New Jersey Board of Public Utilities
Town Center Distributed Energy Resources Microgrid Incentive Program

Phase II Design Incentive Application

Submitted by: County of Camden

Prepared for: New Jersey Board of Public Utilities

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This Design Incentive Program Application (Application) was prepared by Compass Energy Platform, LLC with support from Concord Engineering Group, Inc., Greener by Design, LLC, and Guidehouse, Inc. (together the Compass Team) on behalf of the County of Camden for informational purposes only in response to the Phase II TCDER Microgrid Incentive Program Solicitation issued by the New Jersey Board of Public Utilities (Requestor).

Compass makes no claim to any government data and other data obtained from public sources found in this Application (whether or not the owners of such data are noted in this Application).

Compass does not make any express or implied warranty or representation concerning the information contained in this Application, or as to merchantability or fitness for a particular purpose or function.

“Solicitation” as used in this document refers to the “Design Incentive Program Application” document published by the New Jersey Board of Public Utilities on February 20, 2020 that contains the document content requirements for this Application.

1. APPLICANT INFORMATION [3.1]

1.1 Applicant Name and Address [3.1.1]

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1.3 Project Name [3.1.3]

The Camden Microgrid Sustainability Loop Project

2. PROJECT DESCRIPTION [3.2]

2.1 Microgrid Project General Description [3.2.1]

Initial Scope Previously Studied for Incentive Program Phase I

Although the City of Camden avoided the worst consequences of Superstorm Sandy, the storm clarified Camden's need for more resilient energy infrastructure, particularly at the City's water processing facility run by the Camden County Municipal Utilities Authority ("CCMUA"). The December 2018 Town Center Distributed Energy Resources ("TCDER") Microgrid Feasibility Study Report ("Report") submitted for Camden focused directly on a "Sustainability Loop" between the CCMUA and the Covanta Camden Energy Recovery Center ("Covanta"). The Camden Microgrid Sustainability Loop Project aims to facilitate the exchange of on-site generated electricity (from Covanta to CCMUA) and polished cooling water (from CCMUA to Covanta), with the Loop wrapped in a protective microgrid to provide resilience to both CCMUA and Covanta, allowing both to operate during emergencies, while also lowering energy costs for CCMUA and allowing Covanta to end its operational dependence on aquifer water.

The Board of Public Utilities ("BPU") hopes that the TCDER projects will spark the interest of private investors, allowing project sponsors to make use of external financing and third-party ownership, i.e., public-private partnerships ("P3"). As discussed in the Report, the initial scope for the Sustainability Loop was neither commercially viable nor financeable. Since the release of the Report, the County has been working to expand the project scope, to improve the commercial model for the project to align with third-party financing requirements, and most importantly, to maximize the impact of the project on the community.

Expanded Scope Now Proposed for Incentive Program Phase II

The expanded project scope proposed in this Incentive Program Application (the "Project") is still based upon a DFBOOM model whereby the project will be developed, financed, built, owned, operated, and maintained through a partnership between the County and a firm from the private sector. The opportunities afforded by this P3 arrangement have been leveraged to expand the project significantly, providing energy and resilience to additional commercial and industrial facilities in the Port of Camden and to facilities owned by the City of Camden. Many of these facilities are classified as essential critical infrastructure by the Department of Homeland Security. The expansion of the project in this manner provides greater protection for companies, citizens, and jobs, and it strengthens the Project commercially, benefitting all participants, including CCMUA and Covanta. Notably and of central importance to the BPU's Incentive Program resilience improvement objective, the expanded Project will now provide new islanded electric service to numerous facilities that are vulnerable to disruption during extreme weather and other events including: municipal government, police, sewer and water, bus transit and port, educational buildings (used as emergency shelters), a gas station and grocery store (critical community suppliers), and a jail and housing authority (serving vulnerable populations).

Covanta's Expanded Role

The Project remains focused on a microgrid powered by diverse generation assets, including solar, battery storage, and natural gas. Covanta will serve as the cornerstone generation asset, providing power through municipal solid waste incineration, a New Jersey Class II renewable. The eventual owner of the Project will negotiate a power purchase agreement with Covanta to obtain this power, which the owner

will then dispatch to various local Project customers. In the context of this agreement, Covanta will renovate its Camden plant to reduce emissions.

CCMUA Resilience

In addition to its role as a project development partner, CCMUA will be an off-take customer, purchasing resilient power through a power purchase agreement with the microgrid owner so that CCMUA's plant may continue to operate throughout emergencies. As previously mentioned, CCMUA will also provide polished cooling water to the Covanta incineration facility.

Inclusion of Port Businesses

The map below (Figure 1, left) shows the proposed reach of the Microgrid Cluster customers that the Project aims to serve. The orange main trunk line indicates the connection path between CCMUA and Covanta through which the two will exchange electricity and water. Zone B and D represent the Project's expansion zones -- two areas that contain 8-12 potential commercial and industrial off-takers. Within and nearby these zones are many additional smaller businesses that may be connected to the Project pending outcome of an evaluation to be performed during the next phase of development.

