Gil C. Quiniones  
Co-Chair, Energy Highway Task Force  
President and Chief Executive Officer  
New York Power Authority  
123 Main Street, 16th Floor  
White Plains, NY 10601-3170

RE: NRG Energy’s Astoria Repowering Proposal

Dear Mr. Quiniones and Energy Highway Task Force members:

On behalf of NRG Energy, Inc. ("NRG"), I am pleased to present the Astoria Repowering Project Informational Proposal for consideration in the New York Energy Highway Request for Information ("RFI"). In its Astoria submittal, NRG proposes to replace 600 MW of 1970’s vintage peaking units with more than 1,000 MW of fast-response, high-efficiency combined cycle units at its existing facility in Astoria, Queens. NRG’s proposal fulfills a number of the primary objectives of the RFI, including:

- "Increases efficiency of power generation in densely populated urban areas" (RFI, pg 12);—Replacing existing 1970’s vintage peakers with new combined cycle technology.
- "Contributes to an environmentally sustainable future for New York" (RFI, pg. 13);—Reducing on-site annual emissions by up to 65%.
- Enjoys full and unanimous support among local officials, local environmental groups and local civic groups;
- "Apply advanced technology that benefits system performance and allows more renewable to supply New York City" (RFI, pg. 13);—Utilizes unique fast-start combined cycle units.
- "Creates jobs for New Yorkers" (RFI, pg 13);—Creates up to 500 construction jobs and more than 24 jobs during operations; and
- Provides an anchor project that is “shovel-ready” and can be fully integrated with other transmission and generation projects included in the State’s initiatives.

We would be pleased to schedule a meeting with you and your team at your convenience to discuss or clarify any aspects of our proposal. In any event, we remain available to answer any questions on our proposal and provide additional information that may be helpful to you. Please contact Jon Baylor, our lead on the project, directly at 609.524.4958 or by email at jonathan.baylor@nrgenergy.com.

Respectfully yours,

Lee Davis  
Senior Vice President and President, Northeast Region  
NRG Energy, Inc.

May 30, 2012
NRG Astoria Repowering

Response to Request for Information
The New York Energy Highway

May 30, 2012
# Table of Contents

1. NRG Overview.......................................................................................................................... 1  
2. Project Overview ...................................................................................................................... 2  
   2.1 Site Description .................................................................................................................. 3  
   2.2 Permitting Overview ........................................................................................................... 3  
   2.3 Existing & Proposed Interconnections ................................................................................ 4  
   2.4 Construction Plan ............................................................................................................... 5  
   2.5 Project Cost Estimate ......................................................................................................... 5  
2.7 Technical Summary............................................................................................................ 5  
   2.7.1 Combustion Turbines (“CT”) ...................................................................................... 6  
   2.7.2 Steam Turbine (“ST”) ................................................................................................. 6  
   2.7.3 Auxiliary Boiler ........................................................................................................... 6  
   2.7.4 Electrical System (High Voltage) ............................................................................... 6  
2.8 Plant Operations Plan......................................................................................................... 6  
   2.8.1 Staffing ....................................................................................................................... 7  
   2.8.2 Maintenance .............................................................................................................. 7  
   2.8.3 Safety ......................................................................................................................... 8  
3. Project Justification .................................................................................................................. 9  
   3.1 Downstate Reliability .......................................................................................................... 9  
   3.2 Increased Urban Efficiency ................................................................................................. 9  
   3.3 Technology Benefits ......................................................................................................... 10  
   3.4 Environmental Benefits ..................................................................................................... 10  
   3.5 Community Benefits ......................................................................................................... 11  
   3.6 Ratepayer Impacts ........................................................................................................... 11  
4. Financial ................................................................................................................................. 13  
   4.1 Proposed Contract Summary ........................................................................................... 13  
   4.2 Private-Public Partnership ................................................................................................ 13  
   4.3 Incentives and Options to Reduce Pricing and Price Uncertainty .................................... 13  
   4.4 Project Financing Plan...................................................................................................... 14  
   4.4.1 Project Funding ........................................................................................................ 14  
   4.4.2 Proposed Project Loan Terms ................................................................................. 15  
   4.5 Evidence of Sponsor Creditworthiness ............................................................................ 15  
5. Permitting and Approval Process ........................................................................................... 16  
   5.1 Environmental Permits ...................................................................................................... 16  
   5.1.1 Permits Acquired ....................................................................................................... 16  
   5.1.2 Permitted Limits ....................................................................................................... 16  
   5.2 Electrical Interconnections ............................................................................................... 17  
   5.3 CPCN Award .................................................................................................................... 18  
   5.4 Public Outreach and Approval .......................................................................................... 19  

Appendix

A. Astoria Final Air Permit  
B. Certificate of Public Convenience and Necessity  
C. Smart Power New York Letters of Support
NRG Overview

NRG Energy, Inc. ("NRG") is a Fortune 300 energy supply company headquartered in Princeton, New Jersey. NRG owns and operates one of the industry's most diverse wholesale generation portfolios (including nuclear, wind and solar power) that provides nearly 26,000 megawatts ("MW") of electric generating capacity, enough to support nearly 21 million homes. NRG's retail businesses, Reliant Energy, Green Mountain Energy Company and Energy Plus, serve more than 1.8 million residential, business, commercial and industrial customers.

