



# **Developing a Portfolio of Energy Efficiency and Demand Response programs to Solve a Reliability Crisis: The California experience**

**Prepared by Mike Messenger  
California Energy Commission  
ACEEE Symposium on Market Transformation  
Washington, D.C.  
mmesseng@energy.state.ca.us**

**March 25, 2002**

1



## **Outline of my Talk**

- ∩ Discuss Energy Problem faced by EE administrators in mid 2000.**
- ∩ Discuss process of developing a portfolio of short and long term program responses to solve problem**
- ∩ Discuss results of EE and DR programs known to date**

2



## **What was the Problem to be “solved” by EE/DSM programs ? ( fall of 2000 perspective)**

- ∩ **Demand levels were not responsive to hourly increases in wholesale electricity prices**
- ∩ **Funding was scarce- Utility program administrators faced bankruptcy and irate customers due to disconnect between wholesale and retail prices**
- ∩ **Strong pressure to do something useful**

3



## **Constraints on Solutions**

- ∩ **State agencies and utilities not used to developing and implementing programs in 1 to 2 month time period**
- ∩ **Sense of panic, generators have “Californians by the shorts”**
- ∩ **Legislature prepared to step in and fund massive programmatic efforts but who should decide where funds should go?**

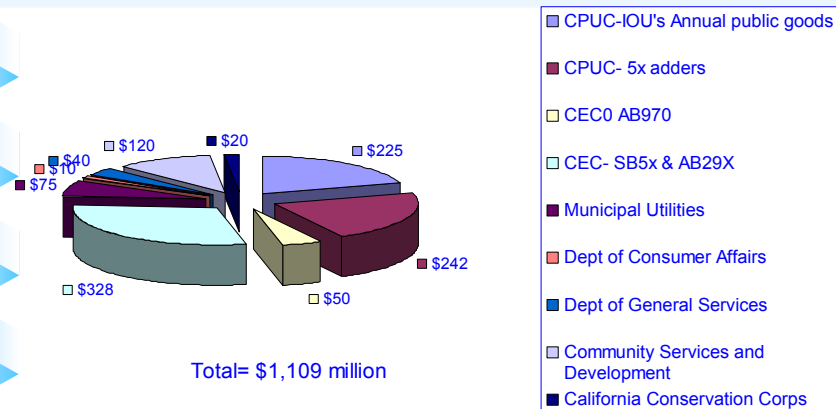
4

## Interim Funding solution

- ⌚ **Authorize \$1,100 million in funding for several different agencies and existing program administrators**
- ⌚ **Attempt to coordinate agency/ utility program efforts through Governor's office.**

5

## CA Energy Efficiency Program Administrator funding-2001 \$ millions



6

## Demand Response Programs Exist to Encourage Reductions in Electricity Demand Over a Continuum of Time Frames.

- **Minutes to Hours**
  - Load Control Programs
  - Demand Response Programs
- **Weeks to Months**
  - Retrofit Energy Efficiency Programs
- **Months to Years**
  - Building Standards Programs
  - New Construction Programs

CALIFORNIA ENERGY COMMISSION

## Important Portfolio Questions

- Ω **Should the program's reduce wholesale prices, help customer's manage bills, build infrastructure, or recruit curtailable loads to deal with anticipated shortages during the summer of 2002?**
- Ω **What is the appropriate mix of short term ( advertising to stimulate behavior change) and long term ( investment in EE equipment, better pricing metering infrastructure) programs**

8



## **Criteria for Developing Portfolio of programs at the CEC**

- ∩ **Spend 50% of funds to get short term peak reduction results; media and load curtailment on peak**
- ∩ **Spend 30% of funds on more efficient equipment used during peak savings- AC/ lighting rebates**
- ∩ **Spend 20% to develop longer term infrastructure to prevent or reduce chances of future blackouts: (eg Interval meters, dynamic pricing, cool roof programs)**

9



## **CA Programs to Encourage Short Term reductions or Shifts in Peak use**

- ∩ **Programs funded to meet this objective**
  - **Flex your power campaign**
  - **LED traffic lights**
  - **Lighting and HVAC rebates by utilities**
  - **DR programs- Voluntary curtailment in exchange for curtailment notification platforms, EIS systems and gateways. pilot tests to verify MW reduction capability**

10



## **Programs to Provide more information on prices and feedback on daily energy use to customers**

- **Demand response- Notification platforms and EIS systems- automate control response**
- **Interval Meters for customers above 200kW**
- **Pilot critical peak pricing programs in SMUD and SDREO areas**
- **Demand response systems for commercial chains**
- **20/20 Program ( monthly)**

11



## **Programs to Stimulate investment in more Efficient Building systems**

- ∩ **Cool Roofs- Rebates for high albedo roofs**
- ∩ **State Buildings and Public Facilities**
- ∩ **Local government loans**
- ∩ **Water/ Wastewater Pumping facilities**
- ∩ **Agriculture irrigation and pumping**