Inclusion of Critical City Services

The map in Figure 1(right) shows selected distributed Nanogrid Cluster customers (that is, facilities in need of resilience that are located outside of the Microgrid's spatial extent) that the Project aims to serve. Unlike the core project customers located in the immediate vicinity of CCMUA and Covanta, the Nanogrid Cluster customers are distributed throughout the City. In the most likely scenario, the Project will provide natural gas backup to the identified Nanogrid Cluster facilities (see Table 2 below), with each of these instances then aggregated and centrally managed by controller software. Solar and storage as backup resources in addition to natural gas will be further investigated during the next phase. During emergencies, facilities would disconnect from the grid and run on their own power supplies, providing resiliency for all Nanogrid Cluster facilities. During blue sky operation, the Nanogrid Cluster aggregation would allow economic dispatch of excess generation to the grid.

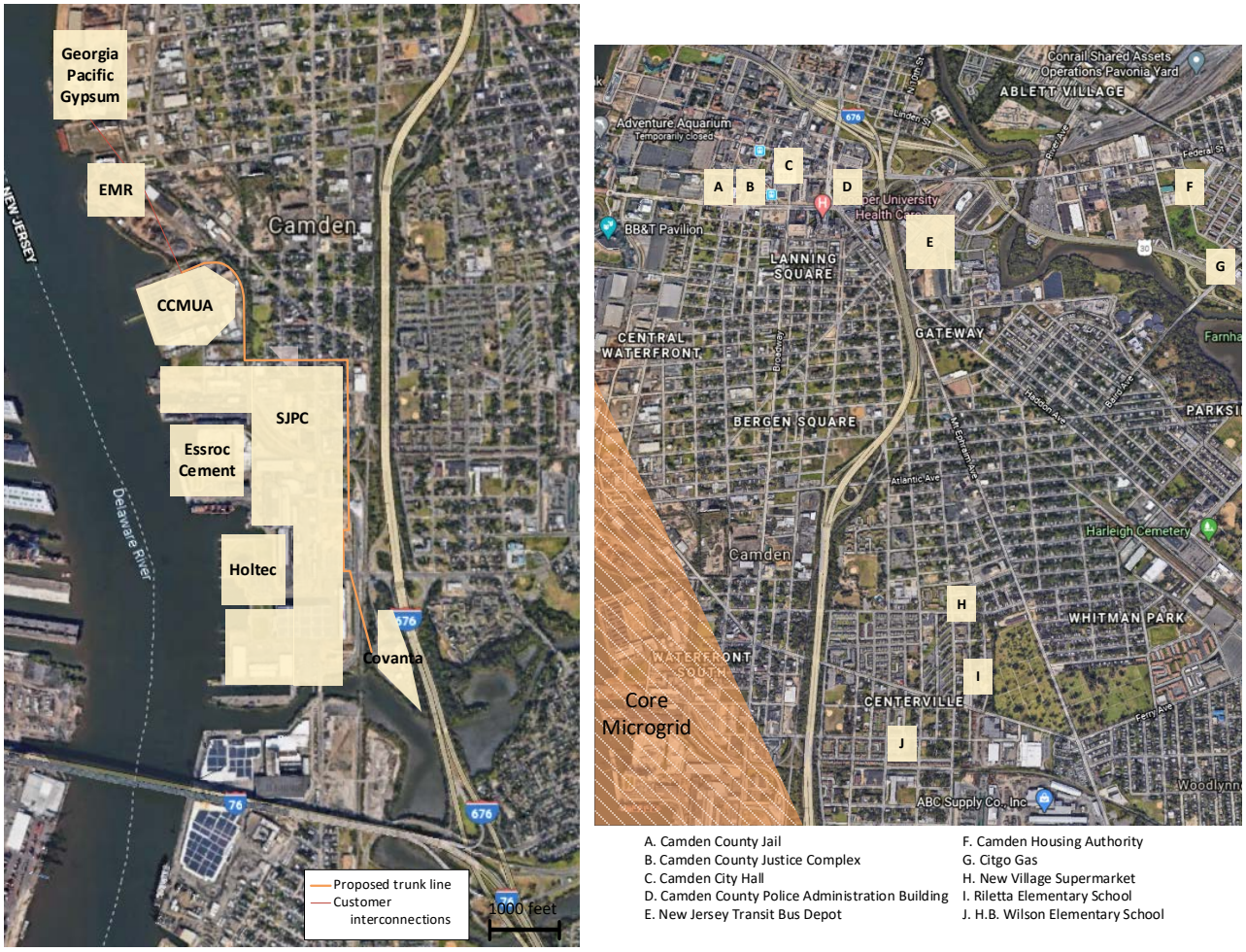

Figure 1: Project Maps: Microgrid Cluster Customers (Left) & Nanogrid Cluster Customers (Right)