In addition to being the power sector's leader in environmental efforts, NRG actively contributes to the local communities where its employees live and work. Since 2004, NRG's Global Giving program has provided more than $15 million to organizations and charities that have a direct impact on the lives of the people in our communities, including food banks and other organizations that foster self-sufficiency, improve housing and provide supplemental education to people in need.

NRG has a market capitalization of $3.6 billion with approximately $2.37 billion of available liquidity. Over the past five years, NRG has successfully developed more than 1,600 MW of new power projects and coordinated project financing of $4.9 billion. NRG has the knowledge and experience to effectively develop and finance the Astoria redevelopment project.

NRG in New York

NRG began its commitment to New York in 1999 by investing approximately $945 million in five fossil-fueled power generating facilities as part of the newly-created deregulated electric generation market, making NRG one of the top investors within the State. Examples of NRG's continuing commitment to the State include:

- 4,000 MW of net generating capacity;
- More than 500 employees dedicated to generating power safely and economically;
- Converting its Western New York coal-fired units in 2005 to Powder River Basin ("PRB") low-sulfur coal which dramatically improves environmental performance;
- Investing $300 million to retrofit Western New York coal units with emissions controls systems that reduces nitrous oxides ("NOx"), sulfur dioxide ("SO2"), and particulate matter ("PM") emissions; and
- Continued commitment to redeveloping existing New York sites to improve emissions and generating efficiency within the state.

In addition to managing its current assets, NRG is developing opportunities to aid New York State in its goals of improving the environment, growing jobs and creating a long-term sustainable future. NRG has a team of experienced professionals focused on building a portfolio of projects across the Northeast that demonstrates our commitment to partnering with our customers achieve their energy goals.

Contact Information

For additional information related to this RFI submission, please contact:

Jon Baylor
Director, Development
NRG Energy, Inc.
211 Carnegie Center
Princeton, NJ 08540
Office: 609.524.4958
Email: jonathan.baylor@nrgenergy.com
2 Project Overview

The Astoria Gas Turbine Power Repowering Project (the “Project”) will replace 31 existing, 40-year-old simple cycle turbines with four new state-of-the-art combined cycle units at the existing site in Astoria, Queens County, New York. The $1.5 billion Project will be completed in two phases.

In Phase I, seven existing oil-fired Westinghouse units (totaling 100 MW) will be replaced with two new gas-fired combined cycle units employing state-of-the-art CC-FAST design, totaling 520 MW. If a contract is awarded by year-end 2012, Phase I can be operational by the 2015 summer season and would increase total onsite capacity to 1,020 MW.

We have the flexibility to build Phase II simultaneously with Phase I, or to build in stages. If staged, Phase II would commence shortly after completion of Phase I. Phase II will require the retiring and removal of 500 MW of dual-fuel (gas & oil) Pratt & Whitney turbines, which will be replaced with two new gas-fired combined cycle CC-FAST units, totaling 520 MW. When completed, Phase I and Phase II will increase total on-site generation from 600 MW today to 1,040 MW at completion of repowering.

NRG’s proprietary CC-FAST technology is based on General Electric’s existing 7FA turbine technology that can operate as peaking units and achieve 136 MW of load on the combustion turbine in 10 minutes, and be at full load (260 MW) in 45 minutes. Where traditional combined cycle gas turbine (“CCGT”) projects require two hours or more to reach full load operations, CC-FAST was designed with the demands of the New York Zone J market in mind. Because of its reduced start time, the CC-FAST unit will provide this Project with the flexibility to meet the demand needs of a constrained load pocket while also providing superior efficiency not typically provided by peaking units.

The Project has obtained all necessary permitting and regulatory approvals to begin construction. Final air permits were awarded in October 2010 with the unanimous support of the local community. Because of the Project’s many merits, the local community rallied behind the Project and enthusiastically supported the significant emissions reductions it will achieve. Despite a projected significant increase in capacity and operating hours, the Project will realize annual reduction of NOx emissions by more than 75% and reduce annual particulate matter (“PM”) emissions by 65%. Additionally, during the highest emissions days of the year, the Project will reduce on-site peak-day NOx emissions by approximately 95% and peak-day PM emissions by more than 90%. Additionally, the facility will account for a 15% reduction in city-wide carbon dioxide (“CO2”) emissions from all power plants.

Today, the Project is the only large shovel-ready CCGT in New York City. To begin construction, the Project needs to secure a long-term off-take contract in order to obtain project financing. NRG believes that a tolling agreement is the most efficient way to obtain financing. Under a tolling agreement, the Project would receive a monthly capacity payment in return for the satisfaction of specific availability and heat rate guarantees, and the counterparty would be responsible for fuel procurement and scheduling. The counterparty to the tolling agreement will have complete dispatch control of the Project. As the counterparty dispatches the units, NRG will charge a variable payment in addition to the capacity payment. However, NRG can customize contracting opportunities to meet customer preference and financing requirements.

NRG can commence construction within six months of the issuance of a notice to proceed and can achieve commercial operations within 36 months of contract award. Up to 500 full time construction jobs would be created during the construction period and more than 24 full time permanent operations and maintenance positions would be created.
2.1 Site Description

NRG’s Astoria generation facility is located on a 15-acre parcel at 31-01 20th Ave., Long Island City (Astoria), Queens County, New York within the 600+ acre Astoria Consolidated Edison (“ConEd”) complex. This complex is home to several power generating facilities, as well as barge facilities, a liquefied natural gas plant, a non-operational waste water treatment plant, and other miscellaneous operations. This area has been the site of power plants and associated activities since the 1890s and remains exclusively a major electric generating and manufacturing complex.

