

## **2.0 PROJECT PURPOSE AND NEED**

The following information supplements the discussion of the need for new and expanded transmission and generation facilities, as presented in the Sunrise DEIR/DEIS and FEIS.

### **2.1 Introduction to the Project Purpose and Need**

Although the two projects are closely related, the TE/VS Interconnect project (CPUC 07-10-005) and the LEAPS project (FERC 11858-002/ER06-278-005) constitute separate and distinguishable energy projects. The TE/VS Interconnect project can be authorized, designed, constructed, and operated with substantial benefits to California's ratepayers, regardless of whether the LEAPS project is built. Nevertheless, making the LEAPS project's pumped-storage capabilities accessible to both the SDG&E and SCE systems is an important benefit of the TE/VS Interconnect project.

Because the Applicant is concurrently seeking authorization to construct and operate both generation interconnection facilities<sup>1</sup> and network upgrades,<sup>2</sup> separate special use permit (SUP) applications (Standard Form 299) were filed<sup>3</sup> with the USFS on June 24, 2003 (for the TE/VS Interconnect project) and on July 12, 2005 (for the LEAPS project) and subsequently accepted for processing by the USFS.<sup>4</sup> Although they are separate projects, CEQA mandates that the cumulative impacts resulting from the approval, construction, operation, and maintenance of both projects be reasonably examined as collectively constituting the "whole of the action" (14 CCR 15378).<sup>5</sup> Accordingly, both projects are described in this PEA and the direct, indirect, and cumulative impacts associated with their individual and combined (integrated) development addressed as part of this PEA.

### **2.2 Needs Determination**

As specified in Section 25300 of the Public Resources Code: "(a) The Legislature finds and declares that clean and reliable energy is essential to the health of the California economy and of vital importance to the health and welfare of the citizens of the state and to the environment.

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<sup>1/</sup> "Interconnection facilities shall mean the transmission provider's interconnection facilities and the interconnection customer's interconnection facilities. Collectively, interconnection facilities include all facilities and equipment between the generating facility and the point of interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the generating facility to the transmission provider's transmission system. Interconnection facilities are sole use facilities and shall not include distribution upgrades stand along network upgrades or network upgrades" (Federal Energy Regulatory Commission, Standardization of Generator Interconnection Agreements and Procedures [18 CFR Part 35], Final Rule, Docket Nos. RM02-1-000, Order No. 2003, July 24, 2003, p. 224)

<sup>2/</sup> "Network upgrades shall mean the additions, modifications, and upgrades to the transmission provider's transmission system required at or beyond the point at which the interconnect customer interconnects to the transmission provider's transmission system to accommodate the interconnection of the large generating facility to the transmission provider's transmission system" (Federal Energy Regulatory Commission, Standardization of Generator Interconnection Agreements and Procedures [18 CFR Part 35], Final Rule, Docket Nos. RM02-1-000, Order No. 2003, July 24, 2003, p. 226).

<sup>3/</sup> In accordance with USFS policies and procedures, applications must be filed in the name of a single applicant. As a result, the two SUP applications were filed in the name of the Elsinore Valley Municipal Water District (EVMWD) but expressly identified The Nevada Hydro Company, Inc. as joint applicants.

<sup>4/</sup> At a meeting conducted on July 22, 2003, the USFS indicated that the Applicant's SUP application (dated June 24, 2003) for the TE/VS Interconnect project had been accepted for further processing.

<sup>5/</sup> As authorized under the State CEQA Guidelines: "Where one project is one of several similar projects of a public agency, but is not deemed to be part of a larger undertaking or a larger project, the agency may prepare one EIR for all projects, or one for each project, but shall in either case comment upon the cumulative effect" (15 CCR 15165).

(b) The Legislature further finds and declares that government has an essential role to ensure that a reliable supply of energy is provided consistent with protection of public health and safety, promotion of the general welfare, maintenance of a sound economy, conservation of resources, and preservation of environmental quality.”

As documented by FERC and the CPUC, the projects responds to identifiable regional need. FERC’s independent “need determination,”<sup>6</sup> as contained in the “Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191F”<sup>7</sup> (FEIS), is incorporated herein by reference. In addition, the CPUC/BLM’s independent need’s assessment, as presented in the “Draft Environmental Impact Report/Environmental Impact Statement and Proposed Land Use Amendment – San Diego Gas & Electric Company Application for the Sunrise Powerlink Project, SCH No. 2006091071, DOI Control No. DES-07-58”<sup>8</sup> (Sunrise DEIR/DEIS), is incorporated herein by reference. The following additional information is provided to supplement the material presented in the Sunrise DEIR/DEIS and FEIS.

### **2.2.1 Electric Transmission Need<sup>9</sup>**

As reported by FERC, between June 2001 and December 2005, the CAISO “has experienced 12 system emergencies where load had to be interrupted and customers were without electricity. On August 25, 2005, for example, the loss of a major western transmission line caused a power outage in southern California. The more recent system emergency occurred on September 12 at 12:32 p.m. when the Los Angeles area experienced a power outage that affected approximately 2,000,000 people (2,200 MW) because of a maintenance error at a substation that is a major source of power to the city.”<sup>10</sup>

As indicated by the CEC: “The fundamental function of new transmission lines is to provide additional electricity to areas of demand or load. Other benefits provided by additions to the transmission system include: [1] Improving system reliability by providing redundant pathways that could serve load if one pathway were out of service. [2] Reducing transmission congestion and improved the transmission efficiency in areas where existing lines have inadequate capacity to carry electricity. [3] Reducing the cost of electricity by avoiding congestion penalty fees, allowing additional sources of power generation to reach an area of load, and/or reducing the need for mandatory power generation at ‘must-run’ facilities.”<sup>11</sup>

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<sup>6</sup>/ Federal Energy Regulatory Commission, Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191F, January 2007, Appendix B.

<sup>7</sup>/ Federal Energy Regulatory Commission, Final Environmental Impact Statement for Hydropower License – Lake Elsinore Advanced Pumped Storage Project, FERC Project No. 11858, FERC/EIS-0191F, January 2007.

<sup>8</sup>/ California Public Utilities Commission and United States Department of the Interior, Bureau of Land Management, Draft Environmental Impact Report/Environmental Impact Statement and Proposed Land Use Amendment – San Diego Gas & Electric Company Application for the Sunrise Powerlink Project, SCH No. 2006091071, DOI Control No. DES-07-58, January 2008.

<sup>9</sup>/ Reference to “transmission system,” “transmission lines,” and/or “transmission facilities” herein is also inclusive of those transmission and distribution lines, towers, substation, switchyards, and other appurtenant facilities associated, from an electrical engineering and/or operational perspective, therewith.

<sup>10</sup>/ Federal Energy Regulatory Commission, Report Submitted to the United States Congress – The Commission’s Response to the California Electricity Crisis and Timeline for Distribution of Refunds, December 27, 2005, p. 3.

<sup>11</sup>/ *Op. Cit.*, Comparative Study of Transmission Alternatives – Background Report, Consultant Report, p. 2.

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As further indicated in EAP II: “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.”<sup>12</sup> As indicated by the CEC, “besides improving the reliability of delivering electricity, transmission lines allow utility systems to be interconnected and share generating resources.”<sup>13</sup> As further indicated by the CEC: “In addition to these reliability risks, due to lack of transmission investments, California continues to experience substantial system congestion and high costs. Without significant transmission upgrades and expansions, congestion costs are likely to further increase in the coming years.”<sup>14</sup>

“Transmission also serves to lower wholesale prices for electricity. Even if in-State capacity is sufficient to meet the needs of Californians, imported power is often less expensive, allowing the State to avoid using older, less efficient plants to meet demand. . .In transmission-constrained areas, a large share of local generation resources must be relied upon during peak hours to meet load due to an inability to import additional power. Failure of these units, absent the ability to import additional power, is more likely to lead to reliability criteria violations, and necessitate the involuntary curtailment of load. Transmission congestion imposes costs even in areas where there is sufficient local generation, as it prevents the import of cheaper power. In areas where local generation is relied upon to a great extent, transmission constraints can result in an additional cost: that of mitigating market power. Where generators can set prices due to a lack of competition, price spikes can only be avoided using cost-based price caps or Reliability-Must-Run (RMR) contracts. These contracts obligate the generator to provide power at a cost-based price in exchange for an annual payment determined by its fixed capital costs.”<sup>15,16</sup>

FERC acknowledges that “[i]nterconnection plays a crucial role in bringing much-needed generation into the market to meet the growing needs of electricity customers.”<sup>17</sup> FERC distinguishes between “interconnection facilities” and “network upgrades.”<sup>18</sup> Interconnection facilities are those facilities situated between the interconnection customer's generating facility and the transmission provider's transmission system. Network upgrades include only those

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<sup>12/</sup> California Energy Commission and California Public Utilities Commission, Energy Action Plan II – Implementation Roadmap for Energy Policies, September 21, 2005, p. 7.

<sup>13/</sup> California Energy Commission, Environmental Performance Report of California's Electric Generation Facilities, P700-01-001, July 2001, p. 3.

<sup>14/</sup> California Energy Commission, Strategic Transmission Investment Plan, CEC 100-2005-006CTF, November 2005, p. 15.

<sup>15/</sup> *Op. Cit.*, Electricity Infrastructure Assessment, Prepared in Support of the Electricity and Natural Gas Report under the Integrated Energy Policy Report Proceedings, p. 28.

<sup>16/</sup> As indicated by the CEC: “In many cases, certain generation-related components, in whole or in part, complement transmission-related components. Generation-related components benefit the transmission grid in several ways, including: providing voltage support, reducing heavy power flows on certain transmission lines, and minimizing the oscillatory nature of the electric system. In these situations, generation and transmission facilities are interdependent in maintaining grid reliability. A generating unit, whose absence could have a detrimental impact on reliability in a discrete local area under specified operating conditions, is categorized as a RMR generating unit” (Source: California Energy Commission [Aspen Environmental Group], Comparative Study of Transmission Alternatives: Background Report, 700-04-006, June 2004, p. 17).

<sup>17/</sup> Federal Energy Regulatory Commission, Standardization of Generator Interconnection Agreements and Procedures, Docket No. RM02-1-000; Order No. 2003, July 24, 2003, p. 4.

