU Energy Centers presented on the work the IOUs have been doing to expand their partnership base to accomplish the goals of the California EE Strategic Plan, e.g., relationships with education, industry, Workforce Investment Boards, labor, community-based organizations, etc. and emphasized our willingness to leverage resources. SCE Energy Centers will continue to participate in the Task Force going forward to ensure our programs and strategies align with the Strategic Plan.
- **CSET Facility Tour**
  In August, AGTAC invited Job Developers from Community Services Employment & Training (CSET) to work with their clients in finding them educational resources and training opportunities. These Job Developers are located throughout Tulare County at "One Stop" offices facilitated by the local Workforce Investment Board. AGTAC staff gave a short presentation on the seminars and events offered as another resource for clients who are seeking energy efficiency educational opportunities or a new career path. In addition, the same group of twenty-five (25) job developers were given a tour of the AGTAC facility.
- **USC/Edison Challenge**
  One of the groups stopping at AGTAC on the way to Big Creek were the winners of the USC/Edison Challenge student competition. In addition to lunch and a tour, they were given a short Basic Electricity class.
- **Lindsay Earth Day Celebration**
  In collaboration with Public Affairs, AGTAC participated in Lindsay's Earth Day Celebration at the McDermont Center in Lindsay. AGTAC was a proud supporter in Lindsay's first Earth Day event and offered information on AGTAC's free seminars and SCE's incentive programs.
- **The Clemmie Gill School of Science and Conservation (SCICON)**
  AGTAC participated in SCICON's Wildflower festival and open house. AGTAC staff members provided information on AGTAC's free seminars and SCE's energy efficiency programs. There were 2,022 visitors to the festival and several organizations displayed energy efficiency and technology exhibits.

TECHNOLOGY AND TEST CENTERS (TTC)

TTC funded activities will continue leveraging its staff's core competencies in technology testing and market connection functions. The TTC will focus on activities that help remove concerns about performance uncertainties and lack of reliable information as market barriers for customers interested in installing energy efficient equipment in their businesses.

Strategies Implemented in 2009

- In 2009, established a total of sixty-seven (67) meetings with product manufacturers to learn about new technologies that have potential for inclusion in EE programs.
- Conducted 119 tours for SCE's internal and external customers, industry members, manufacturers and academia. These tours were designed to address energy efficiency challenges and solution strategies.
- Conducted four quarterly Technology Briefings for SCE's internal customers.
- Taught a lighting training class for SCE's customer service team.
- Provided customized refrigeration training for SCE's customer service team.
- Taught a cold storage training class for customers in the northern part of SCE service territory.
- Established partnership with Western Cooling Efficiency Center (WCEC). The WCEC is a new research facility at UC Davis aimed at addressing cooling issues that are unique to western climates.
- Participated in a radio interview on energy efficient lighting practices for KTIE-San Bernardino.
- Attended a variety of industry conferences and working group meetings including: Strategies in Light conference, ASHRAE summer & winter meetings, ACEEE conference, Inter-Utility Lighting Team Meeting, LEDs 2009 conference, EEI Conference Workshops.
- Spread awareness of EE technologies by presenting at conferences such as: West Coast Energy Management Congress, International Sign Expo, Korean LED Delegation Meeting, ASHRAE Annual Meeting, Voices for SSL Efficiency 2009: DOE SSL Market Introduction Workshop, Illuminating Engineering Society: The New Lighting Technology and Information Expo, DOE Technical Information Network for SSL.
- Leveraged information obtained from TTC activities to support SPC staff in the development of rebate programs for interior and exterior LED fixtures for general lighting, as well as for refrigerated display cases.
- Continue to support other Energy Efficiency programs, such as Emerging Technology (ET) and Codes and Standards (CS), by maintaining and providing laboratory facilities and services.

- Prepared a shift from ETO funding in 2009 to Emerging Technologies Program in 2010-2012.

ENERGY DESIGN RESOURCES (EDR)

EDR is a statewide energy efficiency resource website that includes resource materials to design and build highly efficient new commercial buildings integrating sustainable concepts. Future development of the website includes: expansion of resource materials about effective energy efficiency design and applications for new residential facilities and industrial, agricultural, commercial, and residential retrofit environments.

Strategies implemented in 2009

- **Redesigned Website Launch**
  A redesigned EDR website was launched in Q2 2009. It included the integration of a website content management tool.
- **Educator's Forum**
  Implemented EDR Charrette, a multi-disciplinary student activity to promote skills in systems thinking, integrated design, collaborative communication, and leadership. In particular, a charrette intends to teach strategies for bridging the independent silos that prohibit true integrated design. By exposing the students to integrated design and teaching them collaborative skills, they will become more proficient in applying these skills in their future professional roles.

NONRESIDENTIAL REMOTE ENERGY AUDITS (NRREA)

NRREA strategy offers business customers remote energy audits. The audits mechanisms consist of online, via www.sce.com, mail-in/mail-back, over the phone, and CD-ROM do it yourself customer energy audit reports. The remote audits were available in English (all channels), Spanish (online, mail, and phone) and Chinese (online). Emphasis on mail-in audits as an offering was reduced in 2009.

Strategies implemented in 2009

- Online energy audits had an outstanding year with 1,023 completed online energy audits in 2009. This was over twice the participants in 2008 with little marketing.
- Within a three month period of time, 1003 phone audits were completed in the 2009 program year. This represents a 73% increase over 2008.
- A low priority was placed on mail-in audits due to historical high costs and low participation.
- Our 2010 strategy will include enhancing our online audit capabilities by developing a statewide integrated demand side management audit tool focused on residential, and small and medium commercial customer facilities.

MOBILE ENERGY UNIT (MEU)

MEU is a converted 35-foot Winnebago recreational vehicle equipped with program literature, educational materials, and energy efficiency technologies and displays. The Second Unit (Tent) is an indoor or outdoor display, which features technologies and showcases SCE energy efficiency rebate and incentive programs. The purpose of the MEU, a marketing and outreach vehicle, is to promote SCE's residential and non-residential programs, including Demand Response, Edison SmartConnect, Self Generation, and Low Income Energy Efficiency, which includes Energy Management Assistance or EMA and CARE.

Strategies implemented in 2009

- Continued design efforts on new hybrid powered MEU (HPMEU) which is scheduled to roll out 1st quarter of 2012 or sooner.
- Ordered the Energy Storage System for HPMEU, which will be used to power the display inside vehicle.
- Redesigned the outer wrap of MEU.
- The MEU team began a pilot for lead generation card in March 2009. Developed a manual lead card process from March 14 – December 31, 2009. During the pilot, the MEU collected 2,169 completed lead cards, which resulted in generating 5,531 leads for EE, DR, IQP programs. In addition to that, the MEU successfully signed up sixty-four (64) CARE enrollments and 67 eligible EMA inquiry cards.
- In 2010, the MEU will launch an automated Enerpath PDA lead system.
- By the end of 4th Quarter, the MEU provided customers educational materials regarding energy efficiency, demand response, self-generation and low-income programs to 43,180 customer contacts at various events.
- The program completed 142 events in 2009.

THE BUILDING OPERATOR CERTIFICATION (BOC)

The BOC is a nationally recognized training and certification program in energy efficient building operation and maintenance practices for building engineers working in commercial and institutional facilities offering energy efficiency and demand response strategies including load management and energy conservation. The program training consists of Level I and Level II classes. It is offered statewide in California with sponsorships from SCE, SoCalGas, SDG&E and PG&E since 2002.

Strategies implemented in 2009

- **Promote Training**
  - BOC promoted its program offering through free informational Webcasts and newsletters as well as maintaining a presence in relevant trade shows. In 2009, a total of five (5) webcasts were held with nearly 350 registrants. The program

was exhibited and/or presented in nearly ten (10) conferences and/or trade shows.
- Program manager sent Fall/Winter brochure and registration mailers to 500 SPC 2006-2008 program participants whose projects totaled over $10,500 in incentives.

CUSTOM LANGUAGE EFFICIENCY OUTREACH (CLEO)

CLEO is a non-resource, local, highly targeted residential energy efficiency marketing, outreach education and training program that targets hard-to-reach, Vietnamese, Indian, Chinese and Korean, (VICK) speaking residential customers of SCE and SCG.

CLEO is a 'Non-Resource' program with no energy saving goals. However, the program, whenever possible, encourages implementation of energy efficiency measures.

Strategies implemented in 2009

- CLEO has surpassed all 2009 goals related to program implementation as follows:
  - 51 Seminars / 170% of goal
  - 2,267 HEES Surveys / 123% of goal
  - 22 Community Booths / 122% of goal
  - 222 Newspaper Ads / 153% of goal
  - 331 Radio Ads / 178% of goal
- In 2009, CLEO continued the pilot HEES component as an extension of its program providing In-Home In-Language Audits to Vietnamese, Chinese and Korean Customers. In-Home In-Language strategy was a success in 2009 and resulted in 3,343 In-home In-language surveys and 113 In-language Telephone Surveys.

STATEWIDE EMERGING TECHNOLOGIES

Program Description

2009 was a breach funding year, and SCE was asked to extend the 2008 activity into 2009. The Statewide Emerging Technologies (ET) program is an information-only program that seeks to accelerate the introduction of innovative energy efficient technologies, applications and analytical tools that are not widely adopted in California. ET may include hardware, software, design tools, strategies and services. There are a daunting amount of market barriers which must be overcome for a new energy efficient product to gain acceptance. The ET program intends to help accelerate a product's market acceptance through a variety of approaches, but mainly by reducing the performance

uncertainties associated with new products and applications. The program targets all market segments.

