



Electricity Supply/Reliability 2000 to 2002

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**August 10, 2000
For the Joint Hearing of the
Senate Energy, Utilities, and Communications Committee
Assembly Utilities and Commerce Committee
Senator Bowen and Assemblyman Wright, Chairs**

Presentation Accompanying Slides for Joint Hearing

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The following information is a description of the current California electricity system situation intended to provide foundational information for this joint hearing.

The California Energy Commission was asked to address two primary questions: first, are recent events in the California electricity system what we foresaw in our analysis of the adequacy of generating resources to meet projected demand; and, second, what does the California Energy Commission foresee for the summers of 2001 and 2002?

The short answer to the first question is that this is EXACTLY the situation we were concerned might occur under high temperature conditions. In July, 1999 the California Energy Commission released a thorough analysis of the adequacy of electricity resources to meet California's needs during periods of high electricity demand. Our analysis included an assessment of resources likely to be available from outside the state to meet our needs. Our report was widely distributed. Unfortunately, it was not initially accepted. We presented our conclusions in a workshop at the Capitol in Fall 1999. We again emphasized the tightness of our supply/demand balance at two hearings sponsored by the Senate Energy and Public Utilities Committee earlier this year, along with a set of recommended actions.

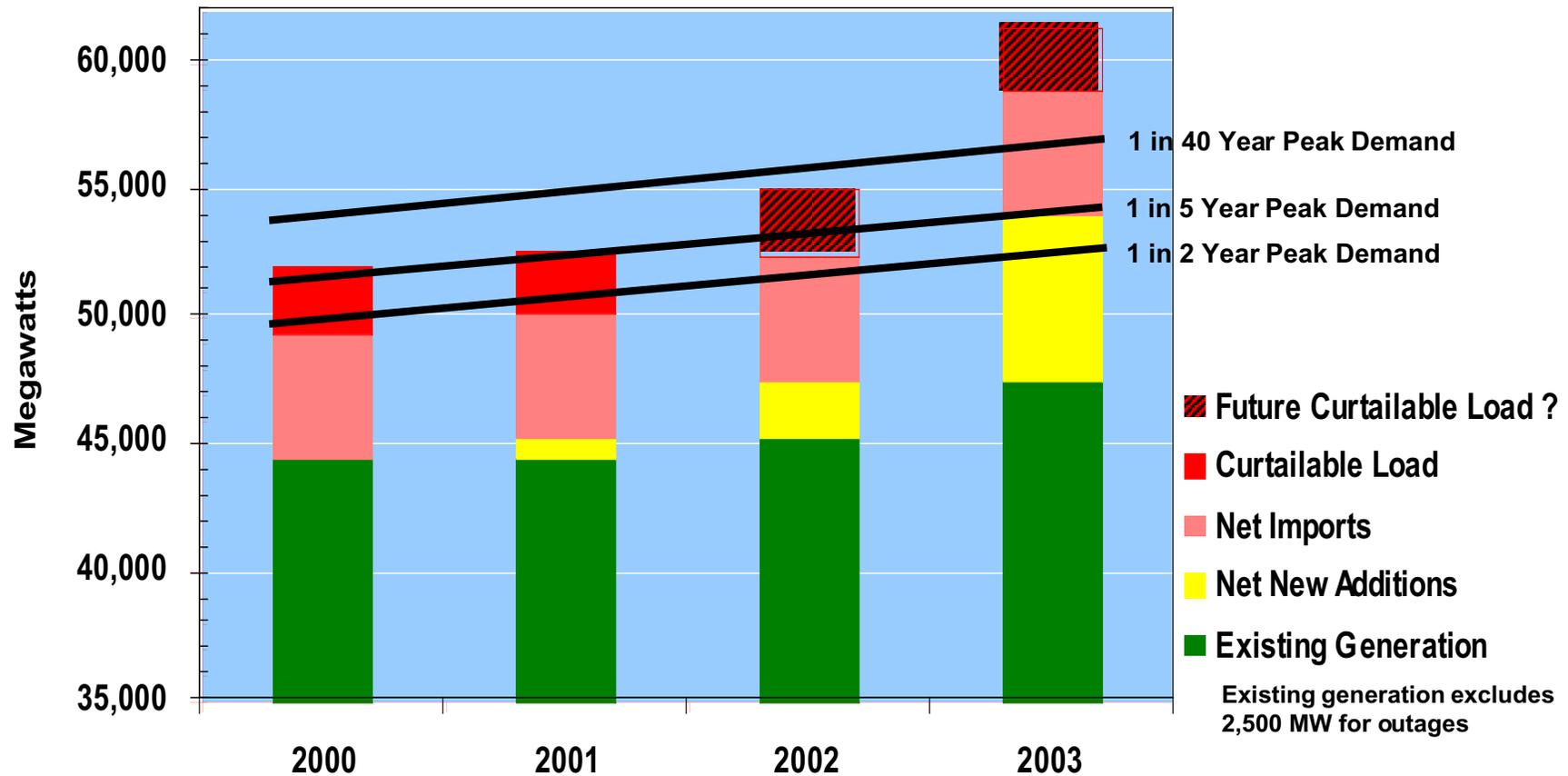
Our electricity demand is extremely sensitive to temperatures. Under extreme conditions, which we saw during the summer of 1998, and again experienced last week (first week of August 2000) when it was hot throughout the West, our electricity demand may grow by as much as 8% or more above normal summer demand levels. For scale, this increment of electricity demand, about 4,000 MW or more, is larger than the electrical load of San Diego Gas & Electric.

