

Petition For A Declaratory Ruling That No Certificate Of Environmental Compatibility And Public Need Is Required For The Installation Of A Customer-Side one (1)- 440 kW Fuel Cell Project To Be Located At Shelton High School., 120 Meadow Street, Shelton, CT 06484.

I. INTRODUCTION

Pursuant to Connecticut General Statutes Section 16-50k, Doosan Fuel Cell America Inc. hereby petitions the Connecticut Siting Council (the “Council”) for a declaratory ruling (“Petition”) that a Certificate of Environmental Compatibility and Public Need (“Certificate”) is not required for the installation of one (1) 440 kW Fuel Cell in support of a customer-side distributed resources project in Shelton, Connecticut (the “Project”) as described below. Doosan Fuel Cell America Inc. submits that no Certificate is required because the proposed installation would not have a substantial adverse environmental effect.

II. DESCRIPTION AND LOCATION OF THE PROJECT

The fuel cell is a customer-side installation distributed generation resource with grid interconnection and is to be located at the Shelton High School, Shelton, CT (see project site – Attachment A). This new installation will consist of one (1) natural-gas fueled 440 kW PureCell[®] Model 400 phosphoric acid fuel cell system (“Fuel Cell”) manufactured by Doosan Fuel Cell America, Inc. in South Windsor, Connecticut (see Attachment B for Model 400 datasheet). The overall dimensions of each of the Fuel Cell power plants are approximately nine feet wide by twenty-nine feet long by ten feet tall. The units are totally enclosed and factory-assembled and tested prior to shipment.

The Fuel Cell is intended for a distributed generation and combined heat and power application. The system for Shelton High School will be capable of producing a total of 440 kW of continuous, reliable electric power while generating heat that will be used for space heating. It will operate in parallel with the utility grid and provide a portion of the electrical requirements of the facility. In addition, the Fuel Cell will provide backup power to designated loads, as determined by the school, when the utility grid power is down. When all of the heat is used, the overall efficiency of the system will be up to 90%, including both electric and thermal output. The fuel cell system will be preheating the return heating lines to the main boilers. As long as natural gas is available, electric power and heat can be generated.

The PureCell[®] Model 400 fuel cell system has been certified to meet the strict ANSI/CSA FC-1 fuel cell safety standard to protect against risks from electrical, mechanical, chemical, and combustion safety hazards. Numerous safety features have been incorporated into the design. A combustible gas sensor and thermal fuses located throughout the power module cabinet detect any over-temperature. The detection of a potential combustible gas mixture, over-temperature, or the failure of this detection circuit will result in a power plant shutdown and a subsequent inert gas (nitrogen) purge of the fuel cell stack and fuel processing system. This event will also result in a system alarm notification to the power plant operator (Doosan Fuel Cell America, Inc.).

The power plant is designed with an integral emergency-stop button on the outside of the enclosure to enable immediate shutdown in the event of an emergency. There is also a gas shut-off valve and electrical disconnect switch easily accessible to emergency personnel.

The fuel cell stack is wrapped in a fire retardant blanket. There are no materials inside the unit that would sustain a flame. There is no large volume of gas or any ignition that occurs within the cell stack. The power plant does not store hydrogen; it consumes hydrogen-rich gas equal to what it requires to produce power.

Phosphoric acid is an integral part of the fuel cell system, acting as the electrolyte within the fuel cell stack. Phosphoric acid is a surprisingly common substance that is contained in common cola drinks. There is no reservoir of liquid; phosphoric acid is contained in the porous structure of the fuel cell stack material by capillary action, similar to how ink is absorbed into a blotter.

The only fluid in the power plant is water. All pressurized water vessels are designed to ASME boiler codes and inspected annually. All piping, welds, etc. meet pressurized piping standards. Water produced through the electrochemical process is “pure” water and is reclaimed and reused by the process. The other source of water is water used in the external cooling module, which is mixed with a propylene glycol and a rust inhibitor to prevent rust and freezing in colder climates.

The fuel cell does not produce any hazardous waste during normal operation. Standard Material Safety Data Sheets (MSDS) are available in the product service manual.

