

Invenergy



Invenergy Clear River Energy Center



New England
Consumer Liaison Group
Meeting
September 15, 2016



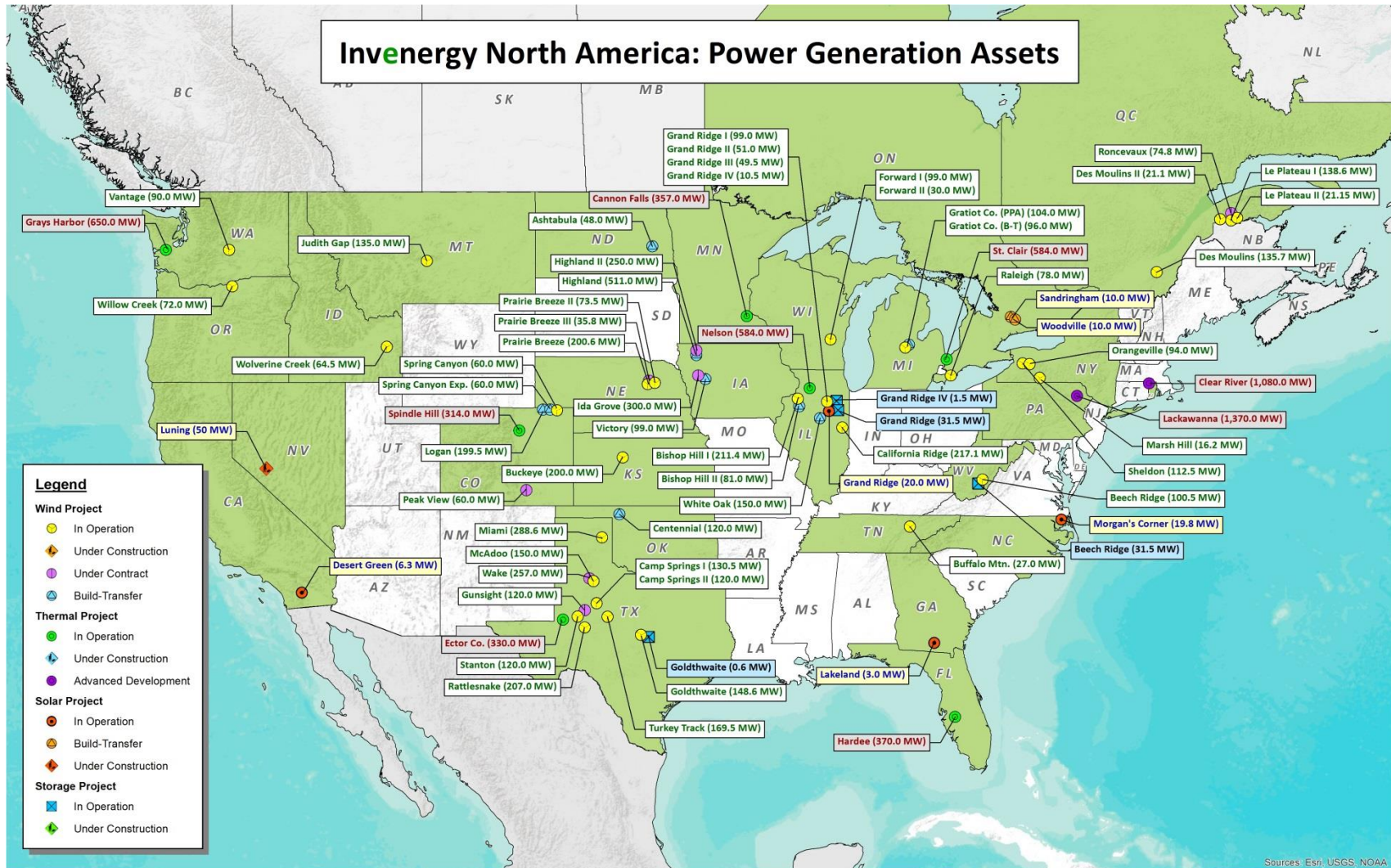


Invenergy Corporate Overview

- Invenergy is *innovation in energy*. Deeply experienced and entrepreneurial in our core, we provide power generation and storage solutions to address the energy challenges facing our communities and our customers. We believe in clean, sustainable energy.
- We develop. We build. We own. We operate.
- We have over 13,000 MW of assets that includes projects that are under construction, under contract or build-transfer.
- Invenergy is the largest independent wind power company in North America (4th overall).
- Invenergy is the largest operator of energy storage systems in the U.S. (Winner of the 2015 ESNA Innovation Award for Centralized Storage.)