Benefits to Camden City and County

There will be several significant benefits to the City of Camden. With the CCMUA, key commercial loads, and public resiliency loads protected by the Project, the City will be better prepared for emergencies. The clean, cheaper, and resilient power that the Project will offer these customers should prove attractive to new businesses with power quality needs considering Camden location, thus stimulating economic growth and jobs. Renovations at the Covanta facility will have an immediate positive impact on air quality and community health, with this benefit existing alongside carbon reduction achieved by other elements of the project. The Project may also result in the reduction of tipping fees paid to Covanta by the City of Camden and surrounding municipalities within the County.

Technical Architecture Summary

Figure 2 below offers a graphical snapshot of the overall technical layout of the Project. The exchange of water and power between CCMUA and Covanta is mapped, along with the electricity provided to the Microgrid Cluster customers, Nanogrid Cluster Customers, and the Project's various generation and storage assets are also shown.

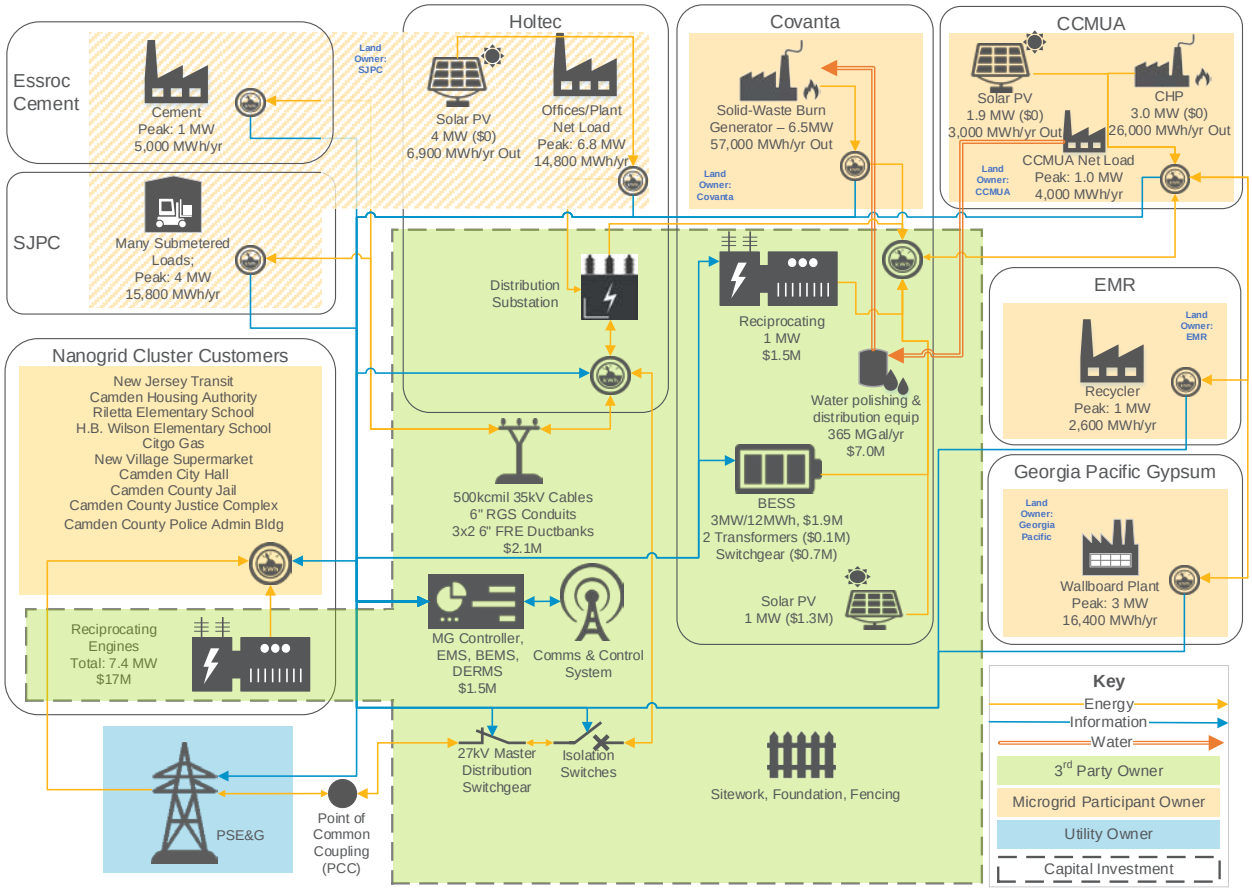

Figure 2: Project Technical Architecture

Expanded Commercial Model

Multiple revenue streams guarantee financial resilience of the Project itself. That is, to guarantee the long-term viability of the Project, it is essential that the Project contract with multiple offtake partners. This will reduce the burden on any single customer (a fundamental problem with the Phase I scope, with the CCMUA defined as the only energy customer) and will likely result in energy cost savings for all.

