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This document of is being formally submitted by e-mail in response to the Notice on Energy Master Plan Stakeholder Meetings to be conducted via public hearings to gather key information

- Event: New Jersey Energy Master Plan Stakeholder Meetings
- Work Group: **Building a Modern Grid**
- Date: September 24, 2019

Based on the Executive Order No. 28 dated May 23, 2018, the State of New Jersey is preparing the 2019 Energy Master Plan (EMP). New Jersey has already set ambitious goals for modernizing its electric grid. Building a modern grid to meet New Jersey's new energy needs and goals will require addressing and overcoming current barriers to new and enhanced infrastructure. A modernized, secure, reliable and smart electric grid should better integrate with the natural gas supply and distribution system, and the logistics of liquid fuels and feedstocks, and integrate closely with the other four key area work groups of the EMP initiative, particularly "Sustainable and Resilient Infrastructure", "Clean and Renewable Power", and "Clean and Reliable Transportation" especially in relation to expansion of electric vehicles (EV) fleets, but also "Reducing Energy Consumption", both as an enabler of this goal, and in determining future electricity demand. Nexant suggests and recommends that the following key issues and market drivers be addressed in the scope and contents of the 2019 EMP:

Key Issues and Market Drivers along with Key Recommendations

- **Distributed generation** - Distributed generation and energy storage are key features of a modern and resilient grid. Microgrids, especially with energy storage and powered by onshore/offshore wind, solar photovoltaics (PV), and/or other renewables-based distributed generation, can be made to continuously operate schools, municipal buildings, fire stations, gas stations, police stations, hospitals, pumping stations, supermarkets, and mission-critical systems such as cell towers. Energy storage can include chemical storage as conventional (e.g., Li-Ion) or flow batteries, compressed air energy storage (CAES), pumped power, and/or different forms of viable thermal energy storage (TES) technologies and applications for heat or refrigeration such as sensible, latent and thermochemical heat storage. High efficiency solid oxide or molten carbonate fuel cells (SOFC and MCFC, respectively) are fully commercial grid-scale options for efficient conversion of natural gas or liquid fuels for distributed power generation. If renewable fuels are used, these can be low- or no-carbon options
- **Buried Lines for Resiliency –** A modern grid prioritizes burying as much of the transmission and delivery infrastructure as feasible.
- **Planning for EVs** - EVs and their integration into the grid can help enhance demand side management (DSM), distributed energy resources (DER), demand response (DR), energy storage, and other important elements of a modern grid. With smart grid features, and appropriate residential and public access recharging, EVs can be an integral part of a more distributed and resilient grid by contributing their (eventual) massive amount of battery capacity to grid balancing
- **Smart Meters and Distribution Automation** – There is a critical role for advanced meter infrastructure (AMI), internet of things (IoT), cybersecurity and big data analytics in the modern grid. Data is the key to grid balancing, reducing losses while increasing efficiency, managing annual and peak demand loads and meeting energy efficiency goals, especially in the built environment, but planning for these systems must be mindful of social justice issues; that is, economically disadvantaged people (low and moderate income families/communities) are less likely to be able to afford or benefit from systems that require laptops or smart phones integrated with them. With smart metering, time-of-use (ToU) rates and tariff design/structures and dynamic pricing for residential customers and small businesses will allow DSM for these customers as they have been currently available to wholesale customers (industrial, institutional, and multi-unit residential). Further, with respect to natural gas, smart meters and distribution automation will enable better leak detection, mitigation measures, distribution monitoring as well as detecting lost and unaccounted for (LUAF) natural gas

- **Advanced Grid Software -** In the interest of a modernized grid that is more data-driven at all levels and in all aspects, the best advanced grid management software should be sought, evaluated, and employed. This includes software to manage New Jersey's regional transmission organization (RTO), PJM, as well as local grids and delivery systems, emergency management, customer relations and interface, etc. There are major emerging challenges for grid management, which include offshore and land-based wind power, solar PV, EVs, integration of distributed generation and microgrids, and benefitting from smart metering

Nexant recommends that the EMP address the following specific elements:

- Guidelines and directives that advocate for and enable enactment of an overarching regulatory framework and legislative policy covering fiscal, financial, and tax incentives, cost allocation for critical grid upgrades and operation, increase grid resiliency and reliability, performance metrics tied to grid performance, regulated rate design and tariff structures to implement the development of a modern grid, workforce training and jobs, potential market structures for infrastructure (e.g., private-public partnerships, tolling etc.) and related policy initiatives that will advance proactive capital investment, projects, jobs creation, and environmental justice in grid modernization projects
- Provide data on the historical (past five years) and forecast (up to 2030) for New Jersey energy market elements (supply, demand, and pricing for electricity, natural gas, and liquid fuels) to enable various stakeholders to get a better understanding of the potential markets and project opportunities
- Provide guidelines for various types of studies, assessments and evaluations that must be conducted, including detailed market forecasts and outlooks, types of commercially mature technologies for energy efficiency, DR, smart meters, AMI, IoT, energy storage and their applications that are viable for deployment, directives on types of projects that need to be developed and financed, and related areas