

**“What Key Smart Grid Areas California Must Address First”**

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Southern California Edison (Edison) appreciates the opportunity to participate today as we discuss California’s energy future. We believe that open discussion and collaboration in support of an integrated state energy policy is necessary and important to both defining and implementing the Smart Grid. We also note the significant parallel efforts at the national level that are important to realizing California’s energy objectives. Edison offers its comments on the California Energy Commission’s (CEC) five questions below.

**1. What can policy makers do to encourage research investments in Smart Grid technologies?**

Edison asks that policy makers fully recognize more research is needed particularly in applied research, electric system analyses and technology demonstrations. Most promising energy technologies, such as utility scale storage and superconducting field equipment, require additional development to become commercially viable. When we look at information systems and telecommunications networks, more work is needed to refine the business uses into architectures that will address not only the path forward but also a graceful transition from the past. In particular, the operating complexity of the electric system overlaid with a pervasive telecommunication network and highly integrated set of millions of sensor nodes, new control systems and field switching devices is massive. These efforts also need to bound enthusiasm with a clear recognition that rate pressures exist and customer value must be demonstrable. As a result, the range of engineering, organizational and customer issues that are raised are significant and are attracting the best minds in industry, utilities and academia. Today, we have a fantastic opportunity to take advantage of this talent to help us design and implement the grid for the 21<sup>st</sup> century.

However, State and Federal programs cannot do it alone. Too much needs to be done and utilities, vendors and other California universities can play roles in furthering Smart Grid research and

development. Edison and the other California utilities often serve as the path to commercialization for PIER program technologies and those of product manufacturers. Without intimate knowledge and hands-on experience providing feedback to product manufacturers and systems developers, technological progress is often delayed or never reaches commercialization. As a recognized industry leader in the development and deployment of Smart Grid technologies, Edison has been actively engaged in many innovative technology development programs including Edison SmartConnect, Circuit of the Future, electro-drive systems and synchronized phasor measurement applications. These programs have been developed at a relatively low cost, but are expected to create significant benefits. However, the current level of funding for utility RD&D is insufficient to achieve the transformation of the grid needed over the next decade or more. The CEC, California Public Utilities Commission (CPUC) and California Air Resources Board (CARB) support for electric utility RD&D would significantly accelerate the development and deployment of the smart grid.

California is home to nine of the world's best research universities with engineering schools interested in Smart Grid research (six in Southern California). We are also fortunate to have the California State University system and many nationally recognized private universities with an interest in educating the next generation of researchers and professionals for the electric industry. Several schools are re-instituting a power certificate in their electrical engineering programs and students have formed special interest groups on campus. This year, Edison helped to form a university Smart Grid research consortium in Southern California that includes UCLA, USC, Caltech, UC Irvine and UC Santa Barbara, as a start. With the pending age bubble in the industry as a backdrop, we have been given an opportunity to align several policy interests, including achievement of environmental goals, grid modernization and workforce development through expanded research. Policy makers in the state should support a broader engagement of universities across California and their pursuit of funding opportunities for State, Federal and industry research.

## **2. Are California's policies driving the California Grid away from the National Grid?**

California's policies are driving California's grid to the national vanguard. This is positive in that we have an opportunity to shape national perspectives on many elements of smart grid development and implementation. California's early adoption of these policies does require us to move more quickly than the rest of the nation, which may temporarily cause gaps with national efforts. Yet based on the current administration and Federal policy the end goals appear consistent. Edison and our colleagues at PG&E and SDG&E are very active at the national and international levels to address this issue. However, we do need to be mindful of these efforts and remain engaged in the policy discussions, legislation development, Federal regulations and standards development so that California Smart Grid investments do not become stranded.

## **3. Are California energy policies too aggressive?**

There is no doubt that California energy policies are aggressive particularly compared to Federal policies or those proposed by other states. Edison believes that many aspects of a smarter grid will need to be operational by the year 2020 to enable California's ambitious policy goals, such as AB 32 Green House Gas reductions, Zero Net Energy homes, California Solar Initiative, Advanced Metering Infrastructure, California's Renewable Portfolio Standard, Low Carbon Fuel Standard, and wide-spread consumer adoption of Plug-in Electric Vehicles. To achieve these goals, significant investment in RD&D, capital deployment and workforce training will be needed. It will also require effective engagement with State and Federal stakeholders. A challenge is managing the development of the future system while replacing the basic elements of the existing aging infrastructure – not too mention maintaining critical day-to-day operations. These challenges can be simplified into scope, schedule, budget and resource questions: how much can be accomplished, over what time period, with what acceptable ratepayer impact, and given qualified and available resources? The 2020 Vision roadmap proposed by EPRI on behalf of PG&E, SDG&E and ourselves along with the CPUC Smart Grid OIR workshops this year should help us better understand the answers.

#### **4. How do we avoid repeating the problems experienced during deregulation?**

The concept of the Smart Grid for many evokes the opportunities we have come to expect today from the internet in terms of ubiquitous information and transaction capability. However, we need to remind ourselves that the internet as we know it today evolved over 40 years and the national electric grid today is not much different than when the internet started in the late sixties. The Smart Grid will require phases of evolution that add increasing functionality and complexity. Understanding both the potential benefits and the potential consequences of the complexity of each phase before implementation is an essential aspect. Otherwise, we are likely to write a sequel to the “beautiful theory meets ugly reality” story.

Also this evolution is not based on a linear function, but rather will follow along a diminishing returns curve. As we pursue greater levels of distributed resources, intelligence, and control - the cost of aggregate components, integration and management will climb at a rate greater than the marginal value of increasingly smaller resources (supply or demand). This should not be a surprise, it is the reason smart meters were deployed in Edison’s service area for the approximately 13,000 large C&I customers that consume 60% of the energy delivered before pursuing replacement of the 5 million small commercial and residential meters. Concepts like vehicle-to-grid or neighbor-to-neighbor transactions ultimately involve millions more points of integration for IT systems and for the physical grid. The current distribution system is not designed for two-way power flow, not to mention potentially hundreds of points of interconnection on a single distribution circuit. We are working to understand the technical challenges, but the solutions will likely be expensive and take time. Setting priorities with the diminishing returns curve and systems complexity along with associated risks in mind will be essential.

## **5. What do you need from policy makers to make the Smart Grid a reality?**

Edison believes that the overarching objective of the Commission is to support the development of a smart grid and to ensure its ultimate flexibility, security, and reliability over time while conforming to state and federal policy goals. To support this objective, Edison proposes that the CEC & CPUC:

- Support ratepayer funded utility research, development, and demonstration projects to accelerate the development and deployment of the smart grid.
- Continue to engage the California utilities in the development of the policies for the Smart Grid, as we are among the most knowledgeable on the subject in the world.
- Support and maintain alignment with smart grid efforts being led by other regulators and lawmakers including the California Legislature, U.S. Congress, Federal Energy Regulatory Commission (FERC), the U.S. Department of Energy and the U.S. Department of Commerce.
- Seek to clarify the jurisdictional intersections between states and with FERC that must be met in order to implement a comprehensive smart grid across California and the West, which includes municipal electric utilities and non-California WECC utilities.
- Continued support for California utilities in their applications to the Department of Energy for stimulus funding and the FERC for cost recovery of prudent transmission related smart grid investments and management of related assets and resources.

Edison thanks the CEC for acceptance of our pre-proposal yesterday for PEV charging infrastructure as part of our electric transportation Federal stimulus proposal.