Data from the National Oceanographic and Atmospheric Administration show that the January through June 2000 weather conditions in California have been the seventh highest in 106 years. In the Southwest, the weather data suggest that they are experiencing the second hottest first six months in 106 years.

The following chart illustrates the tight margin between resources available and potentially extreme summer electricity loads.



CAL ISO Load/Resource Balance with 7% Operating Reserve at Coincident Peak



GRAPHIC – SUPPLY/DEMAND BALANCE

Here is a picture of the current situation. Note several aspects of this chart. First, resources may be adequate unless we have unusually hot weather, and hot conditions over much of the West. The chart shows the range of electrical load over “normal” to very extreme, 1:40 year weather patterns. (A 1-in-40 weather pattern is a set of very high temperatures that occur on average once every 40 years. These conditions have a chance of occurrence of 2.5% in any given year.) Our current supply/demand problem will continue through this summer, next summer, and possibly into the summer of 2002, depending on how quickly recently licensed power plants can be built, and other factors.

There are many uncertainties in an assessment of future resource adequacy. First, the construction time for several projects will affect the summer of 2001. Developers have given us estimates of their on-line date. At least one new power plant, of 500 MW capacity, may be in operation later this year, and possibly two additional plants, totaling another 1548 MW may come on-line during next summer. We may have problems early in the summer, depending on the weather. Problems are reduced, but not necessarily eliminated, during later summer months. You can see the projected increase in the supply columns in years 2001, 2002, and 2003. The next chart lists new power development projects now underway.



POWER PLANT PROJECTS PROPOSED FOR CALIFORNIA

APPROVED PROJECTS

POWER PLANT PROJECTS CURRENTLY BEFORE THE COMMISSION

PROJECT	MW	PERMIT DATE	ON-LINE DATE 1/	CUMULATIVE CAPACITY
UNDER CONSTRUCTION		ACTUAL		EXPECTED
Los Medanos	500	August 17, 1999	July-01	500
La Paloma	1,048	October 6, 1999	Aug-01	1,548
Sutter	500	April 19, 1999	Sept-01	2,048
Delta Energy	880	February 9, 2000	July-02	2,928
NOT UNDER CONSTRUCTION		ACTUAL		EXPECTED
High Desert	720	May 3, 2000	Jan-03	3,648
IN REVIEW		EXPECTED		EXPECTED
Sunrise Cogeneration	320	Sept-00	Sept-02	3,968
Elk Hills	500	Sept-00	Sept-02	4,468
Moss Landing	1,090	Oct-00	Oct-02	5,558
Otay Mesa	510	Jan-01	Jan-03	6,068
Pastoria	750	Jan-01	Jan-03	6,818
Hanford	99	Jan-01	Feb-03	6,917
Three Mountain	500	Feb-01	Feb-03	7,417
Midway-Sunset	500	Mar-01	Mar-03	7,917
Metcalf	600	Mar-01	Mar-03	8,517
Blythe	520	Apr-01	Apr-03	9,037
Contra Costa	530	May-01	May-03	9,567
Mountainview	1,056	May-01	May-03	10,623
Nueva Azalea	550	Aug-01	Aug-03	11,173
IN DATA ADEQUANCY		EXPECTED		EXPECTED
Potrero	540	Sept-01	Sept-03	11,713

