



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

October 8, 2021

Bruce L. McDermott, Esq.
Murtha Cullina LLP
265 Church Street
New Haven, CT 06510
bmcdermott@murthalaw.com

RE: **PETITION NO. 1406A** – Doosan Fuel Cell America, Inc. petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a grid-side 9.66-megawatt fuel cell facility and associated equipment to be located at 600 Iranistan Avenue, Bridgeport, Connecticut, and associated electrical interconnection to the United Illuminating Company's existing Congress Street Substation. **NuPower Bridgeport FC, LLC Reopening of this petition based on changed conditions pursuant to Connecticut General Statutes §4-181a(b).**

Dear Attorney McDermott:

At a public meeting held on October 7, 2021, the Connecticut Siting Council (Council) found changed conditions addressed the Council's concerns in its December 18, 2020 final decision in Petition No. 1406 and ruled that the above-referenced modified proposal meets air and water quality standards of the Department of Energy and Environmental Protection, would not have a substantial adverse environmental effect, would not cause unreasonable pollution, impairment or destruction of the public trust in the air, water or other natural resource of the state, and pursuant to Connecticut General Statutes § 16-50k would not require a Certificate of Environmental Compatibility and Public Need, with the following conditions:

1. The Petitioner shall prepare a Development and Management (D&M) Plan for this facility in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
 - a. A final site plan including, but not limited to, detailed site design, building design, fuel cell layout, site access, electrical, water, natural gas and thermal loop connections, project interconnection detail, fencing, lighting, and site drainage;
 - b. Construction site plans that include, but are not limited to, site preparation, grading, construction laydown areas, and erosion and sedimentation controls;
 - c. Site maintenance/groundskeeping plan;
 - d. Contact information for the spill response contractor;
 - e. Contact information for the construction contractor; and
 - f. Plans for an additional one-foot of fill as a flood protection measure for the facility.
2. Submit a post-construction noise analysis that demonstrates compliance with DEEP Noise Control Regulations at the nearest residential receptors. Include additional noise mitigation measures, if necessary;

3. The use of natural gas as a fuel system cleaning medium during fuel cell construction, installation or modification shall be prohibited;
4. Submit the following information to the Council 15 days prior to any fuel pipe cleaning operations related to fuel cell construction, installation, or modification:
 - a. Identification of the cleaning media to be used;
 - b. Identification of any known hazards through use of the selected cleaning media;
 - c. Description of how known hazards will be mitigated, including identification of any applicable state or federal regulations concerning hazard mitigation measures for such media;
 - d. Identification and description of accepted industry practices or relevant regulations concerning the proper use of such media;
 - e. Provide detailed specifications (narratives/drawings) indicating the location and procedures to be used during the pipe cleaning process, including any necessary worker safety exclusion zones;
 - f. Identification of the contractor or personnel performing the work, including a description of past project experience and the level of training and qualifications necessary for performance of the work;
 - g. Contact information for a special inspector hired by the project developer who is a Connecticut Registered Engineer with specific knowledge and experience regarding electric generating facilities or a National Board of Boiler and Pressure Vessel Inspector and written approval of such special inspector by the local fire marshal and building inspector; and
 - h. Certification of notice regarding pipe cleaning operations to all state agencies listed in General Statutes § 16-50j(h) and to the Department of Consumer Protection, Department of Labor, Department of Public Safety, Department of Public Works, and the Department of Emergency Management and Homeland Security;
5. Compliance with the following codes and standards during fuel cell construction, installation or modification, as applicable:
 - a. NFPA 54
 - b. NFPA 853; and
 - c. ASME B31;
6. Submit a copy of an Emergency Response/Safety Plan prior to commencement of facility operation that includes, but is not limited to the following:
 - a. Detailed safety features and emergency response for the building, site infrastructure, and fuel cells;
 - b. A description of the results of any simulated emergency response activities with any state and/or local emergency response officials;
 - c. Details of any facility site access system; and
 - d. Establishment of an emergency responder/local community notification system for on-site emergencies and planned construction-related activities that could cause community alarm. The system shall include notification to the following: local emergency responders, city or town officials, state legislators, and local residents that wish to participate.
7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed within three years from the date of the mailing of the Council's decision, this decision shall be void, and the facility owner/operator shall dismantle the facility and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's decision shall not be counted in calculating

this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The facility owner/operator shall provide written notice to the Executive Director of any schedule changes as soon as is practicable;

8. Any request for extension of the time period to fully construct the facility shall be filed with the Council not later than 60 days prior to the expiration date of this decision and shall be served on all parties and intervenors, if applicable, and the City of Bridgeport;
9. Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
10. The facility owner/operator shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v;
11. The facility owner/operator shall file an annual report on a forecast of loads and resources pursuant to Conn. Gen. Stat. §16-50r;
12. This Declaratory Ruling may be transferred, provided the facility owner/operator/transferor is current with payments to the Council for annual assessments and invoices under Conn. Gen. Stat. §16-50v and the transferee provides written confirmation that the transferee agrees to comply with the terms, limitations and conditions contained in the Declaratory Ruling, including timely payments to the Council for annual assessments and invoices under Conn. Gen. Stat. §16-50v; and
13. If the facility owner/operator is a wholly owned subsidiary of a corporation or other entity and is sold/transferred to another corporation or other entity, the Council shall be notified of such sale and/or transfer and of any change in contact information for the individual or representative responsible for management and operations of the facility within 30 days of the sale and/or transfer.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the petition, dated March 31, 2021, and additional information received June 4, June 10, August 18, and August 27, 2021, and in compliance with Public Act 11-101, An Act Adopting Certain Safety Recommendations of the Thomas Commission.

Enclosed for your information is a copy of the staff report on this project.

