COMMENTS OF THE SIERRA CLUB REGARDING
DUNKIRK REPOWERING AND TRANSMISSION ALTERNATIVES

I. Introduction

The Sierra Club respectfully submits the following comments regarding the transmission and repowering proposals for the Dunkirk generating station located near Dunkirk, New York. For the reasons set forth below and as supported by the accompanying report from Pinewood Power Solutions LLC and PSM Consulting, Inc., the Sierra Club recommends that the Public Service Commission (“Commission”) approve the transmission upgrades recommended by National Grid and reject the repowering alternatives proposed by NRG. The Sierra Club also recommends that the Commission require National Grid to implement, to the extent practicable, demand response and energy efficiency programs to alleviate potential operational or reliability concerns associated with Dunkirk’s retirement during the time period between completion of the initial set of transmission projects (2015) and completion of the remaining transmission projects (2018-2019).

The Commission, through Docket Nos. 12-E-01361 and 12-E-0577,2 is currently engaged in reviewing and evaluating solutions to address reliability issues created by the proposed mothballing of the Dunkirk coal plant (“Dunkirk”) in western New York. As a party in these proceedings, the Sierra Club retained Pinewood Power Solutions LLC and PSM Consulting, Inc. (“the Consultants”) to review the materials submitted in both dockets and provide technical recommendations on the proposed repowering alternatives and transmission upgrades. The following comments are informed by the technical review and analysis provided by the Consultants.

II. Background

A. Parties

The Sierra Club is a nonprofit environmental organization with over 600,000 members nationally, including more than 35,000 members in New York State. The Sierra Club’s mission

1 Petition of Dunkirk Power LLC and NRG Energy, Inc. For Waiver of Generator Retirement Requirements.  
2 Proceeding on Motion of the Commission to Examine Repowering Alternatives to Utility Transmission Reinforcements.
is to explore, enjoy, and protect the wild places of the earth; to practice and promote the
responsible use of the earth’s ecosystems and resources; to educate and enlist humanity to protect
and restore the quality of the natural and human environment; and to use all lawful means to
carry out these objectives. The Sierra Club’s membership includes individuals and electric
ratepayers who reside in the vicinity of the Dunkirk plant who have a financial and public health
stake in the future of the plants.

Mr. David J. Lawrence, Pinewood Power Solutions LLC’s principal consultant, has been
active in the electric power industry for 36 years, beginning with 24 years at Power
Technologies, Inc. (now Siemens PTI) in various operational scheduling, transmission,
distribution and control/monitoring equipment roles, followed by 11 years at the New York
Independent System Operator (“NYISO”) serving in various demand response program and
capacity market positions, and most recently as President of PPS, providing consulting services
related to wholesale electricity markets. He received his B.S. and M. Eng. Degrees in Electric
Power Engineering from Rensselaer Polytechnic Institute.

Dr. Ricardo J. Galarza, President of PSM Consulting, Inc., has worked in the electric
power industry for over 20 years in various positions, gaining extensive experience in power
system engineering and the electricity markets. After obtaining his B.S. degree, Dr. Galarza
worked 6 years for an electric utility in various capacities. Following completion of his Ph.D.,
Dr. Galarza spent 5 years with Power Technologies, Inc. in various transmission and system
planning roles. He joined the NYISO in 2001, where he worked in the Market Monitoring and
Performance unit. Dr. Galarza founded PSM Consulting, Inc. in September of 2003, where he
has been active in a number of independent consulting projects. He obtained his B.S. from
Northeastern National University, Argentina, and his M.S. and Ph. D. in Electric Power
Engineering from Rensselaer Polytechnic Institute.