Figure 3 below indicates the various exchanges of energy, money and other value streams between Project stakeholders. The many revenue streams that make the project viable include PPA payments, tax incentives, and lease payments.

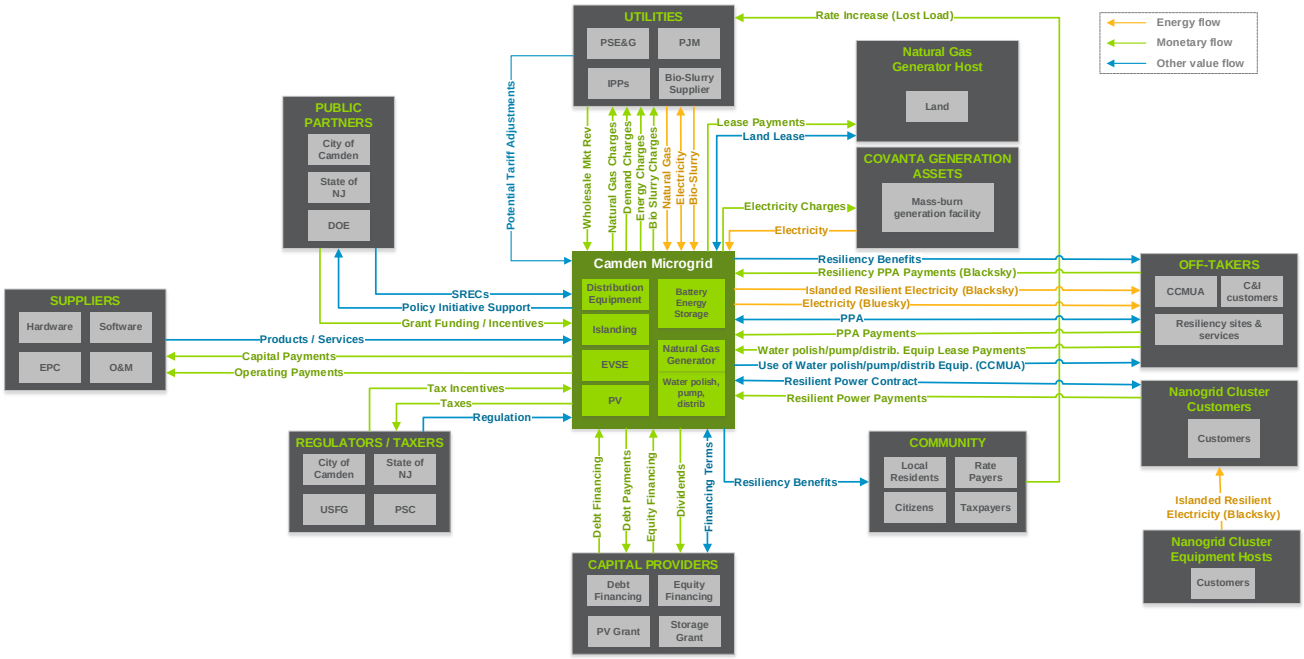

Figure 3: Project Commercial Conceptual Architecture

2.2 Project Differences from Phase I Feasibility Study [3.2.2]

The Project scope has been expanded since the completion of the Phase I Feasibility. New scope elements improve the Project's financial viability, as well as its impact on community resiliency and GHG emissions. Table 1 lists each of the two new scope elements.

Table 1: List of Notable Project Differences from Phase I Design Study

	Design Element Description	Rationale for Difference from Phase I
1	**Addition:** Collection of nearby C&I off-takers	Improves financial viability of the project by bringing in additional, diverse off takers and leverages additional local infrastructure.
2	**Addition**: Community facilities as new off-takers	Improves community resiliency by providing backup power to the Nanogrid Cluster customers including schools, a jail, housing authority, among others. See customer list in Section 2.3.
3	**Addition:** New Jersey Transit Electric Bus Charging	NJ Transit seeks to electrify their bus fleet. Inclusion in the Project of EVSE infrastructure for electric buses is an optimal solution to ensure charging resiliency. NJ Transit is supportive of the concept and has included a letter of support with this proposal. (See Attachment B.)

2.3 Project Participating Facility List [3.2.3]

The US Department of Homeland Security's Cybersecurity and Infrastructure Security Agency (CISA) states that "there are 16 critical infrastructure sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof." As further illustration of the project's resiliency value, Figure 4 maps the Project's customers to six of the relevant CISA sectors.[1]

Figure 4: Project Customers Defined as CISA Critical Infrastructure Facilities

As shown in Table 2, the Project includes seven eligible microgrid cluster facilities and ten eligible nanogrid cluster customer facilities. Each cluster facility encompasses one or more individual facilities. For example, SJPC has numerous facilities that are sub-metered from their substation. SJPC is listed here as the single interconnecting organization, with only a few example sub-metered tenants (i.e., 3a-3c).