Sincerely,



Melanie A. Bachman
Executive Director

MAB/RDM/emr

Enclosure: Staff Report dated October 7, 2021

c: The Honorable Joseph P. Ganim, Mayor, City of Bridgeport (mayor@bridgeportct.gov)
Alberto Hernandez, Fire Marshal, City of Bridgeport (landris.jones@bridgeportct.gov)
Service List dated July 15, 2021



STATE OF CONNECTICUT *CONNECTICUT SITING COUNCIL*

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

Petition No. 1406A **Doosan Fuel Cell America, Inc.** **600 Iranistan Avenue, Bridgeport, Connecticut**

Staff Report
October 7, 2021

Introduction

Petition 1406

On May 11, 2020, Doosan Fuel Cell America, Inc. (Doosan), as an agent for and on behalf of NuPower Bridgeport FC, LLC (NuPower), submitted a petition (Petition) to the Connecticut Siting Council (Council) for a declaratory ruling pursuant to Connecticut General Statutes (CGS) §4-176 and §16-50k for the installation of a 9.66 megawatt (MW) grid-side combined heat and power fuel cell facility located within a 3.5 story steel and concrete structure at 600 Iranistan Avenue in Bridgeport, Connecticut (Petition 1406).

Doosan met with City of Bridgeport (City) officials on March 13, 2020 to discuss the project and present conceptual building and site layout plans. Doosan mailed notification of the project to abutting property owners, City officials and required state agencies and officials on or about April 25, 2020. On May 12, 2020, the Council sent correspondence to the City inviting the municipality to contact the Council with any questions or comments. On October 13, 2020, the City submitted comments to the Council in support of the proposed project.

On May 12, 2020, pursuant to Regulations of Connecticut State Agencies §16-50j-40, the Council notified all state agencies listed therein of the proposed project, requesting comments regarding the proposed project be submitted to the Council by June 10, 2020. The Council received comments from the Department of Transportation (DOT) dated June 10, 2020¹. The Department of Energy and Environmental Protection (DEEP) submitted comments dated June 10, 2020². The DOT Office of Rails submitted comments dated June 26, 2020³. While the Council is obligated to consult with and solicit comments from state agencies by statute, the Council is not required to abide by the comments from state agencies.⁴

On September 29, 2020, NuPower requested party status which the Council granted on October 8, 2020. NuPower would own the proposed fuel cell facility.

CGS §22a-20a requires applicants seeking a permit from DEEP or the Council for a new or expanded facility defined as an “affecting facility” that is proposed to be located in an environmental justice community to file an Environmental Justice Public Participation Plan (EJPPP). The City of Bridgeport is an environmental justice community. However, the proposed facility is not an “affecting facility” under CGS §22a-20a because it is a Class I renewable resource under 10 MW. Thus, CGS §22a-20a does not apply to the facility, and an EJPPP is not required.

¹ STATE OF CONNECTICUT DOT Division of Facilities and Transit comments

² TO: Parties & Intervenor (ct.gov) DEEP comments

³ STATE OF CONNECTICUT DOT Office of Rails comments

⁴ *Corcoran v. Connecticut Siting Council*, 284 Conn. 455 (2007)

The proposed structure is designed to support 21 fuel cells, rooftop cooling towers and associated equipment on a 0.51-acre triangular shaped parcel at the intersection of Iranistan Avenue and Railroad Avenue #1. The proposed structure is aligned parallel with Interstate 95 which abuts the parcel to the south.

On December 18, 2020, the Council denied Petition 1406 without prejudice, on the bases that the petition was incomplete and that the proposed project appeared to have a substantial adverse environmental effect, particularly with regard to matters of public health and safety, as follows:

1. Project plans provided lack site detail;
2. The petition does not address natural gas safety issues;
3. The petition does not address the safety implications of the proposed facility's location in relation to other existing infrastructure (ex. railroad, highway, electric transmission line);
4. The petition does not address potential vapor plume hazards to the adjacent highway or any potential mitigation measures; and
5. The petition does not address the potential to incorporate noise mitigation measures prior to the commencement of facility operation.

Petition 1406A

On April 7, 2021, pursuant to CGS §4-181a(b), NuPower filed a Motion to Reopen and Modify (Motion to Reopen), with supporting documentation, the Council's December 18, 2020 decision to deny Petition 1406 without prejudice based on changed conditions. In its Motion to Reopen, NuPower requested that the Council reconsider the denial on the basis that NuPower addressed the deficiencies and potential adverse effects on public health and safety that the Council identified in its December 18, 2020 final decision.

Also on April 7, 2021, the Council issued a memorandum to the service list for Petition 1406 requesting comments or statements of position on the Motion to Reopen to be submitted in writing by April 21, 2021 with respect to whether the motion should be granted or denied. No comments were received.

On May 7, 2021, the Council granted the Motion to Reopen in accordance with CGS §4-176 and 4-181a(b) and the Council developed a schedule for the exchange of interrogatories.

On May 7, 2021 the Council granted intervenor and Connecticut Environmental Protection Act (CEPA) intervenor status to Joseph Provey (Provey).⁵

The Council developed a schedule that included a deadline for the exchange of interrogatories among parties and intervenors on May 20, 2021. The Council issued interrogatories to Provey and NuPower on May 13 and May 14, 2021, respectively. Provey issued interrogatories to NuPower on May 19, 2021 and NuPower issued interrogatories to Provey on May 20, 2021. Provey responded to the Council's interrogatories between May 25 and May 28, 2021. NuPower responded to the Council's interrogatories on June 4, 2021 and Provey's interrogatories on June 10, 2021. Provey responded to NuPower's interrogatories between June 9 and June 10, 2021.