Figure 1 - NRG Astoria Today

NRG’s facility consists of 31 simple cycle gas turbines that were built more than 40 years ago. The existing site has a total generating capacity of 600 MW. The existing units operate on fuel oil with some natural gas capabilities.

Table 1 - Existing Astoria Generation

<table>
<thead>
<tr>
<th>Technology</th>
<th>COD Year</th>
<th>Total Capacity</th>
<th>Heat Rate</th>
<th>Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westinghouse 191</td>
<td>1970</td>
<td>42 MW</td>
<td>18,000</td>
<td>Kerosene</td>
</tr>
<tr>
<td>Westinghouse 291</td>
<td>1970</td>
<td>80 MW</td>
<td>18,000</td>
<td>Kerosene</td>
</tr>
<tr>
<td>Pratt &amp; Whitney FT4 (4 units)</td>
<td>1970</td>
<td>160 MW</td>
<td>14,500</td>
<td>Nat Gas or Kero</td>
</tr>
<tr>
<td>Pratt &amp; Whitney FT4 (4 units)</td>
<td>1970</td>
<td>160 MW</td>
<td>14,500</td>
<td>Nat Gas or Kero</td>
</tr>
<tr>
<td>Pratt &amp; Whitney FT4 (4 units)</td>
<td>1970</td>
<td>160 MW</td>
<td>14,500</td>
<td>Nat Gas or Kero</td>
</tr>
</tbody>
</table>

One benefit of repowering the existing Astoria site is the ability to re-use existing infrastructure, avoiding costly and time-consuming new build. The site is near three major substations with access to both the 138 kV and 345 kV systems in Zone J. The Project will use existing interconnection rights to the 138 kV electrical interconnections at Astoria East and Astoria West substations. Additionally, the site has two on-site gas headers that deliver natural gas from the ConEd system to the current NRG Pratt & Whitney units. The Project will use existing interconnections, mitigating the need for any extensive build-out of additional transmission and/or gas networks.

2.2 Permitting Overview

By repowering the site with combined-cycle technology, NRG expects that the Project will operate considerably more hours per year than the existing peaking units. NRG reflected this expectation
in its original air permit application filed in December 2007. Despite increased operating hours, NRG expects the Project to significantly reduce emissions. The New York State Department of Environmental Conservation (“DEC”) issued the full permit for the Project in October 2010. NRG worked closely with local stakeholders throughout the air permitting process and received their enthusiastic support.

2.3 Existing & Proposed Interconnections

Through its existing facility, NRG owns interconnection positions at both the Astoria East 138 kV substation and the Astoria West 138 kV substation. With these existing interconnection positions, NRG owns 646 MW of grandfathered capacity deliverability rights that can be used to support the Project. The existing interconnection and deliverability rights provide the Project with the ability to electrically interconnect with minimal interconnection upgrades required to participate as a capacity resource in New York City.

Furthermore, the Project has access to the new Astoria Annex 345 kV substation located less than 100 yards away (Figure 2). While physically located in Astoria, the Astoria Annex feeds power directly into lower Manhattan. ConEd has recently completed an emergency reliability transmission project to connect the Astoria Annex 345 kV substation to the Astoria East 138 kV substation. This connection would allow generation connected at the 345 kV location to supply the lower local 138 kV system and vice-versa such that the Project can significantly reinforce reliability benefits to both the local load pocket and Manhattan with a level of certainty and within a timeframe that no other project can currently offer.

The Project currently owns two active interconnection requests with the New York Independent System Operator (“NYISO”) that would interconnect up to 500 MW of new generation. Queue positions 201 and 224 total 250 MW interconnecting to the Astoria West 138kV substation. These positions presently utilize 100 MW of grandfathered interconnection rights from the existing NRG Astoria Westinghouse units. It is being studied as a Class Year 2011 project and is anticipated that the unit will be fully deliverable. The second queue position (#266) is a 250 MW interconnection to the Astoria Annex 345 kV system and is being studied in the 2012 Class Year.

Figure 2 - Electrical Interconnections Map
2.4 Construction Plan

NRG is highly experienced in the structuring, negotiation, execution and management of engineering, procurement, and construction (“EPC”) agreements. NRG will use this experience, and the expertise gained, to reduce construction-phase risk and price. In a competitive construction market such as New York City, the selection of a reputable, experienced and financially-strong EPC company or consortium is a critical element in effective and timely execution of the projects on schedule and on budget.

NRG’s procurement and construction personnel are skilled at optimizing contracts with vendors and suppliers locally, nationally and globally to maximize quality, limit cost and control schedule. NRG conducts ongoing discussions with well-known EPC companies and maintains strong relationships with both in-city unions and ConEd. NRG anticipates the Project will use standard construction and technology guarantees.

The Project is the only combined-cycle project in New York City that can break ground in 2012. Phase I is currently proposed to be completed by the 2016 summer season but NRG believes that under certain circumstances, the Phase I schedule could be advanced to achieve a summer 2015 completion if a contract award is finalized by year-end 2012.

