VIA EMAIL AND OVERNIGHT DELIVERY

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Dear Mr. Quinones:

Environmental Defense Fund ("EDF") appreciates the opportunity to respond to the Request for Information (the "RFI") in connection with the New York Energy Highway (the "Energy Highway"). EDF is a leading national nonprofit organization, headquartered in New York, representing more than 700,000 members nationwide, including over 70,000 in New York State. Since 1967, EDF has linked science, economics, law, and innovative private-sector partnerships to create breakthrough solutions to the most serious environmental problems.

EDF is committed to helping New York State meet its goals of providing reliable and affordable energy while also working to ensure that environmental concerns remain at the forefront of New York State's energy policy. In addition, we have deep experience, growing out of our work in California and elsewhere, in designing and optimizing electric grids with an eye toward whole-system optimization. While we are greatly encouraged by New York State's recognition that the electric system desperately needs modernization, we must take this opportunity to caution that a "highway" alone cannot meet New York State's needs. The greatest value will come from these

investments if opportunities across the entire system are evaluated to prioritize those that deliver the greatest economic and social return on investment, including improved reliability and greater reliance on community resources. The creation of the clean, low-carbon energy system that our children's generation will need requires whole system analysis and planning, which the state has the opportunity to do now.

We support the Taskforce's call for proposals that apply advanced technologies that benefit system performance and operations, including the application of smart grids. We would like to expand upon that idea and suggest that, in order to maximize the benefits of implementing a smart grid, smart technology must be considered on a systemic level, and not on an ad hoc, project by project basis. To this end we submit the following comments, in the interest of furthering the Taskforce's efforts to create jobs for New Yorkers, contribute to New York State's sustainability, incorporate advanced technologies into the electric system, and maximize New York State electrical ratepayers' value on a systematic level.

By placing the Energy Highway in the context of a full range of electric system upgrades, New York can build upon the state's history of environmental leadership, generate new jobs in sectors as diverse as technology, construction and manufacturing, and provide consumers with affordable and reliable clean energy. We understand that the fast-track approach of the New York Energy Highway suggests that decisions made in this process will likely influence the 2013 Energy Plan, rather than the reverse. Therefore, this proceeding – which comes at a time when the rapid emergence of new technology for all aspects of the energy system presents a once-in-a-generation opportunity to leverage current infrastructure investment – is critical to the development of New York State energy policy in a larger sense. To ensure that New York State energy policy will include the most critical elements needed to maximize environmental, economic and customer benefits, the Taskforce should, in the coming Request for Proposals, broaden the project's vision of tomorrow's electric system to better incorporate some key concepts – notably, (1) the holistic development of a smart, green grid, including modernized transmission *and* distribution systems, that can become a platform for the information and connectivity needed to maximize reliability, efficiency and mobilization of the full array of clean

energy resources, including distributed generation and flexible, responsive load; and (2) the implications of the coming convergence of transportation and electrical infrastructure. These considerations help maximize the benefits from all proposals received in response to the RFI on a systematic level. We also recommend that proposals submitted in response to the RFP be evaluated based on their ability to improve the electrical system in its entirety and yield the systemic benefits made possible by a smart grid.

I. The Energy Highway Is An Opportunity for New York to Achieve Environmental Objectives While Enhancing Affordability and Reliability.

New York's leadership has established aggressive environmental goals to solve climate change and cut harmful air pollution. For example, in Executive Order No. 2, Governor Andrew Cuomo embraced the State's existing greenhouse gas ("GHG") emission reduction goal set by his predecessor: by 2050, to reduce greenhouse gas emissions to *80% below 1990 levels*. The Legislature has also recognized the protection of environmental values as important state policy, stating (in Section 1-0101 of the Environmental Conservation Law of the State of New York) that "[t]he quality of our environment is fundamental to our concern for the quality of life. It is hereby declared to be the policy of the State of New York to conserve, improve and protect its natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well being."[1]

New York's leadership in environmental matters is essential—particularly in the absence of comprehensive federal climate legislation. As an original signatory to the Regional Greenhouse Gas Initiative ("RGGI") Memorandum of Understanding ("MOU"), New York and its fellow signatories stated in 2005 that they "wish to establish themselves and their industries as world leaders in the creation, development, and deployment of carbon emission control technologies, renewable energy supplies, and energy-efficient technologies, demand-side management practice and increase the share of energy used within the Signatory States that is derived from secure and

[1] N.Y. ENVTL. CONSERV. LAW § 1-0101.

reliable supplies of energy."[2] New York's participation in RGGI, a successful regional GHG cap and trade program, has given us a remarkable opportunity to lead by example by achieving significant GHG reductions in the electric generation sector by 2018, while at the same time achieving financial and economic benefits for the people of New York State.[3] Ultimately, the smart grid we envision for New York State ensures opportunities for entrepreneurs to deliver new technologies and services, and encourages economic growth and job creation.

