



An *EDISON INTERNATIONAL*® Company

# Combined Heat and Power (CHP) Systems

**CARB CHP Technical Workshop  
Sacramento, CA**

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SCE**

# Agenda

- Overview
- SCE's Experience with CHP
- Current Activities and Opportunities
- Principles of Sound CHP Policy

# Southern California Edison Overview



## Operating for over 120 years

- 16,300 employees

## Service Area

- 50,000 square miles including 180 cities

## Population served

- More than 13 million
- Over 4.8 million customers
- 5,000 businesses
- 280,000 small businesses

## Financial

- \$11.2 billion operating revenues
- Wholly owned subsidiary of Edison International (EIX)

## Environmental Leadership

- The largest renewable energy portfolio in the U.S.
- One of the largest energy efficiency programs in the U.S.

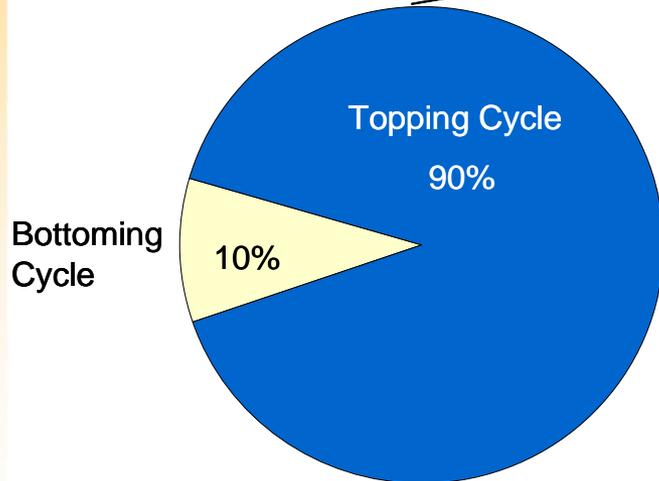
# SCE's Experience with CHP

- One of the largest CHP portfolios in the nation
  - 2,200 MW of firm capacity, as-available capacity, or bypass contracts
  - 260 MW of CHP distributed generation (no export)
- In 2008, SCE purchased 11.8 billion kWh from active CHP contracts
  - Payments for energy and capacity are approximately \$1.15 billion, annually
- Various applications ranging in size from 32 kW to 385 MW
  - Industrial and manufacturing plants
  - Petroleum refineries
  - Commercial buildings
  - Schools and universities
  - Waste treatment plants
- Different fuel sources
  - Natural Gas
  - Coal-fired
  - Biomass (municipal solid waste, biogas, landfill gas)