III. PROJECT BENEFITS

Fuel cell technology represents an important step in advancing Connecticut’s goal of diversifying its energy supply through the use of renewable energy, as expressed in Connecticut General Statutes Section 16-244 et seq. The Project will serve as a cost-effective clean energy source while also reducing the demand for grid electricity from this location. Further, this fuel cell installation will support the efforts of the State of Connecticut to be a leader in the utilization of fuel cell technology.

Because a fuel cell does not burn fuel, the system will significantly reduce air emissions associated with acid rain and smog, and dramatically reduce those emissions associated with global warming. The application of the Fuel Cell for Shelton High School is estimated to reduce

the facility's annual carbon emissions by over 120 metric tons when compared to the build margin emissions in the Northeast grid utility system (per the Green-e Climate Protocol for Renewable Energy). The Fuel Cell is designed to operate in total water balance – no make-up water is normally required after start-up and no water discharges to the environment will occur under normal operating circumstances. Furthermore, unlike many traditional power generation systems, fuel cells produce very little sound and typically do not require sound proofing or cause the need for hearing protection.

IV. NO SUBSTANTIAL ADVERSE ENVIRONMENTAL EFFECT

The proposed installation will have no substantial adverse environmental effect. The installation and operation of the Fuel Cell will meet all air and water quality standards of the Connecticut Department of Energy and Environmental Protection (“DEEP”).

Section 22a-174-42 of the Regulations of Connecticut State Agencies (RCSA) governing air emissions from new distributed generators exempts fuel cells from air permitting requirements. Notwithstanding this exemption, the Fuel Cell system meets the CT emissions standards for a new distributed generator as shown in Table 1 below, and no permits, registrations or applications are required under rules based on the actual emissions of the fuel cell. Furthermore, the Fuel Cell system has been certified by the California Air Resources Board to meet the Distributed Generation Certification Regulation 2007 Fossil Fuel Emissions Standards (see Attachment C). Please note that Doosan Fuel Cell America, Inc. is in the process of reapplying for this certification as the manufacturer.

Table 1: CT Emissions Standards for a New Distributed Generator

Air Pollutant	CT Emissions Standard (lbs/MWh)	Each PureCell Model 400 Fuel Cell System at Rated Power (lbs/MWh)
Oxides of Nitrogen	0.3	.02
Carbon Monoxide	2	.02
Carbon Dioxide	1900	1050

With respect to water discharges, the Model 400 Fuel Cell is designed to operate without water discharge under normal operating conditions. To the extent that minimal water overflow may occasionally occur, such discharges will consist of de-ionized water and will be directed to a site sanitary drain or dry well. This discharge will be incorporated into the overall site design, and will be covered by the site’s water discharge permit, if necessary.

Further, the Fuel Cell installation and operation will have no substantial adverse effect on listed endangered species or listed Connecticut historical places. Attachment D contains the relevant portion of the CT DEEP’s Shelton Endangered Species map. The installation of the PureCell Model 400 fuel cell will be located in the rear of the Shelton High School maintenance parking area and is outside of identified locations of endangered species populations.

The Fuel Cell will not emit noise in excess of limitations set forth in CT regulations. The Fuel Cell location will be in the rear of Shelton High School maintenance parking area. The closest neighbor/residence is across Meadow Street-over 350 feet distance from the fuel cells. CT’s most strict applicable regulation requires a noise level of no greater than 45dBA from a Class B emitter (Shelton High School) to a Class A receptor (residential houses). The fuel cell is expected to operate at full power (440 kW), with a noise level in free field of below 45dBA at 200 feet. Therefore, the fuel cell is not expected to emit “excessive noise” to any neighboring buildings.

V. LOCAL INPUT AND STATE-UTILITY INCENTIVES

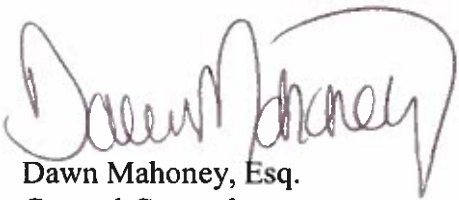
Doosan Fuel Cell America Inc. met with local school officials and presented the plans for the installation of the fuel cell-which was approved. A bid has been submitted for Class I renewable energy credits (RECs) through the CT Low and Zero Emission Renewable Energy Credit Program.