We are providing here a list of potential eligible participating facilities. No facilities have been contracted at this early stage. Final participants will be chosen and contracted during Phase II. The list below, however, is a good representation of the expanded Project load and approach.

[1] CISA critical infrastructure: https://www.cisa.gov/identifying-critical-infrastructure-during-covid-19

Table 2: List of Potential Eligible Participating Facilities

	Facility Group Name	CISA Infrastructure Sector	FEMA Category	Public Shelter Ability	Essential Emergency Services	Critical Services Enabled by Inclusion	Who Benefits?
Microgrid Cluster Customers							
1	Camden County Municipal Utilities Authority (CCMUA)	Water & Wastewater Systems	III	no	yes	Continuity of storm water pumping and wastewater treatment operations	Camden county residents and businesses
2	Holtec International's Holtec Technology Campus (HTC)	Critical Mfg.	I	no	no	Continuity of critical manufacturing operations	US nuclear plant operations and maintenance; City and County tax base and employees
3a	South Jersey Port Corporation's (SJPC) Broadway Terminal Tenant: Holt Logistics Corp's Pier 5 Broadway Marine Terminal	Transportation Systems	III	no	yes	Continuity of critical supply shipping and port services	Regional business customers of shipping services; City and County tax base and employees
3b	South Jersey Port Corporation's (SJPC) Broadway Terminal Tenant: Joseph Oat Corp.	Critical Manufacturing	I	no	no	Continuity of critical manufacturing operations	National customers of critical industrial manufacturing plant components; City and County tax base and employees
3c	South Jersey Port Corporation's (SJPC) Broadway Terminal Tenant: All Other	Emergency Svcs., Critical Mfg.	IV	no	yes	Continuity of fire pump operability and critical manufacturing operations	Port employees and adjacent property owners; City and County tax base and employees
4	Georgia Pacific's gypsum plaster facility (Georgia Pacific)	n/a	I	no	no	None – included to provide economic development through tax base and job protection and enhancement	Regional construction industry participants; City and County tax base and employees
5	EMR's Camden Iron & Metal, Inc. (EMR)	n/a	I	no	no	None – included to provide economic development through tax base and job protection and enhancement	Regional waste metal suppliers and steel manufacturers; City and County tax base and employees

	Facility Group Name	CISA Infrastructure Sector	FEMA Category	Public Shelter Ability	Essential Emergency Services	Critical Services Enabled by Inclusion	Who Benefits?
6	Essroc Italcementi Group's slag cement grinding facility (Essroc Cement)	n/a	I	no	no	None – included to provide economic development through tax base and job protection and enhancement	Regional construction industry participants; City and County tax base and employees
Nanogrid Cluster Customers:							
1	New Jersey Transit (Newton Ave)	Transportation Systems	III	no	yes	Continuity of public transport operations for emergency service workers	Local residents and emergency workers
2	Camden Housing Authority	Government Facilities	III	yes	yes	Protection of vulnerable population and continuity of resident health and emergency services	Local public housing residents
3	Riletta Elementary School	Government Facilities	III	yes	yes	Provision of emergency refuge shelter capacity	Local displaced residents
4	H.B. Wilson Elementary School	Government Facilities	III	yes	yes	Provision of emergency refuge shelter capacity	Local displaced residents
5	Citgo Gas	Transportation Systems	III	no	yes	Continuity of emergency and residential vehicle fuel access	Local residents, businesses and emergency workers; City and County tax base and employees
6	New Village Supermarket	Commercial Facilities	III	no	yes	Continuity of local food supply access	Local residents; City and County tax base and employees
7	Camden City Hall	Government Facilities	IV	no	yes	Continuity of government services	Camden City citizens, residents, and businesses
8	Camden County Jail	Government Facilities	III	yes	yes	Protection of vulnerable population	Jail residents
9	Camden County Justice Complex	Government Facilities	III	no	yes	Continuity of justice services	Camden County citizens, residents, and businesses
10	Camden County Police Administration Building	Emergency Services	IV	no	yes	Emergency police response	Camden County citizens, residents, and businesses

3. TECHNICAL SUMMARY [3.3]

3.1 Legal Permissibility [3.3.1]

There are two legal perspectives we wish to detail regarding the Project, the first regarding the definition of the Project itself, and the second regarding the role of local redevelopment law in development of the Project. See also **Attachment A** for Applicant Certifications in compliance to Solicitation requirement 2.2.2. For the avoidance of doubt, we are providing two certifications: one executed by our County Administrator (representing the County), and one executed by our CCMUA Executive Director (representing CCMUA).