To achieve our overall State GHG emission reduction goals we must go further than RGGI. The creation of the Energy Highway is a potent opportunity to make important strides toward a smart grid – if investments are oriented toward that goal. Other jurisdictions have rigorously examined the question of how to meet the same 80% by 2050 goal that New York has embraced, and their consensus is clear: serious decarbonization demands that we do more than simply ramp up efficiency and renewable generation—it also demands that more and more applications (such as transport) become electrified. To accommodate surges in load associated with electrification of transportation, while simultaneously reducing emissions from the electric system as a whole, that system must be fundamentally dynamic enough for flexible, responsive load to play a key role as variable renewables come on and off line.[4]

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[2] Regional Greenhouse Gas Initiative, Memorandum of Understanding (2005), *available at* http://www.rggi.org/docs/mou_12_20_05.pdf.

[3] The economic impact on the RGGI region its entirety is approximately $33 per capita. Among various effects, residents of the RGGI states experience lower electric bills. In the case of New York State, this effect amounted to $210 million in net bill reductions in . Hibbard, Paul, Susan Tierney, Andrea Okie, and Pavel Darling. The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States. Rep. Analysis Group, 15 Nov. 2011. Web. Pg 2-3. <http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf>.

[4] [4] *See, e.g.*, "Report Maps California's Energy Future to 2050." California Council on Science and Technology. May 2011 <http://ccst.us/publications/2011/2011energy.php>;

James H. Williams, Andrew DeBenedictis, Rebecca Ghanadan, Amber Mahone, Jack Moore, William R. Morrow III, Snuller Price, Margaret S.Torn. "The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity." November 2011. <http://www.sciencemag.org/content/early/2011/11/22/science.1208365.abstract?sid=ba72f8c7-16a6-4236-8e3e-6f5773788788> ;

"Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions." Energy Roadmap 2050. 2011 <http://ec.europa.eu/energy/energy2020/roadmap/doc/com_2011_8852_en.pdf>

We applaud the vision of looking to market players to play a key role in designing and constructing New York's electric system upgrades. New York is fortunate to be the home of some of America's most exciting clean tech companies—from the biggest to the smallest—including some of the most important players in the world of smart grid, such as IBM and General Electric, which participate in the New York State Smart Grid Consortium.[5] Meanwhile, New York real estate owners are increasingly in the vanguard in moving the industry toward world-class energy performance. We urge the taskforce to ensure that non-commercial, non-state actors are fully brought along in this effort; our public and private universities and Brookhaven National Laboratory, located on Long Island, can contribute broad and deep expertise to a concerted effort by the State to build an electric system for the twenty-first century.

II. An Upgraded Electric System Must be "Smart" End to End.

The so-called "smart grid" is, fundamentally, the next step in the natural evolution of the electric grid—the integration of "intelligence" (sensors, communications and controls) throughout the electricity system, from a power plant to every device with a plug. This is critical to enabling decarbonization for several interrelated reasons. The smart grid helps deliver efficiency gains—within the electric system itself and at sites where energy is consumed; it can make electric consumption elastic, by giving electric users the ability to adjust their load shape in response to system conditions, which can be conveyed through price and other types of signals; and it enhances opportunities to integrate renewable energy resources, including by using the flexibility of load and storage to maximize the use of variable resources when they are available. Remarkably, the flexibility that is critical to carbon reduction also gives rise to better reliability and new economic opportunities.

Although we generally imagine the electric system as a means of conveying energy, rather than a user of electricity in its own right, better management of the system itself can actually reduce the amount of electricity needed to serve load. For example, the deployment of "utility-side" technologies that optimize power flows and voltage levels on the grid can deliver significant (3-5%) reductions in GHG emissions. Indeed, simply by combining voltage and reactive power

[5] For a full list New York State Smart Grid Consortium members please visit: nyssmartgrid.com/consortrium-members.html

controls, utilities have already demonstrated peak reductions well in excess of 2%— and Oklahoma Gas & Electric is beginning a roll-out to capture such savings on a large scale.[6]

Two-way communication will enable power consumers to also become "resources." It will facilitate pricing structures that incentivize end users to reduce usage when supply is constrained and wholesale prices are high, or to run discretionary loads at times when carbon free resources are available, or existing transmission assets aren't being fully utilized. Together, sophisticated systems and sophisticated pricing lay the groundwork for meaningful change in how operators make use of grid assets and how electricity consumers manage their energy needs and bills.