Invenergy has developed over 13,000 MW of utility-scale projects globally; our North American portfolio exceeds 9,500 MW



As of December 1, 2015; includes projects that are under construction, under contract, or build-transfer and in advanced development



Invenergy Overview

Plants in Operation:

- We have developed 68 wind projects, totaling almost 7,654 MW
- We have developed eight solar projects, totaling over 144 MW
- Invenergy's energy storage portfolio includes six projects totaling 88 MW in operation or construction
- Invenergy operates over 5,833 MW of natural gas-fired plants in operation or construction



Clear River Energy Center Overview

- Clear River Energy Center (“CREC”)
- Approximately \$700 Million investment
- Combined Cycle Advanced Technology:
 - Two single shaft “H” Class combined cycle units with output up to 1,000 MW
 - Air cooled condensers require minimal water
 - Dual fuel capability (natural gas and oil back up)
- June 1, 2019 Commercial Operation date for Unit 1, June 1 2020 for unit 2
 - 36 Month Construction Schedule
- Discharge to Burrillville waste water treatment plant
- Remote Site with proper zoning
 - Site control through land purchase option agreement
 - Location has on site high voltage power lines (345kV, NE ISO Queue #489) and interstate high pressure gas

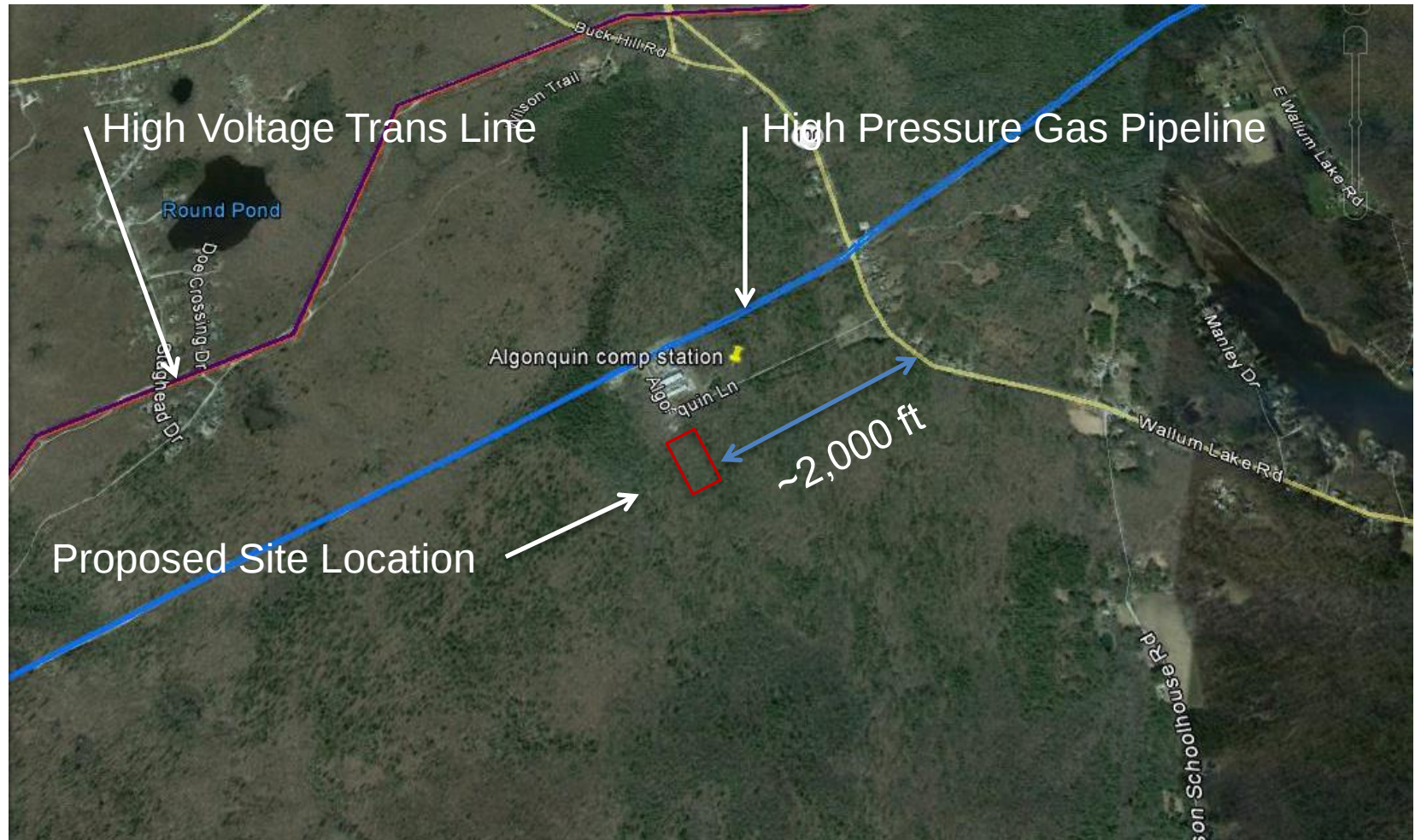


CREC Project Rendering



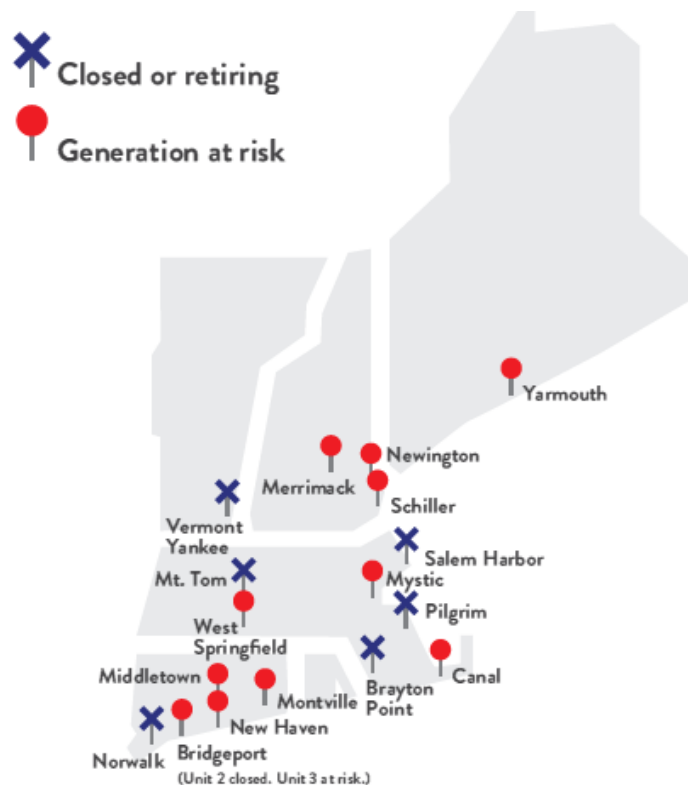


Project Location Burrillville, RI





Meeting New England's Energy Needs



Source: 2015 New England ISO Regional Electricity Outlook

- Replace Older Plants; a high percentage of the existing generation plants are more than 50 years old. **Retirements could total 10,000 MW**
 - 4,200 MW have already retired or will before 2019
 - Additional 6,000 MW identified “At Risk” by ISO-NE
- New resources are **needed to fill the potential retirement gap** as well as improve overall system performance
 - Southeastern New England (i.e. Boston, RI, and Cape Cod) is especially vulnerable. Grid operators say local resources and transmission may not serve the local demand.



Benefits of the Clear River Project

