**Grid Vulnerability Questions**

**Cyber- and Physical-Security Vulnerabilities**

1. Is it possible to 100% secure the grid from cyber and physical attacks?
2. If it is not possible to provide 100% security against cyber and physical attacks, what should the goals and expectations be?
3. How can we effectively balance grid security and the cost of that security?
4. How can we effectively balance grid security and system operability?
5. Do grid operators currently have adequate access to real-time and actionable government generated threat information?
6. Are there potential liability and privacy issues that impair bi-directional threat information sharing between grid operators and the government?
7. Are the roles and responsibilities of federal, state and local governmental entities clearly defined or are there outstanding jurisdictional and event response protocol issues yet to be stated or authorized?
8. Is there a timely and reasonable cost recovery mechanism in place to allow grid operators to confidently invest to meet cyber and physical security threats to the grid?
9. What would the operational impact be of the development of disparate cybersecurity and/or physical security protection standards by individual jurisdictions?
10. Could a single set of grid security solutions be applied to all the assets managed by a single grid operator or to all the systems used and assets held by the nation’s many grid operators?

**Weather Vulnerabilities**

1. The grid today is the sum of investments and improvements made over decades based on a set of assumptions regarding climate. Are there grid modifications needed today to adapt the grid to the current climate? Are there further grid modifications needed to prepare for the changed climate we expect to experience in the years to come?
2. Are there economic advantages to increasing grid resilience to prepare it for more severe weather?
3. How do grid operators manage the risk associated with weather events?
4. How do grid operators coordinate their efforts during a severe weather event? Does this same level of coordination exist between grid operators and the other critical sectors on which the electric power sector depends?
5. What strategies are available to make the grid more resilient , and which ones are most cost effective?
6. How can grid flexibility and robustness be increased?
7. What role is there for increased grid situational awareness and the deploying of advanced control capabilities in improving grid resilience?
8. What impacts would microgrids and distributed generation have on the severe weather ‘experience’ of the average electricity consumer? How should they be paid for?

**Vulnerabilities Associated with the Integration of New Energy Technologies**

1. Can geographically concentrated or too rapid deployment of intermittent renewable resources impact the reliability and security of utility infrastructure and operating systems? What have Germany’s and Hawaii’s experiences been in this regard?
2. Do current transmission and distribution planning entities adequately consider the reliability impacts of the rapid deployment of intermittent renewable energy resources and the application of demand response in their decisions regarding base-load generation and transmission investment?
3. Could the integration of microgrids and renewable energy resources challenge the ability of the larger grid to manage power quality?
4. Is there an inherent risk associated with the tendency of microgrids to rely on a single fuel source? If so, does this risk have the potential to impact the reliability of the larger grid?

**Grid Vulnerabilities Associated with Broader Economic and Policy Issues**

1. Given that grid resilience is impacted by energy demand which, in turn, varies widely depending on weather, time of day, or level of economic activity; what criteria could or should be used to judge the optimal level of resiliency investment that balances cost and benefit?

1. What impact does flat electricity demand have on the ability of the industry to make needed investments to maintain and modernize the grid?
2. How much delay arises, if any, in executing infrastructure improvements and maintenance due to the following:
   1. Regulatory lag
   2. Low authorized returns on equity
   3. Low achieved returns on equity
   4. Failure to use tracking mechanisms to recover reliability/resiliency investments
   5. Failure to use forecasted test years for reliability/resiliency investments
   6. Use of combined reporting or other consolidated tax adjustments to increase taxes on utilities operating in multiple states
   7. A pattern of regulatory second guessing in after the fact prudency reviews
3. How does a regulator separate necessary resiliency investments in transmission and distribution systems from attempts to “gold plate” those systems?
4. Does net-metering have the potential to increase grid vulnerability by requiring a decreasing share of consumers to finance the cost of grid maintenance and investment?
5. How does the availability of critical grid components (such as transformers) impact grid vulnerability?
6. How might grid vulnerability be impacted by the resistance of individual consumers or communities to grid modernization (for instance the use of smart meters) or grid maintenance (such as vegetation management)?
7. Is grid vulnerability heightened with the rapidly increasing reliance on gas-fired generation?