Advanced metering technology for all classes of customers is an important part of the complete picture. Well thought-out roll-outs of smart meters (and residential dynamic pricing programs), in regions as disparate as Oklahoma and the District of Columbia have been both extremely successful in facilitating more efficient use of energy while saving customers money. Moreover, these programs have been extremely popular, demonstrating that energy customers will seize the opportunity to adopt new technologies when properly educated as to their benefits.[7]

Even as it transforms the power of the electric user and makes a low-carbon system possible, a smarter grid also provides resiliency and can be a source of new business opportunities. The smart grid will detect and prevent many outages before they occur; when the system does fail, it will be able to island faults to avoid the kind of cascading black-out that crippled the state in 2003. New York's phasor measurement units ("PMU's"), for example, represent a critically important improvement to the transmission system; they are expected to provide the kind of real-time insight into grid conditions that would have allowed the incident that gave rise to the massive blackout of 2003 to have been contained, rather than escalated.[8] Smart meters in

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[6] "Ventyx Launches Network Manager (TM) DMS v5.3 With Model-Based Volt/VAR Optimization." IT News Online. December 2011. <http://www.itnewsonline.com/showprnstory.php?storyid=190738>

[7] *See* OGE Energy Corp. Homepage, http://www.oge.com/environment/EnergyEfficiency/Pages/Smart%20Grid.aspx (last visited April 27, 2011); POWERCENTSDC PROGRAM FINAL REPORT, Sept. 2010, *available at* http://www.oe.energy.gov/DocumentsandMedia/DC_OPC_Attachment.pdf; Candace Lombardi, *Electricity Use Curbed By Pricing? Not Exactly*, CNET.com (Sept. 9, 2010), *available at* http://news.cnet.com/8301-11128_3-20015964-54.html#ixzz1KrTn4dUu.

[8] Minkel, JR. "The 2003 Northeast Blackout Five Years Later," *Scientific American*. August 2008. <http://www.scientificamerican.com/article.cfm?id=2003-blackout-five-years-later>

Alabama allowed for a faster and more targeted response to repair the grid after it was damaged by tornados in April, 2011.[9] This increased resiliency is especially critical in the context of a changing climate, since the increasing number of extreme storms and large-scale blackouts threaten to cost Americans approximately $100 billion a year.[10] Additionally, the smart grid is a powerful platform for innovation. The smart grid encourages new market opportunities for providers of advanced energy technologies and "apps", as well as new clean resources, including efficiency and renewables. As we advised the New York State Public Service Commission (the "PSC") in its 2010 smart grid proceeding:

> "The smart grid, if thoughtfully planned, can reduce our reliance on fossil fuels by optimizing grid efficiency, bringing clean power online, and even enabling the transformation of our transportation system.[11] The smart grid can prime the grid for dynamic pricing, innovation, energy storage, and clean tech services . . . . ."[12]

The state of our electric system limits the distributed generation and flexible responsive demand opportunities, requiring customers to rely on utility generation, including carbon-intensive utility generation; for example, would-be CHP developers in New York City report numerous gas and electric system challenges that cause them to shy away from this cleaner approach to heat and power. Current demand response programs in New York are limited in scope and size by the use of conventional technology. Studies from FERC and NERC have shown that demand response can be drastically expanded using smart grid technology that would allow for the full utilization of large commercial and industrial loads as well as aggregation of small customers.[13] Such large increases in participation would be incentivized through dynamic pricing and "pay for performance" for fast response ancillary services.[14]

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[9] Redell, Charles. "Alabama Power Finds a New Benefit for Smart Meters: Disaster Recovery." September 2011. <http://www.greenbiz.com/news/2011/09/15/alabama-power-finds-new-benefit-smart-meters-disaster-recovery>

[10] "The Pecan Street Project: Building Tomorrow's Electrical Grid in Austin, TX." *Environmental Defense Fund*. Spring 2011. Page 4. <http://www.edf.org/sites/default/files/11821_pecan-street-project-report-spring-2011.pdf>

[11] ELECTRIC POWER RESEARCH INSTITUTE, METHODOLOGICAL APPROACH FOR ESTIMATING THE BENEFITS AND COSTS OF SMART GRID DEMONSTRATION PROJECTS, Jan. 2010, at 1-1, *available at* http://my.epri.com/portal/server.pt?space=CommunityPage&cached=true&parentname=ObjMgr&parentid=2&control=SetCommunity&CommunityID=405.

