Legislative Testimony of the Connecticut Green Bank
Energy and Technology Committee
February 18, 2021

Regarding Raised Bill 6409
AN ACT CONCERNING THE SOLICITATION OF BIOGAS INJECTION PROPOSALS FROM ANAEROBIC DIGESTION FACILITIES

As the nation’s first green bank, the Connecticut Green Bank (“Green Bank”) leverages the limited public resources it receives to attract multiples of private investment to scale up clean energy deployment. Since its inception, the Green Bank has mobilized nearly $2.0 billion of investment into Connecticut’s clean energy economy at a 7 to 1 leverage ratio of private to public funds, supported the creation of over 23,000 direct, indirect and induced jobs, reduced the energy burden on over 55,000 families and businesses, deployed over 430 MW of clean renewable energy, helped avoid nearly 9.0 million tons of CO2 emissions over the life of the projects, and generated nearly $100 million in individual income, corporate, and sales tax revenues to the State of Connecticut.¹

The Green Bank supports Raised Bill No. 6409 as it would create renewable natural gas from farm-generated organic waste or source-separated organic waste that can be injected into the natural gas distribution system, used for onsite distributed generation (e.g., combined heat and power) producing renewable energy credits for the Connecticut Class I Renewable Portfolio Standard, or as a fuel source for busses and other fleet vehicles producing renewable fuel credits for the EPA Renewable Fuel Standards.

As the Energy & Technology Committee may be aware, the Green Bank has supported the development and financing of farm and food waste to energy projects, including:

- **Fort Hill Farms** – a farm waste to energy project in construction in Thompson that will recycle 17,000-30,000 tons of farm waste to generate approximately 3,500 MWh of clean renewable energy that will support virtual net metering to Middletown and New Britain, using $2MM senior loan from Live Oak Bank and $850,000 of subordinated debt from the Green Bank to finance the project.

- **Quantum Biopower** – a food waste to energy project in operation in Southington that is capable of handling 40,000 tons of food waste to support a 1.1 MW renewable energy facility that is supporting virtual net metering to Southington, using $8MM senior loan from People’s United Bank and $2MM of subordinated debt from the Green Bank to finance the project.

¹ For more up-to-date details on the Green Bank’s impact, go to www.ctgreenbank.com/MAYA
If members of the Energy & Technology Committee would be interested in a site tour to better understand AD technology, the Green Bank would be happy to facilitate with the site hosts.

Please find attached to this testimony the Green Bank’s Impact Report for FY 2020, Green Liberty Bonds Fact Sheet, and Anaerobic Digestion Fact Sheet.

Questions on this document may be submitted to the Green Bank’s Legislative Liaison Matt Macunas, reachable at matt.macunas@ctgreenbank.com or at (860) 257-2889.
How does AD work?

Anaerobic digestion is the natural process in which microorganisms break down organic materials. In this instance, “organic” means coming from or made of plants or animals. Anaerobic digestion happens in closed spaces where there is no air (or oxygen). The initials “AD” may refer to the process of anaerobic digestion or the built system where anaerobic digestion takes place, also known as a digester. The following materials are generally considered “organic” and can be processed in a digester:

- Animal manures
- Food scraps
- Fats, oils, and greases
- Industrial organic residuals
- Sewage sludge (biosolids)

All anaerobic digestion systems adhere to the same basic principles whether the feedstock is food waste, animal manures or wastewater sludge. The systems may have some differences in design but the process is basically the same.

What is made during the AD process?

Biogas is generated during anaerobic digestion when microorganisms break down (eat) organic materials in the absence of air (or oxygen). Biogas is mostly methane (CH\(_4\)) and carbon dioxide (CO\(_2\)), with very small amounts of water vapor and other gases. The carbon dioxide and other gases can be removed, leaving only the methane. Methane is the primary component of natural gas.

The material that is left after anaerobic digestion happens is called “digestate.” Digestate is a wet mixture that is usually separated into a solid and a liquid. Digestate is rich in nutrients and can be used as fertilizer for crops.

How are the products of AD used?

Biogas is produced throughout the anaerobic digestion process. Biogas is a renewable energy source that can be used in a variety of ways. Communities and businesses across the country use biogas to:

- Power engines, produce mechanical power, heat and/or electricity (including combined heat and power systems);
- Fuel boilers and furnaces, heating digesters and other spaces;
- Run alternative-fuel vehicles; and
- Supply homes and business through the natural gas pipeline

How biogas is used and how efficiently it’s used depends on its quality. Biogas is often cleaned to remove carbon dioxide, water vapor and other trace contaminants. Removing these compounds from biogas increases the energy value of the biogas. Low quality biogas is typically used in tougher, less efficient engines, such as internal combustion engines. Higher quality biogas cleaned of trace contaminants can be used in more efficient, but also more sensitive engines.

Biogas treated to meet pipeline quality standards can be distributed through the natural gas pipeline and used in homes and businesses. Biogas can also be cleaned and upgraded to produce compressed natural gas (CNG) or liquefied natural gas (LNG). CNG and LNG can be used to fuel cars, buses and trucks.

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1. [https://www.epa.gov/anaerobic-digestion/basic-information-about-anaerobic-digestion-ad](https://www.epa.gov/anaerobic-digestion/basic-information-about-anaerobic-digestion-ad)
Digestate is the material that is left over following the anaerobic digestion process. Digestate can be made into products like: bedding for livestock; flower pots; soil amendments; and fertilizers.

Digestate can be directly land applied and incorporated into soils to improve soil characteristics and facilitate plant growth. Digestate can also be further processed into products that are bagged and sold in stores. Some emerging technologies can be employed post-digestion to recover the nitrogen and phosphorus in digestate and create concentrated nutrient products, such as struvite (magnesium-ammonium-phosphate) and ammonium sulfate fertilizers.

