

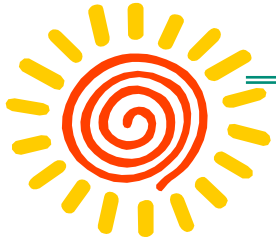


Renewable Power in California

Challenges and Opportunities in the Electricity Market

Tim Tutt
Manager (Acting)
Renewable Energy Program





Here's The Story

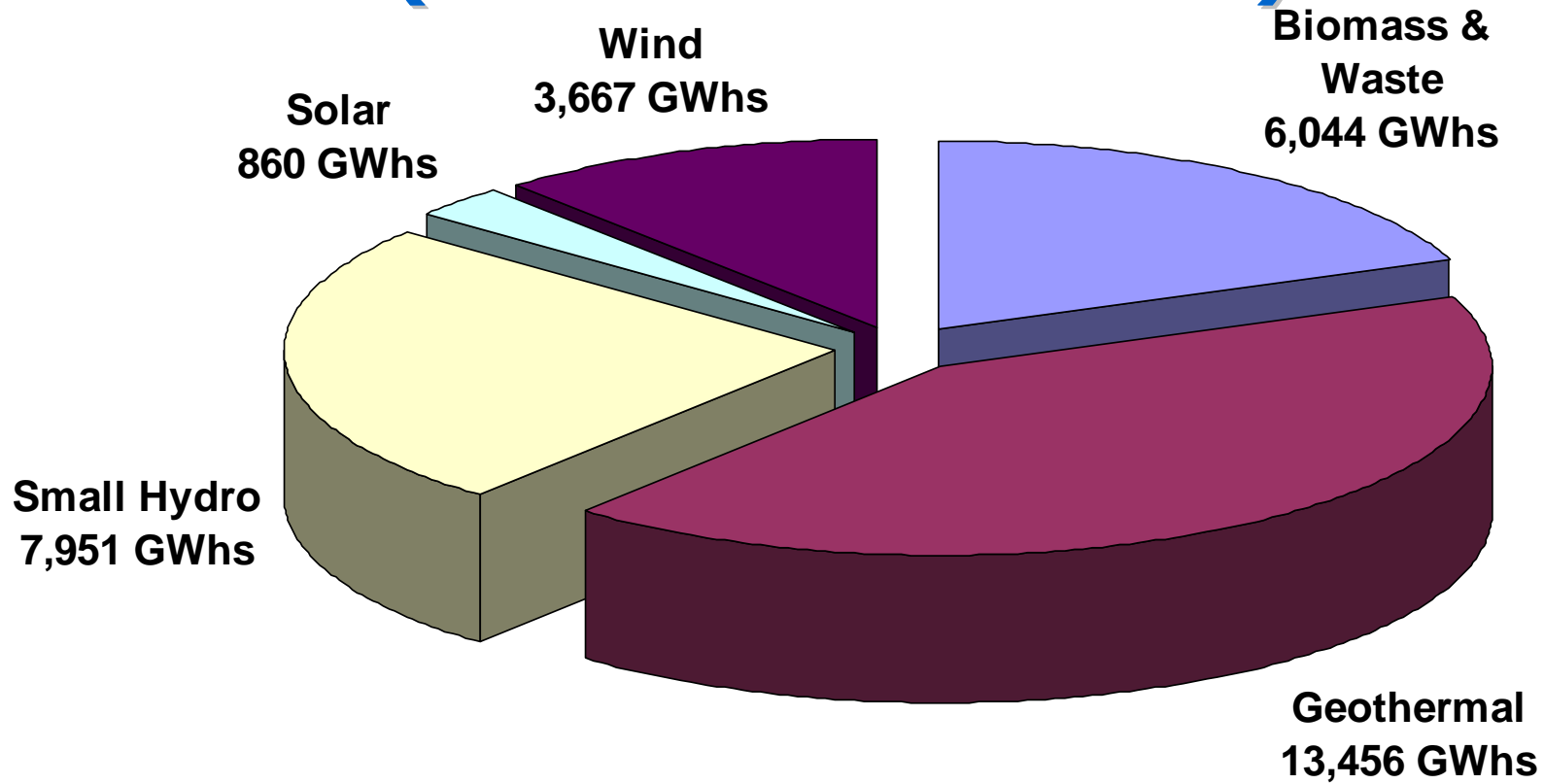
- **Background**
- **Crisis**
- **Aftermath**
- **Future**



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California's Renewable Energy (31979 GWh in 2000)