Phase II is expected to follow a similar timeframe and would be operational within 36 months of ground breaking.

2.5 Project Cost Estimate

Recent capital cost estimates for the Project total approximately $1.6 billion, or $1,540 per kilowatt (“kW”). Phase I is expected to cost approximately $825 million in large part because of the costs of interconnection laterals, site preparation, and mobilization costs. Phase II will utilize existing interconnections and will be constructed on our existing site. Accordingly, Phase II capital costs are expected to be $775 million.

CC-FAST technology is flexible and can respond quickly to market demands. To achieve this flexibility, the steam cycle and cooling systems are less complex than traditional combined-cycle designs but do not sacrifice efficiency. The result is a design that uses 20% less piping and steel and provides significant capital cost savings as compared to a conventional combined cycle design.

2.6 Technical Summary

As mentioned earlier, the Project will be constructed in two phases of two CC-FAST power trains, with each train consisting of one General Electric (“GE”) Frame 7 FA combustion turbine. This technology is a common gas turbine technology used in the power industry, with more than 1,000 frame machines in operation globally.

The CC-FAST design differs from traditional combined-cycle units by using a simpler steam cycle process that can accommodate fast start, load-following operations more easily. A two pressure heat recovery steam generator (“HRSG”) will be used instead of the traditional triple pressure HRSG design. This reduces start times and improves dispatch flexibility. CC-FAST will include conventional selective catalytic reduction (“SCR”) and carbon monoxide (“CO”) catalysts for emissions controls as well. A small auxiliary boiler is also used to maintain seal pressure and turbine temperature to facilitate fast start capabilities.
2.6.1 Combustion Turbines (“CT”)
Each CT will be:
• Capable of providing 75% output (~136 MW ISO) within 10 minutes of initiating the start sequence;
• Dual fuel and capable of turndown to 60% output within emissions compliance; and
• Equipped with combustors to reduce NOx levels to no more than 9 parts per million (“ppm”) when operating on natural gas.

Each unit will have a HRSG equipped with natural gas duct burners. The HRSG will contain a conventional CO catalyst and SCR, which will use 19% aqueous ammonia. The design of the HRSG will incorporate space for additional catalysts. HRSG manufacturers have developed designs that are optimized to support the rapid-start nature CTs. The design has been engineered to support both the quick response time and the frequent cycling dispatch profile that is anticipated for this configuration.

2.6.2 Steam Turbine (“ST”)
Each unit includes a single-case non-reheat ST operating at 1000 psia/1000°F throttle unfired, and up to 1320 psia fired. These units are simpler in nature than traditional triple pressure CCGT steam turbines. However, the designed steam cycle also provides increased dispatch flexibility to the unit without sacrificing efficiency. NRG has established relationships with several vendors capable of supplying the ST units.

2.6.3 Auxiliary Boiler
A small natural gas fired or electric boiler will be installed to maintain ST valve sealing during shutdowns. This will help to preserve the HRSG’s water chemistry and support the rapid start of the steam turbine by avoiding stabilization point delays that are normally required when vacuum is broken and time is required to reestablish water chemistry during the startup process.

2.6.4 Electrical System (High Voltage)
The generator for the CT is a completely enclosed, hydrogen cooled, synchronous unit. Each generator will have its own generator step-up transformer increasing the voltage to either 138 kV or 345 kV depending on the ultimate interconnection. The design incorporates a connection between the two power trains that provides redundancy which allows each CT to cross-connect and start other sister CT units on site.

2.7 Plant Operations Plan
NRG has a proven track record in power plant operations with a focus on three key priorities:
• Safety;
• Minimal forced outages; and
• Maintenance optimization.

NRG has an unrelenting focus on safety across the company which is reflected in its performance, in which the company takes pride. During 2011, NRG’s OSHA Total Recordable Injury Rate was 0.77, which puts NRG in the top decile for the Electrical Generation Industry. NRG has achieved this high level of operational performance through its intensive focus on operations and maintenance fundamentals led by regionally-coordinated operations teams that have developed best practices and have implemented into plant operations protocols.
NRG has the experience to operate power production facilities of all sizes, and currently does. NRG operates and maintains a total of 1,300 MW of intermediate and peaking plants in New York City. NRG emphasizes proper plant operations and maintenance ("O&M"), including the O&M as it pertains to the gas turbines.

2.7.1 Staffing

Plant staffing plans for the Project have been developed with key skills identified. Desired staffing numbers are expected to be approximately 24 full-time positions including plant supervision, mechanical, electrical, instrumentation, operating technicians and support staff. New positions will likely be sourced from the local community. Figure 3 is an organizational chart of the proposed plant staffing.

Figure 3 – Astoria Plant Organizational Chart

NRG is committed to achieving world-class excellence for its generating fleet and a key step in realizing this goal is partnering with technology providers to implement an extensive training program for all levels of the operations personnel. Our training program will include classroom training, computerized simulator training and physical plant training.

2.7.2 Maintenance

Gas turbine maintenance intervals are based on a combination of factors that include fuel type, operating hours, number of starts, types of starts and fuel type. These factors are used to calculate equivalent hours that determine the type and interval of the level of inspection. Maintenance intervals vary among gas turbine suppliers. NRG works closely with equipment
manufacturers and industry experts when completing inspections, outages and equipment upgrades.