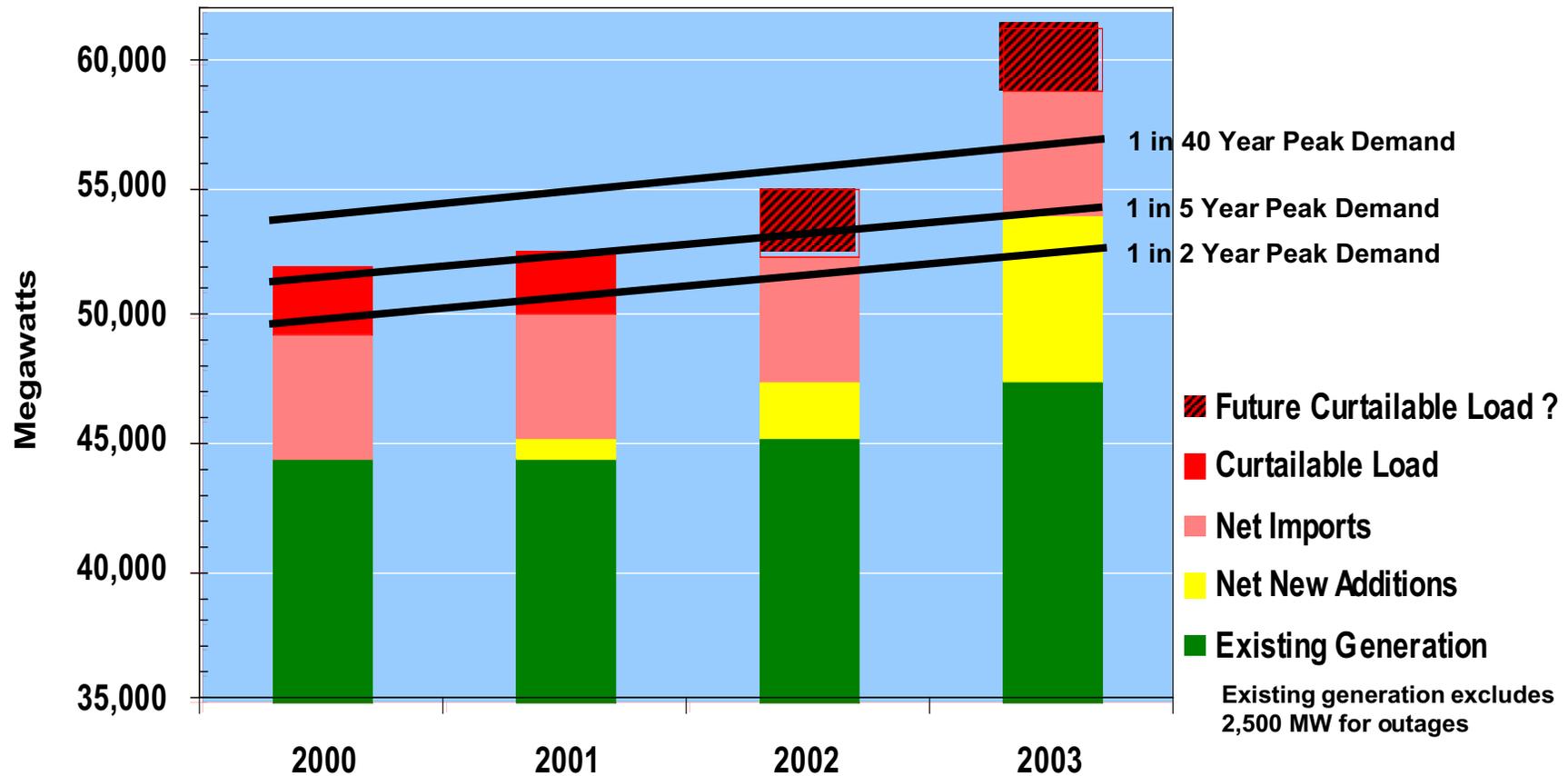
1/ Two years are typically required for power plant construction following permitting.

GRAPHIC – PROPOSED POWER PLANTS

You can see from the chart that developers are responding to California's need for power generation. Since 1997, the California Energy Commission has approved five projects with an aggregate capacity of 3648 MW. Four of the five are now under active construction, totaling 2928 MW. Thirteen projects are under review, totaling 6975 MW. Construction typically takes on the order of two years. By mid-summer 2003, 11,713 MW of new power plants could be operating in the California grid if all of these plants are built.