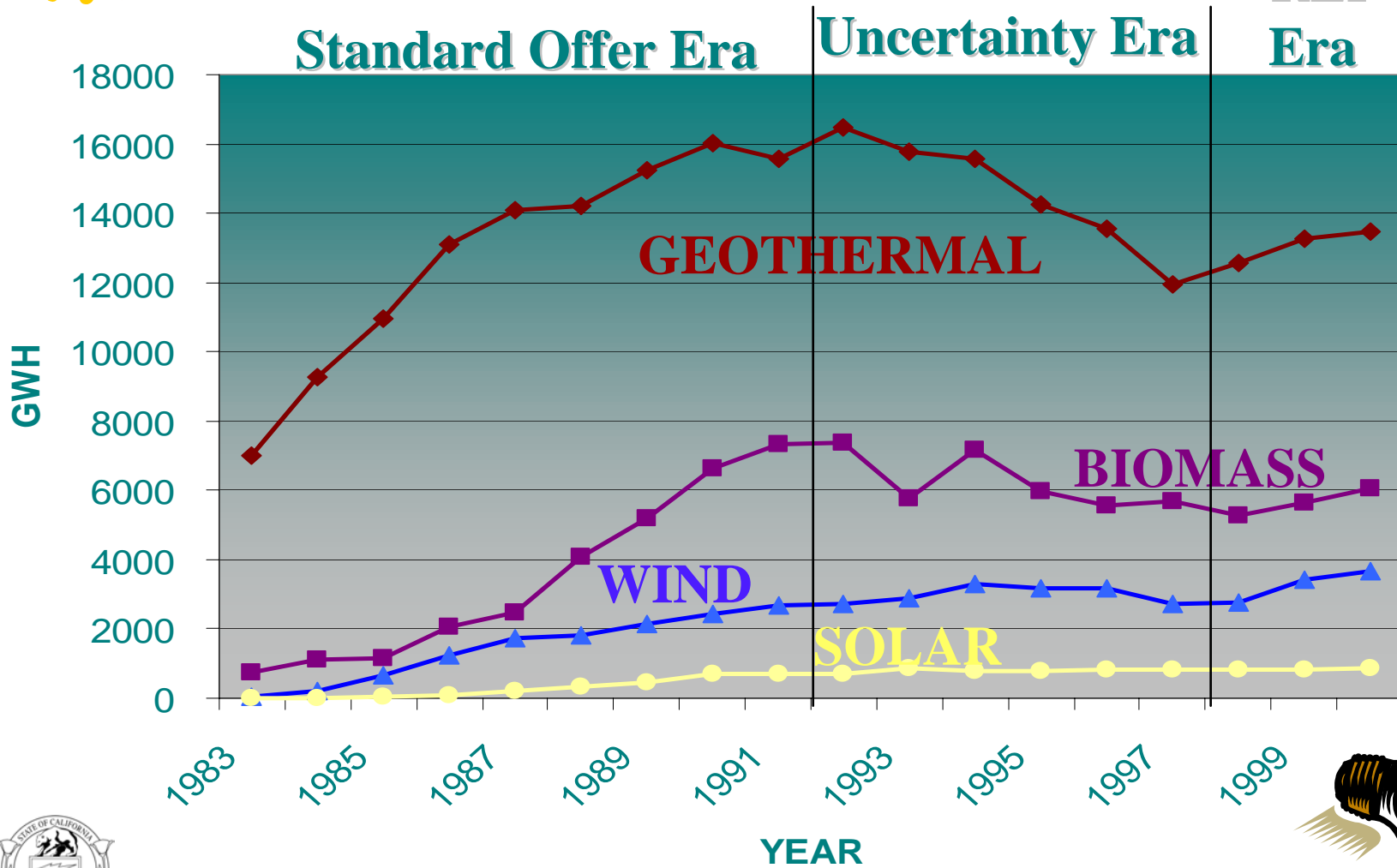




Renewable GWh By Type

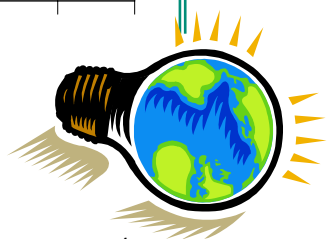


REP
Era



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Renewable Energy Program





Renewable Energy Program



- AB 1890, passed in September 1996, allocated \$540 million; ordered CEC Policy Report
- SB 90, passed in November 1997, detailed funds as Support for:
 - Existing Power Plants
 - Development of New Power Plants
 - Emerging Renewable Technologies Such as Solar Photovoltaics
 - Consumer Purchases of Renewable Power
 - Consumer Education About Renewables
- Program Started in 1998

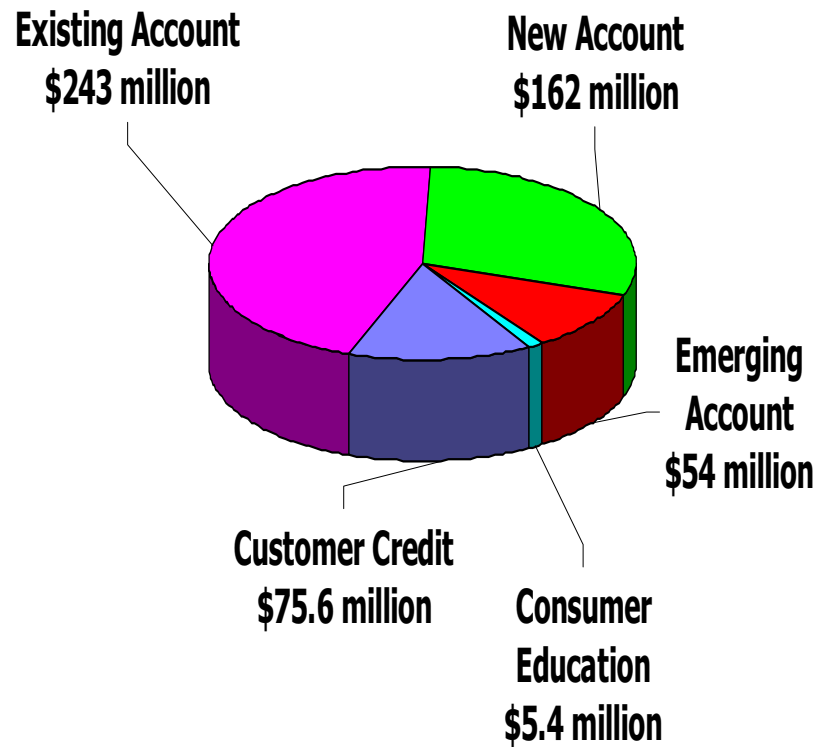


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REP: Operating Principles

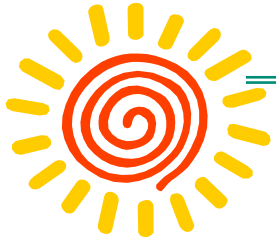


- Ties to Market Prices and Activity
- Pay For Performance
- Address Demand as well as Supply
- Flexibility To Change With Market
- Minimize Administrative Costs
- Target Funds Where Needed