VI. CONCLUSION

As set forth above, Doosan Fuel Cell America Inc. requests that the Council issue a determination, in the form of a declaratory ruling, that the proposed installation above is not one that would have a substantial adverse effect, and, therefore, that a Certificate is not needed.

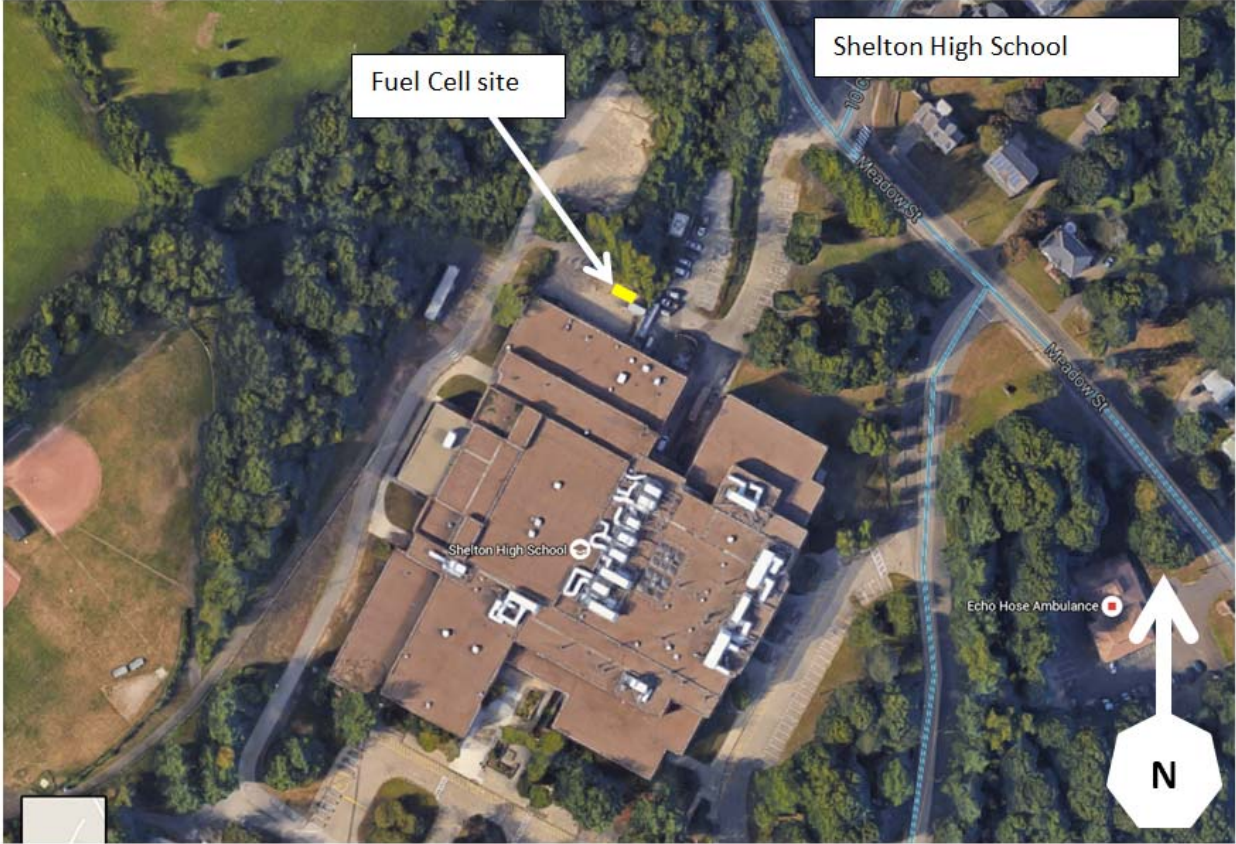
Respectfully submitted,

By:

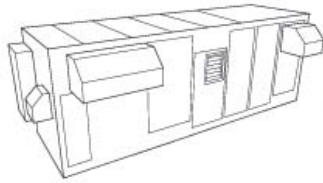


Dawn Mahoney, Esq.
General Counsel
Doosan Fuel Cell America Inc.