B. Proceeding

On March 14, 2012, NRG Energy, Inc. (“NRG”), the owner of Dunkirk, filed notice with
the Commission of its intent to indefinitely mothball Dunkirk no later than September 10, 2012.
In support of its decision, NRG argued that Dunkirk was, and would continue to be, operating at
a net loss and consequently continued operation “is not currently economic and is not expected
to be economic . . .”³ On August 16, 2012, the Commission approved a Reliability Support
Services Agreement (“RSSA”) between NRG and National Grid through which National Grid
agreed to compensate NRG in exchange for keeping certain units at the Dunkirk facility online
for a limited time period.⁴ Subsequently, by order dated May 20, 2013, the Commission
extended the duration of the RSSA for one 80 MW unit through May 31, 2015.⁵

On a separate but parallel track, on January 18, 2013, the Commission issued an Order
Instituting Proceeding and Requiring Evaluation of Generation Repowering (“January 18

³ Notice of Intent to Mothball Dunkirk Units 1, 2, 3, and 4, Case No. 12-E-0136 (Mar. 14, 2012).
⁴ Order Deciding Reliability Issues and Addressing Cost Allocation and Recovery, Case No. 12-E-0136 (Aug. 16,
2012).
⁵ Order Deciding Reliability Need Issues and Addressing Cost Allocation and Recovery, Case No. 12-E-0136 (May
20, 2013).
Order”) in the above-captioned proceeding. In the January 18 Order, the Commission directed NRG and National Grid to compare the costs and benefits of two options: repowering Dunkirk at its existing site or investing in long-term alternative transmission upgrades. 6 The Commission added that “[t]he benefits to be evaluated must include, but may not be limited to, the reliability, environmental, and customer impacts associated with the repowering and transmission solutions.”7

On February 15, 2013, National Grid submitted a list of five transmission projects intended to address the long-term reliability concerns raised by the shutdown of Dunkirk. The five projects are:

1. Addition of two 33.3 MVAr capacitor banks on the two Dunkirk 115kV bus sections ($2.5 million).
2. Addition of a second 75 MVAr capacitor bank at the Huntley 115kV switchyard ($1.4 million).
3. Recconductoring of the two 115kV lines between Five Mile Road and Homer Hill, each approximately 7.4 miles in length ($18.0 million).
4. Recconductoring 14 miles of the Packard – Erie #181 115 kV line ($37.1 million).
5. Recconductoring one mile of the Niagara – Gardenville #180 115 kV line ($4.0 million).

National Grid identified that the first three projects would be in service within three years, with the final two projects in service no later than 2018-2019.8 National Grid explained that “[i]mplementing these projects is expected to address all N-1 reliability problems and greatly mitigate N-1-1 reliability exposure resulting from the shutdown of Dunkirk through at least 2021.”9

On April 1, 2013, NRG submitted its Repowering Proposal with three distinct repowering options. The options were as follows:

- Option 1—a new 422 MW combined-cycle gas turbine (CCGT) and refueling the existing 75 MW Dunkirk unit 2 with natural gas.
- Option 2—the refueling of the existing Dunkirk units 2, 3 and 4 with natural gas.
- Option 3—installation of 285 MW of natural gas-fired peaking units.


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6 Order Instituting Proceeding and Requiring Evaluation of Generation Repowering, Case No. 12-E-0577 (Jan 18, 2013).
7 Id. at 3.
8 National Grid Transmission Submission (Feb. 15, 2013).
9 Id. at 2.
III. Comments

Based upon the filings to date in Docket Nos. 12-E-0136 and 12-E-0577 and the analyses conducted by Sierra Club’s Consultants, Sierra Club offers the following observations and recommendations:

1. By limiting the required evaluation of reliability solutions solely to repowering alternatives and transmission upgrades, the Commission’s January 18 Order was unduly narrow. The Sierra Club urges the Commission to order National Grid, to the extent practicable, to implement demand response and/or energy efficiency programs to alleviate potential operational or reliability concerns associated with Dunkirk’s retirement during the time period between completion of the initial set of transmission projects (2015) and completion of the remaining transmission projects (2018-2019).