Developing the Clear River Energy Center will...

- Create local, well-paying jobs
- Generate millions in revenue for Burrillville
- Help to save money on electricity bills
- Address New England's emerging energy needs
- Support the integration of more renewables
- Reduce regional air emissions from the power sector



Job Creation & Tax Revenues



- Development of the Clear River Energy Center will...
 - Create approximately **350** Building Trade Unions jobs and **25** permanent and local high-paying jobs
 - Contribute more than **\$3.5 million** annually during operations to the local economy in employee salaries
 - Generate **millions of dollars for Burrillville** every year in new tax revenue, which can be used to support schools, libraries, police and fire services



Clear River Benefits

Ratepayer Savings

- By displacing older, inefficient plants, this project is estimated to save consumers up to **\$210 million** in energy and capacity savings between 2019 and 2022
- RI PUC concludes that CREC will provide *“meaningful savings in the capacity market for up to four years and generate savings to wholesale energy prices...for many years”*
 - *“Generating units such as CREC are needed to meet RI clean energy goals”*

RI Office of Energy Resources Opinion:

- *“By lowering the system average CO2 emission rate, the Project will contribute to lowering the consumption-based annual CO2 emissions for Rhode Island within the electric generation sector”*
- *“The potential construction and dispatch of CREC will not prevent Rhode Island from achieving its GHG reduction targets as defined under the Resilient Rhode Island Act.”*



Supporting Renewables, Reducing Emissions

- Natural gas plants like Clear River can quickly **provide power when renewable resources can't**. Their capacity makes it possible to bring more renewables online in New England.
- The project will let us transition away from older, less-efficient and polluting coal and oil plants. That will avoid harmful emissions, as this table shows:

Pollutant	Avoided Tons / Year 2019 thru 2022
CO ₂	1,037,000
NO _x	2,399
SO ₂	2,984