# SCE's CHP Resource Mix

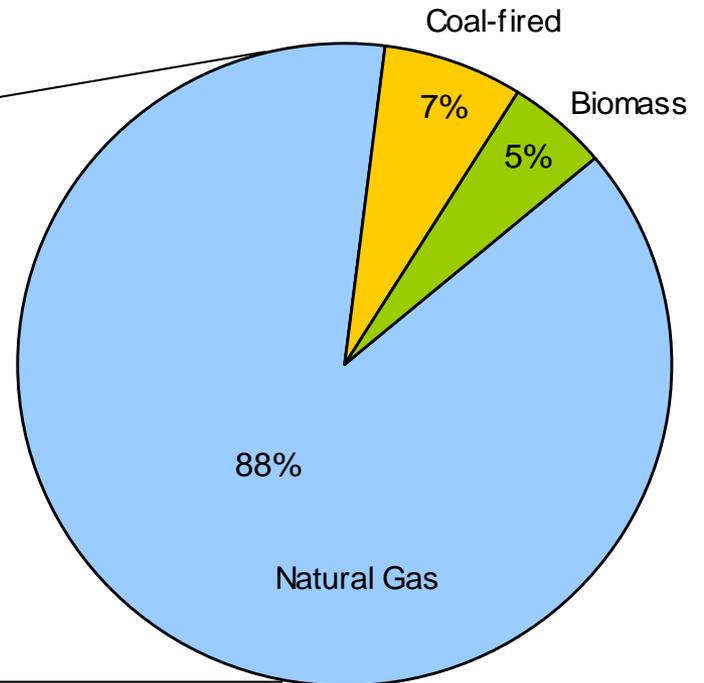
## Type of CHP

2,200 MW

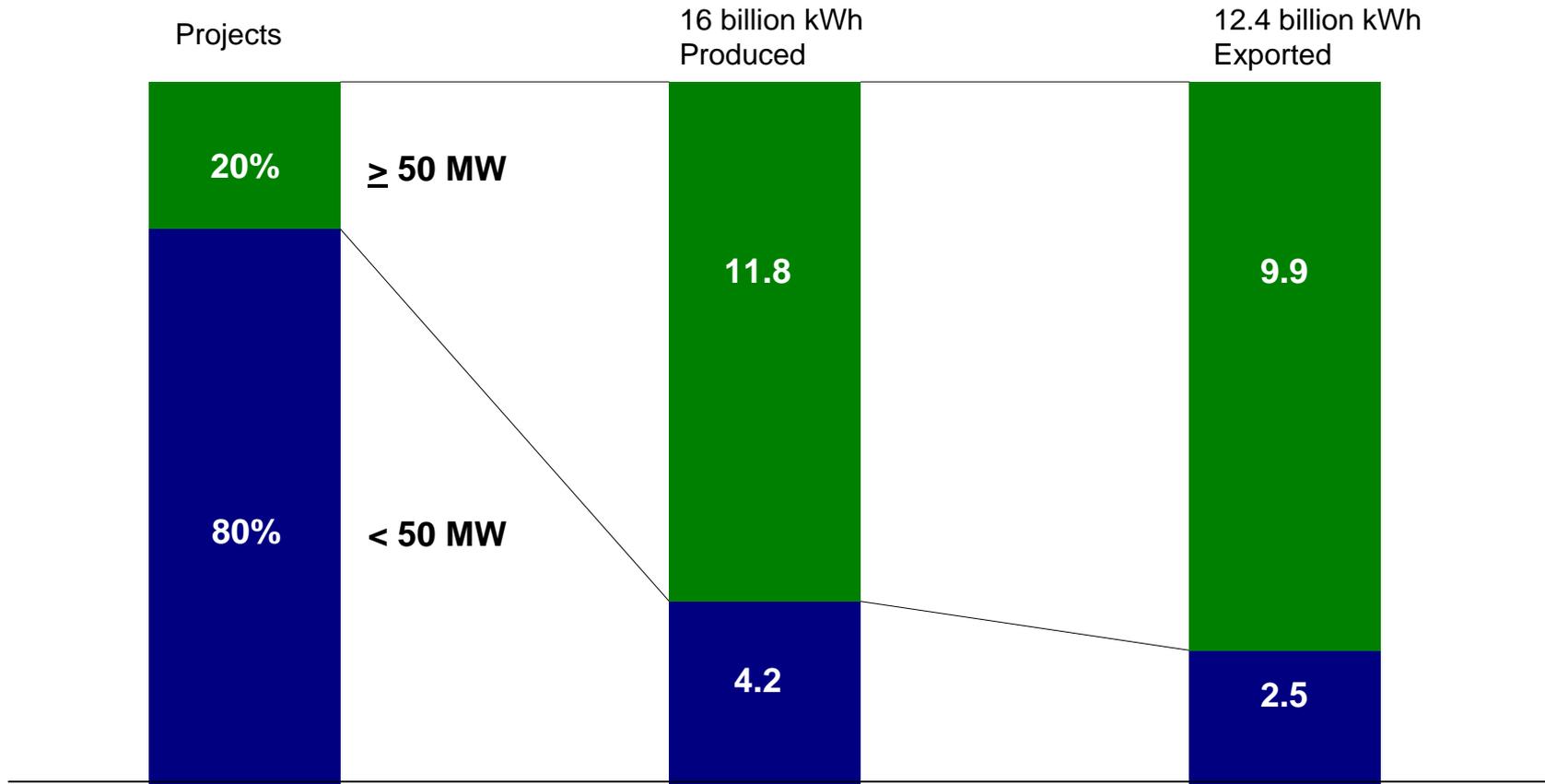


## Fuel Source

1,980 MW