Strategies implemented in 2009

- Accelerated the introduction of energy efficiency technologies and analysis tools that are not widely adopted in various California markets.
- Verified the performance of the technologies in the laboratory under control environment.
- Demonstrated the technologies in actual field conditions.
- Developed computer simulation tools for calculating the energy savings demand reduction for various energy measures.
- Transferred assessment results to Energy Efficiency Programs as an energy measure.
- Transferred the knowledge to customers as well as engineering and design communities.
- Conducted workshops for both internal and external customers.
- Developed fact sheets for Account Managers and Account Executives to be handed to their customers.
- Coordinated with other utilities through the ET Coordinating Counsel.

STATEWIDE CODES & STANDARDS PROGRAM

Program Description

The statewide Codes and Standards (C&S) program is a resource program that advocates upgrades and enhancements in energy efficiency standards and codes. Program activities are conducted over long-term code upgrade cycles. Support of building code cycles, for example, may require seven (7) years of continuous support. Codes and Standards Enhancement (CASE) studies for energy efficiency improvements are performed for promising design practices and technologies and are presented to standards and code-setting bodies.

The statewide C&S program began to prepare for the 2010-2012 program which has four sub-programs including: 1) Building Codes: Advocacy, Extension of Advocacy and CASE Studies, 2) Appliance Standards: Advocacy, Extension of Advocacy and CASE Studies, 3) Compliance Enhancement: Measure-based and holistic, 4) Reach Codes: Local government ordinances and green building standards.

The C&S program offers the state expert testimony to promote standards that approach best practices in energy efficiency, which becomes critically important as stakeholders

voice opposition to improvements to building and appliance standards throughout the public workshops and hearings process. Additionally, the program supports implementation and compliance of energy efficiency standards through strategic initiatives or training. The program targets all market segments.

Strategies implemented in 2009

- Continued the transition from an information-only program to a resource acquisition program. This put an emphasis on developing CASE studies that would result in code changes that would result in energy savings and demand reduction.
- SCE continued to work closely with the Standards and Public Interest Energy Research (PIER) staff and Commissioners of the California Energy Commission (CEC) and other IOUs to enhance the appliance energy regulations and the building energy standards.
- In addition to working on CASE studies that would enhance California energy codes and regulations, SCE also worked on studies that would affect Federal energy regulations that result in energy savings for SCE customers.
- SCE continued to develop CASE studies for the 2011 Title 24 building energy standards while still working with the CEC on the deployment of the 2008 Title 24 standards, and conducted training for the upcoming 2008 Title 24 standards.
- SCE continued to participate in the development of various model energy codes, reach codes, guidelines, and ratings systems such as the California Green Building Standard, ASHRAE/IESNA Standard 90 (Building Energy Code), ASHRAE/IESNA/USGBC Standard 189 (Green Building Code), International Energy Conservation Code, Collaborative for High Performance Schools, etc.
- SCE continued code compliance improvement activities that included various training classes.
- SCE initiated the following twenty-five (25) codes and standards projects (some in support of joint IOU projects):
    - Zero Net Energy (ZNE) Roadmap Study
    - Walk-in Coolers and Freezers, Federal
    - Lighting, General Service and Incandescent Reflector Lamps, DOE
    - Small Motors, DOE
    - Landscape Irrigation, Title 20
    - Electrical Contractor Training, Digital Lighting Controls
    - Walk-in Refrig, Title 20, Phase II
    - Controllable Ballasts
    - TVs--Title 20
    - Refrigerated Warehouse Training
    - Data Center Standards

  - HERS Phase 2 and CALRES Updates for Title 24-2008 Residential
  - HVAC Zoning in Office Buildings
  - Advanced Framing, Phase II
  - LED Streetlighting
  - Large Battery Charger Efficiency Standards
  - Outdoor lighting, Mesopic/Scotopic Lighting
  - Plug Loads, Retail and Office
  - Self Illuminated Signs Study
  - Proximity to Lighting Controls
  - Electric Food Service Support
  - Dimming Ballast/Controllable Ballasts—Controls
  - Electrical Contractor Training, Technical Support
  - DOE Beverage Machine Comments
  - CALRES Update, Phase 2
- In addition, sixteen (16) codes and standards training classes were conducted:
  - EnergyPro Non-Residential Software for Beginners (2 classes)
  - Energy Pro, advanced (2 classes)
  - Building Energy Codes for Energy Efficiency and Commissioning, National Conference on Building Commissioning
  - WCEMC: Pathways to Greener Buildings: CA's Green Building Code, ASHRAE/USGBC/IESNA Standard 189.1 for High Performance Green Buildings, Is Saving Energy the same as Reducing Greenhouse Gas?
  - Title 24 Standards for Refrigerated Warehouses (2 classes)
  - Maneuvering Lighting Design within Title 24, IECC and ASHRAE/IES 90.1 (2 classes)
  - 2008 Title 24 Standards (4 classes)
  - EnergyPro 5 update for the 2008 Standards
  - US AirConditioning Distributors Technical Development Program (TDP) for Engineers

STATEWIDE MARKETING AND OUTREACH PROGRAMS

The marketing and outreach programs convey the important message of energy efficiency and conservation to the general consumer through a consistent and recognizable presence throughout California. As noted by the Commission, statewide marketing and outreach programs "work towards the goal of increasing the efficiency of energy use through energy information, marketing and outreach, education and training and other approaches that do not directly involve or result in the installation of energy efficient equipment or measures at customer premises". During the bridge funding year of 2009, the programs were coordinated under the Flex Your Power campaign. This coordination was accomplished through regular scheduled meetings among the three providers and representatives of the four IOUs, allowing for a seamless and coordinated statewide marketing and outreach offering which served as the focal point for the general energy efficiency and conservation message to consumers. The following programs make up the 2009 Statewide Marketing and Outreach program portfolio, and the 2009 program strategies implemented.

Statewide Marketing & Outreach – Flex Your Power

Program Description

The Flex Your Power statewide energy efficiency marketing and outreach program is an extension of the innovative and historically successful Flex Your Power public education and outreach effort initiated by the State of California in 2001. The program works in partnership with the IOUs, third parties and businesses, local governments, water agencies, non-profits and others, including the state and federal government agencies with responsibility for energy and water efficiency.

Strategies implemented in 2009

- Advertisement through a variety of mediums (i.e. television, TV Partnerships, radio, radio partnerships, Outdoor/Out-of-Home (billboards, bus), online and search, ethnic TV, radio and newspaper Website, and Email.
- Outreach to commercial, industrial, governmental, and agricultural sectors via Best Practice Guides/Printed Materials and Awards.

Statewide Marketing & Outreach – UTEEM

Program Description
The Flex Your Power Spanish Television program is a statewide marketing and outreach program targeted to Hispanics, ages 18 to 49, who speak Spanish at home. The secondary target is homeowners with incomes of $50,000 and above.

The program uses the preferred news and entertainment medium of Spanish language television to increase Hispanic awareness and consideration of energy-saving programs and incentives provided by the state's four IOUs.

Strategies implemented in 2009

- Purchased and placed 16-week Spanish language television schedule of 30-second commercials and 10-second bonus spots promoting energy efficiency programs and initiatives. Spanish-language television media flights created synergy with the general market and rural market campaigns through coordinated use of theme, branding elements, messages and schedules.
- Televisions scheduled around the peak usage period of summer through early fall and included a first quarter winter gas savings schedule.
- Implemented online and a text-messaging pilot programs.
- Shipped LIEE materials and literature stand for SCE, SoCalGas and SDG&E to the appropriate stations serving those areas. Stations distributed LIEE materials at August and September special events and planned to continue using them as possible throughout the remainder of the year.

Statewide Marketing & Outreach – Flex Your Power Rural

Program Description
The Flex Your Power Rural market campaign is a comprehensive statewide energy efficiency communications effort designed to encourage residential energy users in rural areas to participate in statewide gas and electric energy efficiency activities.

The program objectives identified for the rural initiative are: primarily, expand awareness among rural residential energy consumers that reducing household energy consumption can save residents money by making a difference on their utility bills. Secondarily, educate and inform rural audiences statewide as to specific measures they can take to save energy and thus reduce green house gas emissions, e.g. replacing a dated air conditioner to an energy efficient model and replacing incandescent lighting in their homes with CFL alternatives.

Strategies implemented in 2009

- Purchased and placed targeted media flights which included print and radio. Only zip codes where a majority of households receive service from participating IOUs were considered for placement of ads in rural newspapers throughout California.
- Print ads ran in one flight, July through August, emphasizing the objectives of the cooling campaign.
- Creative executions were centered on the themes of lighting and cooling. The creative was designed to communicate two main components of the campaign: 1) saving money and 2) specific measures rural audiences can take to save energy. As a result, three newspaper ads were designed for the campaign. All ads remained consistent featuring the *Flex Your Power* logo, toll-free phone line (1-866-431-FLEX) and the Web site (www.FYPower.org) in each ad.
- Implemented well-established and successful community outreach component where community-based organizations (CBOs) work in partnership with RS&E to complement the media strategies and enhance overall campaign effectiveness.
- Recruited fifteen (15) rural CBOs, statewide. The CBOs were selected based on the proposed scope of work and budget, establishment in their communities and ability to communicate with the target audience.
- Once selected, the community outreach partners attend a 2-day training, hosted by RS&E, where they learn the history and goals of the campaign, presentation skills, how to create media-worthy events, how to speak to the media, how to attract crowds to educational exhibits, as well as event planning and spokesperson training that included on-camera interviews and basics for planning a successful Leave Your Mark media event and Flex Your Power community outreach events.
- After CBO teams were trained, they implemented their local outreach strategies. CBO teams were required to provide monthly, mid-year and end-of-year reports.
- Continued monitoring of the toll-free phone line, 1-866-431-FLEX. All statewide marketing and outreach teams used this phone number as a call-to-action in their marketing activities.
- Developed and executed a Hispanic Marketing and Public Relations component to our rural outreach. RS&E secured Spanish-language media partnerships in rural IOU territories. Through these radio and print partnerships, RS&E was able to place translated Flex Your Power ads, gain earned media and have exposure at Hispanic market events.
- As an effective grassroots tactic, developed and distributed collateral items. Each item is branded with the Flex Your Power logo, Web site and toll-free phone number information. The collateral pieces were distributed by the CBO outreach partners and Spanish-language media partners.