On July 16, 2021, the Council granted a request from Allco Renewable Energy Limited (Allco) for CEPA Intervenor Status and issued a revised schedule for the final exchange of interrogatories among parties and intervenors with a deadline of July 28, 2021. Allco issued interrogatories to NuPower and Provey on July 26, 2021. The Council issued a second set of interrogatories to NuPower on July 29, 2021. NuPower responded to Allco's interrogatories and the Council's interrogatories on August 18, 2021. Provey also

⁵ Provey submitted a request for intervenor status and CEPA Intervenor status on March 5, 2021, prior to NuPower's submission of the Motion to Reopen to the Council.

responded to Allco's interrogatories on August 18, 2021. NuPower submitted additional information regarding the proposed project to the Council August 27, 2021.

The Project has been modified (Petition 1406A) to address the concerns presented in the Council's December 18, 2020 decision as follows;

- a) Provided more detailed site plans;
- b) Performed a risk analysis associated with the use of natural gas at the site and added an excess flow valve and a seismic interruption valve to the project design;
- c) Analyzed vapor plume emissions and developed mitigation measures to reduce the potential for vapor plume related icing on I-95; and
- d) Developed noise mitigation measures to reduce project noise levels.

On March 31, 2021, NuPower notified state agencies and officials, the City and property abutters of the modified project. No abutters provided comment to NuPower.

On February 27, 2021, NuPower and Doosan held an information meeting for the Seaside Village Homeowners Association at NuPower's Cherry Street fuel cell project at 375 Howard Avenue in Bridgeport⁶ that was attended by eight residents. Seaside Village is a co-operative housing corporation of more than 500 residents located approximately 575 feet from the proposed facility. Topics of discussion included project lighting, air emissions, drainage, site selection, maintenance, decommissioning, noise, economic benefits, the thermal loop and visual impacts.

NuPower conducted a field review of the proposed site for City Council members Denese Taylor-Moye and Jorge Cruz Sr. of City Council District 131 (where the site is located). On April 23, 2021, City Council members Taylor-Moye and Cruz, submitted comments to the Council in opposition to the Project.

Pursuant to CGS §4-176(e) of the Uniform Administrative Procedure Act (UAPA), an administrative agency is required to take action on a petition within 60 days of receipt. July 5, 2021 was the deadline for this reopened petition under CGS §4-176(e). In response to the Coronavirus pandemic, Governor Lamont issued Executive Order No. 7, as subsequently extended, that provides for a 90-day extension of statutory and regulatory deadlines for administrative agencies thus extending the deadline for action to October 3, 2021. On September 23, 2021, pursuant to CGS §4-176(e) of the UAPA, the Council voted to set the date by which to render a decision on the petition as no later than January 31, 2022, which is the statutorily mandated 180-day decision deadline under CGS §4-176(i) with the 90-day extension per Executive Order No. 7.

Public Benefit

The project would be a "grid-side distributed resources" facility, as defined in CGS §16-1(a)(37). CGS § 16a-35k establishes the State's energy policy, including the goal to "develop and utilize renewable energy resources...to the maximum practicable extent." The proposed facility is a distributed generation resource, and will contribute to fulfilling the State's Renewable Portfolio Standard as a low emission Class I renewable energy source. Fuel cells are defined by CGS §16-1(a)(20) as a Class I Renewable Energy source in the state.

The project was selected by The United Illuminating Company (UI) under the Request for Proposals (RFP) for energy and Class I and/or Class III renewable energy certificates from combined heat and power system facilities in distressed municipalities, pursuant to CGS §16-258e.

⁶ See Petition 1393, https://portal.ct.gov/CSC/3_Petitions/Petition-Nos-1391-1400/Petition-No-1393-Doosan_Bridgeport

Power produced by the facility would be sold to UI in accordance with a Public Utilities Regulatory Authority (PURA)-approved power purchase agreement (PPA) between UI and NuPower in PURA Docket No. 18-08-14. The PPA has a 20-year term and there are no provisions for extension or renewal.

The PPA includes the utilization of waste thermal energy through a district heating loop that would be constructed in the Project area. The thermal loop would be designed to deliver hot water to local institutions, businesses, and residences located in Bridgeport. The thermal loop is under design (approx. 60% complete) and would be constructed under a separate contract by a thermal energy transportation company. Several entities have signed letters of intent to purchase thermal energy generated from the Project. All thermal energy produced by the Project would be utilized by these potential customers if the contracts are executed. The Council does not have jurisdiction over the thermal loop.

The facility would provide a stable source of power to the utility grid, thus maintaining grid stability. The facility would operate 24 hours per day, seven days per week, providing a stable, nonfluctuating source of power. Additionally, the facility is a distributed energy source reducing the load on electric transmission lines serving the area.

Project Site

The site⁷ is located on a 0.51-acre triangular parcel at the intersection of Iranistan Avenue and Railroad Avenue #1. NuPower has a 20-year lease, plus optional renewals for use of the property.

The property is zoned Mixed Use Light Industrial (MU-LI). Land use in the immediate vicinity includes light industrial, commercial, and residential. I-95 abuts the site to the south. The Metro North Railway is located north of the site on the opposite side of Railroad Avenue #1. A UI transmission line extends along Railroad Avenue #1 between the site and the railroad corridor.

Properties abutting the site are zoned Industrial Light (IL) and MU-LI. The nearest residential properties are approximately 136 feet north of the site, across Railroad Avenue #1, the Metro North Railway and Railroad Avenue North in an IL zone. The nearest residential zone (Multi Family Zone R-C) is approximately 350 feet north of the Project site, beyond the railroad corridor and an abutting IL zone.

Modified Project

The proposed facility would consist of twenty-one 460 kilowatt Doosan PureCell Model 400 fuel cell power modules, each measuring 8.3 feet wide by 27.3 feet long by 9.9 feet tall. The fuel cells are factory assembled and tested prior to shipment. The fuel cells would have an operational service life of 20 years; however, a fuel cell component overhaul would be required after 10 years.

The 21 fuel cells would be installed within a 3.5 story galvanized steel structure with poured concrete decks. The structure is approximately 203 feet long by 37 feet wide (avg.) with the top level reaching 60 feet above grade. The ground footprint measures approximately 7,500 square feet and would feature open air floors on each floor.