<sup>18/</sup> In comparison, the CPUC notes the “transmission needed to connect a generating plant to the electrical load is generally considered to have three components: The transmission line from the generating plant to the point of connection to the utility grid, called the ‘direct assignment facility’ or gentie”; Facilities within the grid to maintain reliability with the added burden of the new generation, called the ‘reliability upgrade’; [3] New facilities within the grid to transmit the new generation from the point of interconnection to the grid to the load center, called the ‘delivery upgrade.’” (Source: California Public Utilities Commission, Report to the Legislature, SB 1038/Public Utilities Code Section 383.6: Electric Transmission Plan for Renewable Resources in California, December 1, 2003, p. 4).

facilities that are located at or beyond the point where the interconnection customer's generating facility interconnects to the transmission provider's transmission system.<sup>19,20</sup>

In August 2006, acting under the provisions of EAct 2005, the United States Department of Energy (DOE) issued the first "National Electric Transmission Congestion Study." The study identified two areas of critical congestion: southern California and the eastern coastal area from metropolitan New York south to northern Virginia.<sup>21</sup> The DOE noted "southern California needs new transmission capacity to reach generation sources outside the region for reliability, economics, and compliance with the State's renewable portfolio standards."<sup>22</sup>

As indicated by the CPUC: "The largest source of renewable generation lies in the SCE service territory, and is far beyond what SCE will need to meet its RPS [renewable portfolio standards] goals. Consequently, much of this power is likely to be wheeled to load in other service territories. Defining the transmission needed to accomplish this will require the investigation of a number of alternatives."<sup>23</sup> "In adopting SB1078 in 2002, the Legislature made it clear that the CPUC should facilitate the construction of new transmission facilities necessary to accommodate the development of renewable resources in the State. In particular, Public Utilities Code Section 399.25, adopted as part of SB1078, directs the CPUC to approve certificates authorizing the construction of transmission facilities that facilitate the achievement of the renewable power goals established by that law, and further directs the CPUC to support actions that are necessary to assure that the costs of such transmission facilities are included in retail electricity rates."<sup>24</sup>

"The RPS program envisions the creation of a great deal of new renewable generating capacity in the State, but this raises the problem of how to connect all the new facilities to the grid. Furthermore, once a facility is connected, congestion of the transmission system means one cannot always reliably and cheaply move electricity from one region to another. State energy policy makers recognize that California has under-invested in transmission, presenting a 'significant barrier to accessing renewable energy resources.'"<sup>[25]</sup>

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<sup>19/</sup> *Op. Cit.*, Standardization of Generator Interconnection Agreements and Procedures, Docket No. RM02-1-000; Order No. 2003, p. 7.

<sup>20/</sup> On July 23, 2003, FERC adopted a final rule (Standardization of Generator Interconnection Agreements and Procedures [18 CFR Part 35]) establishing standard procedures and a standard agreement for the interconnection of generators larger than 20 MW. The rule requires public utilities that offer transmission services to offer non-discriminatory, standardized interconnection services. Under those standards, the generator pays for facilities on its side of the point of interconnection. The cost of upgrades to the transmission provider's transmission system to accommodate the new generator is initially funded by the generator. The transmission provider then refunds the amounts paid by the generator during the five years following commercial operation of the generator (Docket Nos. RM02-1-000, Order No. 2003).

<sup>21/</sup> United States Department of Energy, National Electric Transmission Congestion Study, August 2006, pp. viii and 39.

<sup>22/</sup> *Ibid.*, p. 45.

<sup>23/</sup> California Public Utilities Commission, Report to the Legislature, SB 1038/Public Utilities Code Section 383.6: Electric Transmission Plan for Renewable Resources in California, December 1, 2003, p. 5

<sup>24/</sup> *Ibid.*, p. 10.

<sup>25/</sup> The source citation is from the "Integrated Energy Policy Report, 2004 Updated, 100-04-006CM" (California Energy Commission, November 2004). As indicated therein: "California's systematic under-investment in transmission has left the State's transmission lines congested, increasing the cost of electricity to consumers and reducing reliability. In addition, inadequate transmission presents a significant barrier to accessing renewable energy resources critical to diversifying fuel sources, which increases California's dependence on natural gas, and slows progress in meeting California's energy goals. The State must significantly alter its approach to transmission planning, not only to keep the lights on and hold down energy costs, but also to advance critical State energy, environmental, and economic policy goals" (p. xiii).

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According to the CEC, the southern California region has the greatest potential for development of new renewable energy, particularly wind energy in the Tehachapi area (Kern County) and geothermal energy and other potential renewable resources in the Salton Sea area (Imperial County). This same region is, however, also seriously lacking in transmission infrastructure.<sup>26</sup> Congestion occurs when there is not enough transmission capacity to meet demand in a particular area, not enough generation to meet load within a particular constrained area, and when more generation competes to sell than transmission lines can handle. Congestion varies over time and location as a function of system conditions.<sup>27</sup>

Transmission congestion occurs when actual or scheduled flows of electricity across a line or piece of equipment are restricted below desired levels, either by the physical or electrical capacity of the line or by operational restrictions created and enforced to protect the security and reliability of the grid.<sup>28</sup> As shown in Figure 2-1 (California Extra High-Voltage Transmission Map 500-KV/230-kV Map with Congestion Points), only a single 500-kV transmission line presently serves the San Diego area. As illustrated, substantial transmission congestion exists along a number of transmission routes that connect San Diego to the rest of the CAISO-controlled grid. The southern California area has been designated by the DOE as a “critical congestion area.”<sup>29</sup>

FERC notes there is a “critical need for new transmission infrastructure in this Nation.”<sup>30</sup> Areas of critical congestion areas and electrical blackout potential attributable to transmission congestion, as identified by DOE, are illustrated in Figure 2-2 (Critical Congestion Areas Identified by the United States Department of Energy) and Figure 2-3 (Areas of Blackout Risk).<sup>31</sup> As indicated by the DOE, “whenever there is persistent congestion, buyers must rely on power from less-preferred generating sources, a smaller range of generators is able to serve load, and grid operators have fewer options for dealing with adverse circumstances or unanticipated events, all of which adversely affect consumers. Therefore, the Department [of Energy] finds under FPA Section 216(a)(2) that there are ‘constraints or congestion that adversely affects consumers’ in the Southern California Critical Congestion Area. . .In recent years, southern California’s electricity supply capability, combined with what supplies can be imported from external sources, has been barely enough to meet peak electricity demand.”<sup>32</sup>

The two “most problematic areas of the State” are the San Francisco Bay and San Diego areas.<sup>33</sup> “San Diego and San Francisco [SF] Peninsula were both impacted by serious reliability problems during parts of 2000 and 2001. Both areas are characterized by limited generation within their electrical boundaries and limited transmission capacity to access resources outside

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<sup>26/</sup> Pollak, Daniel, Tradable Renewable Energy Credits and the California Renewable Portfolio Standard, CRB 05-002, California Research Board, June 2005, p. 19.

<sup>27/</sup> Federal Energy Regulatory Commission, Electric Transmission Constraint Study, Division of Market Development, December 19, 2001, p. 5.

<sup>28/</sup> United States Department of Energy, National Electric Transmission Congestion Study, August 2006, p. 3.

<sup>29/</sup> *Ibid.*, p. viii.

<sup>30/</sup> Federal Energy Regulatory Commission, Preventing Undue Discrimination and Preference in Transmission Service, Docket Nos. RM05-17-000 and RM05-25-000, Order No. 890, February 16, 2007, p. 41.

<sup>31/</sup> Meyer, David, Draft Southwest Area National Interest Electric Transmission Corridor, United States Department of Energy, Office of Electricity Delivery and Energy Reliability, May 2007 ([http://www.energetics.com/NIETCpublicmeetings/pdfs/Public\\_Meetings\\_western05-17-07.pdf](http://www.energetics.com/NIETCpublicmeetings/pdfs/Public_Meetings_western05-17-07.pdf)).

<sup>32/</sup> United States Department of Energy, Notice of Opportunity for Written and Oral Comment, Docket Nos. 2007-OE-01 (Draft Mid-Atlantic Area national Corridor) and 2007-OE-02 (Draft Southwest Area National Corridor), April 2007, p. 162.

<sup>33/</sup> California Energy Commission, Integrated Energy Policy Report, CEC-100-2005-007CMF, November 12, 2005, p. 45.

of those boundaries. This combination of conditions has resulted in limited competition, providing local generators the potential to influence both reliability and electricity prices during heavy summer peak load conditions. To provide local voltage support for reliability purposes, as well as mitigate market power problems, much of the generation in both areas has been designated by the CAISO as RMR. This means the CAISO has required certain generators in San Diego and on the SF Peninsula to enter 'must run' contracts that obligate them to operate at specified prices during periods designated by the CAISO."<sup>34</sup>

The State's 2005 "Integrated Energy Policy Report" states "California's electric transmission system is rapidly becoming a costly energy bottleneck for consumers. Transmission-related reliability and congestion costs were more than \$1 billion in 2004, up from \$627 million in 2003. Transmission lines are frequently running to their capacity limits, forcing system operators to back down less costly generation to keep from overloading the system. In addition, transmission line outages caused rolling blackouts of roughly one-half million customers in southern California in August 2005. Local reliability is another casualty of the State's inadequate electric transmission system. Of special concern are the greater San Francisco Bay area and San Diego regions, along with growing apprehension over transmission capacity into the Los Angeles Basin. Without a modernized transmission grid, California's dependency upon aging, less efficient gas-fired plants to support local reliability and contribute to reserve margins will continue indefinitely."<sup>35</sup>

An noted by the CEC: "Within San Diego, significant load growth has been occurring in the hotter, inland areas contributing to increases in the area's summer peak demand because of growing air conditioning loads. San Diego is highly dependent on imported power via transmission lines to meet its peak demand. If the major transmission line that connects San Diego to the southwest were to be unavailable during the summer peak demand season, all generation in the San Diego area would have to be operational to meet demand. Like the power plants in the San Francisco Bay area, most of the large facilities in the San Diego area are more than 30 years old. A combination of additional transmission capacity, and as [sic] new power plants in the San Diego area is needed to ensure reliable electricity service during the summer."<sup>36</sup>

In response to the summer 2006 demand, the CPUC noted that "the peak demand during the heat wave was 51,000 MW, well above any of the scenarios it had assumed in its assessment. As the CAISO notes, that was over 12% higher than last year's record, 6% higher than the worst case scenario the CAISO analyzed in its assessment, and 38% higher than the peak demand of the crisis year 2001; it represents the demand forecasted not to appear until five years from now. . .the demand forecasts used to plan for resource needs in California may not have fully incorporated the impacts of recent population growth in the warmer inland areas of California."

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As noted by SDG&E: "The San Diego region has only two points of interconnection to the interstate electric transmission grid: 1 500 kV line at SDG&E's Miguel substation that delivers

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<sup>34/</sup> *Op. Cit.*, Electricity Infrastructure Assessment, Prepared in Support of the Electricity and Natural Gas Report under the Integrated Energy Policy Report Proceedings, p. 30.

<sup>35/</sup> *Op. Cit.*, Integrated Energy Policy Report, p. 45.

<sup>36/</sup> California Energy Commission, California Energy Outlook - Electricity and Natural Gas Trends Report, Staff Draft, 200-01-002, 2002-2012 Electricity Outlook Report, Docket No.01-EOR-1, September 2001, pp. 42-44.

<sup>37/</sup> California Public Utilities Commission, Order Instituting Rulemaking to Consider Refinements to and Further Development of the Commission's Resource Adequacy Requirements Program, Rulemaking 06-02-013, Commissioner Michael R. Peevey, filed February 16, 2006, p. 4.