The Project will either self perform its long-term maintenance or seek separate Long-Term Service Agreements ("LTSA"). The term of these LTSAs will typically cover the period of startup through the first planned major maintenance period (i.e., the initial 5-6 years of plant operations). A detailed maintenance plan will be developed and implemented in line with standard industry practices.

2.7.3 Safety

NRG’s paramount goal is for its employees to go home injury free every night. As a result, safety training and awareness are NRG’s top priority. Operational procedures will ensure the safe startup, commissioning and operation of the Astoria facility. The operations staff will be involved in the safety review during the design phase of the plant, before any construction begins, and in design of safety systems for new plant operations.
3 Project Justification

The Project will benefit local residents, New York ratepayers, policy makers, and grid operators. By utilizing state-of-the-art technology, the Project will deliver unparalleled emissions benefits to local residents, increase flexibility for grid operators and improve reliability for New York City residents.

3.1 Downstate Reliability

New York City is among the premier cities in the world and among the most electrically congested as well. The city set a peak demand record of 11,424 MW on July 11, 2012 and is expected to grow at a rate of 1.2% per year over the next decade, or about 150 MW annually\(^1\). Additionally, New York City’s generating fleet is aging, with an average generator age of 34 years. Nearly 70% of the capacity in New York City (Zone J) was installed prior to 1972 or earlier (Figure 4).

Figure 4 - Zone J Capacity by Age

![Figure 4 - Zone J Capacity by Age]

These older units are challenged in the near term because of increasing environmental compliance and maintenance costs. Indeed, in the past twelve months the NYISO has received mothball requests for 880 MW of gas and oil fired units in the city\(^2\).

NYISO reliability criteria mandates that approximately 80% of electricity generation must reside inside New York City Zone J. While some additions are expected to come online by 2013, those would effectively replace the units that recently filed for mothball status. With current load growth expectations, additional generation will be necessary inside the Zone J load pocket to maintain reliability and, perhaps more importantly, to mitigate exposure to transmission failure.

3.2 Increased Urban Efficiency

More than 40% of the installed generation in Zone J comprises old steam generators with heat rates over 10,000 btu/kWh. All units built within the last 10 years have been combined cycle units that have heat rates in the 7,000-8,000 btu/kWh range with state-of-the-art emissions controls, and yet these units still only account for approximately 20% of total installed generating capacity in-city.

\(^1\) 2012 Load & Capacity Book, Table I-2b: Baseline Forecast of Non-Coincident Peak Demand, page 13
\(^2\) 2012 Load & Capacity Book, Table IV-3 Generator Retirements, pg. 61
As in-city demand grows and environmental regulations enhance air quality standards, the costs for maintaining and operating older, higher heat rate units will continue to increase. Modernizing the generation portfolio inside the load pocket provides a number of key benefits:

- **Air Quality** – As in-city demand grows, high efficiency combined-cycle units are needed to provide cheaper, cleaner power to meet demand. Utilizing advanced emissions controls equipment, newer units provide dramatic air emissions benefits compared to older, existing generating units.

- **Fuel consumption** – New York City is increasing its dependence on natural gas supply as more buildings are required to switch boilers from fuel oil to natural gas. New CCGT units use 36% less fuel to create 1 MW than existing steam generators. These higher-efficiency units can reduce power-sector fuel demands, helping to improve gas supply in a constrained market.

- **Infrastructure constraints** – New York City has few areas where new generation can be sited. The Project reuses existing land, gas interconnections and electrical interconnection while increasing overall capacity on-site. Repurposing existing sites and infrastructure for new generation units will be critical to ensure sufficient in-city generation.

As the city looks for sustainable solutions that can be foundation blocks for a growing city, repowering existing sites for more output with lower emissions and reduced fuel use is the model for the future, all of which is attainable with the Astoria repowering project.

### 3.3 Technology Benefits

One of the major benefits of the Project is the flexibility it offers. The CC-FAST is a fast-start technology oriented in a 1x1 combined cycle configuration and implemented to fit the unique demands of the New York City market.

Each train of the CC-FAST is based on proven frame technology and is capable of providing up to 136 MW within 10 minutes of start up. Using a simpler design for heat recovery and steam generation, the CC-FAST configuration is capable of achieving full combined cycle operations faster than traditional combined cycle units. Additionally, the 1x1 configuration provides for extremely efficient operations capable of achieving a heat rate below 7,300 btu/kWh. These factors combine to create a unique combined cycle unit that possesses the fast-start capability of a peaking unit, and with the efficiency of a combined cycle generating unit. The combination of efficiency and responsiveness will be unmatched in the New York City market.

### 3.4 Environmental Benefits

One of the many advantages of the Project is its remarkably favorable environmental characteristics. The Project reduces on-site peak-day NOx emissions by approximately 95%. Although the Project will operate many more hours per year than the retiring generation, the Project will still reduce the annual NOx output at NRG’s site by more than 75% and reduce annual PM emission by 65% (Figure 5). Additionally, based on historic emissions city-wide, the inauguration of this Project would reduce city-wide emissions up to 17% from the power sector.
On high demand days, city-wide emissions spike because the least efficient generation comes online to ensure sufficient power supply to the system. Repowering the NRG Astoria Westinghouse and Pratt & Whitney units will also improve peak-day emissions in New York City by reducing on-site, peak day emissions by 98% for NOx and more than 90% for PM.

