

# **US utility-scale solar**

*An investor perspective*

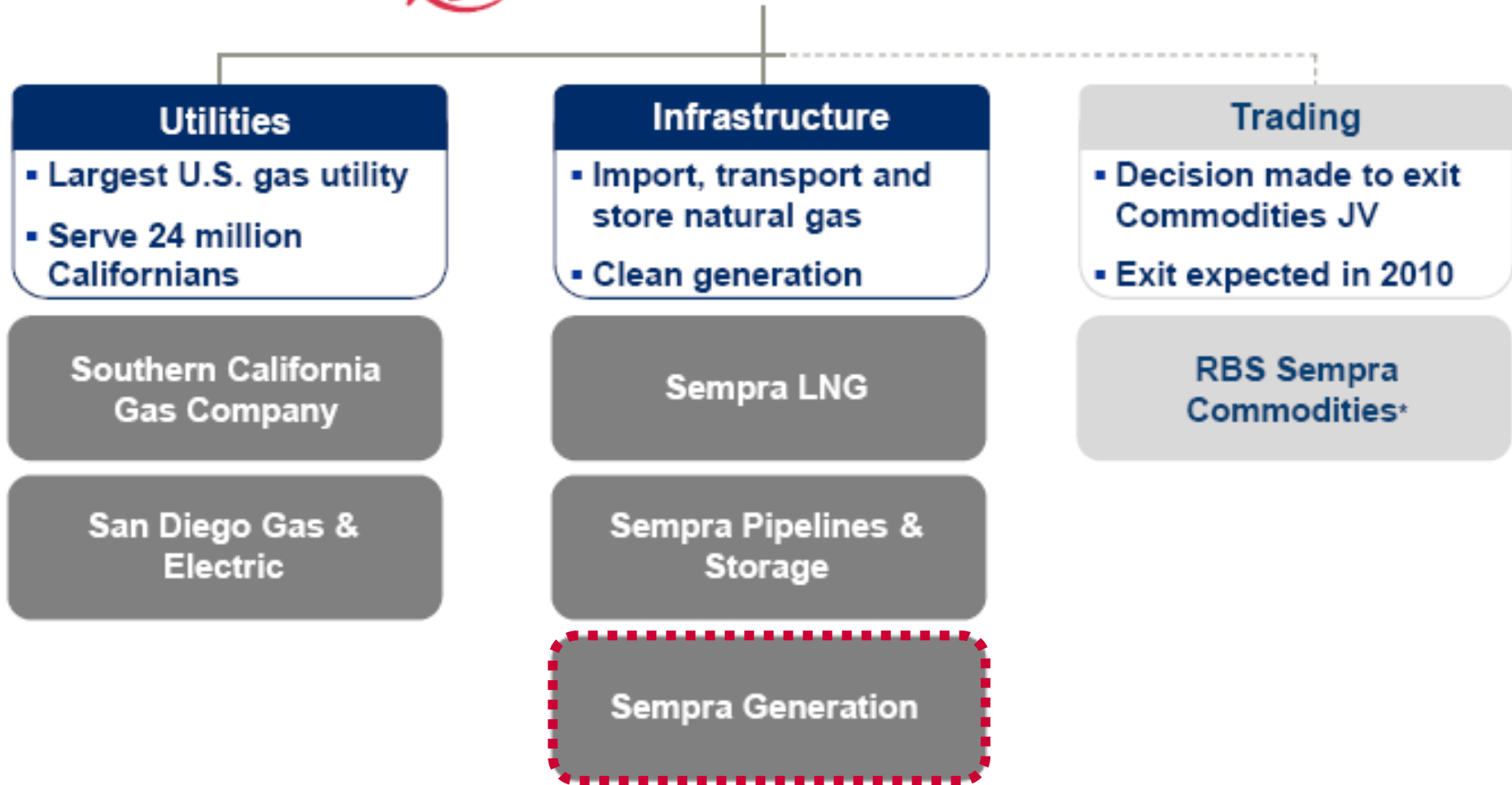
International workshop on  
***The Challenge of Financing  
Low-Carbon Growth***

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# Today's discussion

- **Sempra Energy overview**
- **California: a “policy-rich” investment environment**
- **California's Renewables Portfolio Standard**
- **RPS investment framework**
- **Observations and implications for low-carbon investment policy**



# Sempra asset overview



**Copper Mountain Solar** – 48 MW thin-film PV, under construction  
**El Dorado Solar** – 10 MW thin-film PV, operating  
**El Dorado Energy** – 480 MW CCGT, operating