Six fuel cells would be installed on the first and third floors with the remaining 9 fuel cells installed on the second floor. Each fuel cell would have an associated fan cooling module located on the concrete slab roof of the building.

⁷ RCSA §16-50j-2a(29), "Site" means a contiguous parcel of property with specified boundaries, including, but not limited to, the leased area, right-of-way, access and easements on which a facility and associated equipment is located, shall be located or is proposed to be located.

The facility is designed with blocks of fuel cells connected to independent transformers. Each individual fuel cell can be independently shutdown and isolated from the facility for maintenance/repair purposes. The 21 fuel cell units are connected in four groups of five that connect to four 4000 amp switchboards with the remaining fuel cell connected to a 1600 amp switchboard. Each switchboard is connected to a dedicated step-up transformer that would connect to a 13.8 kV medium voltage distribution switchboard.

The first floor of the building would also house four 2,500 kVA and one 1,500 kVA, 13.8 kilovolt/480 volt transformers, low voltage switchgear and associated metering equipment. Other site components/infrastructure consist of an on-site nitrogen tank and associated piping for a centralized purge system, a medium voltage switchgear pad and a point of interconnection with the utility along the northeast side of the site, a water meter vault and a reverse osmosis system/backflow preventer enclosure in the northwest corner of the site, and a natural gas meter interconnection pad on the west side of the site. The thermal loop interconnection point would be in the eastern corner of the site.

The proposed structure is located on the south side of the host parcel approximately 5 feet from the southern property line (I-95 right-of-way), approximately 40 feet from the sidewalk along Iranistan Avenue to the west and approximately 30 feet from the curb line of Railroad Avenue #1 to the northeast.

The total height of the proposed structure with the cooling fan units would be approximately 70.6 feet above ground level (agl) and approximately 84.6 feet above mean sea level (amsl).

The facility would be grid-interconnected to the Congress Street Substation using two separate 13.8-kV 7,800-foot long cable runs using a duct bank/overhead route along City streets. The new cable run is currently being designed by NuPower and UI, and once the route is finalized it would be submitted to PURA for approval.

The interconnection would cross a DOT Railroad right of way and would require an encroachment permit from the DOT. In its June 10, 2020 comments to the Council, DOT stated it would need to review construction plans depicting all work within the state right of way, all site work, any required easements and standard details for construction prior to issuing the encroachment permit.

On July 14, 2020, ISO-NE completed its review of the Transmission System Impact Study and found no adverse effect on the reliability or operating characteristics of transmission facilities.

Natural gas would be supplied to the facility from a natural gas main operated by Southern Connecticut Gas (SCG). The fuel cells would reformulate the natural gas into a hydrogen fuel to generate electricity. The fuel cell produces electricity by physically passing the hydrogen through its fuel cell stack leaving oxygen as a byproduct. The hydrogen then combines with the oxygen byproduct to form clean water which supports the internal cooling system of the fuel cells. If a hydrogen specific fuel supply becomes available, the fuel cells can be easily retrofitted to use the hydrogen fuel source.

The facility would have a natural gas consumption rate of 84,000 cubic feet per hour. The project would contract for a firm supply of natural gas.

The project is not configured to operate as a micro-grid.

Doosan would construct the facility and maintain the fuel cells. NuPower would own the facility. There are no similar facilities in the United States that have 20 or more fuel cells arranged within a multi-story structure.

According to PURA's final decision in Docket No. 18-08-14, the estimated cost of the fuel cell facility is approximately \$69,132,244. NuPower anticipates a capital investment of up to \$78 million.

Construction of the project would take approximately 18 months followed by approximately 3 months of testing/startup. Regular construction hours for the Project would be Monday through Friday from 8:00 am to 5:00 p.m.

Once operational, the Project would be unstaffed, requiring only occasional vehicle trips to the facility for routine site maintenance activities. No raw or hazardous materials or fuels would be delivered to or stored at the site.

At the end of the 20-year facility life span, all fuel cell components would be removed and the utility connections properly isolated. The structure and on-site concrete pads would remain in place.

Facility Design Alternatives

The Petitioner explored alternative configurations for the modified project. One alternative was to relocate the building on the site to create a larger buffer to I-95 but this alternative was not feasible due to setback requirements associated with adjacent powerlines. A second alternative was to redesign the building into an L-shape so that the portion of the building facing Iranistan Avenue was two stories tall rather than three; however, this alternative wasn't feasible due to space constraints related to fuel cell overhaul, site stormwater detention, and the location of a 15-kV distribution line along Iranistan Avenue.

Public Safety

Natural Gas Safety

During construction, Doosan would use inert nitrogen gas or atmospheric air under pressure as pipe cleaning media, in accordance with Public Act 11-101, An Act Adopting Certain Safety Recommendations of the Thomas Commission.

Natural gas would not be stored at the site. It will be delivered through a connection to an existing underground SCG gas main within Iranistan Avenue.

The fuel cells are designed with a physical barrier that separates the equipment that handles the combustible gases (fuel compartment) from the electrical equipment (motor compartment). The fuel compartment is maintained at a negative pressure relative to both ambient air and the motor compartment to ensure that any gas leaks do not reach the electrical equipment in the motor compartment. The fuel cell ventilation system is designed to dilute a fuel compartment gas leak to non-combustible levels.

An excess flow valve has been incorporated into the project design. It is designed to automatically restrict and stop flow when natural gas flow exceeds certain limits, thus limiting the risk of escaping natural gas due to damage or a pipe failure. A seismic valve would also be installed at the site that would automatically shut off the flow of natural gas if a seismic event is detected.

The natural gas supply contains sulfur which is a fuel cell system catalyst contaminant. Each fuel cell has a desulfurization system that would remove sulfur. The sulfur and other byproducts would be stored in a sealed vessel contained within the fuel cell unit. The vessels would be removed from the fuel cell units and transported by a licensed hazardous waste transporter to an approved disposal facility. Hazardous materials would not accumulate within the fuel cell stacks.