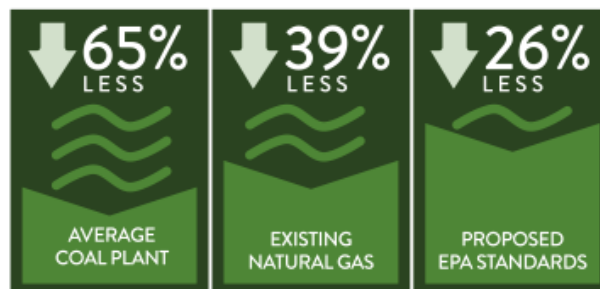
- Clear River will be amongst **the cleanest, most efficient natural gas plants in the country**.



GROWING NEW ENGLAND'S ENERGY MIX

- CLEAN-BURNING, NATURAL GAS PROJECT HELPS REPLACE AGING COAL PLANTS.
- UP TO 1,000 MW OF POWER SUPPORTS RENEWABLE ENERGY SOURCES WHEN THE SUN ISN'T SHINING AND THE WIND ISN'T BLOWING.

EMISSIONS
RATE

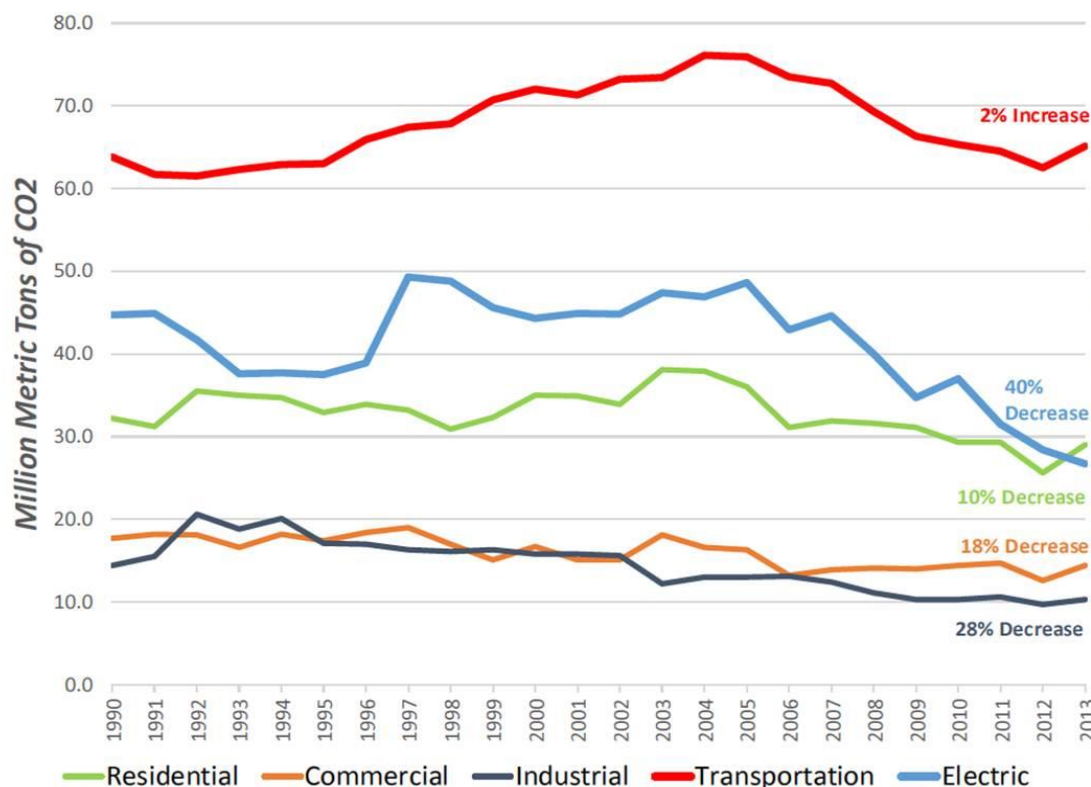


SOURCE: U.S. ENERGY INFORMATION ADMINISTRATION



Natural Gas & Emission Reductions

New England Sector CO2 Emissions



- Increased use of natural gas in New England's electric sector has resulted in falling CO2 emissions
 - Chart shows **40% drop in emissions**
- No sector has achieved greater emission reductions in the past 25 years

Source: U.S. Energy Information Administration, www.eia.gov/environment/emissions/state, October 26, 2015