Attachment A: Project Site. The new Fuel Cell system will be located in the rear of the Shelton High School maintenance parking area.



Attachment B: PureCell® Model 400 Datasheet



Model 400 FUEL CELL SYSTEM

PURECELL® SYSTEM BENEFITS

Energy security

proven, continuous generation that is setting durability records

Energy productivity

increased efficiency that is reducing energy costs

Energy responsibility

clean operation that is driving greener customer facilities

PURECELL SYSTEM COMPETITIVE ADVANTAGE

Long life

industry best, 10-year cell stack life assures high availability and low service cost

High efficiency

up to 90% overall efficiency

Modular and scalable

systems can be clustered to meet growing energy demands

Experience

most knowledgeable and experienced team in the industry

Grid-independence

proven performance in providing power when the utility grid fails

Load-following

can modulate power output to match building needs

Small footprint

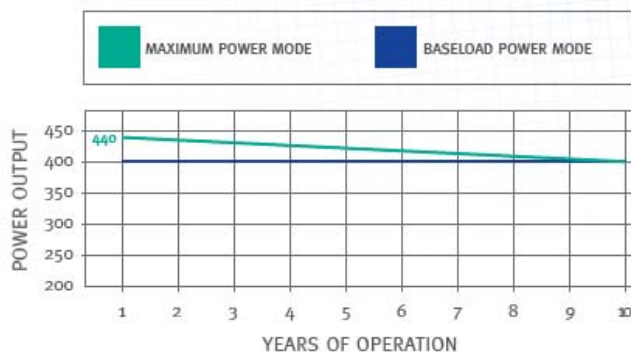
high power density takes less space on site

Flexible siting

indoor, outdoor, rooftop, multi-unit

RATED POWER OUTPUT: 440kW, 480VAC/60HZ

Characteristic	Units	Operating Mode	
		Maximum Power ¹	Baseload Power ¹
Electric Power Output	kW/kVA	440/440	400/471
Electrical Efficiency	%, LHV	41%	42%
Peak Overall Efficiency	%, LHV	90%	90%
Gas Consumption	MMBtu/h, HHV (kW)	4.06 (1,190)	3.60 (1,056)
Gas Consumption ²	SCFH (Nm ³ /h)	3,961 (106.1)	3,515 (94.2)
High Grade Heat Output @ up to 250°F	MMBtu/h (kW)	0.76 (223)	0.64 (188)
Low Grade Heat Output @ up to 140°F	MMBtu/h (kW)	0.99 (290)	0.88 (258)



FUEL

Supply.....Natural Gas
Inlet Pressure 10 to 14 in. water (25 - 35 mbar)

EMISSIONS ^{3, 4}

NOx0.01 lbs/MWh (0.006 kg/MWh)
CO 0.02 lbs/MWh (0.009 kg/MWh)
VOC 0.02 lbs/MWh (0.009 kg/MWh)
SO₂ Negligible
Particulate Matter..... Negligible
CO₂ (electric only)1,049 lbs/MWh (476 kg/MWh)
(with full heat recovery)495 lbs/MWh ⁵ (225 kg/MWh)

OTHER

Ambient Operating Temp. -20°F to 104°F (-29°C to 40°C)
Sound Level <65 dBA @ 33 ft. (10m)
Water Consumption.....None (up to 85°F (30°C Ambient Temp.)
Water DischargeNone (Normal Operating Conditions)

CODES AND STANDARDS

ANSI/CSA FC1-2012: Stationary Fuel Cell Power Systems
UL1741: Inverters for Use With Distributed Energy Resources

NOTES

1. Average performance during 1st year of operation. Refer to the Product Data and Applications Guide for performance over the operating life of the powerplant.
2. Based on natural gas higher heating value of 1025 Btu/SCF (40.4 MJ/Nm³)
3. Emissions based on 400 kW operation.
4. Fuel cells are exempt from air permitting in many U.S. states.
5. Includes CO₂ emissions savings due to reduced on-site boiler gas consumption.

