

LITTLE HOOVER COMMISSION
Public Hearing on Climate Change Adaptation
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In our testimony today, we will present the some of the potential impacts to the electric system and our operations as we and others adapt to climate change and look to decrease their greenhouse gas emissions.

Background

San Diego Gas and Electric Company (SDG&E) is a regulated public utility that provides safe and reliable energy service to 3.4 million consumers through 1.4 million electric meters and 861,000 natural gas meters in San Diego and southern Orange counties. The utility's service area spans 4,100 square miles. SDG&E inspects and maintains 1,896 miles of electric transmission lines and 22,449 miles of distribution lines. The natural gas system includes 234 miles of transmission pipeline; 8,000 miles of distribution pipeline; and 6,300 miles of service pipeline.

SDG&E's forecasted electric energy mix for 2014 is 26% renewables, 55% natural gas and 19% purchased from the California Independent System Operator with an unknown fuel mix.

SDG&E's Electric Peak demand is approximately 4,600 MW and total sales are about 20,000 GWhR. Peak loads grew about a 1% annual growth since 2009. Going forward we anticipate peak load to grow at about the same rate or a little lower. Although peak demand has and is growing, overall sales have remained relatively flat over the past 5 years. Sales growth is expected to at about half the growth rate of peak demand.

Reliability and Climate Change Risk

Although climate change has the potential to influence a large number of our operations, today we are not seeing any major threats that would cause meaningful changes to the overall reliability of the electric grid. This does not mean that new issues

will not appear as more is learned and currently unanticipated impacts begin to appear. With that in mind, we will continually monitor impacts in our service area and California in total.

One example of proactive change that we are making to our infrastructure today is to harden our transmission and distribution system in the parts of our service area that are the most susceptible to highest winds and thus the largest fire damage. SDG&E has successfully implemented transmission system hardening projects that include; replacing wood poles with steel poles, installing stronger multi-stranded steel core conductors, increasing vertical and horizontal spacing of conductors, and increased design standards to withstand higher wind speeds. Currently over 1,650 transmission poles have been replaced with steel. In addition, plans are underway to replace all transmission lines currently on wood poles in the Fire Threat Zone (FTZ) located within SDG&E's service territory.

In addition to the transmission system, SDG&E has also focused on the distribution system by changing its standards so that any new or replacement distribution pole in the FTZ will be made with steel poles. Thus far over 1,500 wood distribution poles have been replaced. This along with our expanded weather monitoring, which is explained below, will allow us to maintain reliability and safety if the potential increased winds and decrease rainfall materialize.

Growth in Electric Demand

SDG&E does anticipate that we will see changes in the demand for power over time due to temperature changes. Also SDG&E sees the potential for other sectors to turn to the use of electricity to reduce their carbon footprint. The best opportunity we have to help influence usage is through rate design that provides customers with price signals on when to wisely and efficiently use energy.

SDG&E, along with the California Energy Commission (CEC), have been estimating the potential of climate change impacts to both annual energy and peak demand forecasts. This is being done by looking at the potential impact to provide both additional amounts of cooling and heating. On the energy side, the potential increase in cooling is partially offset by a reduction in heating. The CEC's 2013 IEPR forecast, found a potential increase in total energy consumption of only 190-300 GWhr. However, a potential large impact is being seen in the peak demand. The peak day demand, which is heavily driven by residential air conditioning load, could see an extra 72-131 MW of growth. Given SDG&E's expected peak of 5,350 MW in 2024, this increase can be planned for and managed.

Electric Vehicles

Another area of increased electricity usage and demand is expected to come from the transportation sector. SDG&E has embraced the growth in plug in electric vehicles in its service area. There are now 7,398 electric vehicles in our service area.¹ We have 602 public charging stations at 177 different locations. The region is also host to the nation's first all-electric car-sharing program, car2go, providing electric transportation to San Diego and Chula Vista, with steady expansion planned in the region. A major focus for SDG&E has been to find ways to incent customer charging in a way that uses the existing capacity on the system, thus increasing utilization of our system and potentially lowering costs to all customers. 2,934 individual customers have signed onto our special EV rate. In 2013, this resulted in 13 million kWh in residential sales, about 10,000 metric tons in GHG reduction. This rate has also provided the necessary incentive to move 90% of kWh consumed for vehicle charging to occur during the low load (off-peak) periods.

The CPUC ruled in 2011 that the utilities (e.g. SDG&E) they regulate cannot own or operate EV charging equipment and related metering, expecting that a third party service provider market will grow and fill this need. At such an early stage of market development when widespread innovation is necessary to create market momentum, SDG&E believes it is premature to restrict any entity, especially the vehicle fuel provider, from contributing innovative solutions to help transform this market. In order to meet Governor Brown's Zero Emission Vehicle Action Plan calling for 1.5 million zero emission vehicles in the state of California by 2025, this restriction should be revisited to ensure that vehicle adoption grows rapidly and EV charging loads are efficiently integrated with the grid to avoid costly infrastructure additions.