2. The Sierra Club supports National Grid’s five identified transmission projects and upgrades as the best long-term solutions to address potential future reliability issues associated with Dunkirk’s retirement for several reasons including:

   a. National Grid’s transmission analysis\textsuperscript{10} (“2012 Study”) was sound and represents the best solution to alleviating reliability concerns associated with Dunkirk’s retirement;

   b. Unlike transmission upgrades, repowering Dunkirk will not address all of the potential future reliability issues. Even if approved, repowering must include additional transmission upgrades to address, at a minimum, the identified low voltage issues; and

   c. Additional considerations support implementation of transmission rather than repowering solutions.

The following sections expand upon each of the above points.

A. The Sierra Club Urges the Commission to Order National Grid to Adopt a Demand Response Program to Address Reliability Concerns Associated with the Gap Between Completion of the First Three Transmission Projects (2015) and Completion of the Final Two Projects (2018-2019)

In its May 17 Report/Recommendations to the Commission, National Grid compared NRG’s repowering projects to the previously identified five transmission projects and, noting both the reliability and economic advantages of the transmission upgrades, unequivocally recommended that “the Commission support the implementation of the Transmission Upgrades solution.”\textsuperscript{11} However, because of the 3-4 year gap between completion of the first three transmission projects in 2015 and the final two transmission projects, National Grid stated its intention to “rely upon operational measures to address any reliability issues remaining in the


period following completion of the first three projects (estimated at June 1, 2015) and before completion of the #180 and #181 line reconductoring.”

Consequently, the Sierra Club urges the Commission to order National Grid to develop a demand response program as part of its “operational measures,” and/or develop energy efficiency programs, to address the extent practicable any potential operational or reliability concerns in the time period between completion of the first three and final two transmission projects. Such a program should subscribe industrial and commercial customers (with minimum kW aggregation limits) to a load relief program specifically tailored to National Grid’s western New York system configuration. As with the Emergency Operating Procedures followed by the New York Independent System Operator (“NYISO”), implementation of demand response programs would play a crucial role in a multi-step program designed to help prevent future reliability issues. Under such a program, the MW penetration and exposure hours can be limited to achievable levels while providing additional operational tools that provide additional flexibility to system operators. The 3-4 year timeframe over which such programs could be implemented justifies serious consideration.

As noted by the Consultants, existing demand response programs, including NYISO’s Special Case Resource and Emergency Demand Response Programs and Con Edison’s Distribution Load Relief Program and Commercial System Relief Program provide good models for a similar National Grid program to address the operational or reliability issues associated with Dunkirk’s retirement. All of these programs use demand response solutions to address specific bulk power system, distribution system, and local network problems in ways that provide meaningful relief and reasonable compensation to participants.

The Commission has also previously adopted similar strategies to ensure that statewide reliability was maintained through the use of demand response programs. In Commission Docket No. 00-E-2054, on Dec. 20, 2000, among other rulings, the Commission ordered New York electric utilities to “file proposed tariffs to implement the NYISO’s emergency price responsive program.” At that time, the Commission noted that “[t]he critical need to ensure an adequate and reliable supply of electricity, particularly in the downstate area, warrants prompt implementation of targeted demand reduction initiatives by the electric utilities.” The Sierra Club sees a parallel opportunity at this time to provide a similar charge to National Grid to cover any potential operational or reliability issues in western New York that may arise in the interim period between 2015 and 2018-2019. This would also help ensure compliance with FERC

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17 Order Requiring Filings and Reports on Utility Demand Response Programs, Case No. 00-E-2054 (Dec. 20, 2000), at 7.
18 *Id.* at 5.
Order 1000, which requires the consideration of non-transmission alternatives in transmission planning processes.\textsuperscript{19}

B. The Sierra Club Supports National Grid’s Five Identified Transmission Projects as the Best Long-Term Solutions to Address Potential Future Reliability Issues in the Most Cost-Effective Manner for New York’s Ratepayers

1. Repowering Dunkirk Will Not Address All of The Reliability Concerns Associated with Dunkirk’s Retirement

In the January 18 Order, the Commission placed a clear emphasis on the need to alleviate reliability issues first, specifically delineating reliability solutions from all “other impacts.”\textsuperscript{20} Due to the primacy of reliability concerns, the Commission should heed National Grid’s warning that repowering will not address all reliability issues, thereby making transmission upgrades preferable to repowering to alleviate concerns associated with Dunkirk’s retirement.