Facility Definition and Right-of-Way Crossing Permissibility

The Project is being developed to comply with the definitions of an "on-site generation facility" per the New Jersey Electric Discount and Energy Competition Act P.L. 1999 c.23 (EDECA). The key provision of this act provides this definition:

> *"On-site generation facility" means a generation facility, and equipment and services appurtenant to electric sales by such facility to the end use customer located on the property or on property contiguous to the property on which the end user is located. An on-site generation facility shall not be considered a public utility. The property of the end use customer and the property on which the on-site generation facility is located shall be considered contiguous if they are geographically located next to each other, but may be otherwise separated by an easement, public thoroughfare, transportation or utility-owned right-of-way.*

The main source of power for the Project is the Covanta QF waste-to-energy facility. This facility lies directly across from properties owned by the South Jersey Port Corporation and Holtec manufacturing. The city owns both the street and the right of ways on both sides of Broadway, the main street which must be crossed to deliver power from Covanta to Project customers. This street crossing fully complies with the definition of on-site generation facility under the EDECA. The Project will route electric distribution infrastructure west of Broadway so as to stay on private property, not violate utility franchise, and not exceed any limitation on private electric distribution.

Local Redevelopment Law and Electric Infrastructure Redevelopment Permissibility

New Jersey's Local Redevelopment and Housing Law (N.J.S.A.40A:12A-14) (LRHL) grants local governments powers that can be useful in developing the Project. The ability to designate a preferred developer to complete the Project, the ability to assemble blocks of property (or in this instance access to blocks of property), to obtain financing for the Project and to provide relief from building and zoning codes to accommodate development of the required infrastructure are all measures that will have value in completing this complex undertaking. Use of these LRHL provisions would be based upon the following factors:

- The Project area contains critical government & public health facilities;
- Standards for these critical facilities were established following Hurricane Irene & Superstorm Sandy;
- Standards call for these facilities to have continuing operational capacity;
- The existing infrastructure does not meet these standards;
- The failure to meet these standards in the Project area is an impediment to the economic viability of the area;

- The substandard infrastructure in the Project area is a threat to public health & safety;
- The implementation of the Project will alleviate the substandard conditions;
- The Project will require coordinated planning and investment over a period of years to construct the necessary facilities;
- The Project will cover multiple adjacent and clustered properties and require assembling legal access to these properties for both construction of infrastructure and creation of utility rights of way;
- The Project will require considerable financing; and
- Continuity from planning to construction and implementation would be best served by identifying a single team to implement the creation of the Project from planning to commissioning.

New Jersey's redevelopment law provides local governments with the tools necessary to effectively address the factors cited above.

The LRHL is applicable in this instance based upon the current status of infrastructure in the Project area. The Project area will serve municipal government, police, sewer and water, bus transit and port, educational buildings (used as emergency shelters), a gas station and grocery store (critical community suppliers), and a jail and housing authority (vulnerable populations) facilities that are vulnerable to disruption during extreme weather and other events. The facilities located within the study area have been categorized as FEMA critical facilities which have been accepted by the NJBPU. The necessity for creating a resilient power grid that can enable these facilities to operate in time of disaster was revealed during and after flooding from Hurricane Irene and Superstorm Sandy.

Standards for infrastructure supporting these critical facilities have been established by the State of New Jersey and the Project area does not meet these standards. The existing electrical infrastructure is obsolete and insufficient to ensure continued operations under emergency conditions. This is both an impediment to the economic vitality of the Project area and a threat to public health and safety. The substandard infrastructure serves to meet the statutorily established criteria for a finding that the Project area meets the definition as "in need of rehabilitation."

The State of New Jersey has recognized the ability to invoke the provisions of the LRHL in similar circumstances prior to this undertaking. Designating the Project area as either an "area in need of redevelopment" or an "area in need of rehabilitation" will allow for the creation of a comprehensive plan to gain access to the subject properties, design the Project infrastructure in an appropriate manner, finance the Project and implement construction and operation of the Project in a rational and efficient manner. This will allow for the installation of the infrastructure necessary to accommodate resiliency, black start capability, critical facility support and overall economic growth and development.

The previously accepted Report will serve, in part, as the required redevelopment study necessary to support the preferred designation. Going forward, pursuant to the LRHL, the local governing body can name a redevelopment team and that team will be authorized to move forward to final design and implementation of the Project. The redevelopment envisions a linear easement for all of the activities, which will allow this Project to be consistent with all of the laws and statutes in the state of New Jersey that will run conterminously with the final design of the Project. The clear inherent public benefits of the community microgrid relative to economic development and enabling continued critical government and public health functions make this Project fully consistent with the laws, regulations and goals of the State of New Jersey.