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Story - Continued

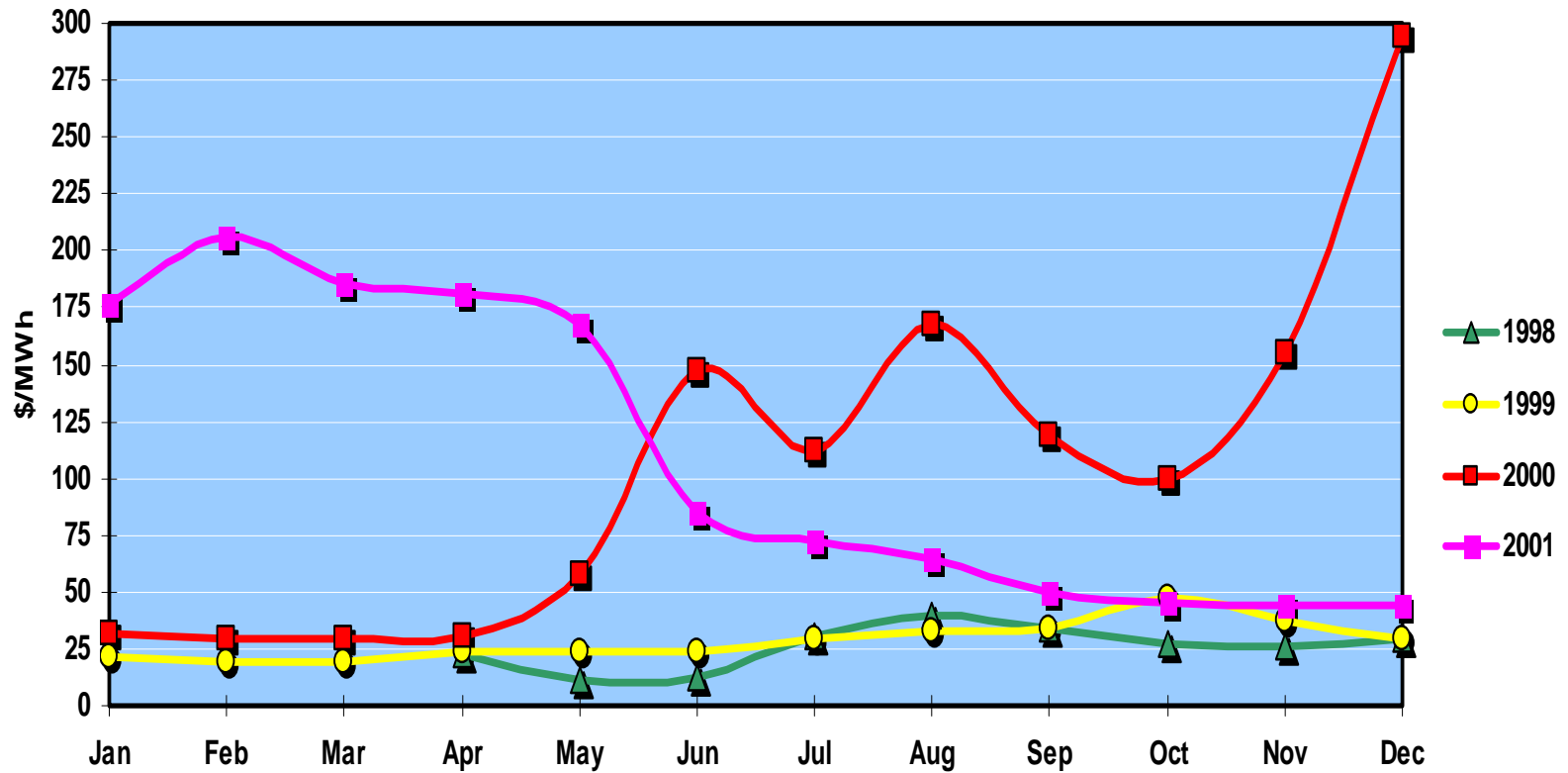
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California Electricity Prices



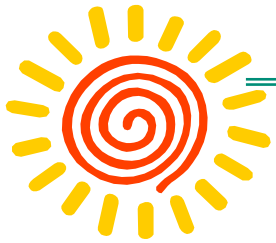
Sources: 1998-1999 PX Market Clearing Price
2000-2001 ISO Market Analysis Report, July 20, 2001