**AD in Connecticut**

Pursuant to Section 103 of Public Act 11-80 (and amended by PA 15-152), the Green Bank ran a 3-year Anaerobic Digestion Pilot Program, budgeting $2M/year for the program in FY 2012, 2013 and 2014 per the statute. While several projects applied to the program, only two were financed. The projects that were not financed lacked the balance of capital required for development.

*Quantum Biopower (Southington) – Food Waste to Energy*

The first project successfully developed was Quantum Biopower – part of The Supreme Group, a construction and materials management and sustainability group. Developed on a 5-acre parcel located in the southwest corner of a 65-acre site in Southington, Quantum operates and manages the AD facility which is capable of handling a maximum capacity of 40,000 tons/year of food based organic material. The project took advantage of Public Act 11-217 which mandates large food waste generators to bring their food scraps to recycling facilities within a 20-mile radius, as well as a post-consumer based organic fraction. The facility is designed to handle pre-consumer, post-consumer, liquid based, and packaged food materials. It has the capacity to take in organic fractions that are slightly dirty; the equipment can clean this material, and subsequently recycle left over inorganic fractions. Quantum selected Quasar Energy Group as their technology provider, bringing experience with (at the time of selection) 12 AD facilities, with 7 more under construction. The facility has a 15-year power purchase agreement (PPA) with the City of Southington to purchase the electricity from the 1.1 MW facility through virtual net metering legislation, allowing for up to 5 municipal beneficial accounts. The facility recently qualified and was awarded an LREC contract with Eversource. The Green Bank provided $2 million in debt funding for the project, subordinated to an $8 million senior loan from People’s United Bank.

*Fort Hill Farms (Thompson) – Farm Waste to Energy*

The second project developed is completing construction and is the first AD facility of scale on a farm in Thompson. With over 200 milking cows, Fort Hill Farms has been active through three generations in over 70 years, producing the milk and cream used in the production of Cabot Cheese and The Farmer’s Cow milk and ice cream. Fort Hill Farms has partnered with Ag Grid LLC, which launched in 2016 with a vision to drive dairy farm viability, financial stability and sustainability by converting agricultural and organic waste to renewable energy and compost, enhancing farm management practices. Together with Martin Energy Group Services, LLC, a development and construction firm which has packaged and installed over four hundred gaseous-fueled engines in the United States, the project (which will be completed in the spring of 2021) will recycle from 17,000 to 30,000 tons per year of farm and food waste per year to generate approximately 3.5 Million kWhours of clean and renewable energy. The facility has virtual net metering arrangements with New Britain and Middletown but has not yet secured an LREC contract. The Green Bank provided $850,000 in debt funding for the project, subordinated to a $2 million senior loan from Live Oak Bank.

With fewer landfills and waste management facilities to dispose of their excess food waste, commercial food waste producers will need to develop alternative disposal mechanisms. The anaerobic digesters, such as those at Quantum Biopower and Fort Hill Farms, act as a beneficial substitute to traditional practices like waste-to-energy incineration by giving businesses a green, environmentally friendly option to recycle their waste.
Green Bank Impact Report

Since the Connecticut Green Bank’s inception through the bipartisan passage of Public Act 11-80 on July 1, 2011, we have accelerated the deployment of clean energy to benefit families, businesses, and our communities. The impact of our green bank innovation is shown below in terms of investment, economic development, and environmental protection from FY 2012 through FY 2020.

**INVESTMENT IN CONNECTICUT**

**Investment** Since inception, the Green Bank has mobilized $1.94 billion of investment into the State’s economy.

**Leverage ratio** The Green Bank’s leverage ratio is the relationship between private investment and Green Bank investment.

**Tax revenues** The Green Bank’s activities have helped generate an estimated $96.7 million in state tax revenues.

**ECONOMIC DEVELOPMENT**

**Jobs** The Green Bank has supported the creation of more than 23,000 direct, indirect, and induced job-years.

**Energy burden** The Green Bank has reduced the energy costs on families, businesses, and our communities.

**Accessible and affordable** The Green Bank has supported residential solar PV installations to achieve income parity against area median income (AMI).

**ENVIRONMENTAL PROTECTION**

**Deployment** The Green Bank has accelerated the growth of clean energy to more than 434 MW.

**Pollution** The Green Bank has helped reduce air emissions that cause climate change and worsen public health, including 8.4 million pounds of SOx and 9.7 million pounds of NOx.

**Public health** The Green Bank has improved the lives of families, helping them avoid sick days, hospital visits, and even death.

Learn more by visiting ctgreenbank.com/strategy-impact/impact
To create a new way for everyday citizens to invest in confronting climate change, the Green Bank launched the Green Liberty Bond in 2020. The Green Liberty Bond sub-category of green bonds is sold directly to the people, the proceeds of which are independently certified as financing projects with climate and environmental benefits.

Key Facts:

- $16,795,000 of Green Liberty Bonds sold in July 2020 to retail and institutional investors in Connecticut and across the country.

- The inaugural issuance sold-out in two days.

- Demand was so strong that the supply of bonds could not meet the interest of those seeking to invest in Connecticut’s green economy.

- Priority was given to Connecticut residents, and their orders for nearly $5 million of bonds were filled first.

- Bonds were sold in $1,000 denominations to allow greater access for all interested investors.

- Proceeds from this issuance supported the Residential Solar Investment Program (RSIP) which provides incentives to Connecticut homeowners to go solar to save money on their electricity bills.

- The marketing campaign used poster images (at right) in the style of War Bond posters from the 1940s.

For more on Green Liberty Bonds visit www.greenlibertybonds.com