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power from the east, and a series of 230 kV lines connecting at the San Onofre Nuclear Generating Station switchyard to the north. Taken together, these two paths are capable of serving only a portion of the peak-load requirements of the SDG&E load reliability area. Neither of these paths is capable of serving the full peak-load requirements of the SDG&E local reliability area if the other is out of service. In fact, these two paths are barely sufficient to serve the average load of the region.”<sup>38</sup>

As noted by FERC’s Chairman: “Southern California faces another summer of tight supply in an area of fast growing demand. The region depends heavily on imports from northern California, the Pacific Northwest and the Southwest, particularly at peak. Under high load scenarios, southern California needs to import 10,000 megawatts, fully a third of its load. Since last year, transmission upgrades may have helped import capability somewhat, but net generation growth barely covered load growth.”<sup>39</sup>

SDG&E’s peak load demands between 1995 and 2006 is presented in Table 2-1 (San Diego Gas & Electric Company – Historic Peak Load Demands [MW]).<sup>40</sup> During that 12-year period, peak-load demand increased by over 38 percent. From an electrical perspective, SDG&E’s has stated that “San Diego is at the end of an ‘electrical cul-de-sac’ that effectively limits the ability to import power into the area to serve San Diego electric loads. There are two major pathways over which power is imported into San Diego: Path 44 to the north and the Southwest Power Link (SWPL) to the east.”<sup>41</sup>

Table 2-1  
**SAN DIEGO GAS & ELECTRIC COMPANY- HISTORIC PEAK LOAD DEMAND (MW)**

	Year											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Peak Demand	3,260	3,305	3,681	3,960	3,606	3,485	3,225	3,541	3,902	4,065	4,058	4,502

Source: San Diego Gas & Electric Company

San Diego is the nation’s eight largest city and the nation’s sixth largest county with an economy producing in excess of \$70 billion of goods and services per year. Yet it depends on a single 500-kV line and a single set of 230-kV lines tied to the largest transmission network outside the San Diego area to obtain the electricity imports needed to support its economy. Among the large electric service areas in the State, only the San Diego region is so underserved. SDG&E’s most recent approved long-term resource plan identifies a need for a second 500-kV transmission interconnection to meet the grid reliability requirements of the CAISO in 2010.<sup>42</sup>

“The next major transmission line will be needed around 2010. Even with the addition of new generating plants coming on line in 2006 and 2008, San Diego does not have sufficient local

<sup>38/</sup> United States Department of Energy, Notice of Opportunity for Written and Oral Comment, Docket Nos. 2007-OE-01 (Draft Mid-Atlantic Area National Corridor) and 2007-OE-02 (Draft Southwest Area National Corridor), April 2007, p. 164.

<sup>39/</sup> Kelliher, Joseph T., Testimony of the Honorable Joseph T. Kelliher, Chairman, Federal Energy Regulatory Commission before the Committee of Government Reform Subcommittee on Energy and Resources, United States House of Representatives, July 12, 2006, p. 3.

<sup>40/</sup> San Diego Gas & Electric, Chapter VII – Supplemental Testimony, A.06-08-010, January 26, 2007, p. 6.

<sup>41/</sup> San Diego Gas & Electric Company, Application for Certification – South Bay Replacement Project, Docket #06-AFC-03, filed June 30, 2006, p. 9-5.

<sup>42/</sup> San Diego Gas & Electric Company, In the Matter of the Application of San Diego Gas & Electric Company for a Certificate of Public Convenience and Necessity for the Sunrise Powerlink Transmission Project, Application 05-12-014, Amended Application of San Diego Gas & Electric Company (U 902-E), Vol. I, August 4, 2006.

generation to satisfy its peak load requirements. SDG&E must therefore look at another transmission line into the area. . .In 2010, SDG&E anticipates a deficiency of about 333 MW, assuming that the Encina power plant continues to operate. In 2014, the number will increase to 700 MW. San Diego load is growing at rate of more than 100 MW per year. If any of the power plants retire, peakers are likely to be needed, along with another baseload power plant.”<sup>43</sup>

SDG&E has historically relied on significant quantities of imported power to meet its remaining regional needs. “SDG&E’s transmission system has a simultaneous import capacity limitation of 2,850 MW. This limited import capability is a critical factor when analyzing and determining grid reliability, siting of future generation resources and/or expanding SDG&E’s transmission system to receive future imported electricity from both conventional and renewable resources.”<sup>44</sup>

As indicated by the CAISO: “The transmission line proposed in association with the Lake Elsinore Pumped Storage project would allow the San Diego area to import substantially more power from surrounding areas and would greatly enhance electric system reliability.”<sup>45</sup> As further indicated by the CEC: “The LEAPS transmission project would deliver pumped storage hydro power to the grid, reduce congestion and improve reliability in the San Diego area” and “the transmission component of LEAPS could strengthen the CAISO grid by providing a 500 kV interconnection between the SDG&E and SCE service territories.”<sup>46</sup>

The State’s existing 500-kV bulk transmission “backbone” runs from the Oregon border through the SCE service territory but does not connect with the San Diego area. San Diego’s system currently connects to the rest of California via 230-kV lines running north through the San Onofre Nuclear Generating Station (SONGS<sup>47</sup>) and 500-kV lines running east to Imperial Valley. The CEC confirms that new “northern 500 kV interconnection would improve the reliability of California’s transmission system and increase the State’s overall ability to import lower-cost power from Arizona, Mexico, and the Desert Southwest. In its April 2, 2004 Motion to Intervene at the FERC, the CAISO noted that ‘The transmission line proposed in association with the Lake Elsinore Pumped Storage Project would allow the San Diego area to import substantially more power from surrounding areas and would greatly enhance electric system reliability.’”<sup>48</sup>

As required under Section 25324 of the Public Resources Code, the CEC, in consultation with the CPUC, the CAISO, “transmission owners, users, and consumers, shall adopt a strategic plan for the State’s electric transmission grid using existing resources. The strategic plan shall identify and recommend actions required to implement investments needed to ensure reliability, relieve congestion, and meet future load growth in load and generation, including, but not limited to, renewable resources, energy efficiency, and other demand reduction measures.”

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<sup>43</sup>/ California Energy Commission, Addendum to Upgrading California’s Electric Transmission System: Issues and Actions for 2005 and Beyond, Staff Report Addendum, CEC 700-2005-018-AD, October 2005, p. 10.

<sup>44</sup>/ Anderson, Robert B., Direct Testimony of Robert B. Anderson, San Diego Gas & Electric Company, R.01-10-024, p. 2, included in County of Orange, Final Program Environmental Impact Report No. 589, The Ranch Plan, SCH No. 2003021141, certified November 8, 2004, Volume III, Appendix A, p. 77.

<sup>45</sup>/ California Independent System Operator, Motion to Intervene and Comments of the California Independent System Operator Corporation in Support of Lake Elsinore Advanced Pumped Storage Project, Docket No. P-11858-002, April 2, 2004, p. 3.

<sup>46</sup>/ *Op. Cit.*, Strategic Transmission Investment Plan, CEC 100-2005-006CTF, p. 68.

<sup>47</sup>/ SCE and SDG&E are currently interconnected at the SONGS switchyard. SCE owns the north half of the SONGS switchyard and the four 230-kV transmission lines to the SCE service area. These four SCE lines comprise what is known as Western Electricity Coordinating Council (WECC) Path 43 or the “north of SONGS path.” SDG&E owns the south half of the switchyard and the 230-kV lines to its service area. These five SDG&E lines comprise what is known as WECC Path 44 or the “south of SONGS path.”

<sup>48</sup>/ *Op. Cit.*, Strategic Transmission Investment Plan, CEC 100-2005-006CTF, p. 68.



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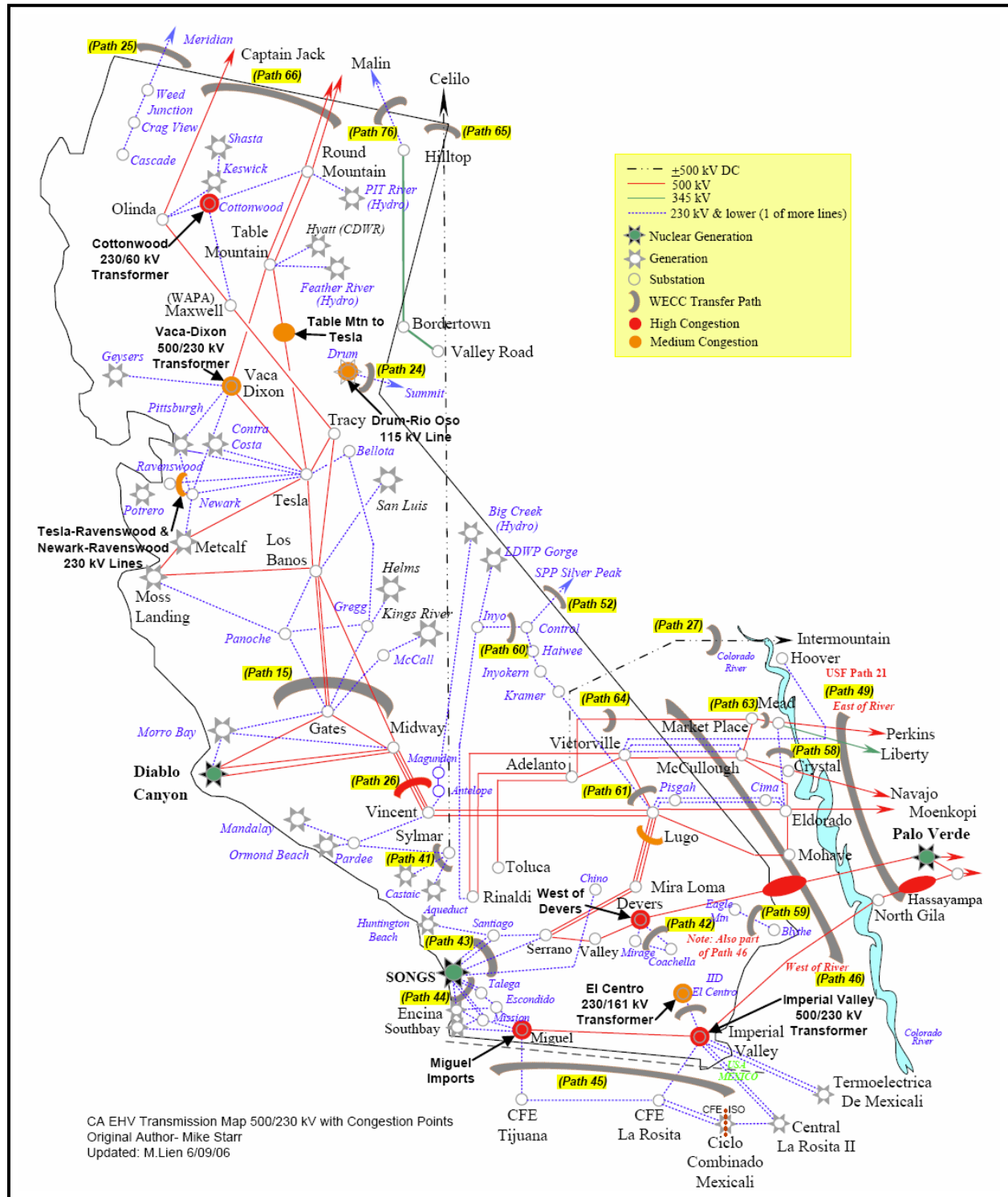


Figure 2-1  
**CALIFORNIA EXTRA HIGH-VOLTAGE TRANSMISSION MAP  
 500-KV/230-KV MAP WITH CONGESTION POINTS**  
 Source: California Independent System Operator

Talega-Escondido/Valley-Serrano 500-kV Interconnect Project  
 Lake Elsinore Advanced Pumped Storage Project