The Consultants have verified that National Grid’s transmission analysis was properly performed in accordance with applicable reliability standards.\textsuperscript{21} In National Grid’s 2012 Study, system performance was evaluated using steady-state techniques (power flow analysis) to report on thermal overloads and/or voltage violations. The bulk of the 2012 Study involved running contingency analyses to detect violations to all applicable planning standards (NERC,\textsuperscript{22} NPCC,\textsuperscript{23} NYSRC,\textsuperscript{24} and National Grid\textsuperscript{25}). As explained by the Consultants, a comprehensive set of contingencies was simulated, representing the loss of a single element (transmission line, generator, bus, transformer, etc.), loss of multiple elements, breaker failure, bus failure, and others.

To complete the requirements of the mandatory NERC Standards, including TPL-003 and the relatively new TPL-001-2 (Transmission System Planning Performance Requirements), N-1-1 contingency analyses were performed. Category P3 and P6 planning events as described in


\textsuperscript{20} Jan. 18 Order at 3.

\textsuperscript{21} See Review of Dunkirk Repowering Options, Pinewood Power Solutions, LLC (June 4, 2013), at 2-3.


TPL-001-2 involve an initial loss of a generator or transmission component, followed by system adjustments,\textsuperscript{26} followed by another loss of a generator or transmission component.

There are numerous combinations of outages that can be tested for N-1-1. For the studies National Grid selected three possible combinations: 1) any loss of a single element followed by another single element, 2) loss of a BPS element followed by a design contingency, and 3) loss of a long lead time element (such as a large transformer, generators, and others) followed by a design contingency, thus appropriately meeting NERC Standards. Consequently, the Consultants found that National Grid’s properly performed studies show that repowering of Dunkirk will not address all of the identified reliability issues.\textsuperscript{27}

The 2012 Study identified a hierarchy of N-1 (single contingency) and N-1-1 (single contingency followed by a second unrelated contingency) cases that result in system problems (either low bus voltages or line flows in excess of Long-Term Emergency (LTE) ratings). As the 2012 Study identified, an earlier 2011 study conducted prior to Dunkirk’s notice of intent to mothball acknowledged that there are underlying issues associated with the transmission system that exist even with the Dunkirk units in service.\textsuperscript{28} While removal of the Dunkirk units would exacerbate the low voltage problems, simply repowering Dunkirk with new generation without additional remedial transmission measures will not fully address the low voltage problems identified in the 2012 Study.

2. National Grid’s Transmission Upgrades Are the Simplest and Most Cost-Effective Solution to Address Reliability Concerns Associated with Dunkirk’s Retirement

National Grid’s 2012 Study\textsuperscript{29} argues that the simplest solution for addressing the previously-identified low voltage problems associated with Dunkirk involves installation of shunt capacitor banks, specifically:

- addition of two 33.3 MVAr capacitor banks on the two Dunkirk 115kV bus sections, and
- addition of a second 75 MVAr capacitor bank at the Huntley 115kV switchyard.