3.5 Community Benefits

From the inception of the Project, NRG has been actively communicating with and soliciting participation from community representatives and stakeholders. The community support for the repowering Project at Astoria has been unanimous and enthusiastic.

A critical element of that support is NRG’s commitment to sustainable development through state-of-the-art technology that ensures emissions reductions. The Astoria area of Queens is home to nearly 5,500 MW of generation—most of which is more than 40 years old. The ability to repower an existing site with cleaner, more efficient units that can provide significant emissions reduction has generated an unprecedented level of community support.

In addition to environmental benefits, the community will also benefit from hundreds of new construction jobs, and long-term capital investment. Each construction phase will last approximately three years and will result in 500 construction jobs and contractors on-site. Recent large-scale construction projects in Astoria have established that the area has adequate roadway and public transportation access to NRG’s site and that the construction impact to local traffic patterns would be minimal.

The Project is located less than 300 yards from the East River so that all major materials can be brought to the site via barge. Barge transport will avoid disruption of local traffic patterns and limit noise pollution during construction. NRG has promised the local community that barge transportation will be widely used to limit community impacts.

During the operations phase of the Project, approximately 24-28 full time staff would be required to operate and maintain the site. These positions would be filled by skilled union laborers and are generally high paying jobs that have a long-term positive contribution to the local economy.

3.6 Ratepayer Impacts

Without investments in modern generation technology in New York City, ratepayers will likely see escalating rates and will certainly experience higher emissions as older units are forced into
increased dispatch to meet growing demand. While multiple transmission lines serve the City with ties from Lower Hudson Valley and PJM, these lines often experience high congestion at peak periods, limiting additional energy and capacity flow into New York City. New York State stakeholders will need to consider the type of generation to add – peaking facilities that can provide capacity and fast response, or efficient combined-cycle units that can run in baseload or mid-merit operations. The Project is an ideal solution because it adds both high-efficiency generation and peaking-response-time flexibility where the grid needs it.

The flexible operating characteristics mean that uneconomic run times and uplift costs to ratepayers can be minimized because the design of the units will not require extensive advanced startup notification time or lengthy minimum run time. These attributes will also complement the increased deployment of intermittent renewable resources because the units can respond quickly to real-time changes in generation and demand on the system.

Capital costs with the CC-FAST design are also lower than traditional CCGT units. Because of its simpler design, CC-FAST requires less labor and materials for both the HRSG and cooling components resulting in cost savings of about 20% compared to the costs of new CCGT units. Additionally, the Project is positioned to utilize grandfathered deliverability rights and significant portions of existing infrastructure. The result is a project that can provide a lower cost product than a traditional combined cycle while improving efficiency and reliability.
4 Financial

4.1 Proposed Contract Structure

<table>
<thead>
<tr>
<th>Contract</th>
<th>Tolling Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterparty</td>
<td>As determined by State process</td>
</tr>
<tr>
<td>Products Sold</td>
<td>All rights to capacity, energy, and ancillary services produced at the facility</td>
</tr>
<tr>
<td>Delivery Point Power</td>
<td>Con Ed 138kV Astoria West substation / ConEd 138kV Astoria East substation/ Astoria Annex 345kV substation</td>
</tr>
<tr>
<td>Delivery of Natural Gas</td>
<td>Buyer is responsible for all the delivery of natural gas to operate the facility</td>
</tr>
<tr>
<td>COD</td>
<td>June 2016</td>
</tr>
<tr>
<td>Project Term</td>
<td>20 Years</td>
</tr>
<tr>
<td>Capacity (MW)</td>
<td>Summer 250 / Winter 290</td>
</tr>
<tr>
<td>Full Load Heat Rate (Btu/kWh)</td>
<td>Summer 7,500 / Winter 7,300</td>
</tr>
</tbody>
</table>

4.2 Private-Public Partnership

NRG proposes several flexible ownership options. As a sub-option to its Astoria proposal, NRG is willing to consider a Build-Own-Transfer (“BOT”) mechanism for one or both units in Phase I of the Project. Under this proposal, NRG will construct both units and transfer one or both units to the counterparty at the commencement of commercial operations for a lump-sum, fixed price. NRG will supply operating and maintenance services through an operating agreement and land through a long-term lease. Using a state agency as the counterparty would allow the Project to take advantage of New York’s tax-exempt status and low cost of capital to help reduce costs to customers.

4.3 Incentives and Options to Reduce Pricing and Price Uncertainty

The Project will seek available incentives as a way to help reduce the overall costs of the project to customers. NRG has engaged in discussions with the New York City Industrial Development Authority with regards to the application for a Payment in Lieu of Taxes (“PILOT”) agreement for the facility.

The Project would also seek out all available tax incentives with the State of New York to reduce the capital and ongoing costs of running the facility. Access to State bonding capability would provide advantageous interest rates during the construction and operations phase of the project, which would provide ratepayers significant cost benefits.
4.4 Project Financing Plan

A traditional project financing structure will be used to finance the Project (Figure 6). This structure will incent potential financing sources, as well as other project participants (such as EPC contractors), by providing flexibility and a structure that mitigates commercial risks by allocating them to the parties best able to manage them.