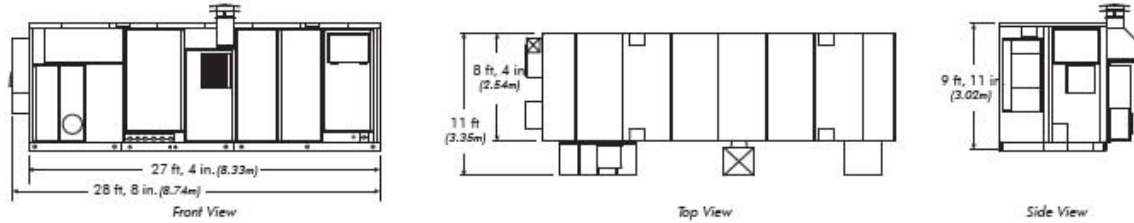




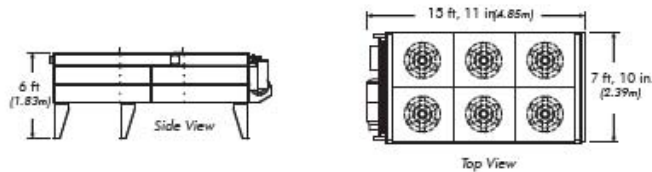
PureCell Model 400 FUEL CELL SYSTEM

SYSTEM DIMENSIONS

Power Module



Cooling Module



Shipping Dimensions

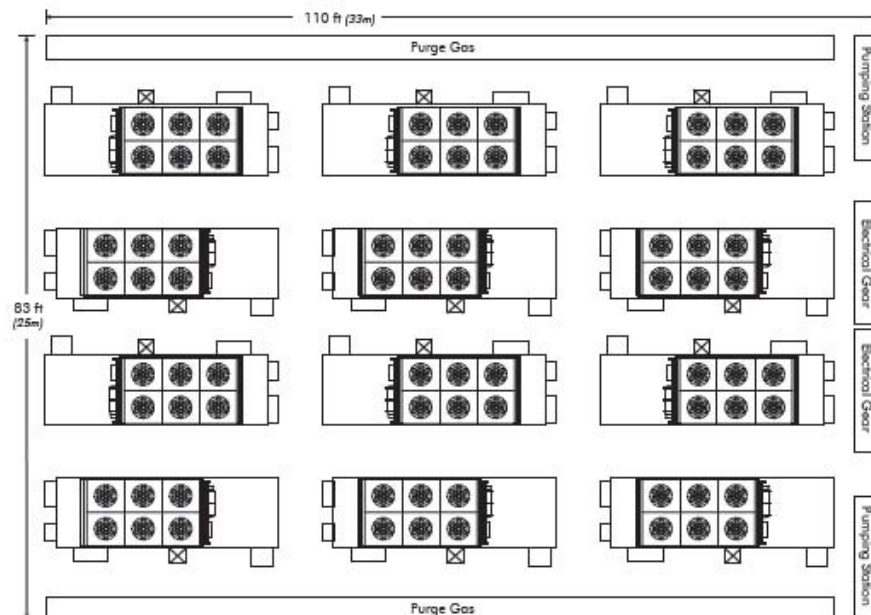
	Power Module	Cooling Module
Length	28 ft, 8 in. (8.74m)	15 ft, 11 in. (4.85m)
Width	8 ft, 4 in. (2.54m)	7 ft, 10 in. (2.39m)
Height	9 ft, 11 in. (3.02m)	6 ft (1.83m)
Weight	60,000 lb (27,216 kg)	3,190 lb (1,447 kg)

MULTI-MEGAWATT CAPABILITY

For multi-megawatt sites, individual power plants can be arranged in multiple orientations. The 12-unit layout defined below represents one option with cooling modules located on the roof of the power plants minimizing the overall footprint of the site.

