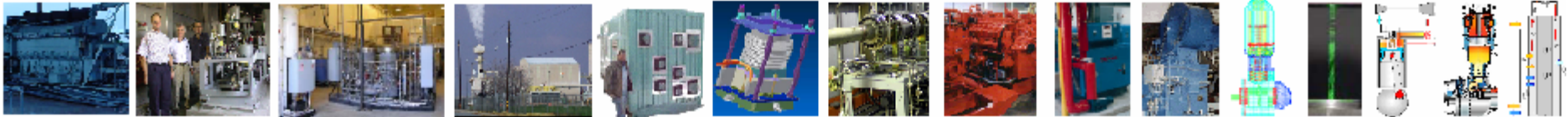




# California Energy Policy: Influence on Combined Heat and Power



## Second Annual Waste Heat to Power Workshop Beckman Conference Center February 15, 2006

**Arthur J. Soinski, Ph.D.**

Team Lead

Environmentally-Preferred Advanced Generation (EPAG)

Public Interest Energy Research (PIER) Program

California Energy Commission





# Public Interest Energy Research (PIER) Program

- **Established in 1996 as part of Electricity Deregulation** (Assembly Bill 1890; with subject areas for PIER identified in 1997 by Senate Bill 90)
  - RD&D must benefit electricity ratepayers
  - \$62.5 million/year from surcharge on IOU ratepayers
  - Between 300-400 active projects
- **Expanded in 2005 when the California Public Utilities Commission (CPUC) gave the Energy Commission administration for natural gas research**
  - Initially \$12 million/year
  - Expected to grow to \$24 million by 2009



# Environmentally-Preferred Advanced Generation (EPAG)



- **Mission:** Enable efficient, clean power and heat for California industry and buildings.
- **Vision:** On-site generation (or Distributed Generations) will be as attractive as grid-supplied electricity.
- **Program Area Objectives:**
  - Develop a portfolio of technologies that provide customers a choice in meeting electrical and thermal needs.
  - Beat grid-supplied electricity with respect to cost effectiveness, efficiency, fuel flexibility, and emissions of pollutants and greenhouse gases.
  - Support revolutionary and game changing concepts.



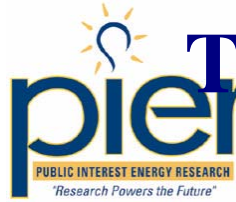


# The Legislature Formulates and Implements Policy



## Some Relevant Legislation

- **SB 90 and AB 1890 Electric Utility Restructuring or Deregulation**
- **SB 1298 (Bowen and Peace) Distributed Generation Emissions Standards**
  - Requires the California Air Resources Board (CARB) to adopt a certification program and uniform emission standards
  - New Natural Gas Combined Cycle Power plant as BACT
- **SB 1078 (2002) Renewable Portfolio Standard (RPS)**
  - Renewables 20% of generation by 2017; accelerated to 20% by 2010



# The Governor Issues Executive Orders and Policy Statements

- **Ten Point Electricity Plan**
- **Reduce Greenhouse Gas Emissions to 1990 Levels by 2020 (EO S-3-05 (July 1, 2005))**
- **California should encourage DG and CHP because “it can occur at load centers, reducing the need for further infrastructure additions” (August 23, 2005 letter)**
- **Develop California Hydrogen Highway Blueprint Plan (EO S-7-04 (April 20, 2004))**



# Governor's Ten Point Electricity Plan



1. 15% Reserve Margin
2. Open, transparent procurement process
3. Rate Relief – Equitable allocation of system costs
4. Rate Relief – Equitable allocation of system costs
5. Renewable Energy – 20% by 2010
6. Renewable Energy – 20% by 2010
7. Energy Efficiency – Improve 20% by 2010
8. Energy Efficiency – Improve 20% by 2010
9. Research & Development – Invest in emerging technologies that improve efficiency, effectiveness and environmental impact
10. Research & Development – Invest in emerging technologies that improve efficiency, effectiveness and environmental impact



# Energy Action Plan (EAP)

- Goal: Ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies...are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound....