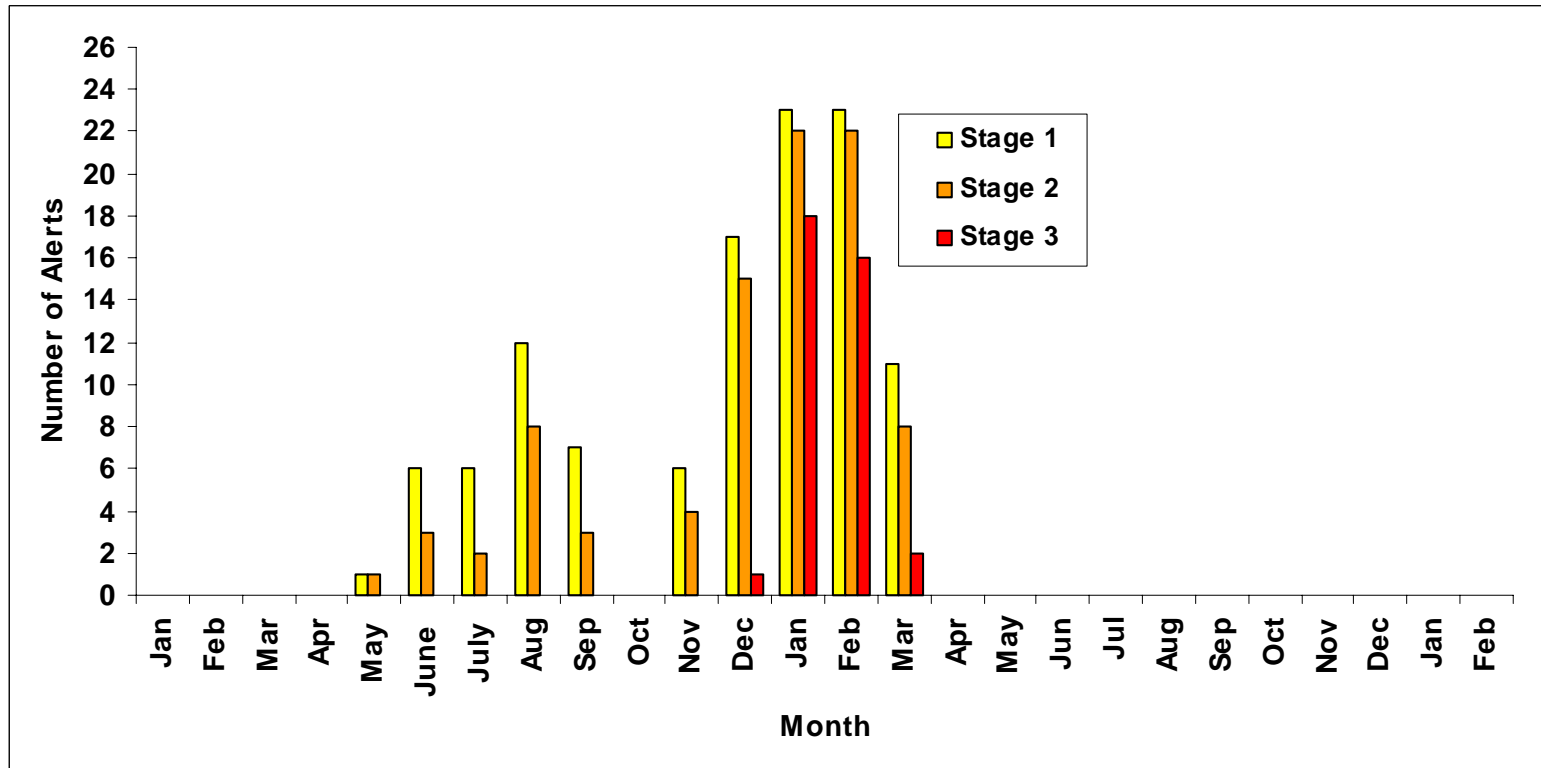
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ISO Declared Emergencies - 1/00 to 2/02