SECTION 1
ENERGY SAVINGS

Table 1

Table 1:
Electricity and Natural Gas Savings and Demand Reduction

Annual Results	Installed Savings [1]	CPUC Goal Adopted in D.04-09-060	% of Goal	% of 2009 Portfolio Goal	Balance
2009 Energy Savings (GWh) – Annual [2]	*1,704*	*1,189*	*143%*	*143%*	-
2009 Energy Savings (GWh) – Lifecycle [3]	*14,019*	-			-
2009 Natural Gas Savings (MMth) – Annual	-	-			-
2009 Natural Gas Savings (MMth) – Lifecycle [3]	-	-			-
2009 Peak Demand savings (MW) [2]	*317*	*249*	*127%*	*127%*	-

[1] Results from activity installed in 2009 only.
[2] Includes savings from Low Income Energy Efficiency and Codes and Standards.
[3] Does not include lifecycle savings from Low Income Energy Efficiency and Codes and Standards.

Footnote 1

Programs and program strategies that were successfully implemented during the past year that contributed to the portfolio energy savings results.

In the 2009 bridge funding period, SCE only operated the successful programs from the 2006-2008 program cycle. Over the course of the year, SCE refined its program offerings as appropriate to continue delivering measurable energy savings results throughout the portfolio. The following programs and program strategies were successfully implemented during the past year, and contributed greatly to the portfolio energy savings results:

Appliance Recycling Program
In 2009, the Appliance Recycling Program (ARP) achieved significant energy savings and made a substantial contribution to the total energy savings result. Surpassing the highest annual volume set the previous year and since inception of the program in 1994, ARP picked-up and recycled over 88,500 working refrigerators and freezers from participants in 2009. The summer marketing campaign was a significant element to the success of the program with promotions in multiple markets, mediums, and languages. ARP held a very successful media campaign at one of the recycling facilities and was featured on numerous news channels to promote saving energy, money and the

[1] The data shown in this annual report is based on SCE's ex-ante modified savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

environment. The strategic placement of promotional materials in retail stores drove participation in the recycling program up, as well. The continued use of PDAs utilizing real-time software has proven successful operationally, administratively and has continued to drive high customer satisfaction results. Beginning July 1, program participants were given the opportunity to donate their monetary incentive to SCE's Energy Assistance Fund (EAF), which helps customers in financial need pay their electric bill. A total of $51,000 was donated to EAF by ARP participants in 2009.

Residential Energy Efficiency Incentive Program – Residential Upstream Lighting Program

In 2009, the Residential Lighting Incentive Program delivered considerable energy savings results. The program allocated upstream customer incentives throughout the year, so as not to commit funds past the expected decision date. Allocations were increased in the third quarter when it was determined the program could allocate the rest of the bridge funding budget. The program met its internal goal of exceeding the program targets by October 1 using increased manufacturer communications to hasten shipping and invoicing.

Business Incentives & Services – Express Efficiency

In 2009, the Express Efficiency component of the Business Incentives & Services Program, made substantial contributions to the 2009 energy savings. Some examples of this success were achieved by participating in numerous outreach events and educating customers and vendors. The program added measures in Lighting and Food Service, which helped increase customer participation. To ensure future success of the program, a focus was placed on collaborating with the statewide team to redesign and optimize our offerings while achieving statewide consistency.

Nonresidential Direct Installation

In 2009, the Nonresidential Direct Installation program worked extensively with the program implementers to proactively provide tools and resources that would bolster program participation. In particular, strategies included providing lists of target customers to the contractors which were used in conjunction with expansive marketing efforts which focused on a face-to-face approach to program promotion. The program's marketing plan also included providing language appropriate brochures and flyers where applicable.

Standard Performance Contract

In 2009, the SPC component of the Business Incentives & Services Program, made substantial contributions to the 2009 energy savings. SPC implemented an incentive structure that directly tied incentive to Peak kW reduction to encourage participation of

measures that will help us achieve our kW reduction goal. Major effort was focused on the development and implementation of policies and procedures towards statewide consistency and reflective of best practices.

Programs that were ultimately dropped from the portfolio program during the past year and why.

The Commission only authorized SCE to operate energy efficiency programs in 2009 that were successful in the 2006-2008 program cycle. As such, there were several programs that operated in 2008, that were not authorized to be implemented in 2009. Below are the programs that were removed from SCE's portfolio prior to the 2009 bridge funding period:

Program Name
SCE 2532 Coin Operated Laundry Program
SCE 2534 Demand Response Emerging Tech
SCE 2536 EE/DR Flex Program
SCE 2538 Lighting Energy Efficiency with Demand Response
SCE 2540 One-2-Five Energy Program
SCE 2542 Affordable Housing EE Alliance
SCE 2545 E-mail Based Energy Efficiency Program
SCE 2547 Aggregation of Housing Agencies for Energy Retrofit and Management Projects
SCE 2549 Future InDEE Solicitations
SCE 2550 Innovative Pool Pump Technology Delivers Radical Efficiency Gains
SCE2552 NightBreeze EE Program
SCE2557 Transforming the Market for New Energy Star Manufactured (Mobile) Homes
SCE2559 The Lighting Energy Efficiency PAR 38/30 CFL (LEEP 38/30 CFL) Program
SCE2562 Campus Housing Energy Efficiency Program
SCE2563 Plugging the Consumer Electronics Gap - A Cross-Cutting Plug Load Reduction Program
SCE2564 Grocery Area Energy Network
SCE2565 Escalator PowerGenius™ Program
SCE2570 Federal Direct Install Initiative

How the utility plans to meet the Commission's portfolio goals in the coming year.

In September 2009, the Commission issued Decision 09-09-047 which authorized SCE's 2010-2012 energy efficiency program portfolio. SCE's portfolio is designed not only to meet the Commission's portfolio goals in 2010, but also to make significant progress towards the Commission's long-term aspirational goals outlined in the California Long-Term Energy Efficiency Strategic Plan.

SECTION 2
EMISSION REDUCTIONS

Table 2

Table 2:
Environmental Impacts

Annual Results [1]	Annual tons of CO2 avoided	Lifecycle tons of CO2 avoided	Annual tons of NOx avoided	Lifecycle tons of NOx avoided	Annual tons of SOx avoided [2]	Lifecycle tons of SOx avoided [2]	Annual tons of PM10 avoided	Lifecycle tons of PM10 avoided
2009 Portfolio Targets [3]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
2009 Total	**865,332**	**7,713,927**	**113**	**1,010**	**-**	**-**	**56**	**500**

[1] Environmental impacts do not include those attributed to Low Income Energy Efficiency or Codes and Standards.

[2] The avoided SOX reductions are not calculated in the E3 calculator. It was determined by E3 that none of the IOUs use coal power on the margin and the energy efficiency savings have impact on the margin only. This is the basis for the E3 analysis as reviewed by all interested parties and approved by the Commission.

[3] In D.08-10-027, the Commission authorized the 2009 bridge funding programs; however, it did not establish environmental reduction targets for 2009.

Footnote 2

Programs and program strategies that were successfully implemented during the past year that contributed to the emissions reductions reported in the table above.

SCE embraces the fact that energy efficiency is the utility sector's first and most cost-effective response to global climate change, and SCE is firmly committed to making major contributions to California's climate change commitments. As a result of such a commitment, SCE's programs were designed to maximize energy savings results and therefore maximized to reduce greenhouse gas emissions. SCE's most successful programs and program strategies are described in detail in Section 1 above.

The Commission has mandated that the utilities report their results using the E3 Calculator tool. This tool includes many imbedded calculations, such as avoided costs and emission factors, all of which have been approved by the Commission. Pursuant to the Commission's authorization to use the E3 Calculator tool, SCE entered its results into the E3 Calculator and determined the amount of emission reductions attributed to the successful implementation of the 2009 portfolio of energy efficiency programs. These results are shown in the table above.

[2] The data shown in this annual report is based on SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

Brief explanation of the assumptions used in the calculation, i.e., the emission rate used, gas combustion type, net-to-gross.

The environmental benefits (annual and lifecycle CO2, NOx, and PM10 reductions) in this document are pursuant to the values adopted in D.05-04-024 (Avoided Costs Decision), as developed by Energy and Environmental Economics, Inc. (E3) and produced in their 2004 Report.

E3 calculated the avoided environmental cost, or emissions costs, as the sum of NOx, PM10, and carbon emissions (CO2) costs, increased by marginal energy losses for each TOU period. E3 estimated the emissions avoided cost streams by multiplying the costs per pollutant (on a yearly basis) by the emission rate (per hour of the year). The emissions costs vary by voltage level, hour, and year.

- The NOx costs ($/MWh) are based on California offset prices generators must pay for NOx emissions, and the estimated emission rate of NOx at the implied heat rate of the market price. The NOx cost per MWh of energy saved at the customer site is increased by the incremental energy losses in each TOU period between the end use and the bulk system. In Period 1, when the forward market prices of electricity are based on NYMEX forward market prices, we assume that these prices already include the cost of NOx emissions so this value is equal to zero in Period 1.
- The PM10 costs ($/MWh) are computed similarly to the NOx costs, with the emission cost based on the California PM10 market prices and the estimated rates of emissions by the implied heat rate. The PM10 costs are also assumed to be included in the NYMEX forward market prices.
- The CO2 costs ($/MWh) are an estimate of avoided costs for reduction in CO2 per MWh saved at the customer site. Currently there is no requirement to purchase CO2 offsets in California so the avoided cost of the CO2 emissions is based on prices in other markets.