The desulfurization process would not result in sulfur being released into the air.

Noise

The primary sources of noise for the proposed project are the dry air coolers located on the roof of the proposed structure. Although the site is located in an area with high background noise, initial acoustical modeling indicated that the Project could exceed DEEP Noise Control Regulations at adjacent receptors. Modeling was conducted for industrial and residential receptors in the area. Given the height of the facility cooling units (51 feet agl), noise modeling was performed at receptor heights of 5, 15, and 25 feet.

NuPower proposes to install an 8-foot high sound attenuation wall around the air coolers to mitigate noise. Acoustic modeling indicates the sound attenuation wall would reduce noise levels to regulatory thresholds except at one residential test location located approximately 300 feet north of the site at 270 Black Rock Avenue, where noise is modeled at 51.4 dBA at a height of 25 feet, exceeding the DEEP Noise Control nighttime criteria of 51 dBA for an industrial emitter (Class C) to a residential receptor (Class A). The daytime limit for a Class C emitter to a Class A receptor is 61 dBA. The modeled noise at heights of 5 feet and 15 feet are 51.1 dBA and 50.7 dBA respectively. In addition, there are several residences on the south side of Black Rock Avenue within an Industrial zone that are closer to the project than the modeled location at 270 Black Rock Avenue (north side of the street).

If “extra-quiet” air-cooling modules were installed at the site, the estimated cost increase is \$800,000.

Noise associated with the construction of this project would be temporary in nature and exempt per DEEP Noise Control Regulations.

Security

The facility would be remotely monitored by Doosan on a 24/7 basis to detect abnormalities in operation. The fuel cell facility would be designed in accordance with American National Standards Institute and Canadian Standards Association (ANSI/CSA) America FC 1-2004 for stationary fuel cell power systems and includes extensive safety control systems, including both automatic and manual shutdown mechanisms that comply with pertinent engineering standards. If operational abnormalities occur, the fuel cell can be remotely shut down and personnel dispatched to service the facility.

A decorative 8-foot tall steel fence with anti-climb features would be installed around the perimeter of the site. It will be consistent with the National Electric Safety Code and National Electric Code. A closed-circuit TV/proximity sensor system with alarms would also be installed to monitor the site.

Fall protection along the open perimeter of each floor would be accomplished by OSHA-approved guard rails and kick plates. Escape routes would be prominently displayed at various points throughout the facility and personnel would receive instructions on where to exit the facility.

Interior lighting would consist of LED strip lighting that meets OSHA illumination requirements. All exterior LED lighting would utilize a flush lens design to minimize fugitive light. All lighting on the roof top level will utilize side shielding to minimize distraction along the adjacent highway.

Fire Protection

In accordance with the National Fire Protection Association, Standard for the Installation of Stationary Fuel Power Systems (NFPA 853), the fuel cell building is classified as an outdoor power installation because it is designed with partial weather protection (maximum coverage of a roof and up to 50 percent enclosing walls) and does not contain flammable liquids. Nearby city fire hydrants would offer fire protection with the closest hydrant located a few feet from the site along Iranistan Avenue. No structure-mounted fire suppression system is proposed.

The Project design incorporates a combustible gas sensor and thermal fuses located throughout the fuel cell cabinet. The detection of a potential combustible gas mixture, a fire, or detection of a circuit failure will result in a facility shutdown and an alarm notification to service personnel. The natural gas supply valves would close and nitrogen (an inert gas) from the on-site storage tank would purge the fuel cell stack and fuel processing system.

The proposed transformers would be filled with fire retardant oil and would be remotely monitored for changes in oil level and pressure.

Emergency responders/site personnel can shut down facility components, as follows;

- a) Each individual fuel cell is equipped with emergency stop push buttons;
- b) A manual natural gas shut-off valve would be located by the security gate that can be activated to stop incoming fuel supply to the facility; and
- c) An electrical disconnect switch located near the entrance gate would enable the facility to decouple from the distribution interconnection at the site.

NuPower would meet with local first responders prior to the commencement of site operation to review emergency response procedures specific to fuel cell facilities. A tour of the facility would occur including a review of the locations of facility disconnect switches. A site specific emergency response manual would also be provided. Two 12-foot wide access gates fronting Railroad Avenue #1 would provide emergency access into the site. First responders would have access to the site through the use of a Knox Security box.

Vapor Plumes

Each fuel cell would have its own exhaust vent. The initial project design had the vents on the south side of the structure with each vent exhausting independently.

Due to the high moisture content of the vapor plume exiting the exhaust stacks, the potential for icing conditions on adjacent I-95 were of concern. NuPower performed an analysis of the project based on metrological conditions during the period 2016-2020. The model indicated that over this five-year period, the vapor plumes would have caused a total of one hour of icing conditions and three hours of fog. Natural meteorological conditions over the same period produced one hour of icing conditions and 116 hours of fog. A vapor plume-induced fog event is more likely to occur when meteorological conditions are conducive to the formation of natural fog.

To reduce the amount of icing and fog, the exhausts vents were subsequently redesigned from vertical-oriented point sources to being routed via ducts to the dry-air cooling module intakes where the exhaust would be mixed with high velocity, hot air from the cooling modules and dispersed over a wide area thus eliminating the potential of a vapor plume for causing icing conditions on the adjacent highway.

Fuel Cell Structure Clearances

Overhead 345-kV electric transmission lines extend along the north side of Railroad Avenue, next to a MetroNorth Rail corridor. UI has reviewed the site plans as part of the interconnection process. OSHA requires a minimum of a 20-foot working distance from exposed energized lines 200 kV to 500 kV. The site fencing and other site infrastructure would meet electric transmission line clearance requirements.