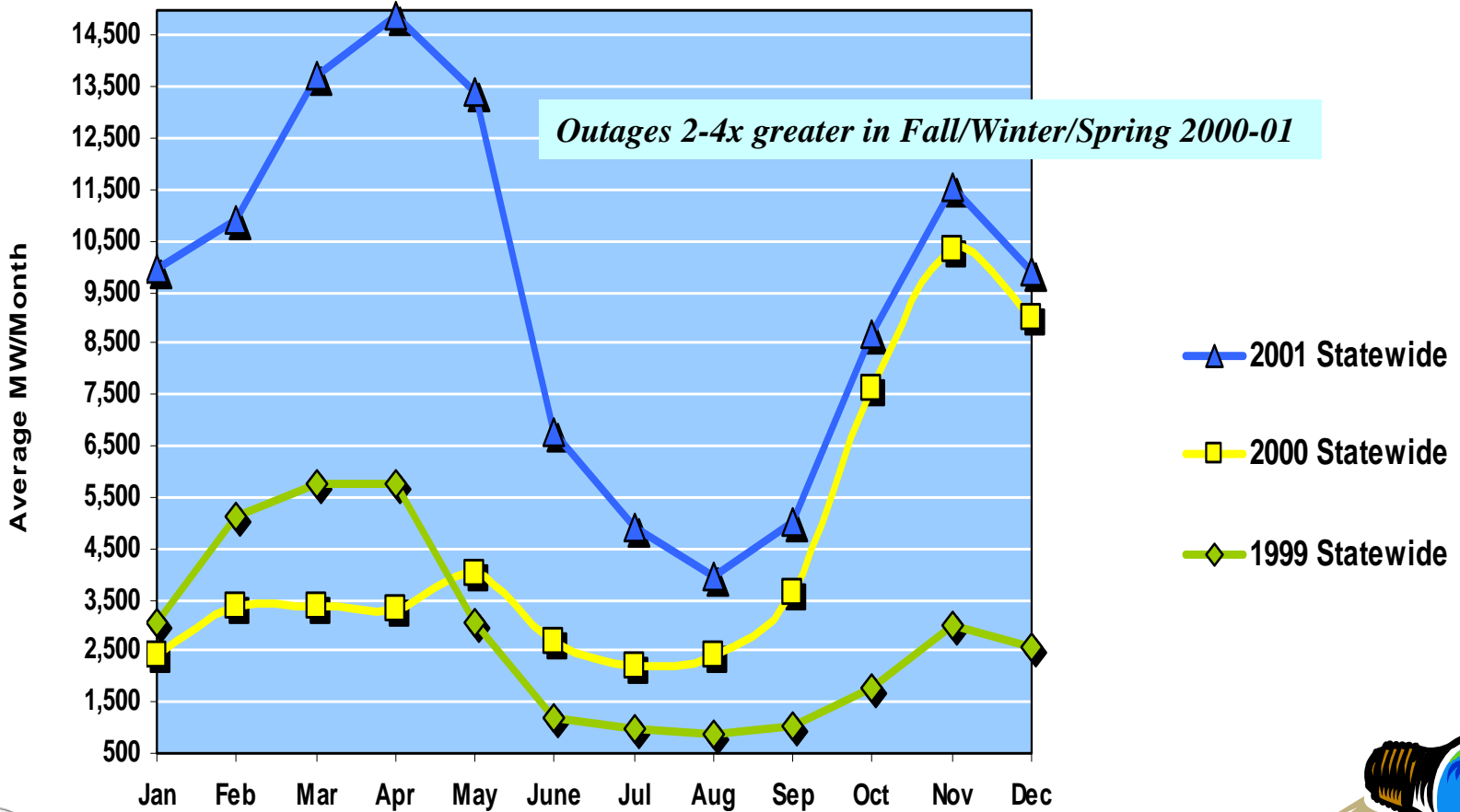


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Historical Generation Outages Scheduled and Forced (Average MW/Month)



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Renewables in the Crisis

- 130 MW of Biomass came back on-line
- 200 MW of New Renewable powerplants on-line
- Wind generation came on just in time on at least 2 occasions
- Existing Renewables continued to generate during financial crisis



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Story - Continued

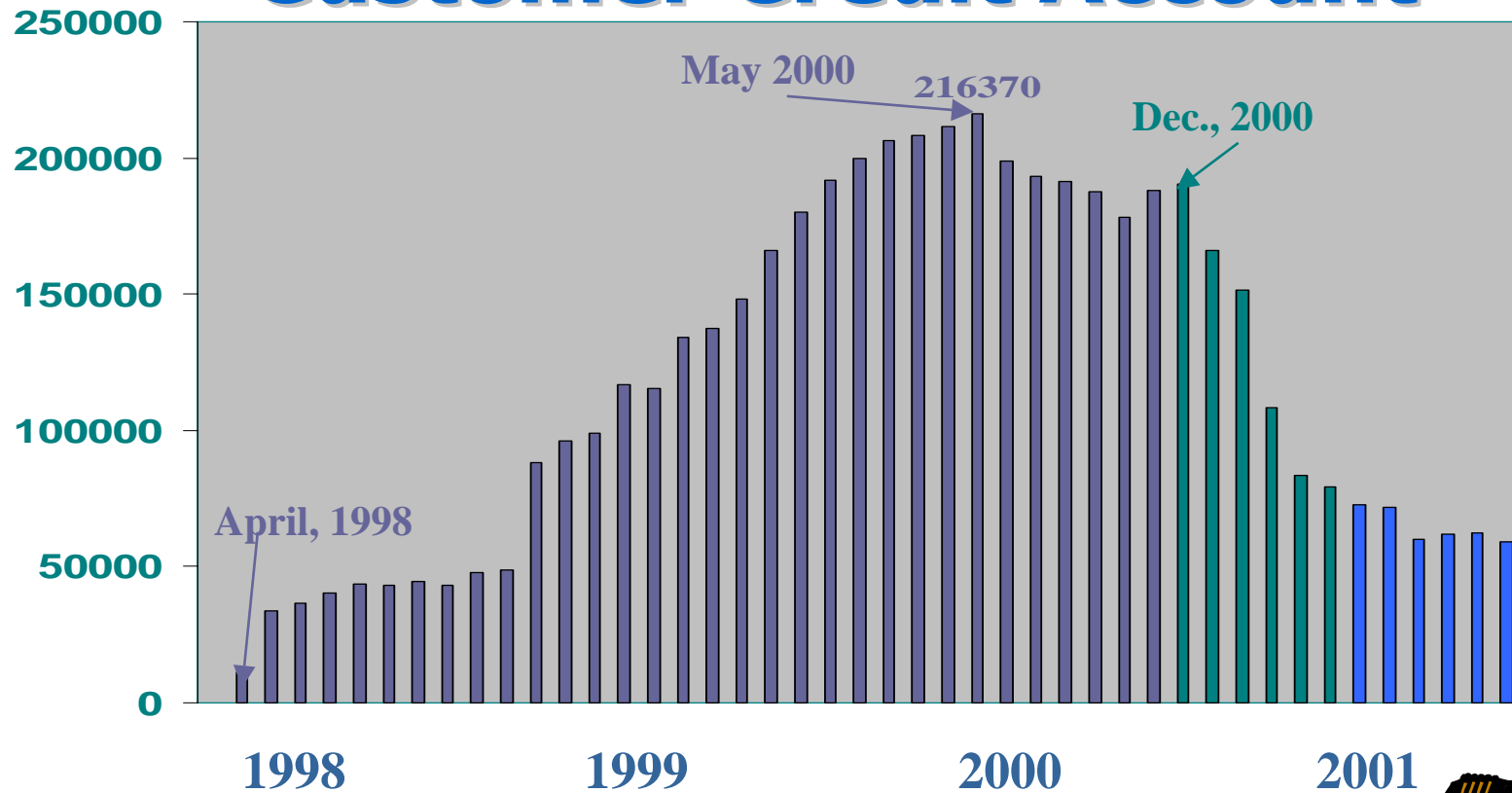
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Green Market: Customer Credit Account