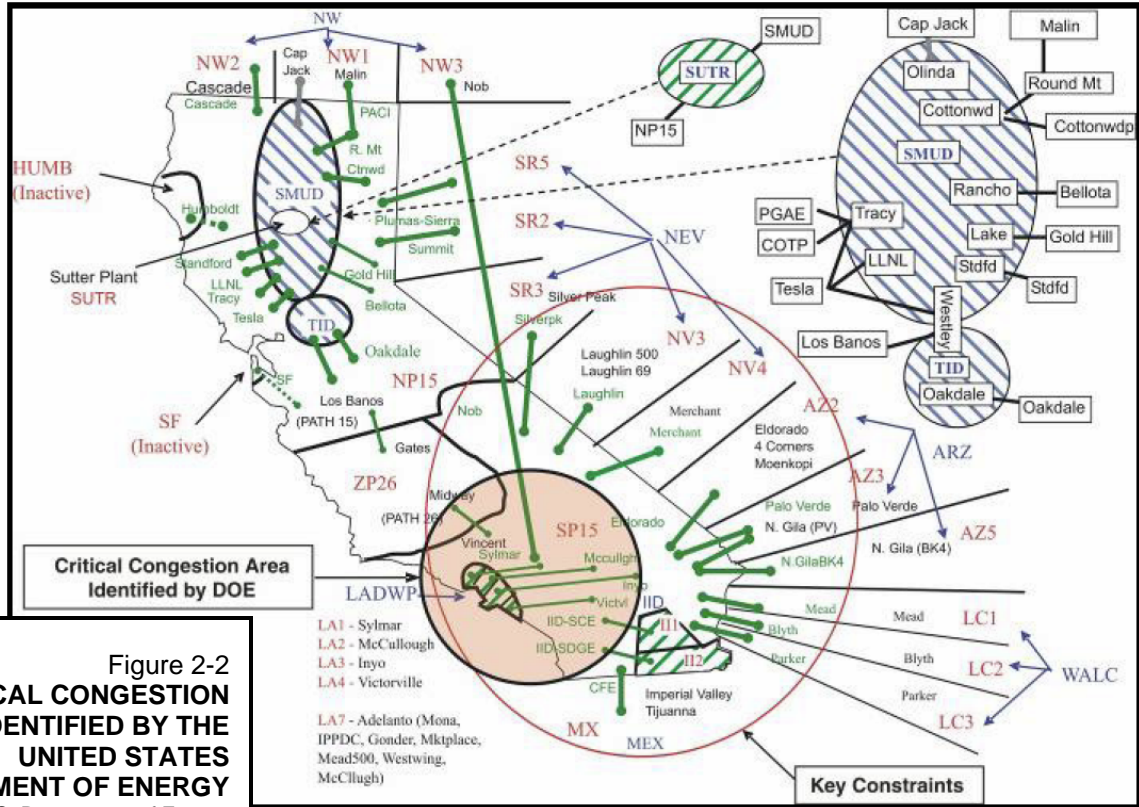
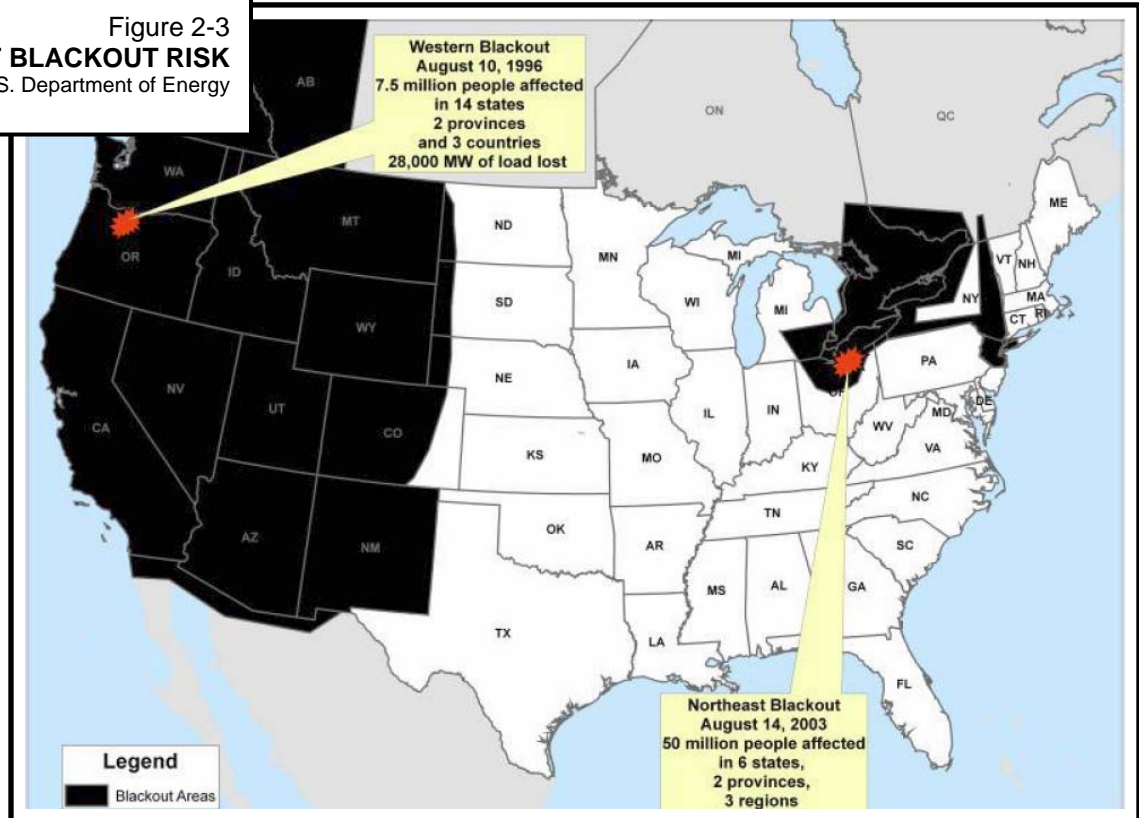


Figure 2-2  
**CRITICAL CONGESTION AREAS IDENTIFIED BY THE UNITED STATES DEPARTMENT OF ENERGY**  
 Source: U.S. Department of Energy

Figure 2-3  
**AREAS OF BLACKOUT RISK**  
 Source: U.S. Department of Energy



## Talega-Escondido/Valley-Serrano 500-kV Interconnect Project

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As indicated in the CEC's "2007 Strategic Transmission Investment Plan – Final Commission Report" (2007 Strategic Plan), the "2007 Strategic Plan recommends five new transmission projects," including the "Lake Elsinore Advanced Pumped Storage (LEAPS) Project."<sup>49</sup> As further indicated by the CEC: "Both the transmission and generation that comprise the LEAPS project could provide significant benefits to California. Generation and transmission should be treated separately and TNHC, CPUC, California ISO, SCE, and SDG&E should proceed expeditiously on permitting issues related to the transmission portion of the project."<sup>50</sup>

Section 1221(a) of EPCRA 2005 added Section 216 to the FPA. This section requires the Secretary of Energy to conduct a nationwide study of electric transmission congestion within one year (by August 8, 2006) and every three years thereafter. On August 6, 2007, the DOE release its "National Electric Transmission Congestion Study" (Congestion Study).<sup>51</sup> The DOE described three classes of congestion that merited further federal attention: critical congestion areas, congestion areas of concern, and conditional congestion areas. As described therein, critical congestion areas are regions where it is critically important to remedy existing or growing congestion problems. The DOE identified two such areas, each of which is "large, densely populated, and economically vital to the Nation."<sup>52</sup> Those areas included Southern California and the Atlantic coastal area from metropolitan New York southward through Northern Virginia.

On April 26, 2007, the DOE issued two draft National Interest Electric Transmission Corridor (NIETC) designations, including the Southwest Area National Corridor comprised of the Counties of Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, and San Diego, as well as Arizona and Nevada. On October 5, 2007, the DOE designated the Southwest Area National Corridor and the Mid-Atlantic Area National Corridor.<sup>53</sup> The Southwest Area NIETC designation is effective for twelve years (October 5, 2007 through October 7, 2019). The proposed projects are centrally located in the Southwest Area National Corridor.

### 2.2.2 Electric Generation Need

As indicated in the "National Energy Policy," the "nation's most pressing long-term electricity challenge is to build enough new generation and transmission capacity to meet projected growth in demand."<sup>54</sup> The nation's and the State's electric generation system must have sufficient operating generating capacity to supply the peak demand for electricity by consumers (including the transmission and distribution losses associated with power delivery). An additional amount of reserve power plant capacity must be operational to act as instantaneous back-up supplies should some power plants or transmission lines unexpectedly fail. According to the Western Systems Coordinating Council (WSCC), to reliably deliver power, control area operators should maintain operating reserves of seven percent of their peak demand (including losses). If operating reserves decline below that level, customers that have agreed to be interrupted in exchange for reduced rates may be disconnected. If operating reserves get as

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<sup>49/</sup> California Energy Commission, 2007 Strategic Transmission Investment Plan – Final Commission Report, CEC-700-2007-018-CMF, November 2007, p. 102.

<sup>50/</sup> *Ibid.*, p. 108.

<sup>51/</sup> United States Department of Energy, National Electric Transmission Congestion Study, August 2006.

<sup>52/</sup> *Ibid.*, p. viii.

<sup>53/</sup> On December 3, 2007, the DOE issued orders granting rehearings for the report and orders designating the Mid-Atlantic Area National Transmission Corridor (Docket No. 2007-OE-01) and the Southwest Area National Transmission Corridor (Docket No. 2007-OE-02).

<sup>54/</sup> National Energy Policy Development Group, National Energy Policy, Reliable, Affordable, and Environmentally Sound Energy for America's Future, May 2001, p. 1-5.

low as one and one-half percent, firm load will likely be shed locally, resulting in rotating blackouts, in order to avoid system-wide blackouts.<sup>55</sup>

The CPUC reports that the high prices and electrical “outages experienced in June 2000 were caused by a number of events and circumstances: [1] New power supplies are inadequate to meet increasing demand. [2] Existing power plants are aging and in need of attention. [3] Limited transmission facilities have also contributed to short supply, especially in San Diego and San Francisco. [4] The State has reduced the role of energy efficiency and construction of renewable energy resources in recent years. [5] California's economy has flourished, creating new demand and its high technology sector is highly dependent on electricity. [6] California's electric system is no longer consistently reliable.”<sup>56</sup>

According to California's 2003 “Energy Action Plan” (EAP) the State annually consumes 265,000 gigawatt-hours (GWh) of electricity. Consumption is growing 2 percent annually. Peak demand is growing at about 2.4 percent per year, roughly the equivalent of three new 500-megawatt power plants per year.<sup>57</sup> Between 2005-2006, the State's peak demand increased by 10.7 percent. The all time peak demand in California was set on July 24, 2006 (50,270 MW).<sup>58</sup>

The Center for Energy Efficiency and Renewable Technologies (CEERT) warns that “[w]ith growing demand for electricity, an aging fleet of power plants, and substantial increases in fuel prices, California' citizens and businesses could face another round of rate increases and power system failures as early as 2006.”<sup>59</sup> In 2005, the California Energy Commission<sup>60</sup> (CEC) concluded “Beyond 2006, if aging power plants retire and are not replaced, California's electricity system will not be able to maintain the required 7 percent operating reserve margin during high-demand periods of very hot weather. Beyond 2005, if aging power plants retire and are not replaced, most of southern California will be unable to maintain this margin even under normal temperature conditions” and “[b]y 2016, approximately 24,000 MW of new supply resources will be needed to serve total peak requirements.”<sup>61</sup>

As noted by the CEC: “It is the long-term planning application usage of resource adequacy requirements that ultimately drives construction of new generating facilities – or ‘new steel in the ground.’ Peak loads are gradually increasing throughout the West because of economic expansion and population growth. As loads increase over time, the existing installed base of ‘steel in the ground’ electric generation is gradually becoming inadequate for reliably meeting future loads, on a planned basis.”<sup>62</sup>

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<sup>55/</sup> When major outages occur, there is an increased risk of significant public health and safety impacts. Shortages of electricity can impose risk of very serious impacts on the public, potentially increasing the risk of deaths due to heat waves (Source: California Energy Commission, CalPeak Enterprise #7 Escondido [01-EP-10] Staff Assessment for Emergency Permit, June 1, 2001, pp. 3-4).