As noted by the Consultants, “[s]hunt capacitor banks, by virtue of their size, flexibility, and relative low cost per kVA, have been used for many decades to correct low voltage problems on transmission systems.”\textsuperscript{30} Consequently, the Consultants found it “difficult to conceive” how repowered generation used to solve the low voltage issues in question could be cost competitive with what has long been recognized as a standard solution for low voltage problems on the bulk power system.\textsuperscript{31}

\textsuperscript{26} A set of corrective actions intended to mitigate the effects of a contingency. Corrective actions may include, among others, the opening or closing of a transmission element; the opening, closing, or re-dispatch of a generator; and load curtailment.
\textsuperscript{27} Review of Dunkirk Repowering Options at 3.
\textsuperscript{28} Review of Dunkirk Mothball Notice at 4 (“The 2011 study determined that severe post-contingency low voltages exist today and will get worse though time. The 2011 study was done with all generation at Dunkirk in service.”).
\textsuperscript{29} Review of Dunkirk Mothball Notice at 19.
\textsuperscript{30} Review of Dunkirk Repowering Options at 3-4.
\textsuperscript{31} Id. at 3.
To address the overload conditions noted on the Five Mile-Homer Hill and lines #180 and #181, the Consultants likewise found that the proposed reconductoring projects are logical solutions, with consideration given to the amount of reconductoring needed to eliminate the most vulnerable portions of the transmission facilities.\textsuperscript{32} Given that a significant number of contingencies result in overloads on these facilities, it is apparent that these lines are the weak links in this portion of the transmission system and reconductoring is the cost-effective solution here. Reconductoring is often the more cost effective, and less risky, way to eliminate potential future thermal overloads – no new Rights of Way need to be obtained, existing towers can often be re-used, and costs are much lower than new right-of-way projects.

Once the most severe set of N-1 and N-1-1 contingencies was identified, the 2012 Study considered a number of alternative transmission system modifications to address the full set of problems, including the addition of new 230 kV and 345 kV lines, the addition of one or more transformers at Stolle Rd, and reconfiguration of breakers at various substations. These were all rejected for various technical and cost reasons, indicating that the specific proposed transmission solutions are considered the most cost effective package of transmission additions to mitigate potential low voltage and overload contingencies.

The five transmission solutions proposed by National Grid, which appear to represent the most appropriate and cost-effective transmission solutions, represent a simpler and more appropriate solution to the identified reliability issues than the repowering solutions proposed by NRG. The Consultants have reviewed the power flow models used by National Grid and agree with National Grid that repowering Dunkirk is not the best solution to for addressing reliability issues, nor is it the best solution for ratepayers. As noted in National Grid’s Report/Recommendations, repowering Dunkirk “is not in the best interest of customers” and “would shift significant risk back to customers and away from the competitive market, which is contrary to key principles underlying the Commission’s move to more competitive electricity markets.”\textsuperscript{33} Based on the Cadwalader analysis performed as part of the National Grid repowering study,\textsuperscript{34} there is significant concern regarding benefits to consumers for a repowering option that includes out-of-market subsidies.

In addition, as referenced in the National Grid study by PA Consulting Group, repowering options will also increase emissions of carbon dioxide and lead to continued (though reduced) emissions of sulfur dioxide and nitrogen oxides.\textsuperscript{35} Furthermore, repowering will necessitate licensing and construction of a gas pipeline extension, and National Grid’s Report/Recommendations called for further evaluation to “assess the reasonableness of the schedules and whether they could meet the reliability need dates.”\textsuperscript{36}

\begin{flushleft}32 Id. at 4.  
34 Id. at 16-17.  
35 Id. at 21-22.  
36 Id. at 22. \end{flushleft}
To protect New York ratepayers and to ensure grid reliability, the Commission should require implementation of the five transmission solutions proposed by National Grid as the most cost-effective long-term solution to the identified reliability issues.

IV. Conclusion

For the reasons set forth above, the Sierra Club recommends that the Commission order National Grid to implement demand response and energy efficiency programs to address potential operational or reliability concerns associated with Dunkirk’s retirement during the time period between completion of the initial set of transmission projects (2015) and completion of the remaining transmission projects (2018-2019). In addition, Sierra Club recommends that the Commission approve the five transmission projects and upgrades identified by National Grid as the best long-term solution for the reliability issues raised by the mothballing of Dunkirk and reject the repowering proposals by NRG.

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Respectfully submitted,

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