No. of Units	Baseload Electric Output MW	High-Grade Heat MMBtu/h (kW)	Low-Grade Heat MMBtu/h (kW)	Fuel Consumption MMBtu/h, HHV (kW)	Site Area ft ² (m ²)
6	2.4	3.8 (1,128)	5.3 (1,548)	21.6 (6,334)	4,400 (410)
12	4.8	7.7 (2,256)	10.6 (3,096)	43.2 (12,668)	8,900 (830)
24	9.6	15.4 (4,512)	21.1 (6,192)	86.5 (25,337)	17,800 (1,650)
36	14.4	23.1 (6,768)	31.7 (9,288)	129.7 (38,005)	26,700 (2,480)
48	19.2	30.8 (9,024)	42.3 (12,384)	172.9 (50,673)	35,600 (3,310)
60	24.0	38.5 (11,280)	52.8 (15,480)	216.2 (63,341)	44,500 (4,140)

12-Unit System Layout



NOTES

- Space required for electrical gear and pumping stations is representative only.
- Purge gas is required to purge the system of unspent fuel during shutdowns and prior to start-up.

The manufacturer reserves the right to change or modify, without notice, the design or equipment specifications without incurring any obligation either with respect to equipment previously sold or in the process of construction. The manufacturer does not warrant the data on this document. Warranted Specifications are documented separately.

Doosan Fuel Cell America, Inc.
Corporate Headquarters
195 Governor's Highway
South Windsor, CT 06074

www.doosanfuelcellamerica.com

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A0290

Attachment C: California Air Resources Board Emissions Certification

**State of California
AIR RESOURCES BOARD**

Executive Order DG-040

**Distributed Generation Certification of
UTC Power Corporation
440kW PureCell® System Model 400**

WHEREAS, the Air Resources Board (ARB) was given the authority under California Health and Safety Code section 41514.9 to establish a statewide Distributed Generation (DG) Certification Program to certify electrical generation technologies that are exempt from the permit requirements of air pollution control or air quality management districts;

WHEREAS, this DG Certification does not constitute an air pollution permit or eliminate the responsibility of the end user to comply with all federal, state, and local laws, rules and regulations;

WHEREAS, on September 24, 2012, UTC Power Corporation applied for a DG Certification of its 440 kW PureCell® System Model 400 fuel cell and whose application was deemed complete on December 10, 2012;

WHEREAS, UTC Power Corporation has demonstrated, according to test methods specified in California Code of Regulations (CCR), title 17, section 94207, that its natural-gas-fueled 440kW PureCell® System Model 400 fuel cell has complied with the following emission standards:

1. Emissions of oxides of nitrogen no greater than 0.07 pounds per megawatt-hour.
2. Emissions of carbon monoxide no greater than 0.10 pounds per megawatt-hour.
3. Emissions of volatile organic compounds no greater than 0.02 pounds per megawatt-hour.

WHEREAS, UTC Power Corporation has demonstrated that its 440kW PureCell® System Model 400 fuel cell complies with the emissions durability requirements in CCR, title 17, section 94207(d); and

WHEREAS, I find that the applicant, UTC Power Corporation, has met the requirements specified in CCR, title 17, article 3, Distributed Generation Certification Program, and has satisfactorily demonstrated that the 440kW PureCell® System Model 400 fuel cell meets the DG Certification Regulation 2007 Fossil Fuel Emission Standards.

NOW THEREFORE, IT IS HEREBY ORDERED, that a DG Certification, Executive Order DG-040 is granted.

This DG Certification:

- 1) Is subject to all conditions and requirements of CCR, title 17, article 3, Distributed Generation Certification Program, including the provisions relating to inspection, denial, suspension, and revocation.
- 2) Shall be void if any manufacturer's modification results in an increase in emissions or changes the efficiency or operating conditions of a model, such that the model no longer meets the 2007 DG Certification emission standards.
- 3) Shall expire on the 26th day of December, 2017.