3.2 Included Loads

The Project's Microgrid Cluster customers will be interconnected via seven wired links, all with new hardened and resilient overhead (OH) lines, and the ten Nanogrid Cluster customers will each be interconnected only for control and communication purposes via a centralized microgrid controller. Table 3 lists each customer's loads, including estimated annual consumption, peak demand, and microgrid integration method.

Again, please note that we are providing here a list of potential eligible participating facilities. No facilities have been contracted at this early stage.

Table 3: List of Potential Eligible Customer Loads

	Customer	Est. Annual Consumption (MWh)	Est. Annual Peak Demand (MW)	Microgrid Integration Method
Microgrid Cluster Customers				
1	CCMUA[2]	0	0	New OH wires from SJPC substation; communication and control via central controller; no expected load during blue sky, only black sky due to higher loads from stormwater processing.
2	HTC	14,800	6.8	New OH wires from SJPC substation or direct from Covanta; communication and control via central controller.
3	SJPC	15,800	4.1	New OH wires from Holtec or direct from Covanta; SJPC will continue to submeter their tenants; communication and control via central controller.
4	Georgia Pacific	16,400	3.0	New OH wires from EMR; communication and control via central controller.
5	EMR	2,600	1.0	New OH wires from CCMUA; communication and control via central controller.
6	Essroc Cement	5,200	1.0	New OH wires from SJPC substation; communication and control via central controller.
Nanogrid Cluster Customers				
1	New Jersey Transit	1,900	0.87	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
2	Camden Housing Authority	1,800	0.5	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
3	Riletta Elem. School	450	0.19	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
4	H.B. Wilson Elem. School	850	0.28	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
5	Citgo Gas	250	0.05	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
6	New Village Supermarket	3,500	0.8	Distributed nanogrid with existing utility service and virtual integration via centralized controller.

[2] CCMUA's annual energy and annual peak demand are omitted because CCMUA will only be a standby black-sky resilience customer, not a blue-sky energy customer.

	Customer	Est. Annual Consumption (MWh)	Est. Annual Peak Demand (MW)	Microgrid Integration Method
7	Camden City Hall	5,600	1.5	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
8	Camden County Jail	10,000	2.0	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
9	Camden County Justice Complex	4,000	1.0	Distributed nanogrid with existing utility service and virtual integration via centralized controller.
10	Camden County Police Admin. Bldg.	900	0.2	Distributed nanogrid with existing utility service and virtual integration via centralized controller.

3.3 Included Distributed Energy Resources [3.3.2]

The project will contain four different primary types of DER assets, each listed in Table 4, along with the relevant size and integration method.

Table 4: List of Included Distributed Energy Resource Assets

	DER Asset	Size (MW)	Microgrid Integration Method
1	Solar PV	1	BTM parking canopy installation; 1.2 MW array with 1 MW inverter; maintains operation during black sky.
2	Gas Generation	1	BTM peaking natural gas generation, sited on off-take customer property via land lease.
3	Battery Energy Storage	2	BTM BESS (8 MWh) for peak load management and maintaining stability during black-sky operational switching.
4	Nanogrid Cluster Customer Gas Generation	6.95	Nine individual units located BTM at Nanogrid Cluster customer host sites throughout the city to provide resilient power; individually grid connected and integrated via central microgrid controller.
5	Nanogrid Cluster Customer Gas Generation (Back-up Only)	0.05	One individual unit located BTM at Nanogrid Cluster customer host site to provide resilient power; individually grid connected and integrated via central microgrid controller.

In addition to the above five DER assets to be constructed as part of the Project, the Project will also purchase energy from the existing Covanta Waste-to-Energy facility. This energy generation plant has a nominal net output capacity of 21 MW.

3.4 Level of Design [3.3.3]

We propose to deliver a “30% - 35%” level “Concept Design” package as guided by the 2009 US Army Corps of Engineers New York District Design Submission Requirements Manual. This design package will also include a commercial and financial design sufficient to assess and demonstrate project financeability

to a private third-party sponsor equity investor and community design sufficient to gain local support and commitment for the Project. This design package is anticipated to include the following components:

Commercial (for each Microgrid and Nanogrid Cluster Customer, PJM Market)

- 8760 load model
- Cost to serve assessment based on delivery point quality and delivery needs
- Revenue assessment considering pricing structure and volume variation
- Pricing offer considering bill assessment, value of resilience analysis, and value of service analysis
- Negotiation of confidential terms and conditions for long-term provision of service
- PJM interconnection queue submittals and WMPA terms assessment
- PJM market participation model considering pricing forecast, dispatch success forecast, and available volume forecast

Community (for the Camden Government Representing Resident and Business Interests)

- Communication of Project details to stakeholders and understanding of community needs and concerns
- Identification and assessment of community engagement and impact opportunities
- Completed Community Benefits Agreement including measurement and verification plan

Technical (for the Microgrid, each Nanogrid, the Integrated Control System, and Water System)

