

# **US utility-scale solar**

*An investor perspective*

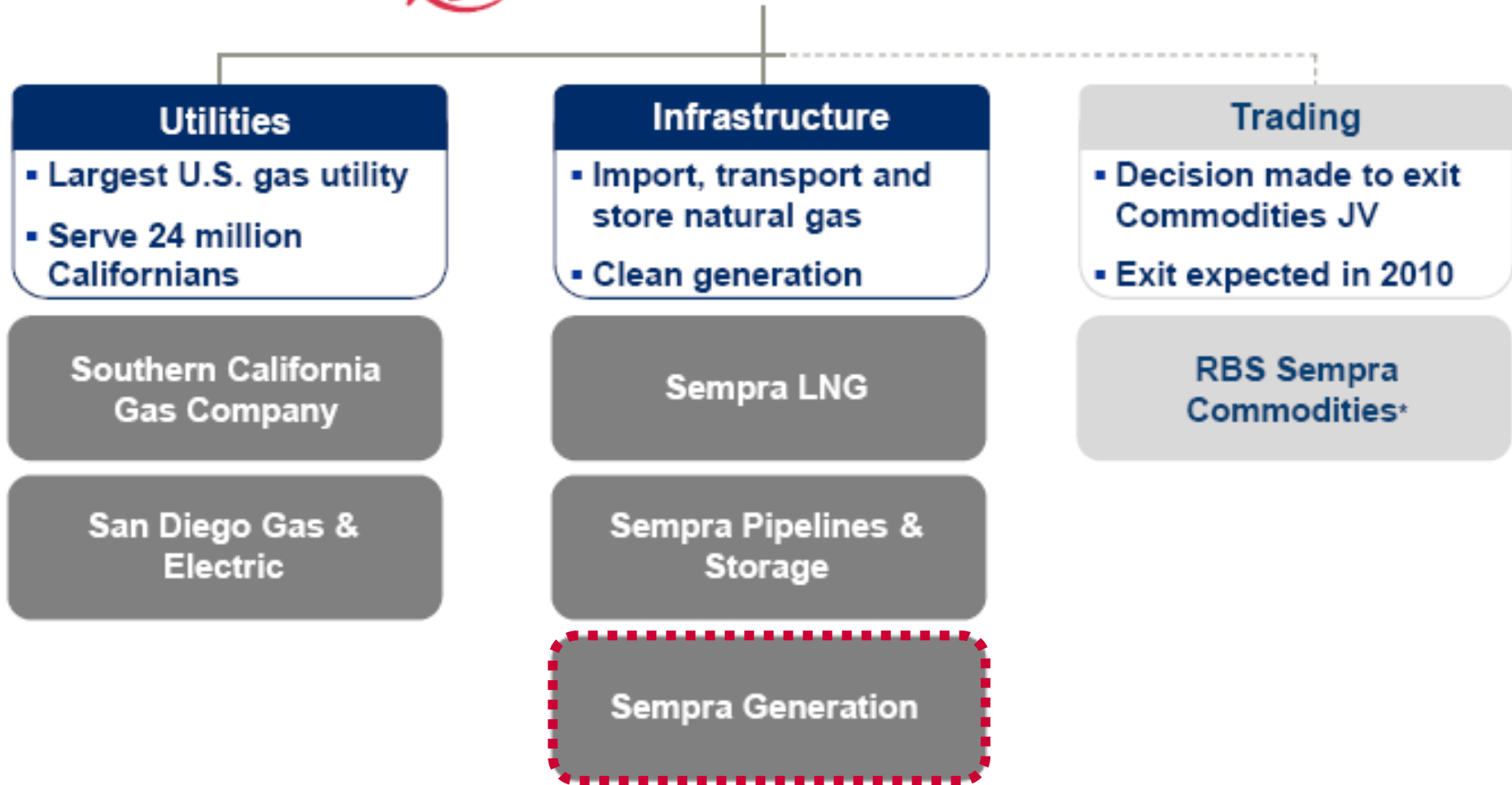
International workshop on  
***The Challenge of Financing  
Low-Carbon Growth***

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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

**Site**

- Insolation
- Private land
- Transmission access
- Topography/grading
- Minimal environmental & cultural sensitivity

**Technology**

- Maturity and reliability
- Supplier track record and financial strength
- Cost (current and projected)
- Water use
- Schedule (tax incentive deadlines)

**Commercial**

- Fixed-price, turnkey EPC contract with long-term performance guarantees
- Long-term PPA with credit-worthy counterparty



# 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?