The environmental benefits utilized in the cost-effectiveness analysis of the programs herein are only applicable to the appropriate reporting of energy efficiency programs for 2009. The factors utilized in the development of these environmental benefits were agreed to specifically to reflect an appropriate and approximate value for the reduced energy savings due to energy efficiency programs. As such, these environmental benefits should not be used in any other context and should also be reviewed for future use in energy efficiency program planning and evaluation.

The emission reduction values for SOx are not included in the environmental benefits (annual or lifecycle) in this document; as such values were not included in D.05-04-024 (Avoided Costs Decision), as developed by E3 and produced in their 2004 Report.

Emission reductions are directly related to the net energy savings derived from the energy efficiency portfolio. As such, the emissions reductions reported herein reflect the net energy reductions also reported in this report.

How these numbers are consistent with the current developments in the Green House Gas Proceeding currently open before the Commission or its successor proceeding (R.06-04-009).

The environmental benefits utilized in the cost-effectiveness analysis of the programs herein are as adopted for the energy efficiency programs only and are currently applicable to the appropriate reporting of energy efficiency programs for 2009. The factors utilized in the development of these environmental benefits were agreed to specifically reflect an appropriate and approximate value for the reduced energy savings due to energy efficiency programs. As such, these environmental benefits should not be used in any other context and should also be reviewed for future use in energy efficiency program planning and evaluation.

SECTION 3
EXPENDITURES

Table 3

Table 3:
Expenditures

Summary of Portfolio Expenditures	2009 Adopted Program Budget	Cumulative Annual Expenditures	Percent of Portfolio Budget	Percent of Total Annual Expenditures
Total Portfolio Expenditures [1]				
Administrative Costs		$ 30,785,879	12.27%	13.64%
Marketing/ Advertising/ Outreach Costs		$ 21,614,025	8.61%	9.57%
Direct Implementation Costs		$ 173,374,648	69.10%	76.79%
Total Portfolio Expenditures [1]	**$ 250,889,100**	**$ 225,774,551**	**89.99%**	**100.00%**
Total Competitive Bid Program Expenditures (sub-component of portfolio)				
Administrative Costs		$ 6,591,124	2.63%	2.92%
Marketing/ Advertising/ Outreach Costs		$ 2,446,985	0.98%	1.08%
Direct Implementation Costs		$ 58,370,086	23.27%	25.85%
Total Competitive Bid Program Expenditures	**$ 73,772,100**	**$ 67,408,195**	**26.87%**	**29.86%**
Total Partnership Program Expenditures (sub-component of portfolio)				
Administrative Costs		$ 3,212,893	1.28%	1.42%
Marketing/ Advertising/ Outreach Costs		$ 50,324	0.02%	0.02%
Direct Implementation Costs		$ 14,225,404	5.67%	6.30%
Total Partnership Program Expenditures	**$ 21,035,244**	**$ 17,488,621**	**6.97%**	**7.75%**
Total EM&V Expenditures				
EM&V IOU		$ 2,645,035	10.10%	89.66%
EM&V JOINT STAFF		$ 304,875	1.16%	10.34%
Total EM&V Expenditures	**$ 26,198,328**	**$ 2,949,910**	**11.26%**	**100.00%**

[1] Does not include the budget or expenditures associated with EM&V.

Footnote 3

[3] The data shown in this annual report is based on SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

Description of SCE's Partnership programs that were included in the portfolio in the past year.

In the table below, SCE describes the partnership programs that were operating in 2009:

Partnership Name	Program Description
Local Government Energy Action Resources	Local Government Energy Action Resources program (LGEAR) optimizes the opportunities for jurisdictions and their communities to work toward the common goal of achieving short and long-term energy savings, reduced utility bills, and an enhanced level of comfort in municipal and commercial buildings as well as homes. Partners are offered technical assistance to overcome barriers to energy efficiency. In return, they leverage their communications infrastructure to provide information to businesses and residents on utility programs to save energy, save money and the environment. Partnering communities funnel existing energy programs and do not offer direct incentives or rebates. One of the major benefits to partners is the opportunity to provide environmental stewardship and leadership to their communities in the wise use of scarce energy resources.
Mammoth Lakes Partnership (LGEAR Partnership)	The Mammoth Lakes partnership implements the LGEAR concept working with the Town of Mammoth. Works with partners to identify and respond to the energy needs of the town and funnel programs as appropriate.
Ridgecrest Partnership (LGEAR Partnership)	The Ridgecrest partnership implements the LGEAR concept with the City of Ridgecrest. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
San Joaquin Valley Partnership (LGEAR Partnership)	The San Joaquin Valley partnership implements the LGEAR concept with the Cities of Visalia, Tulare, Lindsay, Porterville and Tulare County. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
Orange County Cities Partnership (LGEAR Partnership))	The Orange County partnership implements the LGEAR concept with the Cities of Huntington Beach, Westminster, Fountain Valley and Costa Mesa. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.

Partnership Name	Program Description
City of Long Beach Partnership (LGEAR Partnership)	The Long Beach partnership implements the LGEAR concept with the City of Long Beach. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
City of Redlands Partnership (LGEAR Partnership)	The Redlands partnership implements the LGEAR concept with the City of Redlands. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
City of South Gate Partnership (LGEAR Partnership)	The South Gate partnership implements the LGEAR concept with the City of South Gate. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
City of Beaumont Partnership (LGEAR Partnership)	The Beaumont partnership implements the LGEAR concept with the City of Beaumont. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
Desert Cities Partnership (LEGAR Partnership)	The Desert Cities partnership implements the LGEAR concept with the Cities of Blythe, Cathedral City, Desert Hot Springs, Indian Wells, Rancho Mirage, Blythe and the Augua Caliente Band of Cahuilla Indians. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
City of Simi Valley Partnership (LEGAR Partnership)	The Simi Valley partnership implements the LGEAR concept with the City of Simi Valley. The program works with partners to identify and respond to the energy needs of the City and funnel programs as appropriate.
Ventura County Partnership	The partnership finds new opportunities for providing energy efficiency services to public agencies and community asset organizations within the region through in-depth technical assistance and project implementation support. In addition, the program offers an energy resource center, energy education and training, and outreach events.
South Bay Partnership (South Bay Cities of Council of Governments (SBCCOG))	The South Bay Partnership optimizes the opportunities for the fifteen local governments of the South Bay and their communities to work toward the common goal of achieving short-and long-term energy savings, reduced utility bills, and an enhanced level of comfort in municipal and commercial buildings as well as homes. The program offers an energy center, education and training, promotion and outreach.

Partnership Name	Program Description
Bakersfield and Kern County Partnership	The Bakersfield and Kern County Energy Watch Partnership was designed to achieve immediate, long-term peak energy and demand savings, and establish a permanent framework for sustainable, long-term, comprehensive energy management programs. Additionally, the program sets the foundation for sustainability and best practices for the partnership's participating jurisdictions and customers. The program features incentives for retrofit of county facilities, small business and residential direct install, as well as education, training and outreach.
Santa Barbara Partnership (South Coast Energy Efficiency Partnership)	The Santa Barbara partnership assists and facilitates residents and businesses and other city and county government officials in understanding, managing, and reducing their energy use and costs, and positions the partners as leaders in the region in energy management practices. The program follows the LGEAR model providing technical assistance to partners and funnels the existing portfolio of energy programs.
Community Efficiency Partnership (Non-resource/Resource)	CEP is a demonstration program modeling how an effective city government and utility relationship can generate real and sustained energy savings through direct measures, educational curricula, community awareness efforts, efficient product distributions, and promotions to residential and small commercial customers. It is purposely broad and is a continually evolving set of initiatives in the partner communities to raise awareness about energy efficiency.
San Gabriel Valley Energy Wise Partnership	The San Gabriel Partnership is a continually evolving set of initiatives in the partner communities that raises awareness about efficiency, and gets efficient products into the homes and small businesses. It is purposefully broad and includes education, training, marketing and outreach, and efficient product distributions and promotions. The program provides incentives for energy efficiency retrofits of municipal facilities and also works to funnel the existing portfolio of energy programs.

Partnership Name	Program Description
Santa Ana Partnership	The Santa Ana partnership implements the LGEAR concept with the City of Santa Ana. The program works with partners to identify and respond to the energy needs of the town and funnel programs as appropriate. In addition to implementing the LGEAR concept, the City of Santa Ana was chosen to pilot the Energy Leader Model for the 2009-11 program cycle. The new Energy Leader Model is a standardized approach for all Local Government partnerships encouraging municipal facility retrofits and community outreach.
Palm Desert Partnership	The Palm Desert partnership is a fully resourced energy efficiency program with its own unique set of measures, incentive amounts, and goals. This program seeks to achieve maximum energy and demand savings through the combined efforts of the City of Palm Desert, The energy Coalition, SCG and SCE. Aggressive goals of 30% reductions in energy usage and demand have been established. In addition to these quantifiable goals, the purpose of this partnership is to establish a model for other communities to replicate.
California Community Colleges Partnership	The CCC/IOU Partnership Program includes the implementation of retrofits, New Construction, and Retro-Commissioning (RCx)/Monitoring-Based Commissioning (MBCx) projects. The Program also focuses its efforts on Training and Education, which will expand existing vocational education programs, while training faculty and staff on best practices on energy efficient technology implementation and energy management.
California Department of Corrections and Rehabilitation Partnership	The CDCR/IOU Partnership consists of several components, which include Retrofits, New Construction, and Retro-Commissioning projects. The partnership focuses on training and education, which provide information on best practices for energy efficiency management and conservation, which targets not only the maintenance and operations staff but also on the wardens and other end-users at each of the facilities.
SCE-SCG County of Los Angeles Partnership	This partnership continues to achieve immediate electric and gas energy savings and peak demand reduction at county facilities. These energy savings are being accomplished by applying the retro-commissioning (RCx) processes that will result in the implementation of recommended energy efficiency measures to optimize the operation of HVAC and Lighting systems in each building.