The portion of I-95 abutting the site is elevated with the height to the top of the highway parapet wall ranging from 67.5 to 58.8 feet amsl from east to west along the property line.

The structure is not within the I-95 right-of-way or within the non-access highway line. The structure would be a minimum of 10.5 feet from the I-95 bridge pier caps and 13 feet from the bridge parapet.

The proposed 8-foot-tall sound attenuation walls installed on the roof of the building would also serve to prevent the fuel cell units and associated cooling fans from being impacted from highway debris or plowed snow.

In April 2019, Doosan met with a representative of DOT District 3 to discuss the project. DOT easements and the proximity to the elevated I-95 highway deck were discussed. No comments from the DOT regarding proximity to I-95 were submitted to the Council. NuPower is negotiating with the DOT to allow use of the area under the elevated highway for storage during the site construction.

Environmental Effects and Mitigation

Water Resources

The fuel cell facility would comply with all applicable DEEP water quality standards as no water would be consumed or discharged once the facility is operational. A DEEP Stormwater Permit is not required for development of the proposed facility. The site is not within a DEEP Aquifer Protection Area.

Each fuel cell operates in water balance below 86°F. The initial fill requires 350 gallons of water and the amount of make-up water above 86°F increases linearly from 0 gallons per minute (gpm) to 1 gpm at 110°F. A reverse osmosis system would be used by the facility to provide treated makeup water, with estimated usage of approximately 90,000 gallons per year. The thermal loop is a closed loop system and would not significantly impact the water consumption for the project. Minimal discharge of de-ionized water would occur in rare instances and would be directed to the City's sewer system. Water would be supplied by Aquarion Water Company with water mains located along Railroad Avenue and Iranistan Avenue.

The proposed project is located within the coastal boundary zone. NuPower received a coastal boundary zone permit from the City.

The site is within a Federal Emergency Management Agency-designated 100-year flood zone with a base flood elevation of 12 feet. Fill would be added to the site to bring the base elevation two feet above the flood elevation providing reduced flood risk to the fuel cells, electrical switchgear, transformers, natural gas meters, natural gas regulators, and heat recovery pumps. The additional two feet of ground elevation would comply

with Public Act 18-82, An Act Concerning Climate Change and Resiliency, which requires that residential and community structures in areas subject to coastal flooding be elevated two feet above the base flood elevation to account for projected sea level rise. If additional fill was imported to the site to allow for an additional one foot of flood protection, the estimated incremental cost increase is \$117,000.

Air Emissions

Air emissions produced during the operation of the facility would not trigger any regulatory thresholds and would not require a DEEP Air Permit. The proposed facility would emit 38,307 metric tons/yr of CO₂ without operation of the thermal loop. With utilization of the fuel cell thermal energy in the thermal loop CO₂ emissions can be reduced by approximately 9,558 metric tons/year. The proposed facility would emit 0.42 tons per year of methane (CH₄), 0.8 tons per year of nitrous oxide (N₂O), no sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs) or perfluorocarbons (PFCs), which are greenhouse gases defined in Regulations of Connecticut State Agencies Section 22a-174-1(49). The Project would also emit negligible amounts of sulfur oxides, volatile organic compounds and particulate matter.

The combined heat and power facility would be able to recover useful heat from electricity generation, and when used, can result in a fuel cell electrical efficiency factor of up to 90 percent.

Wildlife

The site consists of an undeveloped urban lot. The site is not within a DEEP Natural Diversity Database area.

Historic and Recreational Resources

The Seaside Village Historic District, listed on the National Register of Historic Places, is located approximately 575 feet southwest of the site at its closest point. The district contains several blocks of brick townhouses (275 units) constructed during World War I. The district is bound by Iranistan Avenue to the east, South Avenue to the north, Forest Court to the south, and by Alsace Street to the west. Portions of the proposed structure would be visible from Iranistan Avenue along the east side of Seaside Village; however, most of the proposed structure would be obscured by the elevated portion of I-95, a gas station, an auto repair shop and a commercial building. Approximately 26 units within Seaside Village would have views of the proposed facility.

The facility would be visible from the Division Street Historic District located approximately 300 feet north of the site at its closest point. The district, with a cross-section of 19th-century architectural styles, is bounded generally by State Street to the north, Iranistan Avenue to the west, Black Rock Avenue to the south, and West Avenue to the east. Except for the Metro-North Railroad, there are no tall structures that would block views between the district and the proposed facility.

The facility would also be visible from Went Field Recreation Park located approximately 500 feet northwest of the facility. It is a publicly accessible recreational area with baseball fields.

Soil

Soil borings were conducted in five locations at the site. Ten soil samples from the borings were submitted for contaminant testing. The results determined soils in the tested sample locations were consistent with typical urban fill and did not contain concentrations of contaminants above regulatory criteria. Soils can be re-used at the site but are not suitable to be used as clean fill at off-site locations.

Visibility

The site is within a heavily developed urban area adjacent to I-95, a railroad, and an overhead electric transmission line.

The facility would be visible from the surrounding area, including both the Seaside Village and Division Street Historic Districts, area roads, residential and commercial/industrial properties, Went Field Recreation Park, I-95 and the Metro-North Railroad.

Conclusion

The project is a distributed energy resource with a capacity of not more than sixty-five megawatts, meets air and water quality standards of the DEEP, and would not have a substantial adverse environmental effect. As a low-emission Class I renewable energy source, it would reduce the emission of air pollutants that contribute to smog and acid rain, and to a lesser extent, global climate change, and furthers the State's energy policy by developing and utilizing renewable energy resources and distributed energy resources.