CREC & The Resilient Rhode Island Act

- Development of the Clear River Energy Center will help Rhode Island meet the Resilient Rhode Island Act.
 - The Act creates economy wide – not plant or sector specific – goals for emissions reductions. It's about what RI does overall.
 - CREC will allow for the integration of more renewables in Rhode Island and New England's grid, helping to meet the goals of this Act
- The Resilient RI Act is similar to the Massachusetts Global Warming Solutions Act. In 2013, the Massachusetts EFSB evaluated a similar proposal for the 690MW Footprint natural gas plant in light of that Act. Their conclusion:

*“New England fossil fuel units would be displaced by Footprint and would yield GHG and criteria pollutant emissions reductions on a net basis under any modeling scenario... **the overall trend of reduced emissions is not in doubt.**”*



CREC – Interconnections

- Water
 - An alternative source is being pursued
- Waste Water
 - Discharged to municipal treatment facility via new force main
- Electricity
 - Connection into regional transmission grid via a nearby right-of-way
- Natural Gas
 - Delivered from the adjacent Algonquin pipeline





CREC Water Supply

- Water for the plant was to be supplied by Pascoag Utility District Well 3A
 - This well has been contaminated and unusable since 2001
 - Pascoag recently terminated the agreement to work with the project as they felt they could not accept the liability for the clean up
- The project is pursuing an alternative water supply
- The plant's water use will vary seasonally and with type of fuel used. Natural gas will be used exclusively except for rare winter days when ultra low sulfur oil may be required due to reduced natural gas availability.
 - Daily average: 0.1 MGD
 - Summer (Jul / Sept) average: 0.22 MGD
 - Winter Max w/ oil: 0.9 MGD



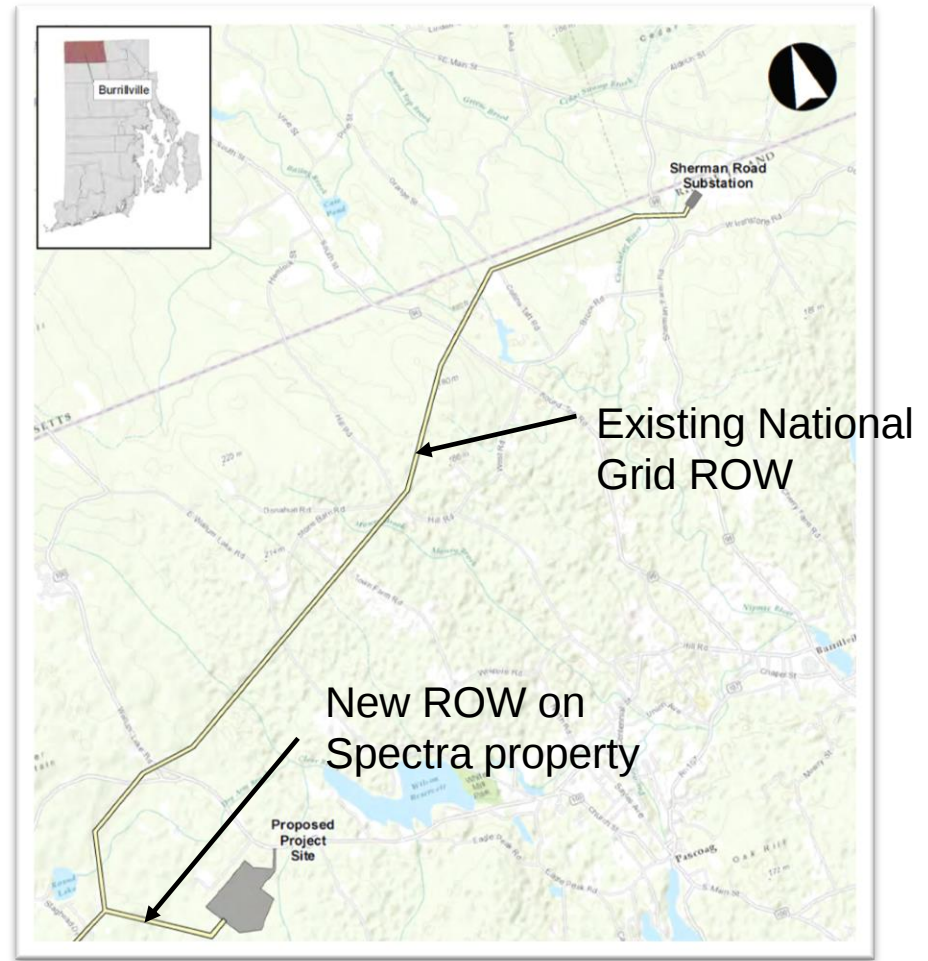
Project Water Discharge

- Burrillville Sewer Commission (BSC) provided written support for the concept of connecting CREC into the Town's Public Sanitary Sewer System and Waste Water Treatment Plant (WWTP)
- A review by the BSC and its engineer of municipal waste water facilities, indicates there is **sufficient capacity at the municipal waste water treatment plant**
 - The Commission voted to accept the Facilities Plan and submitted it to the Rhode Island Department of Environmental Management for approval.



