Geothermal As a System Resource

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California ISO by the numbers

• **Nonprofit** public benefit corporation
• **Governing Board** appointed by the governor & confirmed by the Senate
• **Regulated** by Federal Energy Regulatory Commission
• **Part of the Western Electricity Coordinating Council**: 14 states, British Columbia, Alberta and parts of Mexico
• **30 million** Californians served
• **1,400 power plants units & 100+** transmission companies participate in our market
• **30,000** market transactions per day
• **$8 billion** cleared annually through ISO market (2010)
• **25,526** circuit-miles of transmission lines
Appeal to the Geothermal Industry

1. Reposition geothermal as a system resource
2. Don’t sell geothermal as baseload
3. Build operational flexibility into your projects; drive down costs
1. Most Value As System Resource

- Low-carbon resource diversity
  - Diverse portfolios least expensive
- Geothermal lowest-cost, lowest-carbon, 24/7 source of inertia, other system services; high capacity value
- Change what you sell: New PPAs reward value to system
2. Baseload = Ugly

- CAISO doesn’t need, or want, inflexible baseload resources
- Over-generation, beginning 2015
- Adding operationally inflexible resources worsens this problem
Growing need for flexibility starting 2015
3. Build Flexible Projects

- Partial flexibility: off-line during solar over-gen; back on-line to meet afternoon ramp
- Full flexibility: for load-following, AGC
- The future: low-carbon resources must supply all system services
  - NERC-CAISO 2013 Reliability Assessment
  - ERCOT Ancillary Services
Summary

1. Sell: low-carbon system resources
   • Greatest competitive advantage
   • Press PUCs to require system needs to be met with low-carbon projects
   • Ally with wind, solar, DR
2. Stop trying to sell baseload
3. Build flexible projects; drive down costs