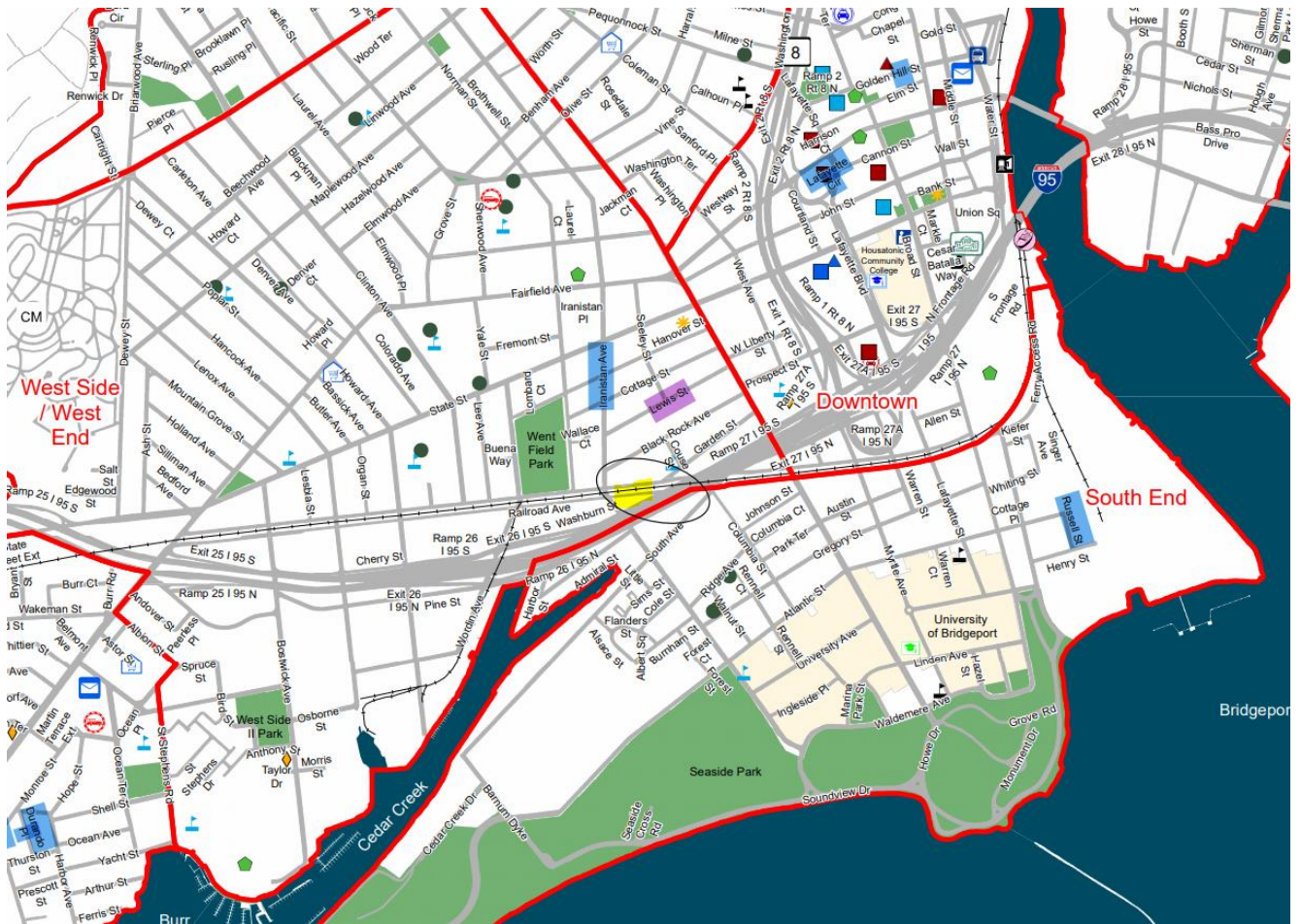
The project was selected in a competitive RFP process and would not cause unreasonable pollution, impairment or destruction of the public trust in the air, water or other natural resources of the state

Recommendations

If approved, staff recommends the following conditions:

1. The Petitioner shall prepare a Development and Management Plan (D&M) for this facility in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
 - a) A final site plan including, but not limited to, detailed site design, building design, fuel cell layout, site access, electrical, water, natural gas and thermal loop connections, project interconnection detail, fencing, lighting, and site drainage;
 - b) Construction site plans that include, but are not limited to, site preparation, grading, construction laydown areas, and erosion and sedimentation controls;
 - c) Site maintenance/groundskeeping plan;
 - d) Contact information for the spill response contractor; and
 - e) Contact information for the construction contractor.
2. Submit an Emergency Response Plan that includes detailed safety features and emergency response for the building, site infrastructure, and fuel cells; and
3. Submit a post-construction noise analysis that demonstrates compliance with DEEP Noise Control Regulations at the nearest residential receptors. Include additional noise mitigation measures, if necessary.

