


USDOE Quadrennial Energy Review
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Jan Smutny-Jones
Chief Executive Officer
Independent Energy Producers Association (IEP)

Who is IEP?

- ▶ IEP is a non-profit trade association of utility-scale independent power producers representing natural gas generators and the majority of renewables delivered to California, including wind, solar, geothermal and biomass. Our members are also involved in storage.
 - ▶ IEP was established in 1982.
 - ▶ IEP engages in state energy policy and California legislation.
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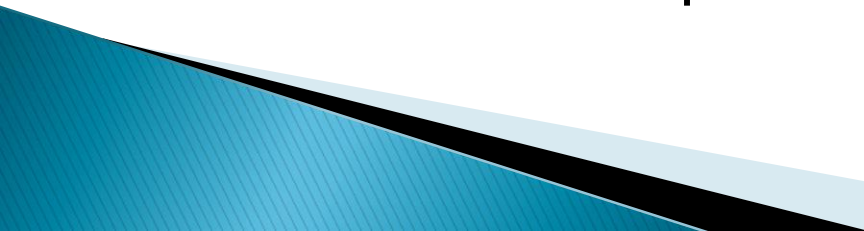
Progress to Date in California

- ▶ **Improvement in gas fleet efficiency of 23% from 2001–2014**
 - Equates to a 37% reduction or 177 MMT of avoided GHG emissions.
 - New technology allows for faster ramping gas generation
- ▶ **33% Renewable Portfolio Standard (RPS) by 2020 projected to be met early in 2017/2018.**
 - Since the end of 2010, an additional 7,700 MW of large-scale renewables have become operational in California, increasing from a total of 6,600MW of renewables in 2010 to 14,300 MW in 2015.
[California Energy Commission–Tracking Progress: Renewable Energy Overview as of 12/22/15]
 - Since 2001 in-state wind generation has quadrupled, solar generation is 13 times what it was, while geothermal and biomass generation have stayed relatively constant.
 - Storage: 1,325 MW Storage Mandate, to be in operation by 2024. Recent SCE RFO resulted in approximately 261MW of storage from both the distribution and wholesale grid.

Challenges for the Future

- ▶ **Managing Carbon While Maintaining Reliability and Affordability**
 - 2050 California Carbon Goal = 80% reduction from 1990 levels.
 - Low to zero carbon emissions
 - *Long-Term* “Aspirational” Policy Goals (2040–2050) require *Intermediate-Term* Infrastructure Investment (2016–2030)
- ▶ **History Shows:**
 - *Long-Term* “Aspirational” Goals will be met by a resource mix, much of which currently does not exist.
 - 35 years from now, the existing gas fleet will be retired; virtually all the solar panels serving the market will be replaced.
 - Managing Carbon in Electric sector will require sustained investment in the electric infrastructure.

Challenges For the Future: A Changing Grid

- ▶ Need Clarity regarding Jurisdictional “Rules of the Road” to ensure comparable, non-discriminatory treatment of resources.
 - ▶ Federal Power Act: “Sale for Resale” and Distributed Energy Resources (DER).
 - State versus federal jurisdictional lines increasingly blurry
 - ▶ Is Behind-the-Meter (BTM) Rooftop Solar Wholesale, Retail, or Both?
 - ▶ Utility Scale Renewables are the most equitable, least-cost and operational way to pursue renewables.
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Existing Challenges

- ▶ Lack of 3–5 year Capacity Market Undermines Existing Gas Fleet
 - Gas Fleet needed to support clean energy market
 - Lack of a transparent capacity market presents challenges for gas fleet, as well as, storage and demand response due to lack revenue from the wholesale market.
 - Multi–Year Resource Adequacy could provide a solution.

Balanced Portfolio Approach

- ▶ Biomass and geothermal are higher cost technologies in an era focused on intermittent, low-cost resources.
- ▶ Both offer unique benefits:
 - Clean, baseload (non-intermittent) power
 - Local economy benefits including higher job numbers, property taxes, royalties
 - Ability to help other sectors of the economy: biomass can use 29 million dead trees as fuel to generate electricity.

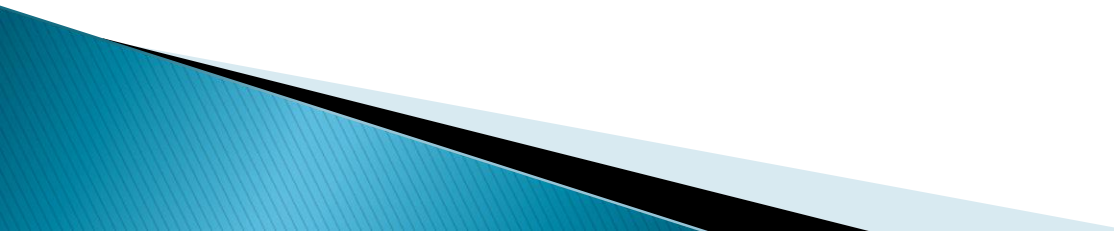
Opportunities

- ▶ Low cost mid-day energy presents opportunities to address CO₂ in other sectors that can act as sinks for power during oversupply conditions:
 - H₂O processing, water recycling, desalination, storm water reuse, etc.
 - Electric Vehicle Charging
 - Hydrogen Production for Transportation
 - Energy Intensive Industries—Revise rate structure to shift to mid-day.
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Opportunities: Western Grid

- ▶ Extensive Resource Throughout the West
- ▶ Potential to export California's overgeneration to other markets
- ▶ Access to additional wind and solar resources in the market.
- ▶ Energy Imbalance Market (EIM)
 - 3 balancing authorities currently participating; 5 additional balancing authorities interested in participating.
 - Successful Implementation: savings in first quarter of 2016 were \$18.90 million.
 - Shift to 5–15 minute markets.
- ▶ CAISO/PacifiCorp Potential Melding
 - Day-ahead market in 6 states
 - Requires Governance Change of CAISO

In Conclusion

- ▶ California Electric Grid is Clean, Reliable and Flexible to Match Load
 - ▶ Timely Investment Needed in Infrastructure is Key
 - ▶ Portfolios of Resources, including a range of reliable baseload generating facilities and flexible thermal units are essential for the future.
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Thank You

Jan Smutny-Jones
Chief Executive Officer
Independent Energy Producers Association
smutny@iepa.com