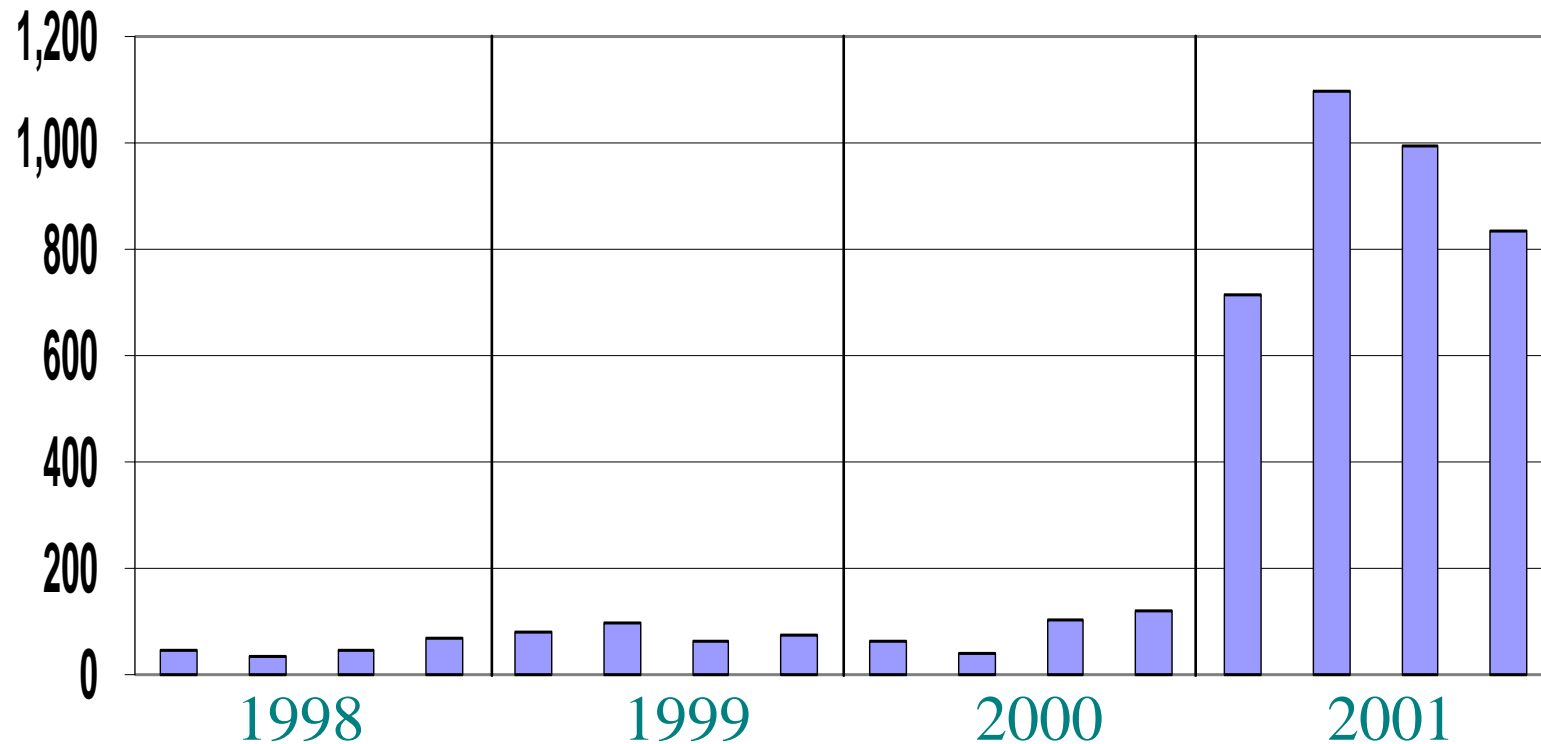
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Buydown Activity: Quarterly Reservations