Partnership Name	Program Description
County of Riverside Partnership	The County of Riverside partnership program aims to deliver immediate electric and gas energy savings and peak demand reduction in Riverside County facilities. These energy savings will be accomplished by implementing retrofit and modernization projects utilizing SCE's traditional programs such as Standard Performance Contract (SPC), Savings by Design and will also include a pilot Retro-Commissioning (RCx) project in one of the counties' buildings.
UC-CSU Partnership	The UC and CSU systems consume vast quantities of energy and, as a combined entity, make up a significant portion of both electric and natural gas in the State of California. They are large, complex organizations with a broad set of goals, stakeholders, processes and constituencies. They are diverse from a geographic, climate, and operational needs standpoint, and with this size and diversity also comes a considerable opportunity to save energy use and cost on a scale that is meaningful to the IOUs and to California. The UC/CSU/IOU Energy Efficiency Partnership program is designed to meet these challenges.
State of California Partnership (formerly Department of General Services Partnership)	The State of California (State) and Investor-Owned Utility (IOU) Partnership was created to assist the State in reducing the amount of energy it purchases off the electrical grid by 20 percent by the year 2015, as required by Governor Schwarzenegger's Green Building Initiative (GBI). The State/IOU Partnership maximizes the limited budget dollars that State agencies can apply toward energy efficiency efforts.

Partnership Name	Program Description
County of San Bernardino Partnership	The County of San Bernardino Partnership was formed at the end of 2008. Its focus is to deliver an integrated support model for the County of San Bernardino to take advantage of the entire portfolio of energy programs and services and other resources. Included in these efforts will be coordination with Demand Response (DR), California Solar Initiative (CSI), new construction, and more. This Partnership will assist the County in achieving its green policy initiatives to formulate an integrated approach to energy efficiency. This will be a collaborative effort with the aim of building an infrastructure that would efficiently deliver cost effective energy efficiency projects thus reducing the "carbon footprint" of County facilities. It would also provide a comprehensive outreach and education element to raise awareness about the benefits of energy efficiency. County facilities will be targeted for the retrofit, retro-commissioning (RCx), and new construction elements.

Description of the programs that were selected as part of the competitive bid process required by the Commission, as well as an assessment of how the portfolio is meeting the requirement that 20% of the portfolio budget be set aside for competitive bid solicitations.

As of the end of 2009, over 29 percent of SCE's 2009 bridge funding portfolio was comprised of programs that were procured through a competitively bid solicitation.

Review of any problems encountered with either the partnerships or competitive bid programs during the past year.

The following are issues and concerns that were observed during the implementation of partnership programs. Resolution of these issues may facilitate in successful program implementation.

- In 2008, the need for greater consistency among local government partnerships to help to facilitate effective management processes and provide for more dependable and tangible energy savings results was identified. During the 2009 bridge period, SCE began educating partners on a new consistent model for implementing local government partnerships. While the actual implementation

will not occur until the new 2010-2012 cycle, partners have been receptive to the new model which provides greater consistency and transparency as well as higher incentives based on higher performance.

- Government and institution partners' budget cycle inconsistent with utility program cycle. Due to difference in budget cycle, it is difficult to engage the partners in projects to capture savings on an annual basis. For any given program year, the G&I partner will have six (6) months to develop and implement the project that can attribute the energy savings to the annual program goal.
- The difficult economic situation in 2009 further exacerbated the institutional and local government partners' ability to fund energy efficiency projects. In addition, residential customers have also been similarly financially challenged. Local jurisdictions have begun developing AB 811 type financing programs which will begin to alleviate this issue for residential customers. Local government and institutional partners expressed a strong interest in On-Bill financing (OBF) to help them fund projects. This option has been approved for the 2010-2012 cycle and will address some of the cost issues. OBF will provide the government and institutional entities with funds at zero interest to invest in energy efficiency and the department may directly receive benefits through reduction in energy consumption and in energy cost for their department. SCE will continue to work with the government and institutional entities to find creative solutions for the department that sponsored the project to retain the incentive dollars.

Competitive bid programs encountered certain problems in the solicitation and implementation phases. For the most part the problems were manageable and had a resolution that was accepted by the bidders and/or the scoring staff.

- Problem: Proposal Evaluation and Management Application ("PEPMA") was not necessarily designed to support professional services solicitations, therefore the solicitation process was hard-copy based requiring extensive time from SCE's procurement department.
- Solution: PEPMA was reprogrammed to facilitate professional services solicitations and the need for hard-copy Request for Proposals was eliminated.

- Problem: SCE noticed that the hourly rates for similar professional services work varied greatly. There was no recent rate benchmark tool available to normalize these rates.

- Solution: Program planners developed an updated energy efficiency third party and professional services rate benchmarking tool.
- Problem: In the past, unsuccessful professional services bidders were unable to determine from SCE's procurement department the reasons for low scores and for not being selected for award.
- Solution: Program planners established an unsuccessful bidder debriefing process. In this process these bidders were contacted and given the opportunity to discuss rationale behind low scores and non-selection. This plan was well accepted by these bidders and SCE staff alike.

SECTION 4
COST-EFFECTIVENESS

Table 4

Table 4:
Cost Effectiveness

Annual Results	Total Cost to Billpayers (TRC) [1]	Total Savings to Billpayers (TRC)	Net Benefits to Billpayers (TRC) [1]	TRC Ratio	Total Cost to Billpayers (PAC) [1]	PAC Ratio	PAC Cost per kW Saved ($/kW) [2]	PAC Cost per kWh Saved ($/kWh) [1]	PAC Cost per therm Saved ($/therm)
2009 Targets [2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2009 TOTAL [3]	$ 419,459,343	$ 675,217,529	$ 255,758,186	1.61	$ 250,891,034	2.69		0.04 cents/kWh	$0.00 /therm

[1] Includes SCE's 2009 shareholder incentive payment of $25,652,348 awarded by the Commission in December 2009 (D.09-12-045).

[2] The adopted avoided cost methodology does not provide information to provide a meaningful value for PAC Cost per kW saved. The adopted avoided cost methodology created kWh costs values that vary for each hour of the year that includes kW generation capacity costs. The current PAC Cost per kWh saved includes all ratepayer financial costs incurred in producing electric savings. The same costs would have to be reallocated if a PAC Cost per kW saved were presented. Additionally, the current approved E3 Calculator does not have the capability to calculate discounted kW, nor is it clear whether an annualized cost per kW saved or total cost per kW saved is more useful.

[3] In D.08-10-027, the Commission authorized the 2009 bridge funding programs; however, it did not establish the cost-effectiveness projections associated with 2009 programs.

Footnote 4

Description of what each metric means in terms of the overall portfolio's progress in producing net resource benefits for California's ratepayers.

The Total Resource Cost Test (TRC) measures the net benefits of a program as a resource versus the participants' costs and program administration costs. TRC Net Benefits (Net Rbn) are the subtraction of the Total TRC costs from the Total Resource Benefits. The Total Resource Net Benefit, is a measure of the total resource benefits from a measure or program, as derived by multiplying the energy savings by the appropriate avoided costs and reduced by the net-to-gross ratio. Total TRC Costs shown in the tables include the sum of the Total Administrative Costs and the Incremental Measure or Participant Cost. The TRC costs also represent the changes to the TRC test mode in Decision 07-09-043.[5]

The Program Administrator Cost Test (PAC) measures the net benefits of a program as a resource versus the total program costs, including both the program incentive and program administration costs. PAC Net Benefits are the subtraction of the Total PAC

[4] The data shown in this annual report is based on SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

[5] Decision 07-09-043 includes the cost incurred by free riders as part to the TRC Costs.

costs from the Total Resource Benefits, Net (RBn). The Total Resource Net Benefit, is a measure of the total resource benefits from a measure or program, as derived by multiplying the energy savings by the appropriate avoided costs and reduced by the net-to-gross ratio. Total PAC Costs shown in the tables include the sum of the Total Administrative Costs and the Program Incentive costs.

Brief explanation of the assumptions used in the calculation, i.e., incremental measure costs used, how rebates (transfers) were applied.

The cost-effectiveness tables provided in this report reflect a summary of the cost-effectiveness calculations developed for SCE's 2009 portfolio. These tables provide energy savings and program costs associated with activity in 2009.

Pursuant to Policy Rule IV.11., to the extent possible, the assumptions that are used to estimate load impacts (e.g., kWh and kW savings per unit, program net-to-gross ratios, incremental measure costs and useful lives) in the calculation of the TRC and PAC tests are taken from the Database for Energy Efficient Resources (DEER). For measures where the required load impacts for cost-effectiveness test inputs were not available in DEER, SCE has developed work paper documentation in support of such measures.

Units (Number and Definition)

Measure of the unit counts are displayed as collected in program tracking databases during 2009. The definition of the unit is tailored to the specifications of the individual measure(s) offered by the program.

Energy and Capacity Savings (per unit and Total)

The annual program energy and capacity reductions are derived from ex ante estimates of energy and capacity savings. Annual program energy and capacity reduction estimates for the programs are the result of a summation of measure-level savings from the measures installed as a result of the 2009 programs. The measure-level savings information used to calculate the 2009 program results are based upon the latest energy and capacity savings data available for the particular measure(s), including DEER 2008 v2.04, ex post measurement studies, historical program results, and engineering estimates.

The gross amounts of the annual energy and capacity savings are reduced by appropriate net-to-gross ratios for the particular measure or end-use and extended through their useful lives by the appropriate effective useful life estimates (see more information in Net-to-Gross and Effective Useful Life sections below).