<sup>56/</sup> California Public Utilities Commission, California's Electricity Options and Challenges, Report to Governor Grey Davis, undated ([http://www.cpuc.ca.gov/published/report/GOV\\_REPORT.htm](http://www.cpuc.ca.gov/published/report/GOV_REPORT.htm)).

<sup>57/</sup> California Energy Commission, California Public Utilities Commission, California Power and Conservation Financing Authority, Energy Action Plan, May 8, 2003, p. 4.

<sup>58/</sup> Federal Energy Regulatory Commission, Market Oversight website (<http://www.ferc.gov/market-oversight/mkt-electric/california.asp#dem>).

<sup>59/</sup> Center for Energy Efficiency and Renewable Technologies (MRW & Associates, Inc.), California's Electricity Market: The Need for Orderly Procurement, Working Draft Report, November 2, 2005, p. 1.

<sup>60/</sup> State Energy Resources Conservation and Development Commission.

<sup>61/</sup> California Energy Commission, Revised California and Western Electricity Supply Outlook Report, Prepared for the 2005 Integrated Energy Policy Report Proceedings Docket #04-IEP-1, CEC-700-2005-019-ED2, July 2005, pp. 4 and 5.

<sup>62/</sup> *Ibid.*, p. 51.

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As further indicated by the CEC, in 2004, almost one-third of California's entire in-state generation base is over 40 years old.<sup>63</sup> According to the State's 2005 "Energy Action Plan II" (EAP II): "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."<sup>64</sup>

As indicated by the President and Chief Executive Officer (CEO) of the CAISO: "In a recent draft decision, the CPUC found that 3700 MW of new generation must come on line by 2009 in order for the State to have adequate capacity and reserves, in addition to the investments that the CPUC-jurisdictional load-serving entities are expected to make in renewable resources. . . While we are encouraged by the progress made to date, we undoubtedly must realize a significant amount of additional infrastructure development to supply the State's growing electricity needs. We estimate that demand for electricity will continue to grow by 1000 MW per year, consistent with demand growth over the last four years."<sup>65</sup>

As noted by the CAISO: "In the recent heat wave, the peak demand of 51,000 MW was well above any of the scenarios we assumed in our assessment. That is over 12% higher than last year's record; 6% higher than the worst case scenario we analyzed in our assessment; 38% higher than the peak demand of the 2001 year of the crisis; and represents the typical demand of five years ahead."<sup>66</sup> As further indicated by the Southern California Edison Company<sup>67</sup> (SCE): "The heat storm that hit California in July 2006, and the growth of electricity demand throughout California exposed certain vulnerabilities in the electric generation and transmission infrastructure. The CAISO advised the [Public Utilities] Commission that the situation is particularly severe in southern California."<sup>68</sup>

Forecasted peak demand in the SCE's and San Diego Gas & Electric Company's (SDG&E<sup>69</sup>) service areas are presented in Table 2-2 (California Energy Commission - Peak Demand Forecasts for SCE and SDG&E Service Areas)<sup>70</sup> and Table 2-3 (California Independent System

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<sup>63</sup>/ California Energy Commission (Aspen Environmental Group), Comparative Study of Transmission Alternatives: Background Report, 700-04-006, June 2004, p. 6.

<sup>64</sup>/ California Energy Commission and California Public Utilities Commission, Energy Action Plan II – Implementation Roadmap for Energy Policies, September 21, 2005, p. 7.

<sup>65</sup>/ Mansour, Yakout, Prepared Statement of Yakout Mansour, President and Chief Executive Officer, California Independent System Operator before the U.S. House of Representatives, Committee on Government Reform, Subcommittee on Energy and Resources, July 12, 2006, pp. 15-16.

<sup>66</sup>/ Mansour, Yakout, Prepared Statement of Yakout Mansour, President and Chief Executive Officer, California Independent System Operator, State Senate Committee Governmental Organizations, August 9, 2006, p. 2.

<sup>67</sup>/ SCE is a regulated utility and supplies energy to an approximately 50,000-square mile area within southern California. SCE currently receives electrical energy from the following five main sources: the Big Creek Hydroelectric Facility (Shaver Lake, California), Four Corners Generating Station (Fruitland, New Mexico), Mohave Generating Station (Laughlin, Nevada), and Palo Verde Nuclear Generating Station (Wintersburg, Arizona), and San Onofre Nuclear Generating Station (San Clemente, California).

<sup>68</sup>/ Southern California Edison, Advice 2031-E, (U 338-E) Establishment of Peaker Generation Memorandum Account, August 24, 2006, p. 1.

<sup>69</sup>/ SDG&E, a subsidiary of Sempra Energy, is a regulated utility and supplies energy to portions of San Diego and Orange Counties. SDG&E operates nine hydroelectric power plants in San Diego County, purchases power from the Yuma Cogeneration Facility (Yuma, Arizona), and owns a 20-percent share of the San Onofre Nuclear Generating Station (San Clemente, California).

<sup>70</sup>/ California Energy Commission, California Energy Demand 2006-2016 Staff Energy Demand Forecast, Staff Final Report, CEC-400-2005-034-SF-ED2, September 2005, Form 1.8.

Operator – 2015 Load Summary).<sup>71</sup> “Beginning in 2010, overlapping transmission and generation contingencies, as defined by the CAISO, on peak days could result in a situation where the sum of available in-area generation and existing import capability could not meet load in the SDG&E service area, potentially resulting in involuntary load shedding.”<sup>72</sup> “New generation development in San Diego could contribute to a resolution of SDG&E’s reliability problems.”<sup>73</sup>

Table 2-2  
**CALIFORNIA ENERGY COMMISSION**  
**PEAK DEMAND FORECASTS FOR SCE AND SDG&E SERVICE AREAS**  
 (MW)

Year	SCE			SDG&E		
	Low	Base	High	Low	Base	High
2006	20,333	20,421	20,474	4,282	4,307	4,320
2007	20,585	20,720	20,809	4,344	4,371	4,393
2008	20,870	21,019	21,151	4,422	4,451	4,481
2009	21,168	21,334	21,518	4,488	4,520	4,558
2010	21,441	21,621	21,853	4,553	4,586	4,635
2011	21,714	21,906	22,185	4,617	4,652	4,710
2012	22,009	22,215	22,545	4,682	4,718	4,787
2013	22,275	22,493	22,878	4,746	4,784	4,864
2014	22,555	22,786	23,243	4,809	4,848	4,940
2015	22,835	23,068	23,596	4,872	4,909	5,015
2016	23,077	23,313	23,908	4,933	4,970	5,088
% Annual Change	1.3	1.3	1.6	1.4	1.4	1.6

Source: California Energy Commission

Other experts argue that, reasonably foreseeable projects should be sufficient to “meet San Diego’s local reliability needs through 2014” and that “the CAISO has the ability to continue contracting with the existing South Bay Power Plant (SBPP) after 2009 if necessary to meet San Diego’s grid reliability needs.”<sup>74</sup> Although there exists disagreement among experts as to the timing when the demand for new generation facilities will arise, there is consensus that future demand exists. As reported by the San Diego Association of Governments (SANDAG): “Current trends indicate that electricity peak demand will nearly double, increasing by more than 4,000 MW by 2020. This increase in demand is the equivalent to the output of about six to seven moderate generation plants.”<sup>75</sup> The North American Electric Reliability Council (NERC) indicates that “[t]he siting of new generators, whether utility or merchant built, can clearly have

<sup>71</sup>/ California Independent System Operator, CAISO Southern Regional Transmission Plan for 2006, July 7, 2006, p. 16.

<sup>72</sup>/ Avery, James P., Sunrise Powerlink, Chapter 1, Application No. A.05-12-014, San Diego Gas & Electric Company, August 4, 2006, p. I-16.

<sup>73</sup>/ California Energy Commission, Electricity Infrastructure Assessment, Prepared in Support of the Electricity and Natural Gas Report under the Integrated Energy Policy Report Proceedings, Docket #02-IEP-01, 100-03-007F, May 2003, p. 30.

<sup>74</sup>/ California Public Utilities Commission, Division of Ratepayer Advocates, A.06-08-010 – Report on the Sunrise Powerlink, San Diego Gas & Electric Company, Phase 1 Direct Testimony, Volume 1 of 5 (Kevin Woodruff), May 18, 2007, p. ES-2.

<sup>75</sup>/ San Diego Regional Energy Office, Energy 2020 – The San Diego Regional Energy Strategy, Creating a More Secure Energy Future for the San Diego Region, San Diego Association of Governments, May 2003, p. 16.



an impact on the reliability of the interconnected electric systems. For example, locating new generators electrically close to demand centers will cause less of a burden on the transmission systems than generators built in remote locations. In some instances, constructing new generators near demand centers may actually reduce transmission system loading.”<sup>76</sup>

Table 2-3  
**CALIFORNIA INDEPENDENT SYSTEM OPERATOR  
 2015 LOAD SUMMARY**

Region	Area	Peak (MW)	Energy (MWh)
CAISO	SOCALIF	26,196	121,274,678
CAISO	SANDIEGO	5,046	24,998,355
CAISO	PG&E VLY	20,276	88,213,467
CAISO	PG&E BAY	9,083	51,274,899
CFE	MEXICO-C	3,209	15,278,286
LADWP	LADWP	6,147	29,956,000
IID	IMPERIAL	1,644	6,215,411

Notes:  
 1. 1-2 Year Heat Wave Load Forecast is used for economic studies per TEAM methodology.