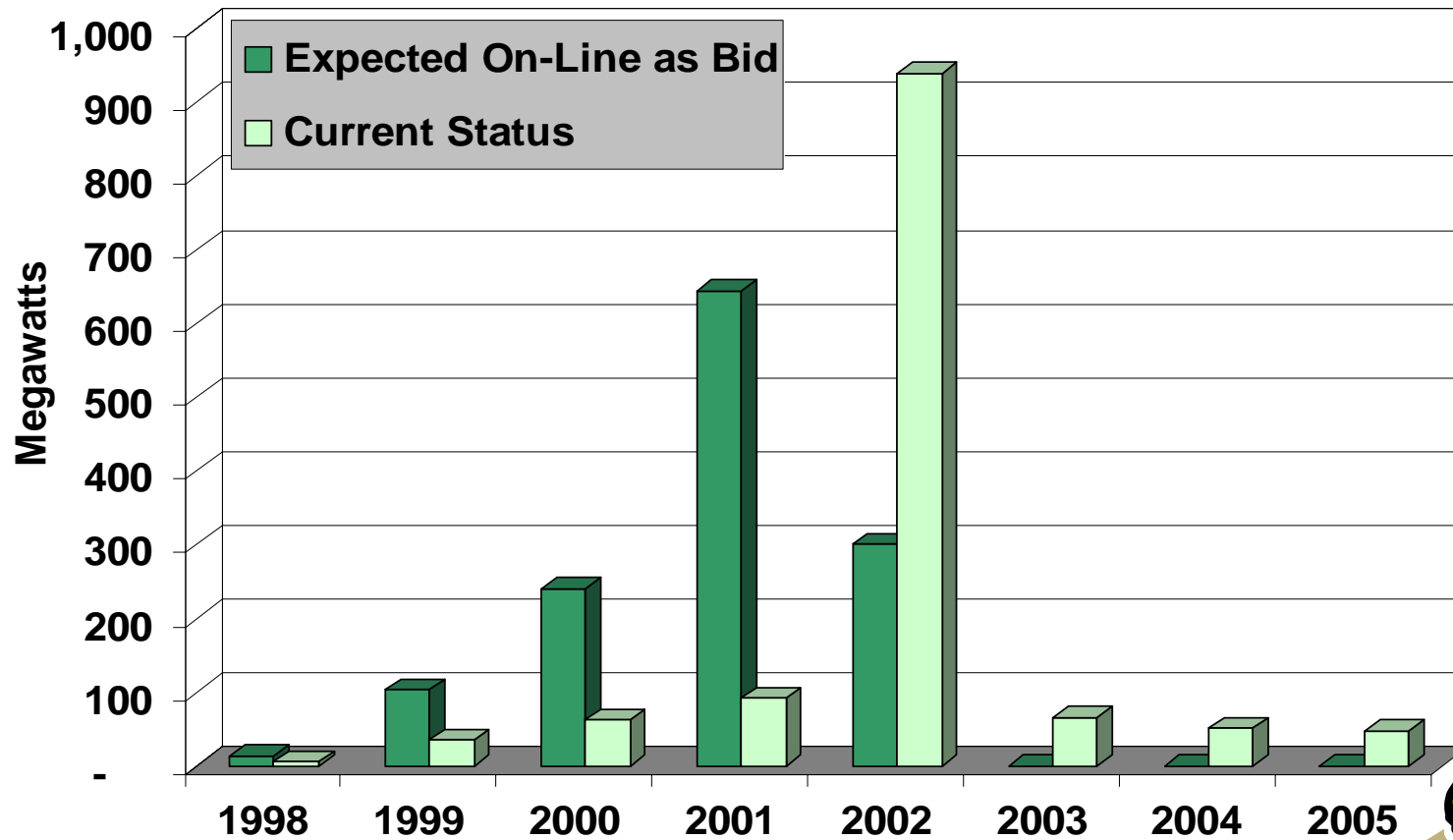


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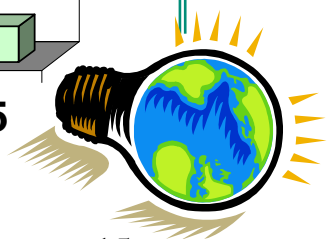


New Account: On-Line By Year



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Existing Renewables

- Most Now or Soon-to-be Covered by Fixed-Price 5-year Contracts at 5.37 cents/kWh plus capacity payments
- Exceptions:
 - Facilities that had moved to competitive market, no longer under Standard Offer contracts
 - Biomass Facilities that returned to service in 2001
- These facilities will probably receive similar deals



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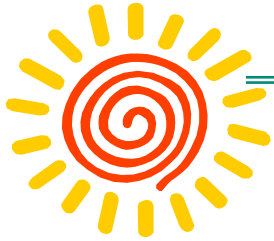


Story - Continued

- Background
- Crisis
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INVESTMENT PLAN

Where We Are Going

GOAL: Pursue investments in renewable resources to achieve self-sustaining renewable energy supply.

- Investment Plan recommends allocation and distribution of \$675 million collected 2002 - 2006

“Investing in Renewable Electricity Generation in California”

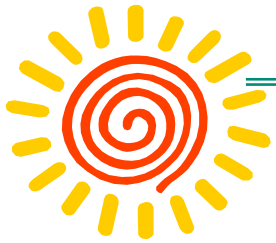
- Plan establishes numerical targets for ramping up percentage of California’s electricity generation from renewables