CAL ISO Load/Resource Balance with 7% Operating Reserve at Coincident Peak



GRAPHIC – RETURN TO SUPPLY/DEMAND BALANCE CHART

However, California needs roughly about 1,000 MW a year of new supply, whether in the form of power plants or load reduction, just to stay even. This is shown by the upward-sloping lines on the chart. Consequently, by 2003 we will have increased demand by about 3,000 MW, and our ability to withstand high temperature conditions is still uncertain. We may still be dependent on imported power under high electric load conditions.

THERE ARE MANY UNCERTAINTIES IN MAKING THESE FUTURE PROJECTIONS, AND IT IS IMPORTANT TO UNDERSTAND WHAT THEY ARE.

A major uncertainty lies in the continued level of participation in the utility-interruptible customer contracts that carried forward from the previous regulated utility era. Also, the program expires in the first quarter of 2002. This is shown in the “hatched” box on the top of the supply column.

IT IS IMPERATIVE THAT PROGRAMS BE DEVELOPED TO REPLACE THIS CRITICAL RESOURCE .

A third uncertainty also stems from the weather. If we have below average rainfall, we will have below average hydroelectric generation. Luckily, the hydrologic year 1999-2000 is an average rainfall year. If next year is below average, up to one-half of the typical 20% of our electricity supply from hydroelectric plants will not be available.

A fourth uncertainty lies in the amount of power generated outside California that may be imported to our state. As the West has grown, so have electricity loads in neighboring states. My next chart illustrates population growth in the West. As population growth occurs, electricity demand increases.