For all of the tables presented in this report, SCE has presented the capacity savings based upon the estimated summer on-peak savings. Thus, the total capacity savings of each measure has been reduced to show only the applicable percentage of savings that fall in the defined summer on-peak period for the particular measure. All energy savings results are a total of the savings across all time periods.

Net-to-Gross Ratio

Gross energy savings are considered to be the savings in energy and demand seen by the participant at the meter. Net savings are assumed to be the savings that are attributable to the program. That is, net savings are gross savings minus those changes in energy use and demand that would have happened even in the absence of the program (free riders). The net-to-gross ratio is a factor that is applied to gross program load impacts to convert them into net program load impacts. This factor is also used to convert gross measure costs into net measure costs.

Each of the Net-to-Gross ratios utilized in the report are derived from DEER 2008 v.2.04, as required by the Commission.

Effective Useful Life

The Effective Useful Life is the length of time (years) for which the load impacts of an energy efficiency measure are expected to last.

Incremental Measure Cost (per unit and Total)

These costs generally represent the incremental costs of energy efficiency measures over the standard replacement measures. The gross amounts of these costs are reduced by appropriate net-to-gross ratios for the particular measure or end-use. SCE relies upon DEER 2008 v2.04 for ex ante incremental measure cost values, as required by the Commission. In such cases were DEER does not contain an estimate, SCE's incremental measure costs are typically derived from the latest measure cost study and documented in SCE's work papers.

Program Incentive Cost (per unit and Total)

Incentive costs are the amount of incentives to pay to customers during 2009. The incentive cost totals are based upon the per unit incentive costs paid to the customer multiplied by the total number of units.

Program Administrative Cost

Program administrative costs include all expenditures directly charged to the program with the exception of incentive costs. The administrative costs consist of allocated administrative, labor, non-labor (i.e., material and other), and contract labor cost.

Labor costs consist of SCE labor charges that are directly charged to the program. These costs include salaries and expenses of SCE employees engaged in developing energy efficient marketing strategies, plans, and programs; developing program implementation procedures; reporting, monitoring, and evaluating systems. Costs reflect actual costs incurred in 2009 in support of the programs.

Non-labor costs include materials and other miscellaneous costs charged directly to the program. These costs include items such as booklets, brochures, promotions, training, membership dues, postage, telephone, supplies, printing/photocopying services, and computer support services.

Contract labor costs consist of contract employees and consultant labor charges that are directly charged to the program. These costs include salaries and expenses of contract employees and consultants engaged in developing energy efficient marketing strategies, plans, and programs; developing program implementation procedures; reporting, monitoring, and evaluating systems.

Allocated administrative costs represent those for building lease and maintenance costs and management oversight expenditures.

How these numbers are consistent with the instructions provided by Commission in the avoided costs proceeding, R.04-04-025, particularly D.06-06-063 and the December 21, 2006 ALJ Ruling.

The tables provided in this report include modifications to the cost-effectiveness calculations pursuant to the direction the Energy Efficiency Policy Manual, the avoided costs rulemaking (R.04-04-025), and recent Decisions related to energy efficiency cost-effectiveness, including D.06-06-063 and D.07-09-043.

SECTION 5
BILL PAYER IMPACTS

Table 5

Table 5:
Ratepayer Impacts

2009	Electric Average Rate (Res and Non-Res) $/kWh [1]	Gas Average Rate (Core and Non-Core) $/therm	Average First Year Bill Savings ($)	Average Lifecycle Bill Savings ($)
SCE	$0.141	$0.000	$ 240.27	$ 1,976.73

[1] SCE's average rate in 2009 for bundled-service customers is 14.1 cents per kWh (Source: Form 10-K, Southern California Edison, March 1, 2010).

Footnote 6

Explanation of the impact of the energy efficiency activities on customer bills relative to the level without the energy efficiency programs.

In 2009, SCE was authorized to collect over $280 million (D.08-10-027) in rates in order to implement the authorized bridge funding periods. Customer rates were increased starting January 1, 2009 as program implementation started to ramp up. Therefore energy efficiency programs increase customer bills up front, as funds are collected to fund the energy efficiency programs. However, upon implementation, the programs lead to lower energy usage due to improvements in energy efficiency by customers and subsequent reductions in participant bills. In the long-term all users will benefit through reductions in the avoided costs of energy. The tables provided above show the bill impacts of participating customers from 2009.

Brief explanation of the assumptions used in the calculation.

The bill impacts included in this report reflect the net impact on bills, accounting for the benefits of the programs. The overall impact of SCE's programs is that customer bills will decrease relative to the level without the energy efficiency programs.

[6] The data shown in this annual report is based on SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

The following methodology was utilized for the calculation of bill impacts resulting from the 2009 energy efficiency portfolio:

The calculation methodology for determining the average first year bill savings utilizes the total gross net energy savings per year multiplied by the average rate denominated in kWh. The product of these numbers results in a total bill savings for all program participants.

Similarly, the calculation methodology for determining the average lifecycle bill savings utilizes the total lifecycle net energy savings multiplied by the average rate denominated in kWh. The product of these numbers results in a total bill savings for all program participants.

SECTION 6
GREEN BUILDING INITIATIVE

Table 6

Table 6 :
Green Building Initiative

	GWh				MW			MMTh		
2009	Expenditures [1]	Goal [2]	Annual	% of Goal	Goal [2]	Annual	% of Goal	Goal	Annual	% of Goal
SCE	$40,005,599	N/A	295	N/A	N/A	62	N/A	-	-	-

[1] Expenditures reflect incentive payments for 2009 installations only.
[2] In D.08-10-027, the Commission authorized the 2009 bridge funding programs; however, it did not establish the GBI targets associated with 2009 programs.

Footnote 7

Description of the programs that contributed to the GBI savings.

Governor Arnold Schwarzenegger signed Executive Order S-20-04 regarding Green Buildings on December 14, 2004. It established the State of California's priority for energy and resource-efficient high performance buildings.

The Executive Order sets a goal of reducing energy use in state-owned buildings by 20 percent by 2015 (from a 2003 baseline) and encourages the private commercial sector to set the same goal. The order also directs compliance with the Green Building Action Plan, which details the measures the State will take to meet these goals.

SCE is committed to helping California meet the Governor's Green Building Initiative (GBI). In 2009, SCE's programs have made significant contributions, as indicated in the table above.

The following programs contributed in 2009 towards GBI energy savings:

- Business Incentives & Services Program

[7] The data shown in this annual report is based SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

- Industrial Energy Efficiency Program
- Agricultural Energy Efficiency Program
- Retro-Commissioning (RCx) Program
- Comprehensive HVAC Program
- Nonresidential Direct Installation Program
- Savings By Design Program
- California Community Colleges Program
- SCE-SCG County of Los Angeles Partnership Program
- UC-CSU-PG&E-SCE-SoCalGas-SDG&E Partnership Program
- County of Riverside Partnership Program
- California Department of Corrections and Rehabilitation Partnership Program
- Ventura Partnership Program
- Bakersfield/Kern County Partnership Program
- Community Energy Partnership Program
- San Gabriel Valley Energy Efficiency Partnership Program
- State of California Partnership Program
- Palm Desert Partnership Program
- Santa Ana Partnership Program
- County of San Bernardino Partnership Program
- Santa Barbara Partnership Program
- Federal Direct Install Initiative Program
- MAP Energy Efficiency Program
- CA Preschool Energy Efficiency Program (CPEEP)
- Healthcare Energy Efficiency Program
- Energy Efficiency Program for Entertainment Centers Program
- Automatic Energy Review for Schools Program
- City of Ridgecrest Partnership
- Data Center EE Program
- Long Beach Partnership
- South Gate Partnership
- Orange County Partnership

- Beaumont Partnership

Assessment of the status of the portfolio's progress in meeting GBI goals.

SCE successfully implemented its energy efficiency programs in 2009 and is on its way to achieve the goals established for the Governor's Green Building Initiative. The table above illustrates the progress that SCE has achieved towards the GBI goals.

SECTION 7
SHAREHOLDER PERFORMANCE INCENTIVES

Summary

The 2006-2008 shareholder performance incentive mechanism, or Risk/Reward Incentive Mechanism (RRIM), was established by the Commission in D.07-09-043 and further modified by D.08-01-042, D.08-12-059, and D.09-12-045.

California's Energy Action Plan establishes energy efficiency as the preferred resource, first in the utility loading order to secure the state's energy future. A successful RRIM, including consistent, timely, and annual payments is the cornerstone of ensuring that all cost-effective energy efficiency is pursued. Such a mechanism will elevate energy efficiency to an equal footing with supply-side investments and entrench of energy efficiency as an essential component of the California utility business model.

Operationally, the RRIM is a shared savings mechanism that allows for both financial incentives and economic penalties based on the SCE's performance toward meeting the Commission energy efficiency goals. Under this mechanism, SCE has the opportunity to earn an incentive of 9% of the value of total energy efficiency savings if it achieves between 85% and 100% of its energy efficiency goals for the cumulative three-year period or can earn 12% of the value of energy efficiency savings if 100% or greater of its goals are achieved. Economic penalties would be imposed in the event SCE achieves less than 65% of its goals. The mechanism has a deadband between 65% and 85% of energy efficiency goals, where no economic penalty or incentive would be earned. The mechanism allows for two progress payments, subject to a 35% holdback, for estimated progress towards meeting the Commission's three-year goals and a third payment for final measured performance towards those goals, which includes the payment of any holdback.

SCE may retain the first and second progress payments as long as it meets a minimum of 65% of the goals, as measured by the Commission in the final payment. If SCE falls below the 65% level, the amount of the progress payments and economic penalties would be deducted from future earnings awards. For SCE, both incentives and economic penalties for each three-year period are capped at $200 million.