Source: California Independent System Operator

**2.3 Off-Peak Consumption and On-Peak Generation**

As indicated by the CEC: “Electricity uses varies widely over the time of day and time of year. On a typical day, demand increases 60 percent from the midnight low to the afternoon high. Because air conditioning loads drive peak demand, California sees its greatest demand spikes during the summer months (June, July, August, and September). On a hot summer day, this swing can be 85-90 percent.” Figure 2-4 (Annual Pattern of Daily Peak Demand) “shows how peak demand changes over the course of the year. This variable load requires a generation system that is extremely flexible. The full available capacity of the system needs to be dispatched only to meet a few hours of peak demand.”<sup>77</sup>

“Peak electricity demand increases dramatically in the summer due to air conditioning loads. The difference in demand between an average summer day and a very hot peak day is 6 percent. This difference is equivalent to three years average growth in Statewide electricity demand. The generation system must be capable of adding or dropping generation from some facilities to accommodate the wide daily swings in demand, the high summer peaks, weather variability, and economic growth cycles. Along with adapting to these shifts in demand and changes in consumer habitats, the system must accommodate the varying availability of generation, pipelines, transmission lines, storage facilities, and fuel sources. . .Peaking power plants can provide capacity for a short amount of time during high demand periods.”<sup>78</sup>

Although electricity cannot be directly stored, it can be converted to other forms of energy and then reconverted back to electricity when it is needed. As illustrated in Figure 2-5 (Load Profile

<sup>76/</sup> North American Electric Reliability Council, Reliability Assessment: 2002-2011, The Reliability of Bulk Electric System in North America, Final Draft for BOT Approval, October 2002, p. 28.

<sup>77/</sup> California Energy Commission, Revised California and Western Electricity Supply Outlook Report, Prepared for the 2005 Integrated Energy Policy Report Proceedings Docket #04-IEP-1, CEC-700-2005-019-ED2, July 2005, p. 13.

<sup>78/</sup> *Ibid.*, p. 14.

of a Large-Scale Energy Storage Facility<sup>79</sup>), large-scale storage systems, such as pumped storage, provide the ability to utilize low-cost, baseload power, generated during period of low-demand, during peak-load periods. Without storage, the electrical industry must develop and maintain a delivery network capable of meeting the highest demand of the year. With storage, however, the electricity delivery system can be designed to accommodate a normal load and the stored energy can be used to respond to peak demands.

The Energy Policy Act of 2005 (PL 109-58) (EPAAct 2005) “encourages deployment of transmission technologies and other measures to increase the capacity and efficiency of existing transmission facilities and improve the operation of the facilities.”<sup>80</sup> Under Section 1223(11), “pumped storage” is classified as an “advanced transmission technology,” defined as a technology that increases the capacity, efficiency, or reliability<sup>81</sup> of an existing or new transmission facility.<sup>82</sup> By treating pumped storage as a transmission asset, FERC could include the LEAPS project in the CAISO’s transmission access charge (TAC).<sup>83,84</sup>

The CEC defines pumped storage as “an energy storage technology consisting of two water reservoirs separated vertically; during off-peak hours, water is pumped from the lower reservoir to the upper reservoir, allowing the off-peak electrical energy to be stored indefinitely as gravitational energy in the upper reservoir. During peak hours, water from the upper reservoir may be released and passed through hydraulic turbines to generate electricity as needed.”<sup>85</sup>

“Pumped storage operates operate much like storage projects, with the added benefit or recycling water for reuse. Usually staged between two reservoirs, pumped storage powerhouses generate power during peak hours and pump water back to the upper reservoir during off-peak hours. The power required to pump water from the lower reservoir to the upper

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<sup>79/</sup> Energy Storage Council, Energy Storage: The Missing Link to the Electricity Value Chain, ESC White Paper, May 2002, p. 7.

<sup>80/</sup> Under Section 219 of the FPA, Congress granted the Commission explicit authority to establish, by rule, incentive-based rate treatments for the purpose of ensuring reliability or reducing the cost of delivering power by reducing congestion. On July 20, 2006, the Commission issued Order No. 679. Under the Final Rule, pursuant to the requirements of the Transmission, Infrastructure Investment provisions in Section 1241 of EPAAct 2005, the Commission established incentive-based rate treatments for the transmission of electric energy in interstate commerce by public utilities. As indicated therein: “Pursuant to Section 219(b)(3) of the FPA, the NOPR [Notice of Proposed Rulemaking] proposed to encourage the use of advanced technology in new transmission projects. Advanced transmission technologies are defined in Section 1223 of EPAAct 2005 to be technologies that increase the capacity, efficiency, or reliability of an existing or new transmission facility. . .Section 1223 of EPAAct 2005 lists 18 advanced transmission technologies. We interpret this list as being illustrative of the kinds of technologies that Congress sought to encourage and not exclusive of advanced technologies that may be employed and considered for incentive rate treatment. . .This includes technologies that may indirectly mitigate congestion and enhance grid reliability, if such technologies can be shown to increase the capacity, efficiency, or reliability of an existing or new transmission facility” (Docket No. RM06-4-000, pp. 147-148 and 150-151). On December 22, 2006, the Commission issued Order No. 679-A, reaffirming on rehearing its July 20, 2006 final rule that, pursuant to the EPA 2005 promotes transmission investment by establishing incentive-based rate treatments for electric transmission by public utilities.

<sup>81/</sup> Section 215 of EPAAct 2005 requires federal agencies to expedite approvals that are necessary for owners or operators of electrical transmission and distribution facilities to comply with applicable reliability standards.

<sup>82/</sup> Section 1223(11), Federal Energy Policy Act of 2005 (PL 109-58).

<sup>83/</sup> On the CAISO grid, the costs of transmission upgrades are now spread among all users through transmission access charges (TAC) (Source: California Energy Commission, Integrated Energy Policy Report, 2004 Update, 100-04-006CM, November 2004, p. 31).

<sup>84/</sup> As an “advanced transmission technology,” under EPAAct 2005, the LEAPS project can be incorporated into the transmission grid like any new or additional transmission facility. This means that the LEAPS project and the associated TE/VS Interconnect project can both become part of the long-term transmission plant incorporated within the CAISO and into the CAISO’s TAC rates.

<sup>85/</sup> California Energy Commission, Renewable Energy Program Guidebook, CEC-300-2006-008-ED2, November 2006, p. 26.



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reservoir exceeds the power generated when water from the upper reservoir is allowed to flow through the turbine and back into the lower reservoir. However, pumped storage projects can release upper reservoir water to meet peak load demands, and it is at these times when power is valued the highest. Pumped storage systems can thus provide a net economic benefit.”<sup>86</sup>

Although pumped storage is the most efficient technology available for energy storage, it nonetheless consumes more energy than it produces. Pumped storage is, however, economical because it serves to flattens out the variations in the load on the power grid, permitting baseload power stations to continue operating at their most efficient capacity and reducing the need to build power plants that operate only during peak demand period and using more costly generation methods.

“Pumped storage plants are primarily peak generating facilities. During off-peak periods, water is pumped from a lower reservoir or body of water to an upper one. The water is then released for power generation during periods of peak power demand. Although a net consumer of energy, pumped storage can be economically viable because it uses baseload capacity during off-peak periods to create additional peak capacity. Pumped storage can also be used to provide emergency reserve generating capacity.”<sup>87</sup>

The CEC has recently concluded that the “State has more than adequate amounts of power in the low-load periods, especially at night. California utilities and generators have some options for shifting power supplies from off-peak to on-peak periods, such as through the use of pumped storage facilities. While the options may be limited, they would not only reduce the number of power plants needed to meet day-time peaks, but could also increase the overall efficiency of the generating sectors by increasing baseload operations and decreasing load-following and peaking operations, and thus reduce natural gas use and air emissions as well.”<sup>88</sup>

As indicated in the State’s “Integrated Energy Report”: “In pumped storage facilities, water is pumped from a lower to a higher reservoir during off-peak times and is used to generate electricity when peaking power is needed. Pumped storage is generally considered the only commercially viable method for the large-scale storage of electricity.”<sup>89</sup> The off-peak electrical energy used to pump the water up hill can be stored indefinitely as gravitational energy in the upper reservoir. Energy is generated during high-value peak-load (on-peak) periods by hydraulic means using water stored in the upper reservoir during low-cost off-peak periods.

While pumped storage projects are net consumers of energy, their output for meeting peak demand is quite reliable. The cycling of water between the upper and lower reservoir is nearly immune to weather changes. By pumping uphill during the night, pumped storage plants help to build load in those hours, flattening the daily load curve. Pumping generating plants increase system-wide economy by using energy from baseload plants that are most efficient when run continuously.<sup>90</sup> By providing night-time loads, pumped storage helps to balance the system.<sup>91</sup>

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<sup>86/</sup> California Energy Commission (Aspen Environmental Group), Comparative Study of Transmission Alternatives: Background Report, 700-04-006, June 2004, p. 13.

<sup>87/</sup> Upper Mississippi River Basin Association, Nonfederal Hydroelectric Development and Licensing – A Perspective from the Upper Mississippi River Basin, May 1991, p. 4.

<sup>88/</sup> California Energy Commission, Integrated Energy Policy Report, Committee Final Report, 100-04-006CTF, October 2004, p. 19.

<sup>89/</sup> *Op Cit.*, Integrated Energy Policy Report, pp. 79 and 146.

<sup>90/</sup> California Energy Commission, California Hydro-Electricity Outlook for 2002, Staff Report, P 700-02-004F, April 2002, p. 3.

<sup>91/</sup> Hawkins, David, Role of Energy Storage in California ISO Grid Operations, CEC/DOE Workshop on Energy Storage, California Independent System Operator, February 24, 2005, p. 3.