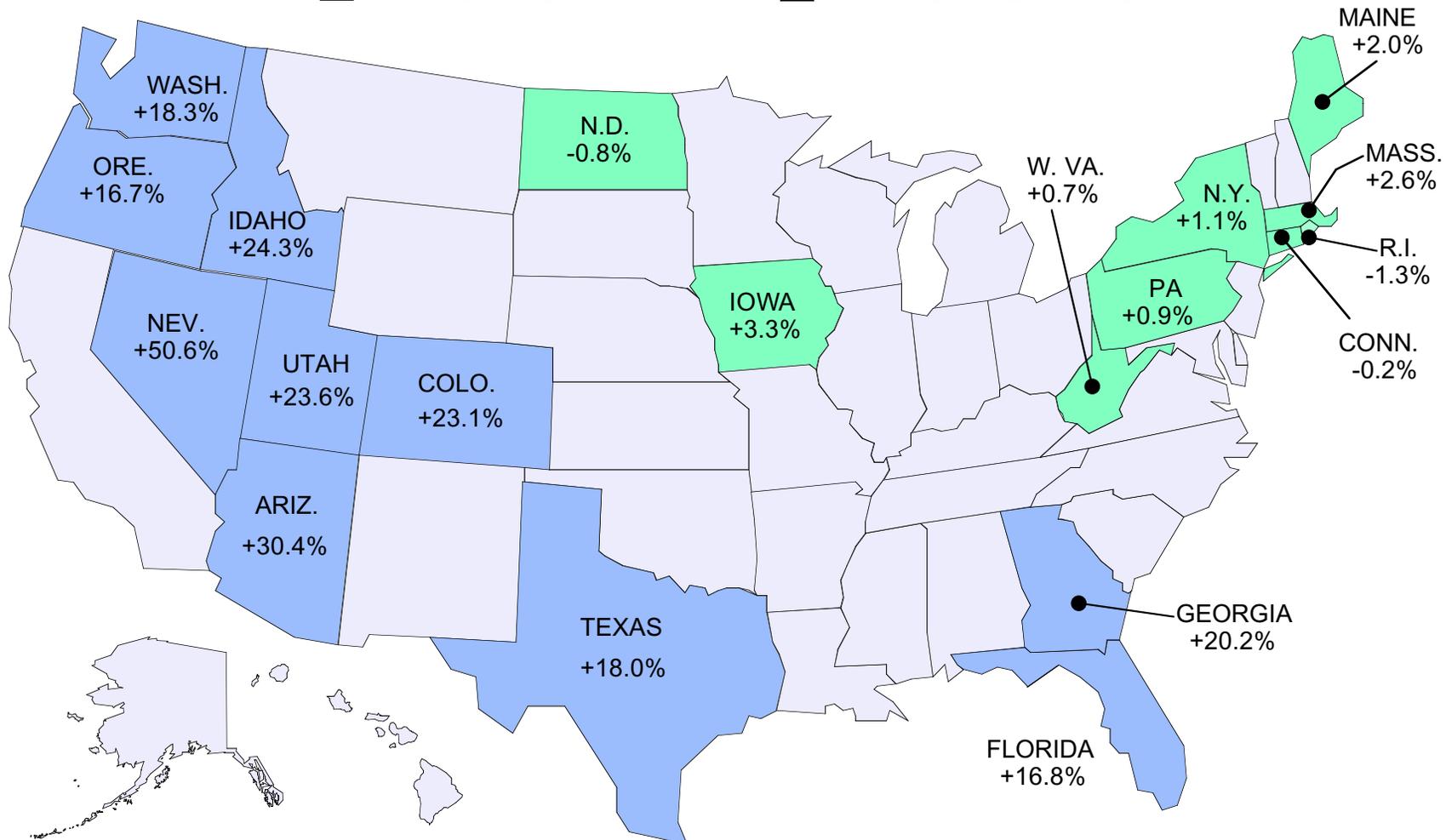


A Country in Transition

Percentage changes in population from April 1, 1990 through July 1, 1999

■ Fastest-growing states

■ Slowest-growing/shrinking states



GRAPHIC – STATE POPULATION GROWTH

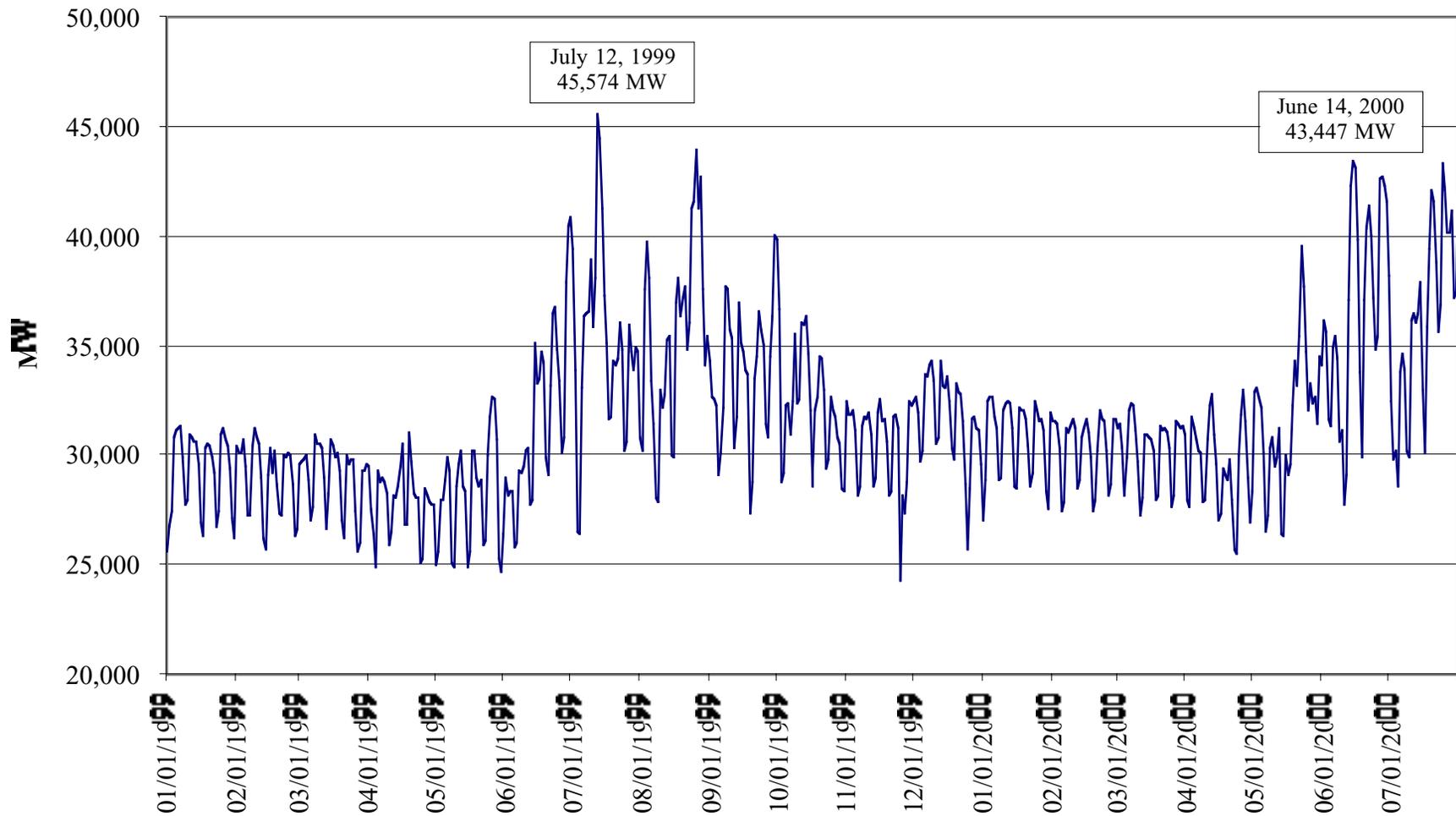
Western states as a whole have been the fastest growing areas of the U.S. during the decade of the 1990s. Only two non-western states, Georgia and Florida, have had growth rates comparable to the West. California is surrounded by fast-growing states. This growth impacts electricity supply in the West very significantly. In years past, California has imported about 20% of its electricity from neighboring regions. Both the Pacific Northwest and Southwest had excess generating capacity and it was less expensive to California consumers for the state's utilities to buy out-of-state power than to generate it within California. Population growth, however, has strained the ability of electricity supplies in the Southwest to meet their needs on very hot summer days, severely limiting net power sales to California. In fact, reserve margins in the Southwest are actually lower than those in California on hot summer days. In recent years we have seen reduced imports from neighboring states.