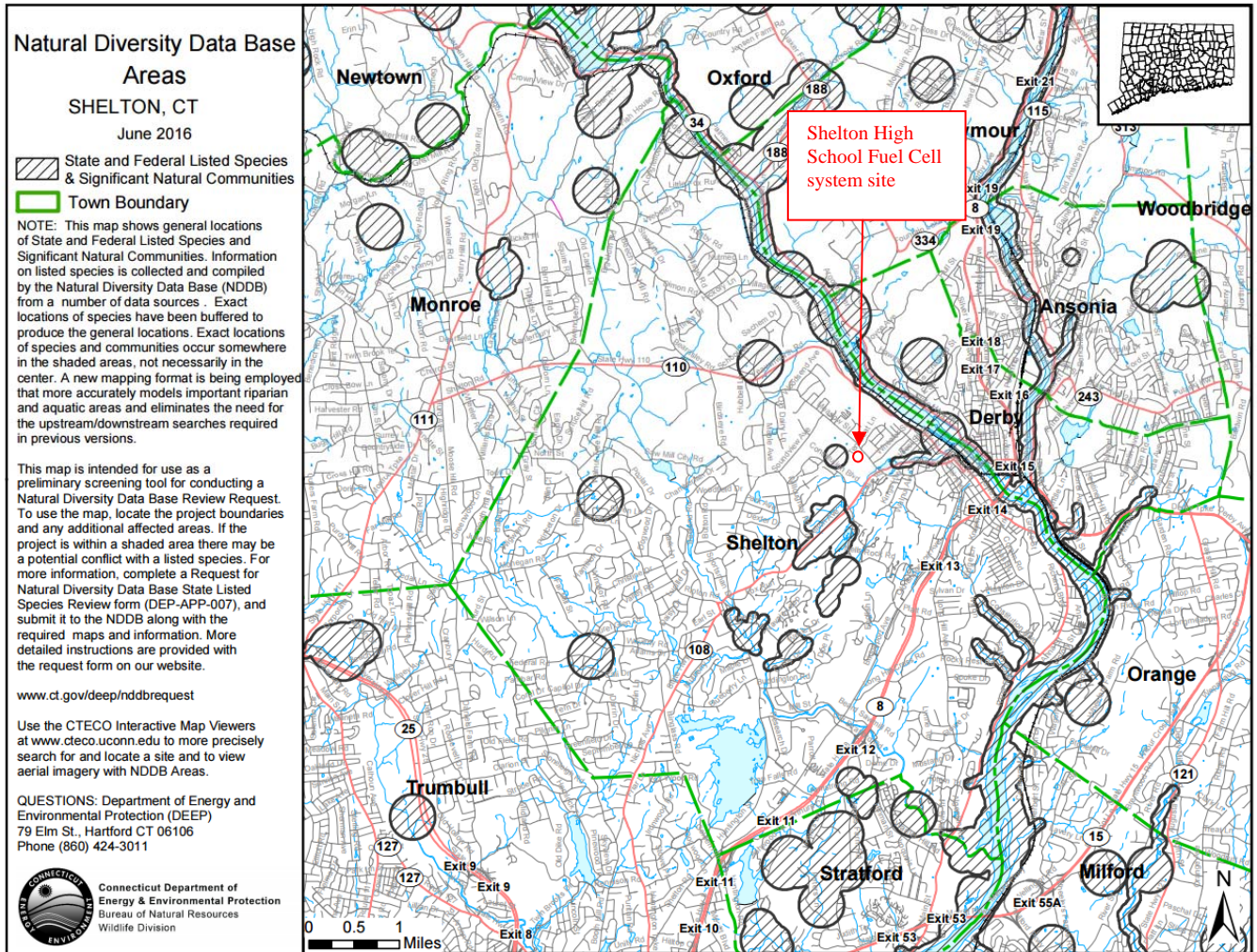
Executed at Sacramento, California, this 26th day of December 2012.

James N. Goldstene
Executive Officer
by

/s

Cynthia Marvin, Chief
Stationary Source Division

Attachment D: Connecticut DEEP Shelton, CT Endangered Species Map (shaded areas denote known locations of State and federally listed species).





Doosan Fuel Cell America, Inc
195 Governor's Highway
South Windsor, CT 06074
T - 860 727 2200

June 14, 2016

RE:Petition of Doosan Fuel Cell America, Inc. to the Connecticut Siting Council for a Declaratory Ruling for the Location and Construction of one 440 kW Fuel Cell at Shelton High School, 120 Meadow St., Shelton CT.

Pursuant to Section 16-50j-40 of the Connecticut Siting Council's (the "Council") regulations, we are notifying you that Doosan Fuel Cell America, Inc. intends to file June 15, 2016 a petition for declaratory ruling with the Council. The petition will request the Council's approval of the installation of one (1) 440 kW Fuel Cell in support of a customer-side distribution resources project at the Shelton High School, 120 Meadow St, Shelton CT. Each of the Fuel Cell units is 28'-8" x 8'-4" x 9'-11"; in addition there will be ancillary equipment including cooling fans. Electricity generated by the facility will be consumed primarily at the site, and any excess electricity will be exported to the electric grid. The Fuel Cell will be fueled by natural gas.