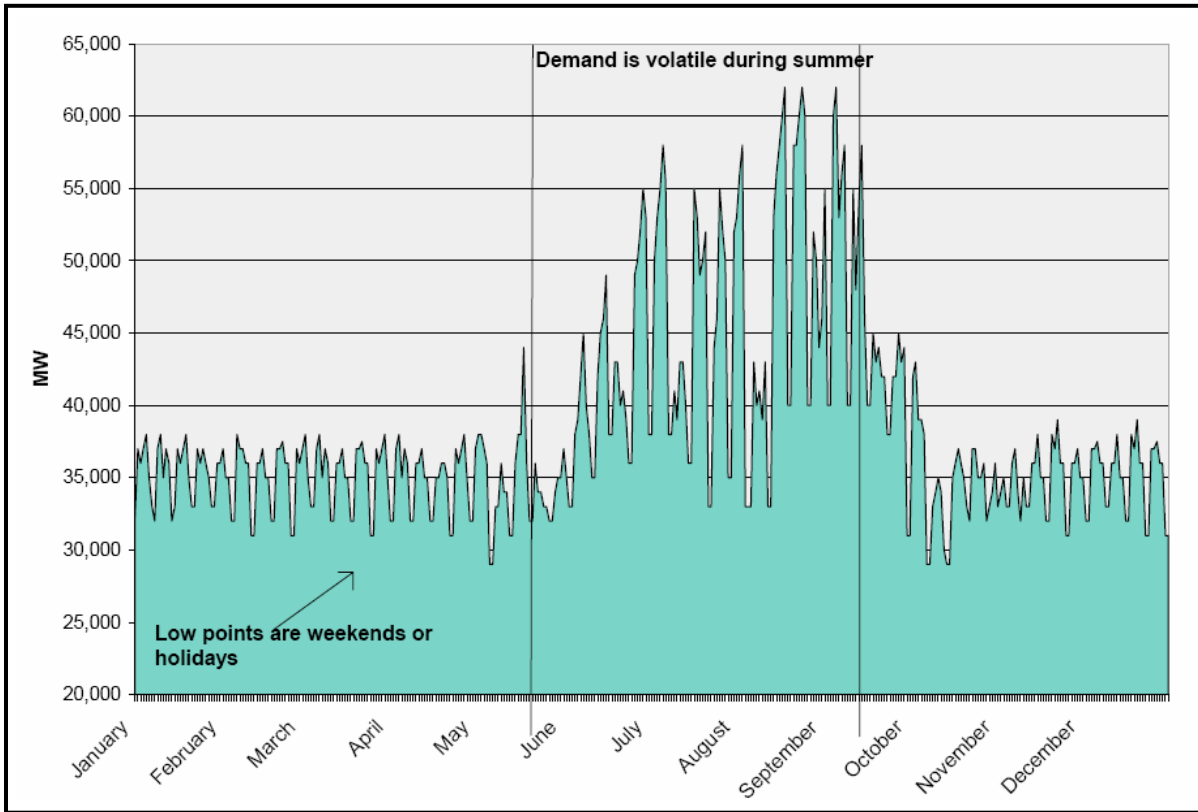
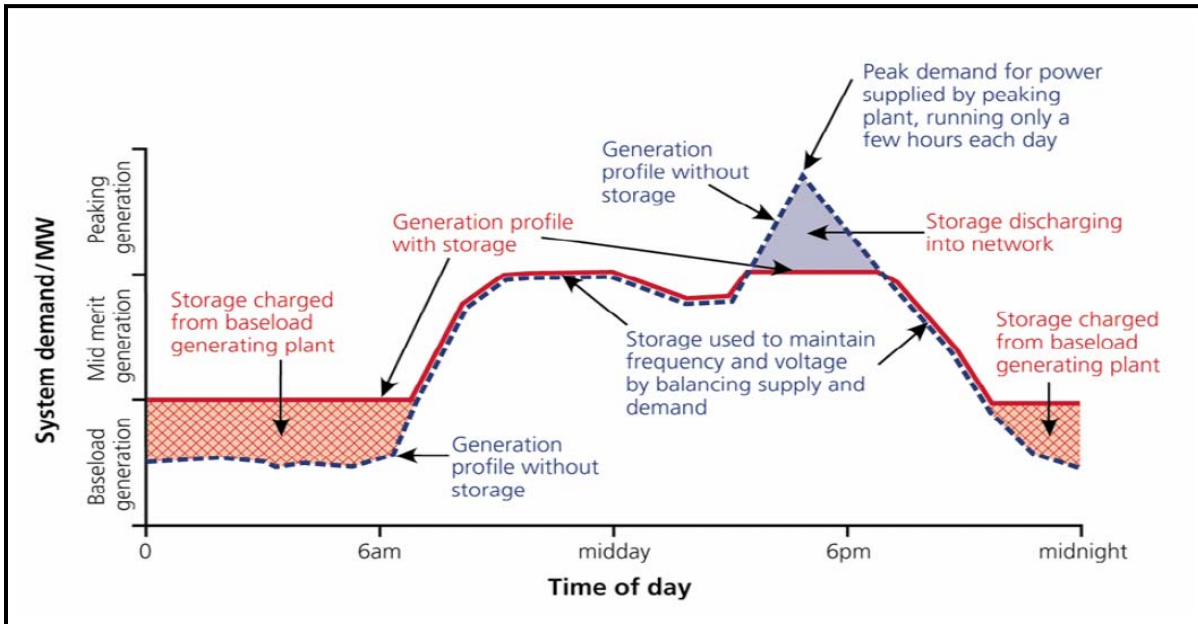


Figure 2-4  
**ANNUAL PATTERN OF DAILY PEAK DEMAND**  
 Source: California Energy Commission

Figure 2-5  
**LOAD PROFILE OF A LARGE-SCALE ENERGY STORAGE FACILITY**  
 Source: Energy Storage Council



## **2.4 Benefits of the Proposed Projects**

### **2.4.1 Transmission Benefits**

A CEC report on planning for transmission lines lists a number of strategic benefits attributable to transmission lines, including reliability, access to markets, fuel diversity, environmental, insurance against contingencies, and replacement for aging power plants.<sup>92</sup> Specifically, the CEC states that transmission projects can provide the following strategic benefits: (1) price stability and more efficient energy market operations due to increased competition and decreased “market power” for existing generators in the importing region; (2) the potential for increasing reserve sharing and firm capacity purchases and, therefore, for decreasing the number of power plants that have to be constructed in the importing region to meet reserve adequacy requirements; (3) insurance against contingencies during abnormal system conditions such as fuel supply disruptions, loss of an extended time period of large base-load power plants, and extreme weather conditions leading to an extended drought period and greatly reducing production from a hydroelectric system; (4) environmental benefits due to reduction of air emissions and offset requirements in the importing region; (5) reduction in the construction of additional infrastructure such as gas pipelines and pumping stations, and water and waste treatment systems; and (6) State policy objectives to commercialize renewable resource development consistent with State law.<sup>93</sup>

A CEC report calling for upgrading California’s transmission systems lists the following benefits of transmission lines: least-cost, reliability, risk, market efficiency, fuel diversity, and resource flexibility.<sup>94</sup> The CEC’s “Strategic Transmission Investment Plan” lists the following benefits associated with transmission lines: insurance against contingencies during abnormal system conditions, such as low-probability but high-impact events, price stability and mitigation of market power, potential for increased reserve resource sharing, and environmental benefits.<sup>95</sup>

As indicated in the 2005 “Strategic Transmission Investment Plan”: “As SDG&E noted at the June 2, 2005 Joint Conference on Energy Infrastructure and Investment in California: ‘Transmission represents roughly 5 percent of the [electric] rates our customers pay. Yet if we look at the cost of congestion or if we look at the cost of these [Reliability-Must-Run] type of contracts that we pay. . .support the deficiencies in the transmission infrastructure, that another 10 percent of our retail rates. So there’s a significant economic opportunity to make transmission investments in San Diego that would mitigate those costs.’”<sup>96</sup>

“In the absence of sufficient transmission infrastructure, the CAISO has relied upon RMR contracts to support local area reliability. According to the CAISO, the total RMR contracts costs for the three California investor-owned utilities in 2004 was \$644 million. . .More

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<sup>92/</sup> California Energy Commission, Planning for California’s Future Transmission Grid, Review of Transmission System, Strategic Benefits, Planning Issues, and Policy Recommendations, 700-03-009, October 2003, pp. 1 and 5.

<sup>93/</sup> California Energy Commission (Consortium of Electric Reliability Technology Solutions), Economic Evaluation of Transmission Interconnection in a Restructured Market, Consultant Report, 700-04-007, June 2004, p. 17.

<sup>94/</sup> *Op. Cit.*, Upgrading California’s Electric Transmission System: Issues and Actions for 2005 and Beyond, 700-2005-018, pp. 35 and 109.

<sup>95/</sup> *Op. Cit.*, Strategic Transmission Investment Plan, CEC 100-2005-006CTF, p. 15.

<sup>96/</sup> *Op. Cit.*, Upgrading California’s Electric Transmission System: Issues and Actions for 2005 and Beyond, 700-2005-018, p. 12.

transmission capacity is needed to reduce RMR costs and allow the shutdown of aging power plants.” In 2004, RMR costs for SDG&E were \$173 million.<sup>97</sup>

## **2.4.2 Electrical Ratepayer Benefits**

The LEAPS project will result in the generation of 500 MW of electrical energy that would not otherwise be available for consumptive use in the absence of the proposed projects. As reported by the United States Department of the Interior, Minerals Management Service, a one-megawatt electricity-generating device would generate enough electricity to supply 1,000 households. The actual number would, however, depend on factors such as the reliability of the system and the availability of the resource.

According to the Edison Electric Institute (EEI), the average total per-household use has grown from 1.07 kW/household in 1978 to 1.30 kW/household in 2003, and is projected to reach 1.45 kW/household by 2020.<sup>98</sup> Assuming the 2020 average, the LEAPS project would generate sufficient energy to power about 345,000 homes.

The proposed 500-kV transmission lines would have a nominal rating of 1,500 MW and could increase import capability into the San Diego area by as much as 1,000 MW, raising the total import capacity into the San Diego area to approximately 4,000 MW. In addition, the proposed projects will provide 500 MW of black-start generation capacity, 600 MW of off-peak load for grid baseload generation stability, 6,000 MWh of emergency generation, and all forms of ancillary services (AS), including regulation services, spinning and non-spinning reserve, voltage support, black-start generation capacity.<sup>99</sup>

In response to such factors and real-time congestion and intermittent energy projection (renewables), the LEAPS project can be used in the CAISO’s post-day ahead ancillary market to take care of real-time ancillary services needs. The superior dynamic capabilities of the LEAPS project make it uniquely capable of solving short-term reliability concerns and energy-balance issues. The facility can provide ancillary services, including regulation and frequency response, regulation up, regulation down, operating reserves including spinning and non-spinning reserves and operating reserves, and supplemental reserves, up to its maximum pumping capacity, generating capacity, or both. In addition, the LEAPS project can provide reactive support to help the CAISO maintain voltages, particularly for post-contingency and black-start capabilities. It has been noted that the “new pricing and consequent bidding opportunities in ancillary services means that hydropower plants’ revenues are not necessarily dictated by the avoided costs of non-hydropower generating plants.”<sup>100</sup>

As independently determined by the CAISO, the economic value of the LEAPS and TE/VS Interconnect projects fall into the following areas: (1) energy benefit (due to both the power plant and transmission); (2) local capacity requirements and reliability must run (LCR/RMR) benefit

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<sup>97/</sup> *Ibid.*, pp. 37-38.

<sup>98/</sup> United States Department of the Interior, Minerals Management Service, Draft Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternative Use of Facilities on the Outer Continental Shelf, OES EIS/EA MMS 2007-010, March 2007.

<sup>99/</sup> Ancillary services are needed to maintain reliability within the CAISO-controlled grid. Ancillary services include coordination and scheduling services (load following, energy imbalance service, control of transmission congestion), automatic generation control (load frequency control and the economic dispatch of plants), and support of system integrity and security (reactive power, spinning and operating reserves).

<sup>100/</sup> Deb, Rajat, Ph.D., Operating Hydroelectric and Pumped Storage Units in a Competitive Environment, The Electricity Journal, April 2000.

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(due to the transmission line); (3) capacity benefit (due to the power plant); (4) ancillary services benefits (due to the power plant), including mitigation of operating concerns due to wind generation and over-generation mitigation benefit; (5) black-start benefit (due to the power plant); and (6) reactive reserve benefit (due to the power plant).<sup>101</sup> In evaluating the ancillary benefits, the CAISO assumed that the LEAPS facility will be operated to maximize ratepayer benefits; however, it imposed an arbitrary cap (no more than 25 percent of any of the CAISO's ancillary services needs could be procured from the power plant) which potentially conflicts with that objective and artificially constrains the projects' economic benefits.

The Applicant's initial assessment of the economic benefits of the TE/VS Interconnect and the LEAPS projects are presented in Table 2-4 (Summary Benefits and Net Benefits of the TE/VS Interconnect Project, LEAPS Project, and Combined TE/VS and LEAPS Projects), Table 2-5 (Energy and Ancillary Services [AS] Benefits of the TE/VS and LEAPS Projects Using PLEXOS Modeling), Table 2-6 (Additional Benefits), Table 2-7 (Ancillary Services [AS] MW Limits), and Table 2-8 (Cost of 500 MW of Emission Reduction Credits in the South Coast Air Quality Management District).