In 2009, the Commission awarded SCE an earnings amount of $25.6 million.[8] This award constituted the second progress payment of the 2006-2008 program cycle for activities achieved in 2008.

In 2008 SCE was authorized to receive a first interim incentive reward of $24.7 million for activities in 2006 and 2007.[9]

On January 31, 2009, the Commission issued a new Order Instituting Rulemaking (OIR) to evaluate modifications to the RRIM for energy efficiency first adopted in D.07-09-043. It is anticipated that the review of the RRIM will result in a final payment for 2006 – 2008 accomplishments no later than December 2010.

[8] D.09-12-045, Ordering Paragraph 1, page 83

[9] D.08-12-059, Ordering Paragraph 5, page 28

SECTION 8
SAVINGS BY END-USE

Table 8

Table 8:
Annual Savings By End-Use

2009	GWH	% of Total	MW	% of Total	MMTh	% of Total
Residential	**681**	**39.97%**	**121**	**38.31%**		
Appliances	0	0.00%	0	0.01%		
Consumer Electronics	1	0.03%	0	0.01%		
HVAC	14	0.81%	15	4.60%		
Lighting	513	30.13%	81	25.57%		
Pool Pump	7	0.42%	2	0.57%		
Refrigeration	140	8.21%	21	6.71%		
Water Heating	0	0.01%	0	0.01%		
Other	6	0.35%	3	0.82%		
Nonresidential	**892**	**52.32%**	**168**	**53.04%**		
HVAC	110	6.44%	30	9.53%		
Lighting	471	27.65%	96	30.16%		
Office	14	0.82%	0	0.00%		
Process	203	11.90%	29	9.22%		
Refrigeration	39	2.29%	4	1.12%		
Other	55	3.21%	10	3.01%		
Low Income Energy Efficiency	**24**	**1.38%**	**6**	**2.05%**		
Codes & Standard Energy Savings	**108**	**6.33%**	**21**	**6.60%**		
SCE Annual Portfolio Savings	**1,704**	**100%**	**317**	**100%**		

Notes:
Results from activity installed in 2009 only.
SCE's rebates for energy-efficient refrigerators as well as the Appliance Recycling program element are shown under the refrigeration end use.

Footnote 10

[10] The data shown in this annual report is based on SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

Description of how the programs and program strategies implemented in the past year produced energy savings reported in the table above are consistent with the Commission's policy rules.

The Commission's energy efficiency reporting requirements mandates that SCE submit regular reports to the Commission quantifying the accomplishments of the portfolio. One such requirement, reporting portfolio performance of energy savings and demand reduction by end use, as shown in the table above, is reported on a regular basis as part of SCE's monthly report. The table above illustrates the 2009 results, by end use, of SCE's portfolio of energy efficiency programs.

Brief explanation of the source of the LIEE savings reported above, i.e., which Impact Evaluation report provides the savings numbers.

The 2009 Low Income Energy Efficiency program relies on the most up-to-date evaluation data in order to determine the program's effectiveness. Primarily, SCE relies upon the Impact Evaluation of the 2005 California Low Income Energy Efficiency Program Final Report as it contains the latest and best available information for the energy savings and demand reduction associated with low income measures. In the cases that SCE's program implemented measures that were not evaluated as part of the aforementioned study; the program utilized impacts from the Impact Evaluation of the 2001 Statewide Low-Income Energy Efficiency program and internally developed SCE workpapers. Together, these sources stemming from vetted and approved EM&V studies developed a robust set of information in which SCE relied upon to report the energy savings and demand reduction associated with its Low Income programs.

SECTION 9
COMMITMENTS

Table 9

Table 9:
Commitments

	Commitments Made in the Past Year with Expected Implementation by December 2009			
	Committed Funds	Expected Energy Savings		
2009	$	GWH	MW	MMTh
SCE Total	$ -	-	-	-

	Commitments Made in the Past Year with Expected Implementation ***after*** December 2009			
	Committed Funds	Expected Energy Savings		
2009	$	GWH	MW	MMTh
SCE Total	$ 56,385,099	637	167	-

[1] Committed Funds represent incentive amounts only.
[2] Savings impacts are ex-ante and have not been adjusted.

Footnote 11

Description of the programs implemented during the past year that did not result in installed savings but reflect commitments entered into by the utilities that are expected to produce installed savings during the 2009 program cycle.

All of SCE's 2009 bridge funding programs that have remaining commitments scheduled to be installed beyond the 2009 bridge funding program period are listed in the response to the question below.

[11] The data shown in this annual report is based on SCE's modified ex-ante savings, adjusted for actual installations, and has not been verified through ex-post impact analysis by the CPUC.

Description of the programs implemented during the past year that did not result in installed savings but reflect commitments entered into by the utilities that are expected to produce installed savings after December 2009.

The following programs had commitments that will be installed in 2010 and beyond:

Appliance Recycling Program	San Gabriel Valley Energy Efficiency Partnership
Residential Energy Efficiency Incentive Program	UC-CSU-PG&E-SCE-SCG-SDG&E Partnership Program
Multifamily Energy Efficiency Program	California Community Colleges-IOU Partnership
Home Energy Efficiency Surveys	City of South Gate Partnership
Integrated School-Based Program	VIEW Partnership Program
CA New Homes Program	Desert Cities Partnership
Business Incentives & Services	Beaumont Partnership
Savings By Design	City of Redlands Partnership
Industrial Energy Efficiency Program	SCE-SCG County of Los Angeles Partnership
Agricultural Energy Efficiency Program	County of Riverside Partnership
New Energy Star Manufactured Housing	State of California Partnership
Nonresidential Direct Installation	Palm Desert Partnership
	Community Energy Partnership Program

In 2009, the above mentioned programs secured commitments in the amount of over $56 million, almost 637 gigawatt-hours of energy savings, and over 167 megawatts in demand reduction.

Explanations of how commitments are calculated and reported in the above tables, i.e., are these commitments from incentives only.

In 2009, SCE actively enrolled customers into energy efficiency programs. These programs work with customers at various stages in their decision-making process in order to influence them to implement the energy-efficient choice. When a customer has firmly committed to the program, an incentive payment is reserved on their behalf to be paid when the customer implements the energy-efficient activity. It is only when that firm commitment is received (in the form of a contract, reservation, etc.), that it is counted as a program commitment and is reported to the Commission. The tables above reflect the summation of energy savings and demand reduction that is committed to be installed by SCE customers.

Appendix A

Appendix A contains the list of programs included in SCE's 2009 Energy Efficiency Portfolio, and the date the programs were added or removed where applicable.

Southern California Edison Programs for 2009

CPUC ID	Program Name	Date Added (new programs)	Date Removed
SCE2500	Appliance Recycling Program (IOU Program)	N/A	N/A
SCE2501	Residential Energy Efficiency Incentive Program (IOU Program)	N/A	N/A
SCE2502	Multifamily Energy Efficiency Program (IOU Program)	N/A	N/A
SCE2503	Home Energy Efficiency Survey (IOU Program)	N/A	N/A
SCE2504	Integrated School-Based Program (IOU Program)	N/A	N/A
SCE2505	CA New Homes Program (IOU Program)	N/A	N/A
SCE2507	Comprehensive Packaged Air Conditioning Systems Program (IOU Program)	N/A	N/A
SCE2508	Retro-Commissioning (IOU Program)	N/A	N/A
SCE2509	Industrial Energy Efficiency Program (IOU Program)	N/A	N/A
SCE2510	Agricultural Energy Efficiency Program (IOU Program)	N/A	N/A
SCE2511	Nonresidential Direct Installation (IOU Program)	N/A	N/A
SCE2512	Savings By Design (IOU Program)	N/A	N/A
SCE2513	Education, Training, and Outreach (IOU Program)	N/A	N/A

CPUC ID	Program Name	Date Added (new programs)	Date Removed
SCE2514	Sustainable Communities (IOU Program)	N/A	N/A
SCE2515	Statewide Emerging Technologies (IOU Program)	N/A	N/A
SCE2516	Statewide Codes & Standards Program (IOU Program)	N/A	N/A
SCE2517	Business Incentives & Services (IOU Program)	N/A	N/A
SCE2518	Local Government Energy Action Resources (Partnership Program)	N/A	N/A
SCE2519	Ventura County Partnership (Partnership Program)	N/A	N/A
SCE2520	South Bay Partnership (Partnership Program)	N/A	N/A
SCE2521	Bakersfield and Kern County Partnership (Partnership Program)	N/A	N/A
SCE2522	Santa Barbara Partnership (Partnership Program)	N/A	N/A
SCE2523	Community Energy Partnership - Non-Resource (Partnership Program)	N/A	N/A
SCE2524	Community Energy Partnership - Resource (Partnership Program)	N/A	N/A
SCE2525	San Gabriel Valley EE Partnership Program (Partnership Program)	N/A	N/A
SCE2526	California Community Colleges (Partnership Program)	N/A	N/A
SCE2527	California Department of Corrections and Rehabilitation (Partnership Program)	N/A	N/A
SCE2528	SCE-SCG County of Los Angeles Partnership (Partnership Program)	N/A	N/A
SCE2529	County of Riverside Partnership (Partnership Program)	N/A	N/A
SCE2530	UC-CSU-PG&E-SCE-SCG-SDG&E Partnership (Partnership Program)	N/A	N/A