Electrical Interconnection

- Proposed project would interconnect to the Sherman Road substation:
 - 6 miles of new 345 kV line installed in the existing National Grid ROW that contains the two 345 kV lines
 - New breaker in the Sherman Road substation
- Existing ROW crosses Spectra property approximately 3,700 ft from proposed site



Transmission Map



Gas Pipeline

- New gas pipeline lateral connections with Algonquin pipeline
 - Gas lateral and meter station is approximately 500 feet long, all on Spectra or CREC property



- No impact on local gas supply
- Project is situated at an ideal location requiring no new rights of way



Noise

- Noise produced during operation of the CREC must conform to levels approved by the Rhode Island EFSB
- The Clear River Energy Center **will meet Burrillville's A weighted noise ordinance levels**: facility noise will be limited to 43 decibels at nearby residences during normal operations
 - What's 43 dbA sound like? A suburban neighborhood, background noise in a conference room, or a humming refrigerator
 - CREC requested a variance on the Town's octave band limits
- We have carefully modeled the noise from the facility to determine the A weighted noise level can be met
 - Project is employing extensive controls to meet the A weighted limits

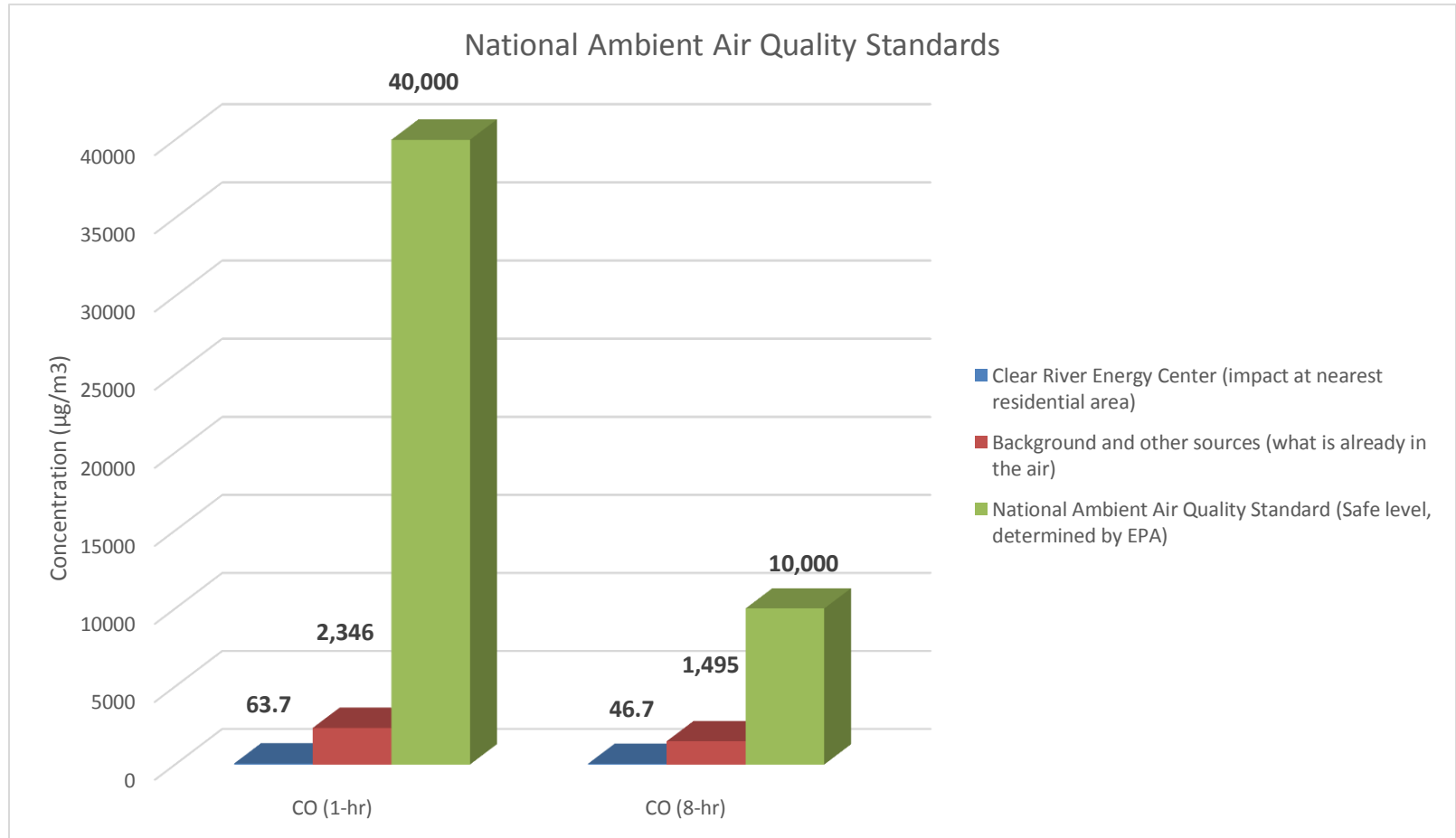


Major Source Air Permitting Process

- The rigorous Major Source air permitting process will ensure that air quality in the area surrounding the CREC Facility will be protected and will require the following:
 - Compliance with all applicable state and federal air pollution control regulations
 - Lowest Achievable Emission Rate (LAER) and offsets for all nonattainment pollutant emissions (NOx & VOC)
 - Best Available Control Technology (BACT) for all pollutant emissions
 - Compliance with the EPA's National Ambient Air Quality Standards (NAAQS) and RIDEM's Acceptable Ambient Levels (AALs)
- Process is administered by RIDEM and overseen by USEPA

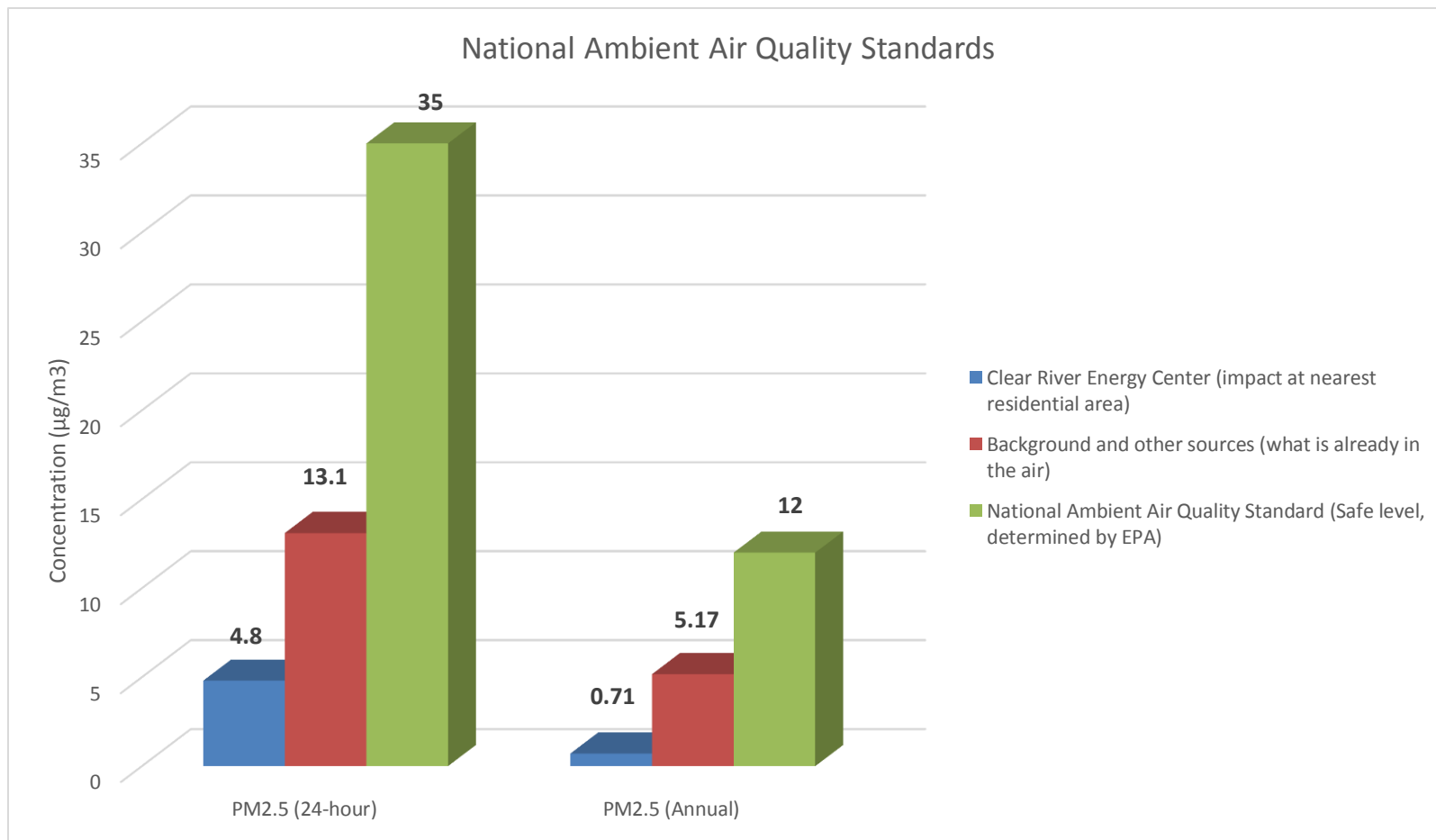


National Ambient Air Quality Standards (NAAQS)