(CEC, CPUC and CAPCFA, 2003)



# The Loading Order Policy: Ensuring Adequate Electricity Supply



- **Energy Efficiency and Demand Response**
- **Renewable Resources**
- **Distributed Generation, including  
Combined Heat and Power**
- **Clean and Efficient Fossil-Fired  
Generation**
- **Upgrade Transmission and Distribution  
Systems**






## **EAP II: Implementation Roadmap for Energy Policies (2005)**



- **Reaffirmed Loading Order**
- **Energy efficiency is the least cost, most reliable, and most environmentally-sensitive resource**
- **Demand response and dynamic pricing tariffs**
- **Long term transportation fuels plan by March 31, 2006**
- **30 GW of clean energy across the west by 2015**



## 2003 Energy Report

- 
- Create a transparent distribution planning process addressing the utility benefits of DG and CHP
  - Observation: 2,000 MW of CHP could shut down as generation contracts signed in the early 1980s expire



## 2005 Integrated Energy Policy Report

- **Loading Order Revised!:** “CHP deserves its own place in the loading order.”
- **“CHP can be considered a viable end use efficiency strategy for California businesses.”**
- **“CHP is the most efficient and cost-effective form of DG.”**
- **“The benefits of DG go far beyond actual generation.”**
- **“CHP has significant market potential, as high as 5,400 MW, despite high natural gas prices.”**



**2005 IEPR**

## **Recommended Initiatives for CHP**



- **Improve access to wholesale markets and streamline utility long term contracting for CHP**
- **Allow CHP owners to sell power at reasonable prices at the retail level**
- **Utilities should offer CA ISO scheduling services at no cost**
- **CA ISO should modify its CHP tariffs in recognition of its unique operational requirements**
- **CPUC should require IOUs to buy electricity through standardized contracts at their avoided cost**



## 2005 IEPR Recommendations: Incentives for Utilities



- **Utilities should be compensated for revenue shortfalls to the point of being revenue neutral**
- **IOUs should be rewarded for promoting DG and CHP**
- **CEC and CPUC should establish annual IOU procurement targets toward goal of 5,400 MW of CHP by 2020**
- **Distribution system infrastructure investment should facilitate DG and CHP**



# CHP Additions (MW) to 9,130 MW at 776 Sites in 2004



Scenario	2010	2015	2020
Business as Usual	234	1,142	1,966
No Incentives			1,141
Aggressive Market	338	1,457	4,376
Increased Incentives	488	1,879	5,348
Streamlining	301	1,469	2,489
High R&D	511	1,878	2,764
High Deployment	805	3,098	7,340



# Roadmapping Future PIER CHP RD&D Solicitations and Contracts



## DISTRIBUTED GENERATION TECHNOLOGIES

	Internal Combustion Engines	Fuel Cells			Micro-turbines	Stirling Engines
		Proton Exchange	Solid Oxide	Molten Carbonate		
Efficiency	Close	Doesn't Meet	Meets	Meets	Close	Doesn't Meet
O&M Costs	Close	Insufficient Data	Insufficient Data	Insufficient Data	Close	Close
Capital Costs	Meets	Doesn't Meet	Doesn't Meet	Doesn't Meet	Doesn't Meet	Close
Useful life	Meets	Doesn't Meet	Doesn't Meet	Doesn't Meet	Close	Close
Availability/Reliability	Close	Insufficient Data	Insufficient Data	Insufficient Data	Meets	Close
Emissions	Doesn't Meet	Meets	Meets	Meets	Meets	Close

- CHP represents 17% of state's generation
- Capacity is in the larger systems: CHP systems smaller than 5 MW are 3% of CHP capacity



# Energy Commission Website

[www.energy.ca.gov](http://www.energy.ca.gov)