CPUC ID	Program Name	Date Added (new programs)	Date Removed
SCE2531	Future IDEEA Solicitations (Competitively Solicited Program)	N/A	N/A
SCE2532	Coin Operated Laundry Program (Competitively Solicited Program)	N/A	N/A
SCE2533	Energy Efficient Program Made Efficient (Competitively Solicited Program)	N/A	12/7/2006
SCE2534	Demand Response Emerging Tech (Competitively Solicited Program)	N/A	N/A
SCE2535	80 Plus (Competitively Solicited Program)	N/A	2/1/2008
SCE2536	EE/DR Flex Program (Competitively Solicited Program)	N/A	N/A
SCE2537	MAP Energy Efficiency Program (Competitively Solicited Program)	N/A	N/A
SCE2538	Lighting Energy Efficiency with Demand Response (Competitively Solicited Program)	N/A	N/A
SCE2539	Cool Change Program (Competitively Solicited Program)	N/A	11/27/2006
SCE2540	One-2-Five Energy Program (Competitively Solicited Program)	N/A	4/30/2008
SCE2541	Convenience Store and Service Stations EE (Competitively Solicited Program)	N/A	12/31/2006
SCE2542	Affordable Housing EE Alliance (Competitively Solicited Program)	N/A	N/A
SCE2543	Designed for Comfort - Efficient Affordable Housing (Competitively Solicited Program)	N/A	N/A
SCE2544	CA Preschool Energy Efficiency Program (Competitively Solicited Program)	N/A	N/A
SCE2545	E-mail Based Energy Efficiency Program (Competitively Solicited Program)	N/A	N/A
SCE2546	Lights for Learning CFL Fundraiser (Competitively Solicited Program)	N/A	7/31/2007
SCE2547	Aggregation of Housing Agencies for Energy Retrofit and Management Projects (Competitively Solicited Program)	N/A	N/A

CPUC ID	Program Name	Date Added (new programs)	Date Removed
SCE2548	Southern California Home Performance Program (Competitively Solicited Program)	N/A	N/A
SCE2549	Future InDEE Solicitations (Competitively Solicited Program)	N/A	N/A
SCE2550	Innovative Pool Pump Technology Delivers Radical Efficiency Gains (Competitivey Solicited Program)	N/A	N/A
SCE2551	Low Pressure R.O. (Competitively Solicited Program)	N/A	3/11/2007
SCE2552	NightBreeze EE Program (Competitively Solicited Program)	N/A	N/A
SCE2553	BEST Wireless HVAC Maintenance System (Competitively Solicited Program)	N/A	3/9/2006
SCE2554	Statewide Marketing & Outreach - Flex Your Power (Statewide Marketing & Outreach Program)	N/A	N/A
SCE2555	Statewide Marketing & Outreach - UTEEM (Statewide Marketing & Outreach Program)	N/A	N/A
SCE2556	Statewide Marketing & Outreach - Flex Your Power Rural Program (Statewide Marketing & Outreach Program)	N/A	N/A
SCE2557	Transforming the Market for New Energy Star Manufactured (Mobile) Homes (Competitively Solicited Program)	1/1/2007	N/A
SCE2558	Modernization and New Construction Efficiency Enhancement Program for Schools (Competitively Solicited Program)	1/1/2007	N/A
SCE2559	The Lighting Energy Efficiency PAR 38/30 CFL (LEEP 38/30 CFL) Program (Competitively Solicited Program)	1/1/2007	N/A
SCE2560	Hospital Facility Energy Efficiency Program (Competitively Solicited Program)	1/1/2007	N/A
SCE2561	Energy Efficiency Program for Entertainment Centers (Competitively Solicited Program)	1/1/2007	N/A
SCE2562	Campus Housing Energy Efficiency Program (Competitively Solicited Program)	1/1/2007	N/A

CPUC ID	Program Name	Date Added (new programs)	Date Removed
SCE2563	Plugging the Consumer Electronics Gap - A Cross-Cutting Plug Load Reduction Program (Competitively Solicited Program)	1/1/2007	N/A
SCE2564	Grocery Area Energy Network (Competitively Solicited Program)	1/1/2007	N/A
SCE2565	Escalator PowerGenius™ Program (Competitively Solicited Program)	1/1/2007	6/30/2008
SCE2566	Mammoth Lakes Partnership (Partnership Program)	6/12/2006	N/A
SCE2567	Ridgecrest Partnership (Partnership Program)	7/26/2006	N/A
SCE2568	State of California IOU Partnership (Partnership Program)	8/25/2006	N/A
SCE2569	Palm Desert Partnership (Partnership Program)	12/16/2006	N/A
SCE2570	Federal Direct Install Initiative (Partnership Program)	10/31/2007	N/A
SCE2571	Santa Ana Partnership (Partnership Program)	11/15/2007	N/A
SCE2572	Data Center EE Program (Competitively Solicited Program)	5/17/2008	N/A
SCE2573	San Bernardino County Partnership (Partnership Program)	10/30/2008	N/A
N/A - not applicable.			

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Appendix B Part 1

Part 1

Appendix B – Part 1 contains SCE's final December Monthly report for 2009.

For access, please visit the California Public Utilities Commission Energy Efficiency Groupware Application at http://eega2006.cpuc.ca.gov.

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Appendix B Part 2

Part 2

Appendix B – Part 2 contains SCE's final 4th Quarter Report for 2009.

For access, please visit the California Public Utilities Commission Energy Efficiency Groupware Application at http://eega2006.cpuc.ca.gov.

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CERTIFICATE OF SERVICE

I hereby certify that, pursuant to the Commission's Rules of Practice and Procedure, I have this day served a true copy of SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) 2010 ANNUAL REPORT FOR 2009 ENERGY EFFICIENCY PROGRAMS on all parties identified on the attached service list(s). Service was effected by one or more means indicated below:

Transmitting the copies via e-mail to all parties who have provided an e-mail address. First class mail will be used if electronic service cannot be effectuated.

Executed this **30th day of June, 2010**, at Rosemead, California.

/s/ ALEJANDRA ARZOLA
Alejandra Arzola
Project Analyst
SOUTHERN CALIFORNIA EDISON COMPANY

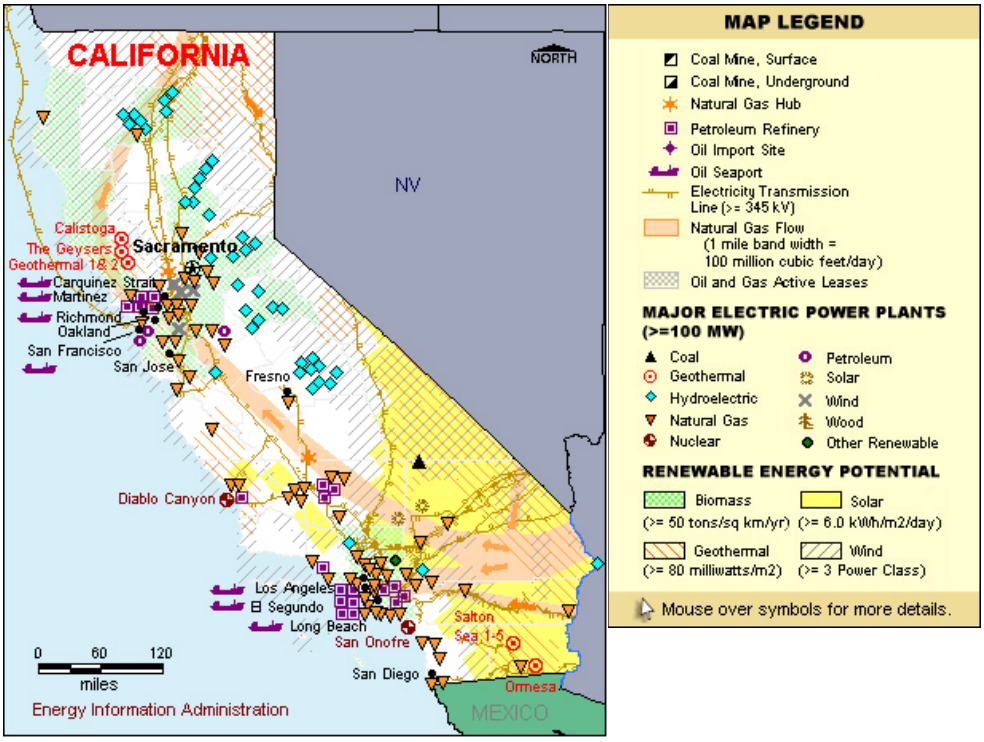
2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770

cc: Assigned Commissioner Grueneich (hard copy)
Administrative Law Judge Pulsifer (hard copy)
Administrative Law Judge Gamson (hard copy)
Administrative Law Judge Ferrar (hard copy)
Julie Fitch, Director Energy Division CPUC (hard copy)
Service lists: R.06-04-010
R.09-11-014
R.09-09-019

CALIFORNIA

Map of California

SEE MAP OF THE SAN FRANCISCO BAY AREA
SEE MAP OF THE LOS ANGELES AREA



Last updated in November 2009.

California Quick Facts

- California ranks third in the Nation in refining capacity and its refineries are among the most sophisticated in the world.
- California's per capita energy consumption is low, in part due to mild weather that reduces energy demand for heating and cooling.
- California leads the Nation in electricity generation from nonhydroelectric renewable energy sources, including geothermal power, wind power, fuel wood, landfill gas, and solar power. California is also a leading generator of hydroelectric power.
- California imports more electricity from other States than any other State.
- In 2000 and 2001, California suffered an energy crisis characterized by electricity price instability and four major blackouts affecting millions of customers.
- Two solar power plants are proposed for central California, covering 12.5 square miles and generating as much as 800 megawatts of power.

Last updated in October 2009.

Print this state
(includes overview, data, & analysis)

Updates

as of September 22, 2011

New statistics for June 2011:

- Price of coal delivered to the electric power sector
- Prices of electricity sold to the residential, commercial, and industrial sectors
- Total net electricity generation and net electricity generation by fuel
- Fuel stocks at electric power producers
- Consumption for electricity generation by fuel

View all updates »

Notes & Sources

Maps
Quick Facts & Analysis
Data

Related Information

California State Energy Data System ›
California Electricity Profile ›
California Nuclear Profile ›
California Renewable Electricity Profile ›

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Washington, DC 20585