We are beginning to see competition for scarce resources with out-of-state buyers competing with California users for generation supplies.

To understand the nature of California's electricity system, and our current difficulties in meeting PEAK DEMAND, we must examine how electricity demand varies over the course of a year. We call the next chart an "electrocardiogram." It displays how demand varies over the time period January 1999 through the end of July, 2000 for the Cal ISO's control area. (The Cal ISO is about 85% of statewide peak demand, and about 75% of statewide electrical energy.)



Daily Peak Loads California ISO Control Area January 1999 - July 2000



GRAPHIC – DEMAND VERSUS TIME

Note that high demand is concentrated in the summer months. This illustrates the affect of high temperatures and air conditioning demand on electricity demand. Most of the year, peak demand ranges from 30,000 to 33,000 MW. In the summer, however, there may be days in which demand “spikes” to 45,000 MW, or higher. The implications of this profile are very significant to understanding why we need to undertake a PORTFOLIO of actions to solve our current problem.

Most of the year, California has far more generating capacity than we need. In fact, our reserves are about 50%. In other words, for about nine months of the year we have 50% more power plants than we need to meet demand. The result in our competitive market is typically low prices during the non-summer months (although equipment failures or late Fall heat waves can cause higher prices). Our problem is in the summer, when supplies are strained, and as we have seen, prices that are UNACCEPTABLY high.

The high demand periods in the summer may only last for five or six hours, but the prices during those times reflect the scarcity of generation. However, we cannot rely on the market to solve the problem of scarce generation by building more power plants UNLESS WE ACCEPT VERY HIGH PRICES DURING PERIODS OF HIGH DEMAND. The high prices are needed because the power plants operate only a relatively few number of hours, at times of peak demand. For example, in 1998 there were only 121 hours in which demand was above 40,000 MW in the Cal ISO control area. In 1999, the figure was 51 hours. So far in 2000, we have had 112 hours. Power plants of the type now being reviewed by the California Energy Commission must typically operate thousands of hours each year to earn enough revenue to cover their investment costs. Recent actions such as the CPUC’s decision to allow PG&E and SCE to purchase capacity products from the market, with appropriate safeguards as outlined in their decision, may help increase the quantity of generation expected to operate only on peak. We anticipate that the resources that will be forthcoming will complement the type of generating capacity that is proposed for licensing at the California Energy Commission.

We must not forget that a market has two components: a supply side and demand side. A well-functioning market will have both components. What have been seriously under-emphasized in our market development are efforts to evolve the demand side of the market. Efforts to increase demand responsiveness by providing consumers with the means to receive price information, rate designs that reflect true market costs, and opportunities for consumers to reduce load for compensation must be accelerated.