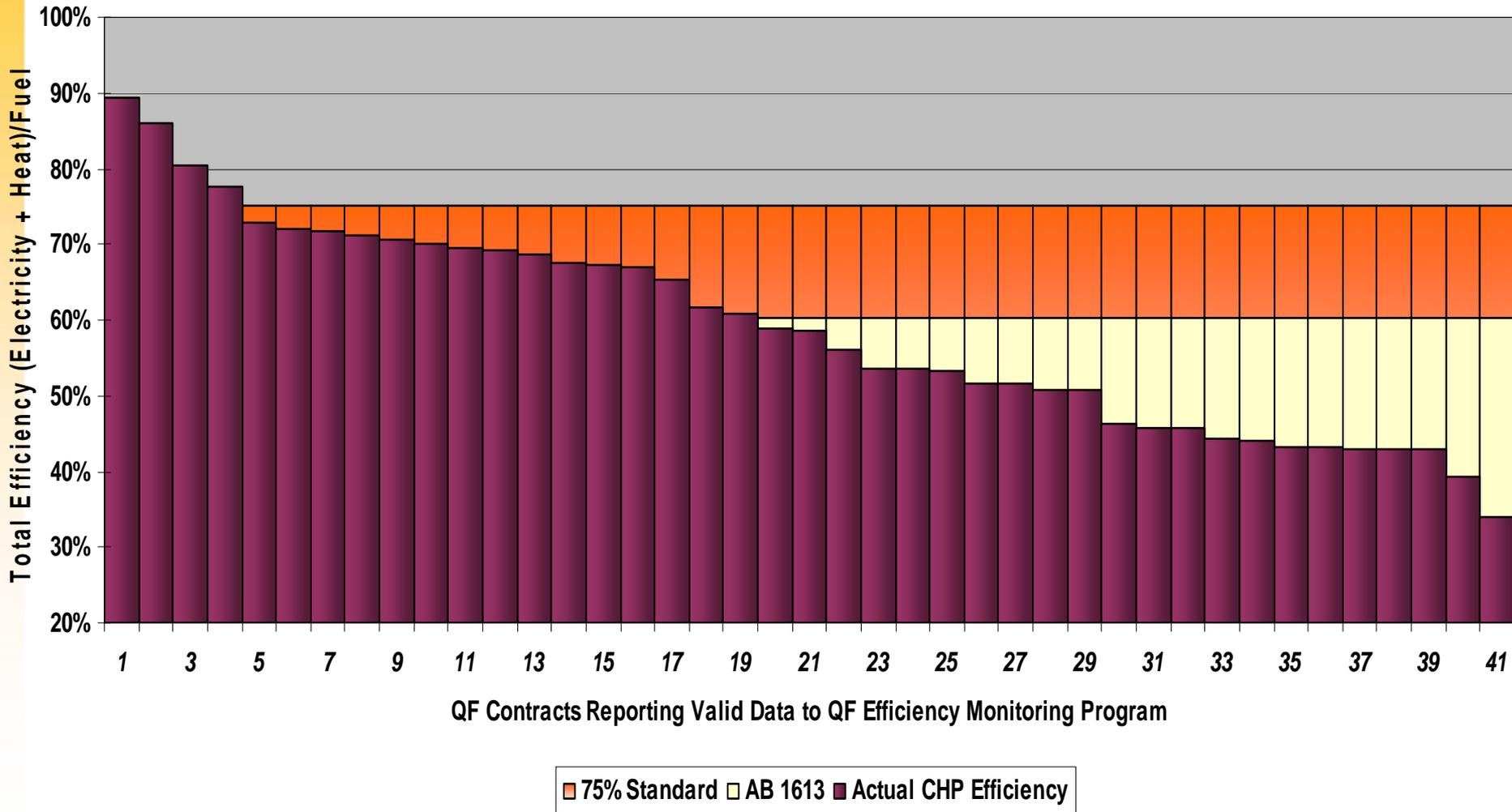
# CHP Production and Exports



On average, CHP systems in SCE's portfolio export 77% of their electric output.