# California: a “policy-rich” investment environment

## California has a long history of utility-policy progressivism

- Energy efficiency/demand-side management programs in place since the mid-1970s
- Rate decoupling since the early-1980s
- One of the first US states to deregulate its electric sector
  - Subsequently re-regulated after 2000-01 energy crisis
  - Currently a hybrid of “managed reserve margins” + wholesale competition
- Steeply progressive rate structure (AB1X)
- Renewable portfolio standard
  - 20% by 2010
  - 33% by 2020
- Utility procurement GHG emissions performance standard
- California Global Warming Solutions Act (AB32) imposes a statewide emissions cap
  - 1990 emissions by 2020
  - Includes electricity imports
- Smart meters currently being deployed across the entire IOU customer base
- Funding for pilot programs and studies: smart grid, electric vehicles & charging infrastructure, biogas-processing, utility-owned rooftop PV, batteries, CCS, etc.

# California's Renewables Portfolio Standard (RPS)

|                              |  |
|------------------------------|--|
| <b>Background</b>            | <ul style="list-style-type: none"> <li>■ Established in 2002 (SB 1078)</li> </ul>  |
| <b>Covered entities</b>      | <ul style="list-style-type: none"> <li>■ Investor-owned utilities (71%; top 3: 67%)</li> <li>■ Electric service providers (~7%)</li> <li>■ Community-choice aggregators (0% currently)</li> </ul>                              |
| <b>Target</b>                | <ul style="list-style-type: none"> <li>■ 20% by 2010</li> <li>■ 33% by 2020</li> </ul>   |
| <b>Eligible technologies</b> | <ul style="list-style-type: none"> <li>■ Solar</li> <li>■ Wind</li> <li>■ Small-scale hydro</li> <li>■ Biomass</li> <li>■ Biogas/biofuel</li> <li>■ Geothermal</li> <li>■ Ocean/tidal</li> <li>■ Non-combustion MSW</li> </ul> |
| <b>Delivery points</b>       | <ul style="list-style-type: none"> <li>■ Up to 25% outside California (but within WECC)</li> </ul>   |
| <b>Procurement process</b>   | <ul style="list-style-type: none"> <li>■ Competitive RFP process</li> <li>■ Price most important selection criterion; below avoided CCGT cost streamlines CPUC approval</li> </ul>   |
| <b>Enforcement</b>           | <ul style="list-style-type: none"> <li>■ Utility penalty of 5¢/kWh, up to \$25 million per year</li> <li>■ Nominal developer performance bonds</li> </ul>  |

# Sempra Generation renewables investment framework

**Objective: certainty of outcome, both near- and long-term**

- Influenced by structure of California RPS market
- Prices based on long-term contracts between buyer and seller, not “market fundamentals”
- “Oligopsony” – few buyers, many sellers – limits returns to “utility-type”
- Limited upside for technology risk

|                   |   |
|-------------------|---|
| <b>Site</b>       | <ul style="list-style-type: none"> <li>■ Insolation</li> <li>■ Private land</li> <li>■ Transmission access</li> <li>■ Topography/grading</li> <li>■ Minimal environmental &amp; cultural sensitivity</li> </ul>                                 |
| <b>Technology</b> | <ul style="list-style-type: none"> <li>■ Maturity and reliability</li> <li>■ Supplier track record and financial strength</li> <li>■ Cost (current and projected)</li> <li>■ Water use</li> <li>■ Schedule (tax incentive deadlines)</li> </ul> |
| <b>Commercial</b> | <ul style="list-style-type: none"> <li>■ Fixed-price, turnkey EPC contract with long-term performance guarantees</li> <li>■ Long-term PPA with credit-worthy counterparty</li> </ul>  |



# Observations and implications for low-carbon investment policy

- **Renewables policy ≠ GHG policy ≠ innovation policy**
- **Challenges of regulatorily-constructed markets**
  - Regulatory uncertainty > market uncertainty (regulator term << asset life)
- **CPUC's management of economic rents – a model for other regions and sectors?**
  - Minimizes customer impacts and wealth transfers, which helps mitigate regulatory risk
  - Well-suited for innovation?
- **Influence of market structure on policy outcomes**
  - US – fragmented, privately-owned
  - Rest of world – more concentrated, greater state involvement
- **Extra-regional influence of regional regulators**
- **Mobilization of capital**
  - Renewables 2x-12x more capital-intensive than fossil
  - Tenor- and risk appetite-matching
  - Tax-advantaged capital?