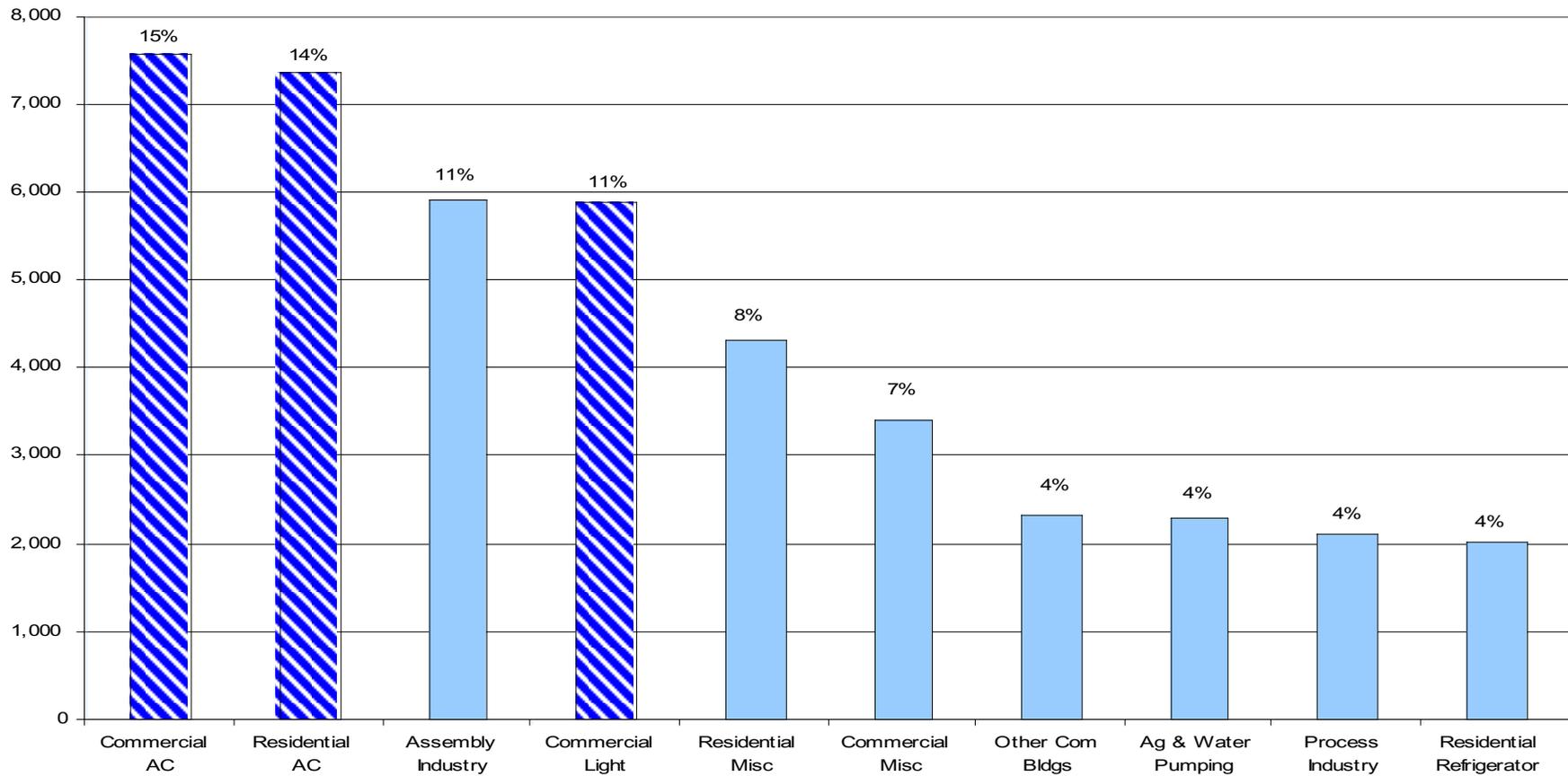
At the same time, however, we must recognize that some residential consumers cannot withstand periods of high prices. Consequently, we cannot blindly rely on the market itself to allocate electricity through the mechanism of cost, alone. We must be

sensitive to the needs of our low income and elderly, or other groups that cannot bear the impact on their budgets of prices that we have seen recently in San Diego. Rationing electricity solely on the basis of price is not acceptable.

A PORTFOLIO approach is needed. Our efforts to assure adequate electricity supplies and reasonable prices must operate on both the supply AND demand side of the market, with recognition that the approaches so perfect in theory must be sometimes tempered in practice to ease the impacts on some. Again, a PORTFOLIO of actions is needed since no single action will solve with this complex problem.



Statewide Peak Demand (MW) by Sector and End-Use



GRAPHIC – STATEWIDE PEAK DEMAND BY SECTOR AND END-USE

It is helpful to understand how we use electricity on peak because this explains why we have chosen to recommend certain actions. Our recommended actions should be considered complementary to the actions of others, including the ISO and CPUC. They are not in lieu of the actions of others.