Electric Vehicles also have a great potential to serve as an innovative resource to contribute to grid reliability, support state energy policies and benefit consumers. Because of the unique flexibility of EV charging loads, all customers can benefit by making use of the energy storage characteristics inherent in EVs to improve system utilization, grid reliability and increased utilization of renewable energy resources. SDG&E plays a lead role in ensuring the efficient integration of EV loads with the grid and improve system utilization to benefit all customers.

¹ The total includes 6,020 plug-in electric vehicles and 1,378 neighborhood electric vehicles.

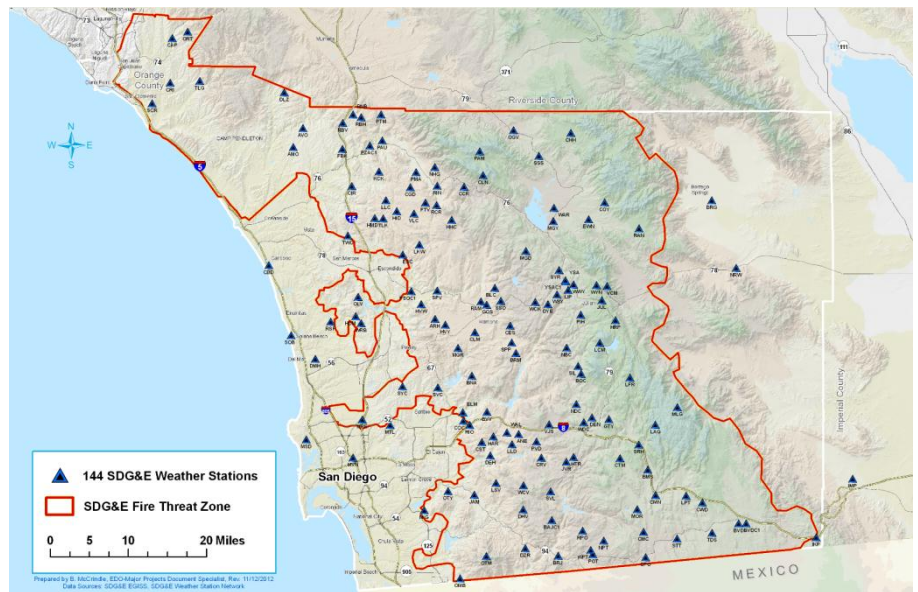
Weather and Fire

At SDG&E, wildfires have been identified as a significant threat with a likely occurrence within our risk management team. In 2003 and 2007, San Diego encountered two of the largest wildfires in California history. These fire events consumed over 300,000 acres which is around 13% of our service territory. In both events, over 300,000 people were evacuated. Normally, extreme wildfire events seem to coincide with wind and dry fuel conditions.

SDG&E has developed partnerships with many agencies to connect science to wildfire conditions. Co-operations with these agencies have allowed SDG&E to incorporate science directly into operations and reduce the risk to wildfires.

Weather Network

In 2007, 17 weather stations across the SDG&E service territory recorded weather information once per hour, giving a total of 408 daily observations. A push to increase weather sampling frequency in 2009 led the Electric Operations to install 144 weather stations across the service territory, creating the largest utility-owned weather network and one of the largest and densest



weather networks in the country. **Figure 1. SDGE weather network**

Observations of temperature, wind and humidity are now available at 10-minute intervals, producing 20,736 observations each day that allow for increased situational awareness.

The knowledge from this expanded network has been vital to Electric Operations and SDG&E; allowing for increases in wind forecasting accuracy, the ability to provide the Emergency Operations Center (EOC) with pinpoint forecasts of the location and

timing of peak wind gusts, as well as real-time wind and humidity data across the service territory.

Observations from the weather network are available to many sources, including fire agencies and local government, and are also sent to the EOC and populated into a public database to keep customers informed of weather conditions.

Fire Potential Index

SDG&E has developed a comprehensive assessment, known as the “Fire Potential Index”, which is used as a tool for making operational decisions which would reduce fire threats and risks. This tool converts environmental, statistical and scientific data into an easily understood forecast of the short-term fire threat which could exist for different geographical areas in the SDG&E service territory. The index is generated for a seven-day forecast period and provides SDG&E personnel and threatened communities time during which they may plan and prepare accordingly.

This product is a planning and decision support tool that is designed to reduce the risk of a wildfire while improving efficiency and reliability. The FPI establishes the likelihood of a fire occurring in each of SDG&E’s districts in a 7-day forecast that is incorporated into daily operations to reduce the risk of catastrophic fires. The company changes operating conditions based on the fire potential.