4.4.1 Project Funding

Based on discussions with various commercial and investment banks, NRG anticipates that the Project will be funded with a combination of debt and equity throughout its life. Although NRG can supply 100% of the required equity, NRG may include additional equity partners, particularly in situations when such potential partners, by virtue of their core businesses and expertise, are in a position to contribute additional value to the Project. If third parties subscribe for equity, NRG would continue to retain a substantial ownership interest, reflecting its strong commitment to the Project. Sources of NRG equity will include its current cash balances as well as future cash flows generated by its existing operations. As mentioned above, NRG currently has available liquidity of approximately $2.3 billion, including more $1.2 billion in cash and $1.1 billion in letter of credit capacity.

Figure 6 indicates the project components that must be executed or be in an advanced stage before successfully raising third-party financing. These components include an executed power purchase agreement or hedge with a creditworthy off-taker, as well as interconnection arrangements. To date, initial development and engineering activities for the Project have been funded by NRG corporate funds and no project debt has been used or assumed.

NRG understands the magnitude of financing required for this undertaking and has the financial resources available to implement the Project on budget and on schedule. Since January 1, 2011, NRG has successfully financed 1,600 MW of development projects on a non-recourse basis, resulting in $4.9 billion of project debt financing, including letter of credit facilities, with competitive terms.
Debt financing may include several tranches of debt with various terms and maturities syndicated among a broad range of domestic and international banks and financial institutions. NRG routinely canvasses the lending markets to determine which institutions would be receptive to participating in such a loan facility. Several have demonstrated their capability and willingness to serve in a lead role in a project finance syndication. Once the Project development has advanced, NRG will discuss with potential lenders the financial model for the Project and the key assumptions and conditions under which the planned Project financing could take place. In parallel with negotiation of a financeable off-take contract, NRG will seek formal proposals from the lending community for a project finance package.

4.4.2 Proposed Project Loan Terms
The following table summarizes the key financing terms which NRG believes, based on its recent experience successfully obtaining project financing and its ongoing consultations with leading financial institutions, could be available to the project, assuming commencement of financing negotiations in 2012 following execution of a long-term, financeable contract and other material project contracts. These terms are generally consistent with those offered for any non-recourse energy financing in the United States.

<table>
<thead>
<tr>
<th>Table 2 – Financing Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction and Letter of Credit; First Lien</strong></td>
</tr>
<tr>
<td>Lenders</td>
</tr>
<tr>
<td>Prevailing Interest Rate</td>
</tr>
<tr>
<td>Ratings (Moody’s/S&amp;P)</td>
</tr>
<tr>
<td>Loan Term</td>
</tr>
</tbody>
</table>

4.5 Evidence of Sponsor Creditworthiness
As of year-end 2011, NRG owns nearly 26,000 MW of net generation assets worldwide, representing a diversified mix of fuel source (including 545 MW of renewable sources), generation technology, output configuration, and geographical location. The company has an additional 1,410 MW under construction. In addition to its wholesale generation business, NRG is a participant in the retail business in Texas and the Northeast, with over 57 TWh sold in 2011. This portfolio of assets and businesses generates significant cash flow, as indicated in NRG’s financial statements and guidance.

NRG is a financially sound company with more than $26.7 billion in assets and unaudited liquidity in excess of $2.3 billion, including $1.2 billion in cash.

Given NRG’s corporate strength and strategic interest in the success of the proposed projects, as well as its proven ability to raise meaningful amounts of capital in the equity and debt markets, NRG has the capacity to ensure the successful financing of the preferred project throughout the development, construction and operating life of the Project.
5 Permitting and Approval Process

5.1 Environmental Permits
NRG began the air permitting process for the Project in December 2007 with the DEC. During the permitting process, NRG worked with local environmental groups and local stakeholders to develop the project in a way that would reduce annual emissions. The Project received unanimous public support from local environmental protection groups and local stakeholders, and was awarded its full air permit in October 2010 from the DEC.

The DEC awarded the permit for the fully repowered site—four 1x1 dual-fuel capable CCGT units totaling 1,040 MW. The permit allows the Project to be completed in the planned two phases, with each phase retiring a portion of existing generation and replacing it with two 1x1 dual-fuel CCGT units.

The completely repowered site will realize significant local emissions reductions. Simply put, the Project reduces on-site peak-day NOx emissions by approximately 98%. Although the Project will operate many more hours per year than the retiring generation, the Project will reduce the annual NOx output at the facility by more than 75%. PM emissions will be reduced at the site on peak days by more than 90% and annually by 65%. Additionally, the facility will account for a 15% reduction in city-wide CO2 emissions from power plants.

5.1.1 Permits Acquired
The Project has already obtained all major regulatory approvals and permits for the construction of this project including:

- The DEC issued a Final Environmental Impact Statement (FEIS) for the Project.
- The DEC issued a complete and final Title V Air Permit and Title IV Acid Rain Permit for the Project.
- The DEC issued a complete and final Industrial SPDES Permit issued for the Project.
- The Federal Aviation Authority issued Determinations of No Hazard to Air Navigation with respect to the Project’s proposed stacks.

5.1.2 Permitted Limits
The Project’s Title V Permit has limits that preclude a significant increase in emissions. During Phase I the Project will have operating hour restrictions that will limit operation to 6062 hours per year on natural gas and 50 hours per year on Ultra Low Sulfur Diesel fuel ("ULSD") as well as emission rate limits for NOx, SO2, CO, PM and ammonia. The hours limit on the Phase I units is largely due to the fact that the Pratt & Whitney combustion turbines (500 MW) will still be operational on-site. By limiting operating hours from the proposed units, total site emissions at maximum production limits will not exceed levels of significance.