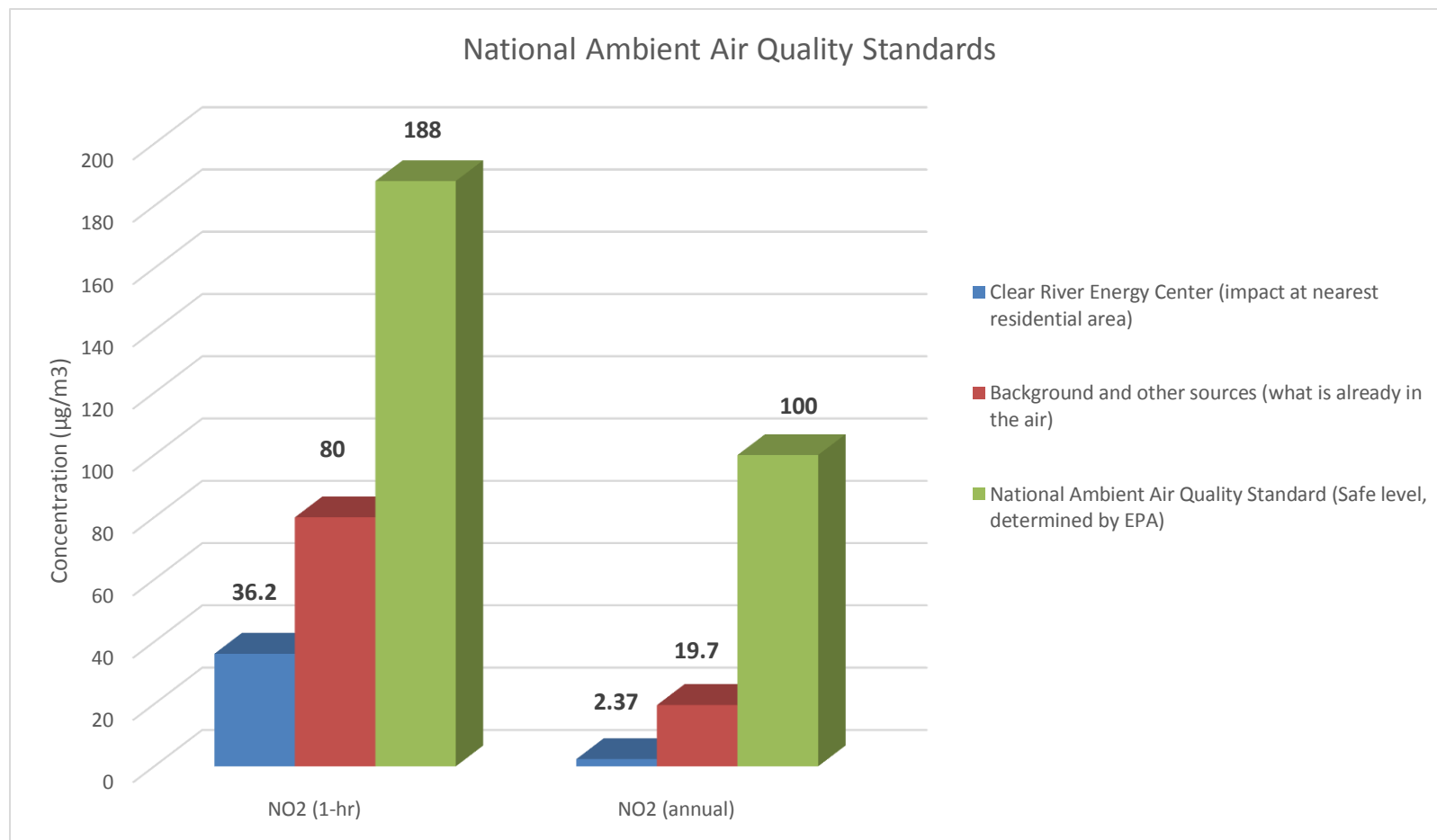


Emission Comparison - PM





Emission Comparison - NO_x



□ Clear River emissions based on air permit application.