# 2006 Data on CHP Efficiency

Based on Higher Heating Values (HHV)



# Efficiency and Design are Not Limited by Size

	Size	Efficiency	Application	Operation	Export
Highest Efficiency	1.3 MW	89%	Government	Heating and cooling for multiple buildings	Incidental (< 6%)
	48 MW	86%	Refinery	Refinery process	Serves majority of on-site load (occasional export)
	.2 MW	80%	Government	Heating for pool, spa, and surrounding buildings	Incidental (<2.5%)
Lowest Efficiency	50 MW	43%	Food products	Manufacturing process	100% export
	31 MW	43%	School	Heating for multiple buildings, kitchens, and pool	97% export
	.55 MW	39%	Wastewater treatment plant	Sewage treatment	Serves all on-site load
	16 MW	34%	Wastewater treatment plant	Wastewater treatment	Incidental (<2%)

Efficiencies range from 34% to 89%

## Activities in Support of AB 1613 (20 MW and less)

- AB 1613 creates a tariff for export of incidental electric output
  - Requires minimum efficiency and emissions standards
- CPUC opened R.08-06-024 to establish program parameters including pricing, terms, and conditions
  - The IOUs and the CHP parties have been working together to agree on standard contract terms and conditions; agreement on many but not all terms
  - Two contracts in development
    - Small projects (limit will be either 1 MW or 5 MW)
    - All others (up to 20 MW)
  - Price is yet to be determined
- CEC is developing efficiency and monitoring requirements
  - SCE is working with staff on the proposed guidelines
  - SCE recommended an efficiency standard of 75% which coincides with CARBs 4,000 MW goal and 6.7 mm/tons of CO<sub>2</sub>e reductions
- Commission is required to adopt CHP regulations by January 1, 2010

# Contract/Market Opportunities For CHP Generators

- Facilities certified as “Qualifying Facilities” may sign standard contracts (updated contracts are pending CPUC approval)
  - Price for energy is at “avoided cost” as defined under PURPA and established by the CPUC
- Generators can submit competitive bids in response to “Request for Offers” (RFOs)
  - SCE issues new generation RFOs for new capacity and all source RFOs to buy capacity and energy from existing resources
- Rule 21 allows for non-exporting CHP units to interconnect as distributed generation
  - No project size limit
- The CAISO Integrated Forward Market (aka “MRTU”) includes a day-ahead energy market, ancillary services market and transmission management
  - Generators can sell directly into the market or to other buyers (*e.g.*, municipalities, energy service providers, community choice aggregators, energy marketers, as well as to out-of-state entities

# Perspectives and Challenges

- Balancing Policy Objectives
  - Requires a careful balance between meeting the State's policy objectives and environmental goals, managing costs, and maintaining grid reliability
- Requirements of local air districts
  - Siting natural-gas fired CHP might be difficult in light of the scarcity of emission credits in the SCAQMD air district.
- Coordination of estimated market and economic potential
  - The November 2005 CEC study estimates CHP potential of 847 MW in SCE's service by 2020
  - The July 2009 ICF International study estimates the CHP market penetration in SCE's territory to be 743 MW

# Principles of Sound CHP Policy

- Premium efficiency standards
  - Only efficient CHP will result in reduced fuel use and reduced emissions
- Performance and monitoring standards
  - Ensures efficiency is maintained and the State receives the expected benefits
- Proper design and sizing requirements
  - Site should have a continuous need for the steam
  - Customers installing CHP should have both a thermal and an electrical need that can be served more efficiently with CHP than through conventional generation

With Verifiable Design and Performance Standards, New CHP Can Help Contribute to State Policy Goals

# Contact Information

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Thank you!