[12] *Id.*

[13] *See, e.g.*, A National Assessment of Demand Response Potential (June 2009), *available at* http://www.ferc.gov/legal/staff-reports/06-09-demand-response.pdf.

[14] Indeed, the FERC study's high-end estimates of demand response participation assume full-scale deployment of advanced metering infrastructure and dynamic pricing. *See id.* at xii

Here in New York, intelligence on the transmission system is already improving reliability and delivering other benefits. The PMUs provide a powerful example. And innovative players statewide are experimenting with smart technology at the building and community level. For example, ConEdison *Solutions* and Viridity Energy, Inc. are working on a service that will permit energy users to efficiently convert their buildings into energy providers, a virtual power plant, when market conditions allow. Customers who participate in such a virtual power plant can profit from changes in energy prices, while adding resilience to the entire system.[15] However, underinvestment in the grid limits such opportunities.

III. The Fiscal Impact of a Smarter Grid

The focus, in this initiative, on in-state resources, such as our underutilized upstate generation resources, can have significant, positive economic consequences for New Yorkers. In addition to the improved asset utilization of these upstate generation resources, a comprehensively modernized grid will yield dividends all over the state—for every community—by enabling greater reliance on distributed generation and greater consumer efficiency. Improvements with local impact can – including any improvements that level peaks, and thus reduce the need for infrastructure built specifically to serve peak load – reduce the need for the expense of building even more transmission lines to import electricity, and exporting New York's consumer dollars to other states or Canada.

Looking across the entire system from the outset enables the right sequencing of investments to maximize returns at every step. *Delaying system-wide modernization costs money*. Utility companies are constantly replacing plant, and the opportunity cost resulting from continued investments in conventional infrastructure-- centralized, fossil-powered, inflexible and incapable of absorbing innovation -- is a burden that our children and our children's children will live with for decades. This visionary effort can make strides toward resolving this problem, *building a system worthy of the future.*

[15] "ConEdison Solutions and Viridity Energy Join Forces to Expand Beyond Demand Response." ConEdisonSolutions, 5 Oct. 2011. Web. www.conedsolutions.com/news/newsview/11-10-05/ConEdison_Solutions_and_Viridity_Energy_Join_Forces_To_Expand_Beyond_Demand_Response.aspx

IV. Tomorrow's New Yorkers Demand System-Level Thinking

The needs of the next generation of New Yorkers are daunting. They will need ways to better utilize clean upstate resources to more reliably power the highly populous downstate region—and we applaud the Energy Highway Taskforce's commitment to making that happen. But in light of the importance of local systems in providing system resilience, the transmission/utility-generation-focused approach that the RFI embraces risks falling short of those objectives. Moreover, tomorrow's New Yorkers need the emissions reductions New York's leaders have promised to achieve to protect public health and climate stability. While the RFI speaks of "a sweeping public-private initiative to upgrade and modernize New York State's electric power system," an approach to system modernization that focuses entirely on the conventional generation and transmission portions of the system leaves too much on the table. States and other jurisdictions, such as California, the European Union and South Korea, that have made binding carbon commitments, have made concurrent commitments (sometimes called "roadmaps") to whole system grid modernization to mobilize all of the distributed energy resources, demand and supply. Similarly, New York State's goal of reducing GHG emissions to 80% below 1990 levels by 2050 cannot be met without full and thoughtful deployment, throughout the electric system, of the technology that supports real time energy optimization by all parties in the energy marketplace. Upgrades to the entire system—from the power plant to the delivery system to the end-user—must be employed concurrently to realize the greatest value, because the value of each is enhanced by the others. A piecemeal approach will devalue the return on investments made in upgrading the system.

At this critical juncture, the Energy Highway Taskforce has a unique opportunity to make a better energy future for tomorrow's New Yorkers. We encourage the Taskforce to seize this opportunity fully, by significantly broadening its vision as expressed in the Request for Proposals that is to come, and by preparing to evaluate the proposals that are to come in terms of the system-level benefits they can facilitate. We look forward to continuing to support this vital effort secure New York's energy future.

Respectfully Submitted,

/s/Elizabeth B. Stein

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