GREENING THE GRID

California is on the path to generate 33 percent of its electricity from renewable power by 2020. The ISO supports this important renewables portfolio standard and is focused on the reliable integration of zero-emission resources such as solar and wind power. By planning carefully and giving diverse types of power suppliers equal access to the electricity grid and its market, the ISO is helping advance a sustainable energy future.

TRANSITION TO A GREENER GRID NEEDS THOUGHTFUL PLANNING WITH A FOCUS ON MAINTAINING GRID RELIABILITY

THE CALIFORNIA ISO:

Nonprofit, public benefit corporation that manages the flow of electricity across more than 25,000 circuit-miles of transmission lines serving 30 million people

- Balances electricity supply and demand every four seconds, delivering more than 200-billion kilowatt hours annually
- Facilitates competitive markets for electricity the day ahead, hour ahead and minutes ahead of when power is consumed
- Coordinates future planning for new power plants and power lines necessary to maintain electric reliability 24x7x365
- Leverages advanced and emerging technologies to support a diverse power resource mix, integrating the largest renewable portfolio in the world including wind and solar generation

KEEPPING THE LIGHTS ON

A lot of planning, resource balancing and coordinating go into powering one of the largest and most complex electric grids in the world.

Every minute of every day, the California Independent System Operator Corporation (ISO) works to match energy supply with demand, dispatches the most efficient and cost-effective resources and keeps electrons flowing smoothly on high-voltage, long-distance power lines.

MAINTAINING RELIABLE POWER TO MEET THE ELECTRICITY NEEDS OF TODAY AND FOR GENERATIONS TO COME

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GRID DYNAMICS INCREASE
While renewable power plays a critical role in greening the grid, it also adds a layer of complexity to the important job of “keeping the lights on.” Output from wind and solar plants varies with the weather, the seasons, and even the time of day. Consumer needs will also fluctuate as smart grid technologies mature and opportunities expand for demand (people power) to respond to market signals.

To maintain power reliability in the face of these exciting changes, the California ISO needs access to conventional power plants, such as natural gas to dispatch at a moment’s notice when the wind stops blowing or the sun goes away.

OLDER COASTAL PLANTS
New clean water regulations will limit the use of ocean water for turbine cooling. More than 12,000 megawatts of older coastal generation faces a 2017 deadline for either retiring, retrofitting or repowering.

REPOWER KEY PLANTS
Repowering coastal gas-fired power plants at key locations may be the answer. The new, high efficiency units will emit less pollution while supporting the grid in densely populated areas, providing supply and voltage support to maintain grid reliability.

The ISO is partnering with state energy resource agencies, to determine the exact amount of local coastal generation required. Currently, about three-quarters of the coastal plants could retire without compromising grid reliability.

EMERGING TECHNOLOGIES
Central to our approach to integrating green power onto the grid successfully is something we label “flexible capability.”

Until emerging resources such as consumer-enabled demand response and battery storage matures, conventional power plants are essential for providing the fast and flexible ramping up and down of supply to match variable renewable production.

Orchestrating the transition:
1. Industry Collaboration
   The California ISO works closely with a host of stakeholders—from the Public Utilities Commission to local utilities and energy suppliers—to determine which critical natural gas plants are needed to maintain reliability during the transition to a greener grid.

2. Smart Planning
   We use careful planning to analyze and predict how many megawatts of power is needed (by region, season, time of day, etc.) and to assess the amount of capacity available to meet that need. Our work helps coordinate how and when older power plants can come off the list of critically needed resources.

3. Grid Technology
   With state-of-the-art technologies, including innovative geospatial maps, ISO operators stay one step ahead of wind and solar output. This rich, visual intelligence also helps spot wildfires and other grid threats quickly and with accurate grid data.