MANAGING THE EVOLVING GRID

Climate change policy is driving innovation across the economy and ushering in new ways to grow and evolve the electric system. All eyes are on us as state policies and programs lead to reductions in greenhouse gas emissions.

<table>
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<th>Mandates:</th>
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<tr>
<td>CA Renewable Portfolio Standard: 33% renewable energy by 2020</td>
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<tr>
<td>U.S. Environmental Protection Agency's Clean Power Plan: 30% reduction in carbon dioxide levels from existing power plants by 2030</td>
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<td>California’s goal by 2030</td>
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<th>Resource mix: The ISO needs a resource mix that can react quickly to adjust electricity production to meet the sharp changes in demand.</th>
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<td>22% current renewable energy</td>
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<tr>
<td>50% renewable energy</td>
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**Challenges:**
- Can’t turn it on and off as needed
- Varies with weather and time of day
- Infrastructure cost

**Benefits:**
- Cleaner air — less carbon emissions
- Reduced environmental impact
- Creates jobs

**INCREASING RENEWABLES ON THE GRID**

**Role of conventional generation:**
Conventional power plants are used to quickly ramp up or down to match demand. Since it can take several hours for these plants to start up, they remain at least at a minimum operating level to maintain grid reliability when there is less renewable generation available to serve demand. This minimum generation, when added to the available renewable generation, can result in overgeneration.

**TO INTEGRATE RENEWABLES & ENSURE RELIABILITY**

**Encourage low carbon energy solutions such as energy storage, demand response and expanded energy efficiency standards.**

**Facilitate renewable generation contribution to grid reliability.**

**Leverage the electrification of the transportation system to reduce greenhouse gas emissions and harness surplus energy when renewable generation output is high.**

**Increase regional collaboration to expand the diversity of resources and to leverage opportunities for infrastructure and operations efficiencies.**

**Provide incentives for consumers to adjust energy use in response to changes in supply and demand.**

**Encourage development of more flexible generation resources that can adjust to constantly changing system conditions.**

This is our vision of what must happen to ensure grid reliability and efficiency while leading the transition to a low carbon grid.

[www.epa.gov/climatechange](http://www.epa.gov/climatechange)