Note that Commercial and Residential air conditioning account for 29% of statewide electricity use on hot summer afternoons, when we have our electricity peak demand. Commercial lighting accounts for another 11%. Taken together, these air conditioning and lighting end-uses account for 40% of electricity on-peak use.

In the very short run, voluntary load reductions are an essential part of a program to keep the lights on. I emphasize the voluntary nature of these actions. If we can reduce our air conditioning electricity demand by 5%, this is equivalent to over 750 MW on a statewide basis. This is another very large power plant. If we can reduce air conditioning by 10%, we have another 750 MW. A 10% air conditioning electricity reduction is approximately the energy requirements of 1.5 million Californians, who might otherwise face a rolling blackout. If businesses can reduce their lighting intensities by 10% on peak summer afternoons, they will free another 575 MW of generation. Combined, these simple efforts could provide the power needed by 2 million of our citizens.

State government has implemented a program of load reduction measures when the ISO calls for voluntary load reduction. The ISO has told us that their system operators could see the effect last week when state government electricity consumption began to drop.

Let us now turn to our recommended actions, which should be considered part of the PORTFOLIO of responses to our current electricity problem.



Reduce Demand for Electricity During Peak Periods

Efficiency Programs

GOAL: 600 MW reduced by June 2001 through implementation of efficiency programs

Demand Bidding

GOAL: 2000 MW of peak electricity use reduced by June 2001 to lower prices and avoid outages



Demand Reduction Programs

	MW Saved
1. Residential and Small Commercial Air Conditioner Maintenance	55
2. High Efficiency Air Conditioner Replacement for Residential and Small Commercial Customers	130
3. Large Commercial A/C Maintenance focused regionally in the San Francisco and San Diego areas	50
4. Residential Air Conditioner Cycling focused regionally in San Francisco and San Diego areas	180
5. LED traffic lights for Caltrans and Local Governments	165
6. Water/wastewater pump retrofit	160
7. Cool Communities/White roofs	100
8. Price Sensitive Thermostats/Lighting in San Francisco and San Diego	300

GRAPHIC – DEMAND BIDDING – EFFICIENCY PROGRAMS

As noted earlier, we believe it is absolutely critical to replace the contracts now in place between the state's investor-owned utilities and large consumers that have given the utility the right to interrupt the customer's power demand in exchange for lower rates. This has proven to be an essential resource for maintaining the power grid the last few summers. We believe a goal of 2000 MW of peak demand reduction through load bidding is achievable by next summer. We pledge to work with the ISO, CPUC, and EOB to design and implement such a program by next summer. I want to emphasize that such a program would compensate parties for the costs incurred in reducing load, would help to avoid outages AND would lower prices.

Let me illustrate how all electricity consumers would benefit through the price lowering affect. Using actual price data from the PX, on a representative day in August, 1999 before prices reached the extreme levels seen this year, if total electricity demand was reduced by 5%, market clearing prices would have fallen from \$225 to \$185/MWh. This relatively small change would have reduced electricity purchase costs by about \$2.5 million. In one sense, reducing the demand was the equivalent of avoiding the purchase of power at \$1470/MWh, a price far higher than we have yet seen in our market, especially given the current price caps of \$250/MWh. The potential benefits to all consumers are large and worth pursuing.

We believe that TARGETED Energy Efficiency programs could be in place and produce initial results by next summer. We estimate savings on the order of 600 MW could be achieved in the short run, with larger savings in future years. We have estimated the impacts in the San Francisco and San Diego regions to illustrate what could be achieved if they were the first areas targeted for these programs. The last page of my presentation shows our estimate of the demand reduction from programs that target air conditioning, lighting, pump retrofits, building designs that reflect heat (not absorb heat) and retrofits of low electricity consuming light emitting diode traffic signals. We believe our savings estimates are quite modest for some of the activities, and are here to illustrate what could be achieved through modest efforts.

In conclusion, a PORTFOLIO of actions is needed to relieve the pressure on our severely strained electricity system. Our response must include actions that will produce results by next summer, over the next several years, and in the five year and beyond time frame.

We have only touched on a few prospective California Energy Commission initiatives. Other participants here today will likely add to the list of actions. Time is truly of the essence. We must consider the summer of 2000 as preparation for potentially even more serious conditions in the summer of 2001. **We must act.**

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