12% in 2002  17% by 2006

- Plan contains built-in flexibility to respond to market changes

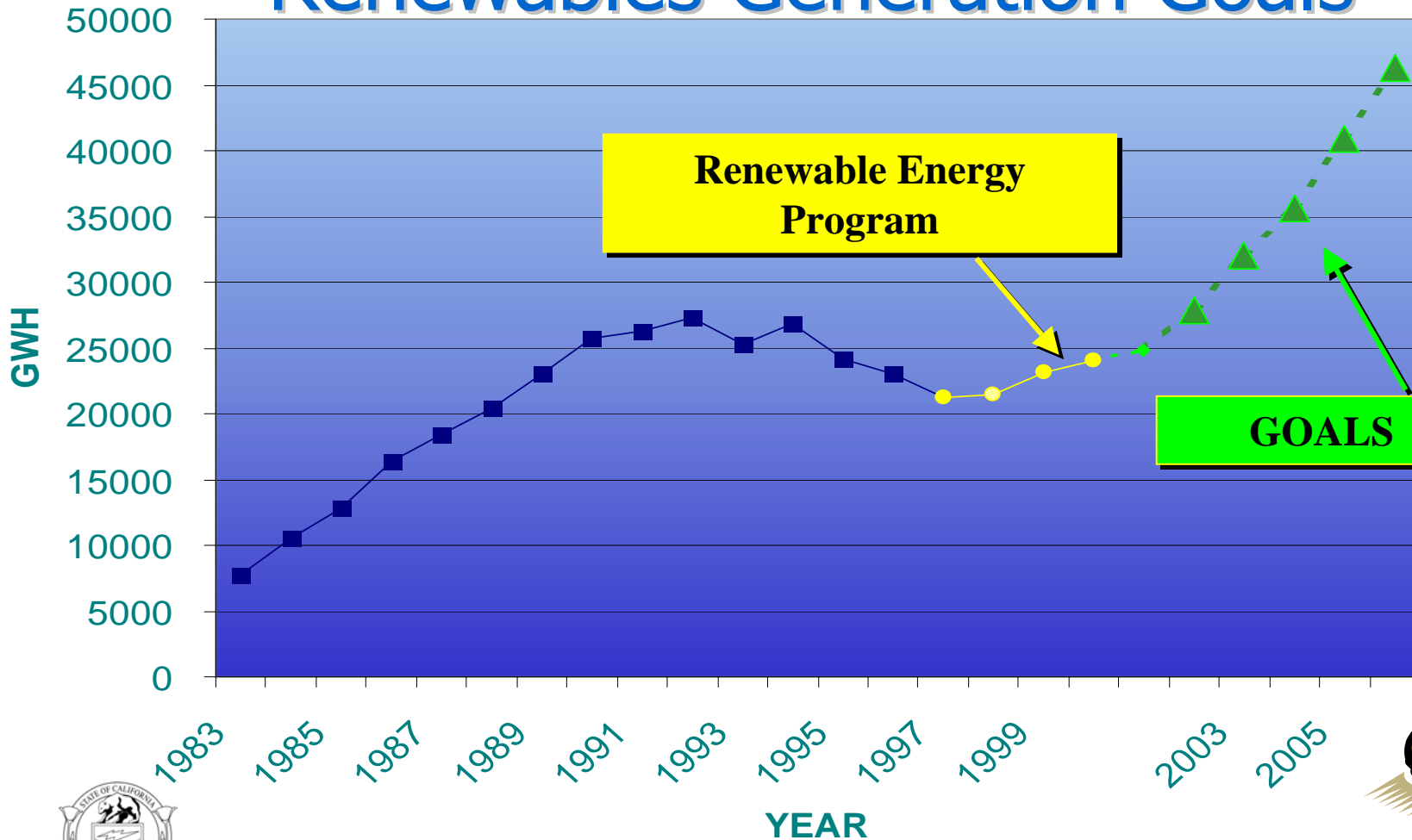


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INVESTMENT PLAN

Renewables Generation Goals



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Renewable Energy Program





Other California Policies



- CPUC Self Generation Program
- California Power Authority Investment Plan
- Solar/Wind Income Tax Credit
- SF Solar bond Issue

- Possible Renewable Portfolio Standard
- Research and Development - PIER



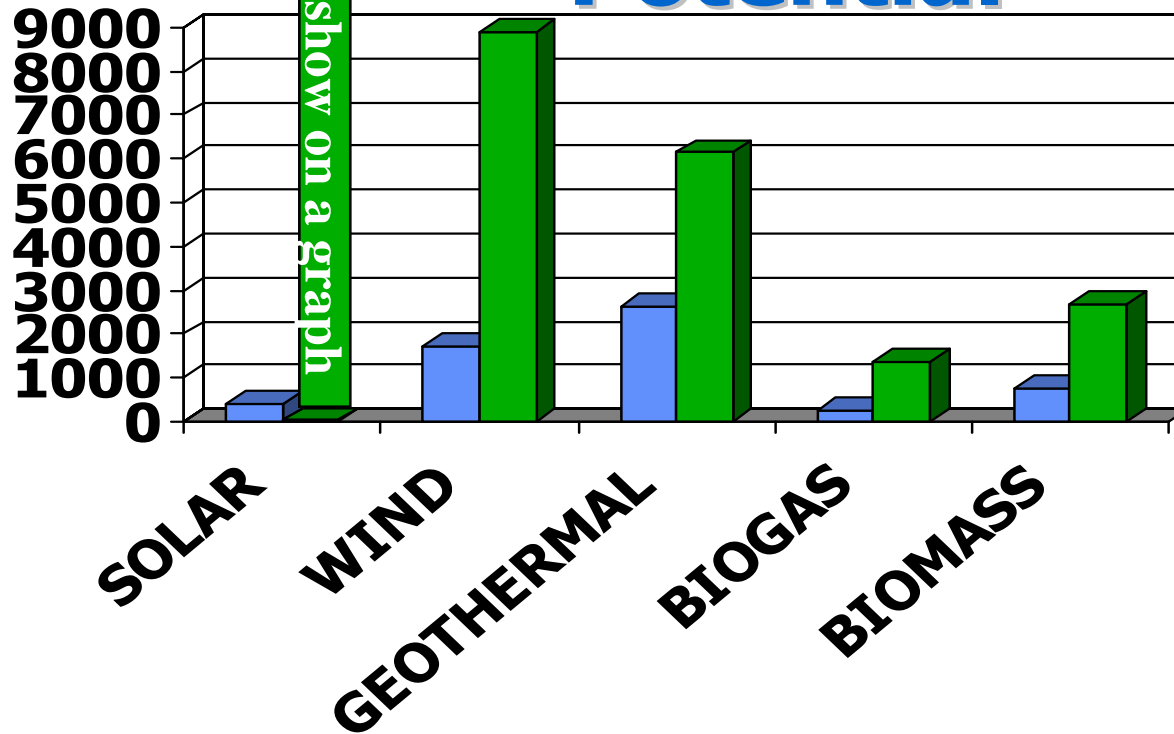
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California Renewables: Installed VS Potential

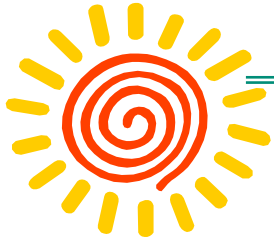
MW



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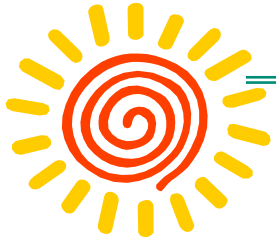
Down the Road



- Technology Improvements
 - Cost Reductions
 - Increased Efficiency
 - Reduced Maintenance
- Enhanced System Value
 - Nexus Between Resource and Need
 - Secondary Benefits: e.g. - Cooling Reductions
 - Reactive Power ---- Electronically
 - Spinning Reserve ---- Distributed PV
 - Reliability --- Multiple distributed renewable systems



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Conclusions

- In the Near Term - Look for significant expansion of Renewable Supply In CA
- In the Long Term - Look for significant role for renewables - particularly distributed renewables - in a quite different electricity market structure
- For more information:
 - **Tim Tutt -- (916) 654-4590**
 - **www.energy.ca.gov/renewables**



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