Table 2-4<sup>1</sup>

### SUMMARY BENEFITS AND NET BENEFITS OF THE TE/VS INTERCONNECT PROJECT, LEAPS PROJECT, AND COMBINED TE/VS AND LEAPS PROJECTS (\$M 2015 Nominal)

Benefits	Estimates (\$)		
	TE/VS	LEAPS	TE/VS + LEAPS
Energy Benefit <sup>2</sup>	22	71	93
Ancillary Services Benefit <sup>2</sup>	1	57	58
Wind Integration and Over-Gen Mitigation Benefit <sup>3</sup>		33	33
Local Reliability Compliance (or RMR) Benefit	126	-	126
Resource Adequacy (or Capacity) Compliance Benefit <sup>4</sup>	-	14	14
Total Benefit	149	174	324
Total Levelized Annual Cost <sup>5</sup>	51	94	145
Net Annual Benefit	98	81	179

Notes:

1. Testimony of Philippe Auclair, The Nevada Hydro Company CPCN Application for the Talega-Escondido/Valley-Serrano 500kV Project, A.07-10-005, October 9, 2007, Appendix D – Section 4, page 24..
2. See Table 2-5 (Energy & AS Benefits of the TE/VS and LEAPS Projects using PLEXOS Modeling).
3. California Independent System Operator, Presentation: Economic Benefits Assessment of the LEAPS Project, Regional Transmission South, September 19, 2006, at 32. The wind integration includes only the regulation need associated with 5-minute variation and does not include the increase in regulation during unscheduled flow or absent of wind generation.
4. The Resource Adequacy (RA) Capacity compliance benefit number assumes LEAPS project only qualifies as system RA capacity and not local RA capacity. Moreover, it is assumed that the value of system RA is \$27/kW-year (2006 dollars). Should the LEAPS project qualify as local RA, which is highly likely, its RA Capacity value would be higher. For example, in a September 16, 2006 CAISO presentation in the CAISO CSRTP process, LEAPS was given a capacity value of \$39.756 kW year.
5. The total levelized annual cost is based on a project cost assumption of \$350 million for the TE/VS project and \$750 million for the LEAPS project.

Source: The Nevada Hydro Company, Inc.

<sup>101/</sup> Shirmohammadi, Dariush, Memorandum: LEAPS Project Status, CAISO Board of Governors, August 31, 2006, p. 2.

Table 2-5<sup>1</sup>  
**ENERGY AND ANCILLARY SERVICES (AS) BENEFITS OF THE  
 TE/VS AND LEAPS PROJECTS USING PLEXOS MODELING**  
 (\$M 2015 Nominal)

	<b>Benefit of Project (\$)</b> (Cost of Base Case minus Cost of Project Case)		
	<b>TE/VS</b>	<b>LEAPS</b>	<b>LEAPS + TE/VS</b>
Customer Energy Payments from PLEXOS (\$M)	39	20	59
Customer AS Payment from PLEXOS (\$M)	1	28	29
Less CAISO PTO Transmission Rent (\$M)	(15)	(2)	(17)
Less CAISO URG Margin (\$M)	1	(7)	(6)
Less IOU Excess Loss Payments(\$M)	(4)	(5)	(9)
LEAPS Energy Storage Value (\$M)	-	66	66
LEAPS AS Margin to Consumers (\$M)	-	29	29
<b>Total Energy &amp; AS Benefit (\$M)</b>	<b>23</b>	<b>128</b>	<b>151</b>

Notes:  
 1. Testimony of Philippe Auclair, The Nevada Hydro Company CPCN Application for the Talega-Escondido/Valley-Serrano 500kV Project, A.07-10-005, October 9, 2007, Appendix D – Section 4, page 36.

Source: The Nevada Hydro Company, Inc.

Table 2-6  
**ADDITIONAL BENEFITS**  
 (\$M 2005 Nominal)

<b>Benefits</b>	<b>TNHC Estimates</b>
Reactive Support	3.491
Black Start Capability	46.451
Emission Revenue Credits (See Table 2-8 [Cost of 500 MW of Emission Reduction Credits in the SCAQMD] below)	17.90
5-Local 115 kV Circuits for SCE	14.68

Source: The Nevada Hydro Company, Inc.

Table 2-7  
**ANCILLARY SERVICES MW LIMITS**

<b>Ancillary Services Based on 2005 Numbers</b>	<b>CAISO Average MW</b>	<b>TNHC Average MW</b>
Regulation Up	87.98	125
Regulation Down	88.12	125
Spin	173.53	250
Non-Spin	172.6	0

Source: The Nevada Hydro Company, Inc.

Since these estimates address only electric ratepayer benefits, the numbers presented do not represent the full bundle of economic and other benefits that will be derived from the implementation of the proposed projects. These estimates are subject to further change and refinement and do not represent commitments by or obligations upon TNHC.

Table 2-8  
**COST OF 500 MW OF EMISSION REDUCTION CREDITS IN THE  
 SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT**

Pollutant	Tons/Year	\$Ton/Year	Total (\$)
NO <sub>x</sub>	561	126,486	70,933,349
PM <sub>10</sub>	91	268,588	24,414,649
SO <sub>x</sub>	16	78,123	1,218,719
CO	114	30,961	3,520,266
Total			100,086,983

Source: The Nevada Hydro Company, Inc.

As acknowledged by the CAISO, one “major benefit of the project will be in terms of an array of ancillary services that can [be] provided due to its operational flexibility. These include: regulation up, regulation down, spinning reserve, non-spinning reserve, reactive support, [and] black start. . .In addition to providing ancillary services in a traditional fashion, the LEAPS power plant can provide added benefits as the need for regulation increases due to large penetration of wind generation (e.g., the Tehachapi project) as well as the expected increase in overgeneration conditions. These added benefits are [still] being currently evaluated.”<sup>102</sup> Even with significant constraints imposed by the CAISO on the LEAPS project’s ancillary services benefits and absent the consideration of all ancillary service benefits, the CAISO has determined that the LEAPS project will still save the State’s ratepayers about \$126.34 million per year in 2010 and about \$175.94 million annually in 2015. As reported by SDG&E: “The CAISO’s preliminary assessment demonstrates large economic benefits for the [LEAPS] power plant if operated by the CAISO.”<sup>103</sup>

### 2.4.3 Access to Renewable Resources

The TE/VS Interconnect project will provide San Diego with access to renewable energy resources and will increase the depth of the pool of renewable suppliers able to provide renewable resources to SDG&E. For example, the TE/VS Interconnect project facilitates access for SDG&E consumers to electricity generated from renewable resources located north of San Diego, including wind resources in the Tehachapi area of Kern County, as well as wind and other renewable resources from the Pacific Northwest, other portions of the western United States, and Canadian.

The TE/VS Interconnect project will allow San Diego area consumers access to the geothermal and other renewable energy resources generated within the Imperial Valley area of Imperial County. Imperial Valley resources can be delivered to the San Diego area, by means of the TE/VS Interconnect project, over either of two transmission lines now under development. First, the Los Angeles Department of Water and Power’s (LADWP) “Green Path North” transmission project will link the Imperial Valley and Salton Sea area to the Los Angeles basin and to SCE’s transmission network. In addition, the Imperial Irrigation District (IID) has approved construction of a new line into SCE’s existing Devers substation (San Bernardino County). Transmission along either of these routes will allow renewable resources from Imperial Valley access into the San Diego market.

<sup>102/</sup> *Ibid.*, p. 6.

<sup>103/</sup> *Op. Cit.*, Sunrise Powerlink, Chapter 1, Application No. A.05-12-014, p. 34.

The proposed project will bring renewable energy resources to San Diego County from throughout California and the western United States, including Imperial County, by providing access to remote areas with the potential for significant development of renewable energy sources. The TE/VS Interconnect project is consistent with Senate Bill (SB) 1078 and California's "Energy Action Plan" (EAP), by providing San Diego consumers more economical access to the Imperial Valley, an area that is rich in renewable resource potential. By providing access to the San Diego marketplace, the TE/VS Interconnect project will encourage the development of such resources, thereby diversifying the State's resource mix and reducing its reliance on fossil-fueled generation.

## **2.5 Statement of Applicant's Objectives**

The TE/VS Interconnect and the LEAPS projects constitute separate but closely related projects. Because they respond to different needs, the Applicant has formulated a separate set of project-specific objectives for each project.

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- ◇ Provide facilities that promote the region's attainment of minimum California Independent System Operator (CAISO), North American Electric Reliability Corporation (NERC), and Western Electricity Coordinating Council (WECC) reliability criteria throughout the planning horizon, including the criteria that there be no loss of load within the San Diego area under G-1/N-1 contingency conditions.<sup>104</sup>
- ◇ Provide transmission capability to Statewide renewable resources into San Diego to assist in meeting or exceeding California's 20% renewable energy source mandate by 2010 and the Governor's proposed goal of 33% by 2020.
- ◇ Provide transmission facilities with a voltage level and transfer capability that promotes the development of a regional system that allows for prudent system expandability to meet both anticipated short-term (2010) and long-term (2015 and beyond) load growth through contributing 1,000 MW of new import capability into the San Diego area (under G-1/N-1 contingency conditions).
- ◇ Reduce the above-market costs to San Diego ratepayers associated with maintaining reliability.
- ◇ Improve regional transmission system infrastructure to provide for the delivery of adequate, reliable and reasonably priced energy supplies (including renewable supplies).
- ◇ Improve regional transmission system infrastructure through the expansion of the State's backbone system, interconnecting SDG&E' and SCE's existing high-voltage transmission systems.
- ◇ Implement the transmission elements of State's energy plans and assist the state in meeting its renewable resource objectives.
- ◇ Obtain electricity generated by diverse fuel sources and decrease the dependence on increasingly scarce and costly natural gas.
- ◇ Avoid, to the extent feasible, the taking and relocation of homes, businesses or industries, in the siting of the transmission line, substation and associated facilities.

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<sup>104</sup> This "G-1/N-1" standard requires a defined area system to withstand the simultaneous outage of its largest generating unit (G-1) and largest transmission interconnection (N-1) and be able to withstand the next most critical transmission outage without dropping load.



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- ◇ Develop a financially feasible transmission interconnect project.
- ◇ Commence the transmission of electricity along the proposed transmission lines by the end of 2009.

#### ▪ **Lake Elsinore Advanced Pumped Storage Project**

In addition to those objectives identified for the TE/VS Interconnect project, the following additional objectives have been established for the LEAPS project.

- ◇ Respond to the area's need for new electrical generation and storage facilities through the expansion of the State's backbone system and through the construction of a pumped storage facility utilizing Lake Elsinore as the lower reservoir and availing itself of the unique topographic characteristics of the Lake Elsinore area.
- ◇ Create a peaking facility to meet load demands in the San Diego service area.
- ◇ Construct and operate a new 500-MW hydropower facility accommodating the storage and utilization of regionally available renewable energy resources, promoting the attainment of the State's renewable portfolio standards, and serving the needs of the San Diego metropolitan area.
- ◇ Develop a financially feasible federally licensed hydropower project.
- ◇ Commence operations of the pumped storage facility by the end of 2012.

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