Upon completion of Phase II, all the existing simple cycle turbines will be removed and the operating limits for the new units will increase to 8460 hours per year on natural gas and 100 hours per year on ULSD.
Table 3 below lists the existing permitted emission rates for criteria pollutants.
Table 3 - Astoria Permitted Operating Limits

<table>
<thead>
<tr>
<th></th>
<th>ULSD</th>
<th>Natural Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Hours</td>
<td>100 hrs/yr</td>
<td>8460 hrs/yr</td>
</tr>
<tr>
<td>NOx</td>
<td>.0315 lb/mmBtu</td>
<td>.0101 lb/mmBtu</td>
</tr>
<tr>
<td>SO2 Fuel</td>
<td>Fuel &lt;.05% sulfur</td>
<td></td>
</tr>
<tr>
<td>PM 2.5</td>
<td>160.7 TPY</td>
<td></td>
</tr>
</tbody>
</table>

The Project will use emissions control technologies that will allow safe compliance with current permit limits during operation of the facility. Emissions control technology and management strategy will include the following:

- Conventional SCR that will control more than 90% of NO\(_x\) and that will provide a 2-3 ppm discharge rate for NO\(_x\) emissions to the atmosphere.
- Catalytic oxidation that will reduce carbon monoxide emissions.
- Water injection for control of NO\(_x\) and combustion by-products during fuel oil firing.
- Use of prompt start and fast ramp procedures to minimize the startup/shutdown emissions from the units.
- Turbines equipped with software technology that will reduce emissions at lower operating levels, in turn reducing emissions on system shutdown.
- Use of natural gas as the primary fuel and ultra-low sulfur fuel oil (\(<0.0015\%\) sulfur by weight) as backup during gas curtailments, minimizing sulfate, fine particulate, and sulfuric acid formation.

5.2 Electrical Interconnections

NRG currently has queue positions pending for Phase I of the repowering which consists of two 250 MW units of the repowering. Queue positions #201 and #224 (a/k/a Berrians GT I and GT II) which would comprise one, 1-by-1 combined cycle unit that will connect to the Astoria West 138kV location. This unit will utilize the bus position of four existing NRG Astoria Westinghouse GTs of approximately 100 MW that will be demolished with the construction of this unit. The repowered unit is currently a member of the 2011 Class Year. The Class Year Facility Study is nearly complete and the overall Class Year cost allocation and deliverability study will be finalized by early 2013, and possibly sooner.

A second 250 MW unit (Berrians GT III), which holds Queue #266, is being studied in the 2012 Class Year. The second unit is proposed to connect to the new Astoria Annex 345kV substation (Figure 7). Class Year 2012 is just getting underway and NRG has executed the Facility Study Agreement and submitted the required study deposit. Completion of the 2011 and 2012 Class Year studies will provide certainty regarding the project’s interconnection costs.
Construction of the third and fourth 250 MW combined cycle units is planned as a Phase II of the repowering after construction of the first two units is completed. Phase II would require the demolition of 500 MW of Pratt & Whitney GTs connected to Astoria East 138kV. NRG would plan to file an interconnection queue request with the NYISO sufficiently in advance of this construction phase (Figure 8).

5.3 CPCN Award
NRG submitted its application for approval of the New York State Certificate of Public Convenience and Necessity (“CPCN”) with the New York State Public Service Commission (“PSC”) on April 26, 2010 (CASE 10-E-0197). The PSC issued an order approving the CPCN on January 24, 2011 (see attached Appendix B).
5.4 Public Outreach and Approval

The Project has broad-based support from local, state and federal elected officials, environmental groups, and civic and business organizations. The list of entities and individuals who are on record supporting the Project during the permitting process and currently includes:

- Congresswoman Carolyn Maloney
- Congressman Joe Crowley
- Senator Michael Gianaris
- Senator Jose Peralta
- Assemblywoman Aravella Simotas
- City Councilor Peter Vallone, Jr.
- City Councilor James Gennaro
- Queens Borough President Helen Marshall
- Queens Community Board 1
- United Community Civic Association
- Coalition Helping Organize a Kleener Environment (CHOKE)
- Natural Resources Defense Council
- League of Conservation Voters
- Queens Chamber of Commerce
- Building and Construction Trades Council of Greater New York

Most of these individuals and organizations have supported the Project since the permitting process began in 2007. NRG worked closely with the Astoria community throughout the DEC permitting process to address the community’s concerns about air emissions, traffic and jobs. It was this collaborative effort between the community and NRG that has created a project with such rare and enthusiastic support.

This year, this list of supporters created the Smart Power NY Coalition specifically to promote the Project. Assemblywoman Aravella Simotas is the Chair of the Coalition. Smart Power NY is proactively educating policy makers and the public on the benefits to the community and state on proceeding with the Project. Information on the coalition is available at www.smartpowerny.org.

Attached as Appendix C is a copy of the April 18 letter from the Smart Power NY Coalition that was sent to Governor Cuomo stating its support for the Project and the benefits it provides to the Astoria community. The initiation of the coalition and subsequent letter to Governor Cuomo has generated a significant amount of local interest as support for the Astoria Repowering Project continues to grow.