If you have any questions regarding the proposed Facility, please contact any of the following:

Josh Abrams

195 Governor's Highway
South Windsor, CT 06074
(860) 727-2200
Josh.abrams@doosan.com

Connecticut Siting Council

Ten Franklin Square
New Britain, CT 06051 Telephone: (860) 827-2935

Sincerely,
Dawn Mahoney, Esq.
General Counsel
Doosan Fuel Cell America, Inc.

PROOF OF NOTICE

This is to certify that on the 15th day of December 2016, the foregoing notice was sent via first class mail to the following officials and abutters:

AGENCY	NAME/ADDRESS
Mayor of Shelton, CT	Mark A. Lauretti-Mayor 54 Hill Street Shelton, CT 06484
Planning and Zoning	Rick Schultz, Planning and Zoning Administrator 54 Hill Street Shelton, CT 06484
Building Department Head	Joseph Ballaro Building Department Head 54 Hill Street Shelton, CT 06484
State Senator	Kevin Kelly Senate District 21 240 York Street Stratford, CT 06615
State House	Ben McGorty House District 122 30 Wigwam Dr Shelton, CT 06484
State House	Jason Perillo House district 113 454 Coram Ave. Shelton, CT 06484
United State Congressman	Rosa DeLauro 59 Elm Street New Haven, CT 06510
United State Senator	Christopher S. Murphy One Constitution Plaza, 7th Floor Hartford, CT 06103
United State Senator	Richard Blumenthal 90 State House Square Hartford, CT 06103
State Department of Energy and Environmental Protection	Robert Klee, Commissioner 79 Elm Street Hartford, CT 06106
State Department of Public Health	Dr. Jewel Mullen Commissioner 410 Capitol Avenue Hartford, CT 06134
State Council on Environmental Quality	Susan Merrow, Chair 79 Elm Street Hartford, CT 06106

(continued)

State Department of Agriculture	Steven K. Reviczky Commissioner 165 Capitol Avenue Hartford, CT 06106
Office of Policy and Management	Benjamin Barnes, Secretary 450 Capitol Avenue Hartford, CT 06106-1379
State Department of Economic and Community Development	Catherine Smith, Commissioner 505 Hudson Street Hartford, CT 06106-7106
Naugatuck Valley Council of Governments	Rick Dunne-Excecutive Director Naugatuck Valley Council of Governments 49 Leavenworth Street, 3rd Floor, Waterbury, CT 06702
Attorney General	George Jepsen, Attorney General Office of the Attorney General 55 Elm Street Hartford, CT 06106
Public Utilities Regularity Authority	Arthur House, Chairman Public Utilities Regularity Authority Ten Franklin Square, New Britain, CT 06051
Department of Transportation	James P. Redeker, Commissioner Department of Transportation 2800 Berlin Turnpike, Newington, CT 06111

(continued to abutters)

Abutters to Shelton High School

Airal Sharma
15 Wellington Ct
Shelton, CT 06484

Leon Gjoni
9 Wellington Ct
Shelton, CT 06484

Brian Soderholm
5 Wellington Ct
Shelton, CT 06484

Brian Phillips
1 Wellington Ct
Shelton, CT 06484

John Lawrence
10 Wellington Ct
Shelton, CT 06484

Edward Turcotte
4 Wellington Ct
Shelton, CT 06484

Edwin Garces
97 Independence Dr
Shelton, CT 06484

James Kaklamos
101 Independence Dr
Shelton, CT 06484

Robert Thomas
105 Independence Dr
Shelton, CT 06484

Mark Arena
127 Meadow St
Shelton, CT 06484

Scott Morgero
95 Meadow St
Shelton, CT 06484

Hirem Patel
121 Meadow St
Shelton, CT 06484

Fernando Goncalves
115 Meadow St
Shelton, CT 06484

Thomas McMahon
103 Meadow St
Shelton, CT 06484