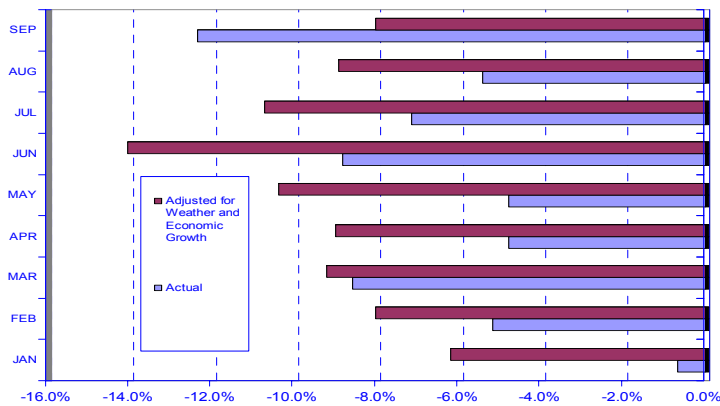
12

# Program Results

- ∞ **Statewide Peak Load Drops**
- ∞ **Verified Results by Program Type**
- ∞ **Sustainability of Demand Response Programs**

# Statewide Monthly Peak Reductions in 2001

Monthly Peak Demand Reduction in 2001  
(Percent Change 2000 to 2001)



## Update on Conservation Persistence in CA

### February CAISO Load statistics- MW

	2000	2001	2002	% Diff (00-02)
Actual Metered Load	32,071	30,414	31,662	-1.3
Load Adjusted for Weather	31,257	29,617	30,751	-1.6
Load Adjusted for Growth an	32,195	29,617	30,751	-4.5

15

## Program Goals vs Actual Savings

### Programs to Reduce Peak Demand in Short term

Program Name	MW Summer 2001 Goal	MW Verified by 9/01	Funding \$ Millions
Flex your Pow er *	1000	2416	50
LED Traffic Lights	6	3.6	10
Lighting and HVAC rebates ( munis)*	35	25.6	40
Lighting and HVAC rebates ( IOU's)*	115	104.3	110
Voluntary Demand Response (CEC)	50	103	15
subtotal	1206	2652.5	225

\* No explicit estimate of savings available, = total ob peak reduction - program sav

16

## Programs to Stimulate more long term investment in Energy Efficient Buildings and Pumping Systems

Program Name	Summer MW goal	Verified MW by 9/01	Funding- \$ millions
Cool Roofs	24	4	6.5
State Buildings	50	40	5.5
Local Government Loans	20	2	49.5
Water/Wastewater pumping facilities	45	44	16.3
Ap pumping Retrofits	22	33	30
Innovative Program	122	34	48
subtotal	283	157	155.8

17

## Programs to Provide more frequent Price Signals and Energy Use Feedback to Customers

Program Name	Summer MW goal	Verified MW by 9/01	Funding- \$ millions
Interval meters with comm links to internet EIS displays	500	100-450 est	34
Critical peak pricing pilots	2	Not complete	2
Smart Thermostats	15	Not complete	12
subtotal	517	200	48

18

## Summary of Peak Savings (6/01) and 2001 Spending by Program type

Program Objective	2001 MW goals	MW Verified	Spending \$ millions	Spending as % of total
Stimulate Short term Peak reductions	1206	2725	225	52.7%
Stimulate EE investment by rebate *	283	159	154	36.1%
Build Infrastructure for more frequent feedback and price signals to customers*	517	200	48	11.2%
Total	2006	3084.3	427	

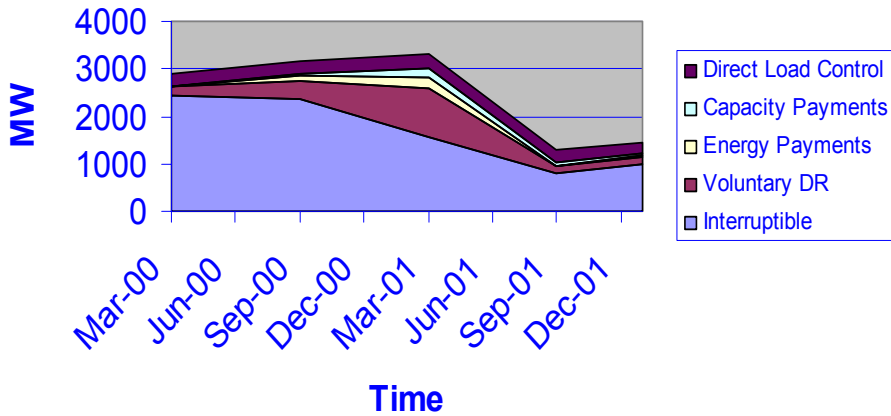
19

## What is needed to make the Electricity Market More Demand Responsive?

- ⌚ **A functional wholesale market design**
- ⌚ **Customer Awareness of Wholesale Price Signals**
- ⌚ **Technology that adjusts demand levels in response to price changes and customer preferences**
- ⌚ **Ability to communicate system emergency conditions to users and technology to respond based on customer input**

20

## MW Capacity from Demand Response programs over time in CA



21

## New Programs that Promote both long term energy savings and DR capability

- Ω **Market Enhanced Automation as a means of controlling bills- not just a reliability message**
- Ω **Allow customers to control energy usage from a central location for chain stores**
- Ω **Three active marketers in field- lots of customer interest. \$ 5 million in funding to install controls and EIS systems**

22

## Conclusions

- ∩ **Possible to Promote both increased Demand Response (thru Drprogram and rates) in short term and long term (thru Energy Efficiency programs)**
- ∩ **DR programs are not likely to be sustainable without Dynamic pricing**
- ∩ **Some customers strongly support dynamic pricing ; helps to increase interest in EE programs**