Site Location*

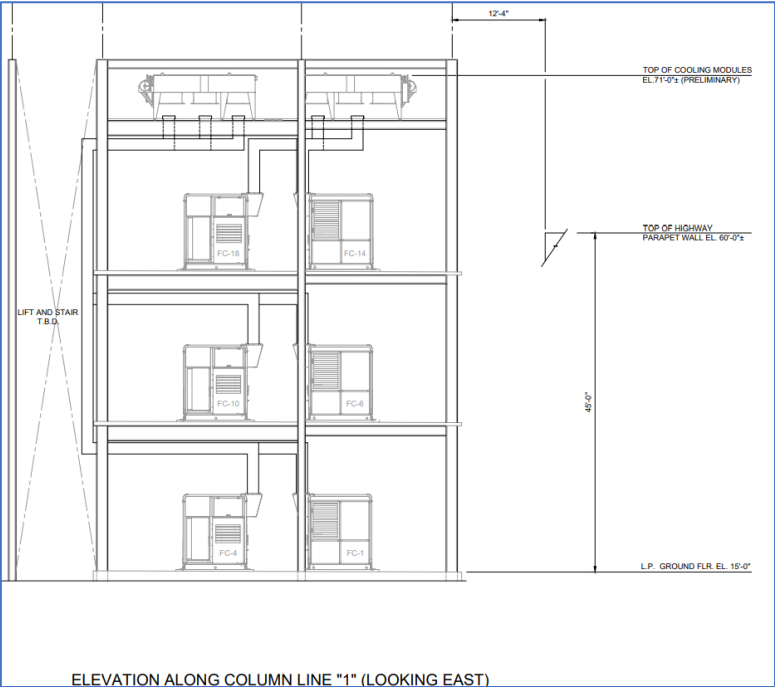
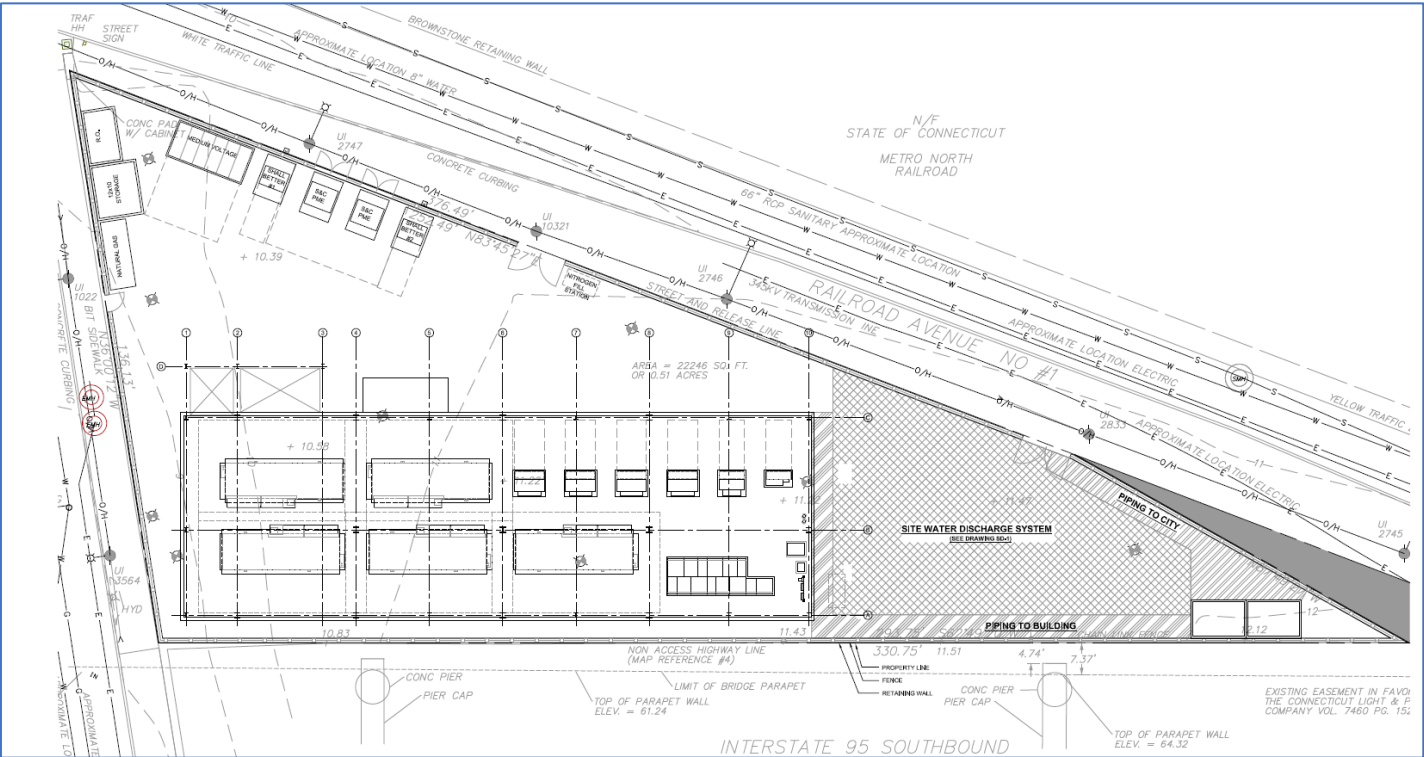


*Site is marked in yellow

Site Aerial Images



Site Drawing

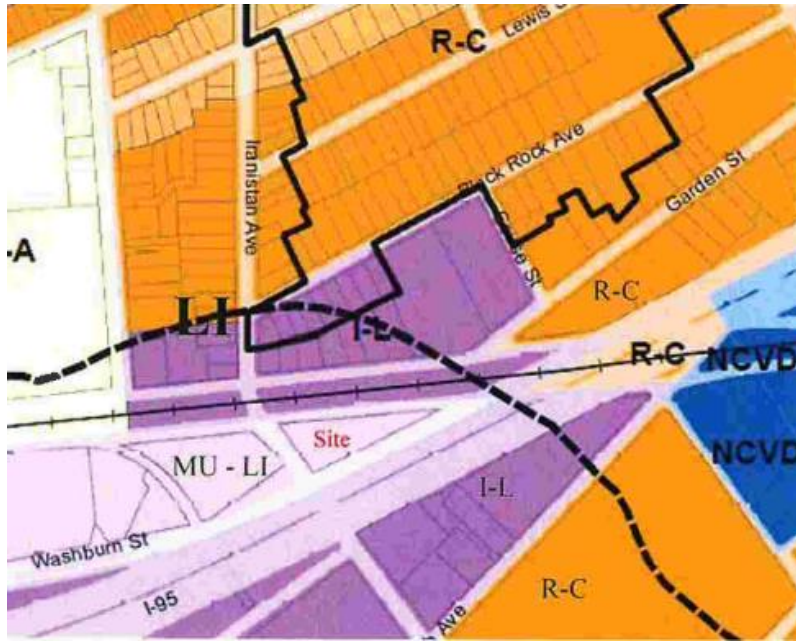


Facility Rendering



(view northwest)

Zoning Map



Historic District Map