- Basis of Design final definition considering options and alternatives analysis to optimize social and financial profit and third party financeability
- 15% Preliminary Concept Design Package inclusive of discovery, survey, and further optimization analyses to include:
    - Preliminary electric distribution and routing design
    - Preliminary microgrid communication, control and operation design
    - Site survey and geotechnical assessment
    - Environmental assessment and air permit survey
    - Preliminary water distribution piping design
    - Preliminary DER and water polishing asset specification
    - Preliminary cost and schedule estimate to achieve COD
- 30% Final Concept Design Package suitable for EPC design-build procurement and detail financeability assessment, inclusive of progressed, elaborated and final version of preliminary concept design package and the following:
    - Land use agreements including easements and leases
    - Interconnection and permit applications
    - Third party energy supply and distribution asset agreements
    - Level II quality schedule and confidence level cost estimate to achieve COD

Financial (for the Full Scope of Future Project Company Investment and Operations)

- Business model detail specification inclusive of counterparty identification and key terms, value exchange optimization, and social and financial profit optimization
- Cash flow forecast for lifetime operation of the new project company, inclusive of total capital investment required, financing cost, revenue and operating cost estimates and tax assessment

- Iterative assessment and optimization of commercial and technical design implications to optimize financial profit outcomes considering investment return sensitivities and potential upside and downside case scenarios
- Preliminary financing plan including identification of debt and/or tax equity investment sources, underwriting criteria, key terms and conditions for investment, flow of funds, assignment of risks, and transaction structure design

3.5 Degree of Resilience

The proposed Project will offer a very high degree of resiliency to each Microgrid Cluster customer. The addition of distributed generation controlled and dispatched by the main microgrid controller will provide resilience to additional high value Nanogrid Cluster customers.

The interconnected participants' resiliency will first come from the power supplied by the Covanta Waste-to-Energy ("WTE") facility, which will be delivering power behind the meter at the point of common coupling ("POCC") for the Microgrid Cluster customers. It is expected that there will be more power delivered to the POCC than the Project will require even on peak hours and that the excess power will be transmitted to the electric grid. The WTE facility does shut down for major repairs and maintenance but with three boilers and two turbines these shutdowns can be scheduled to leave sufficient power online to meet the Project's resiliency requirements.

The Project will also include distributed generation (especially for each Nanogrid Cluster customer), renewable assets, and energy storage which will all be available in the event of a grid shutdown. These assets will be managed in a black sky event by the microgrid controller.

Although the available power will be able to meet all the Project customers' power needs, a significant portion of those needs are likely to be reduced during a grid-level power outage as they would be either operating at a reduced load or not operating at all during a long-duration grid outage.

The microgrid's resilience is reviewed via six different elements in Table 5.

Table 5: Summary of Resilience Design Characteristics

	Resilience Characteristic	Summary of Project Degree of Resilience Design
1	Transition Time	The microgrid is anticipated to transition from grid-connected to islanded mode in seconds or minutes thereby limiting load's transition outage to that of a more common short duration grid reliability event. During this transition, it is expected that the Project's Battery Energy Storage System ("BESS") will 'ride-through' the brief outage so that customer experience is of continuous uninterrupted power supply.
2	Islanding Duration	The microgrid will be able to operate continuously for an indefinite duration, equaling or exceeding DoD's 14-day continuous islanded operation requirement for US national defense facilities.
3	Load Service	The microgrid will to be able to serve all loads, both critical and non-critical, for all customers for the full islanded mode design duration.

	Resilience Characteristic	Summary of Project Degree of Resilience Design
4	Fuel Supply	Microgrid energy generator fuel sources – the sun, regional municipal waste, and natural gas, are each anticipated to be generally available and continuously supplied even in cases of a 'Sandy-like' multi-week grid outage weather event. In particular, regional municipal waste supplies have always been continuously available to Covanta, even throughout the worst-case Superstorm Sandy event.
5	Distribution Infrastructure	The microgrid will serve most loads through modern and hardened behind-the-meter distribution cables thereby minimizing the risk of wind, flood, or ice-related power line outages.
6	DER Inclusion	All customer- and Project-owned DER assets, especially including solar generation, will be enabled to operate during black sky events through a reference for voltage and frequency signal provided by the microgrid controller. Currently all customer-owned solar generation is not functional during a grid power outage.

3.6 Integration of Renewable Energy [3.3.4]

The Project incorporates several renewable energy technologies. The Project will also integrate and manage certain existing renewable energy PV systems so that they become resiliently operable during black sky events.

- The foundation of the Project is enhanced use and localized benefits from the existing Covanta Waste-to-Energy facility. This facility is a qualified Class 2 Renewable energy producer. Currently 100% of the energy production from this facility is exported to the grid. This facility will instead deliver energy to Project customers, thereby utilizing as much of this energy resource locally as is technically feasible.
- The Project will add Solar PV parking canopy assets. The existing roofs will need to be evaluated to determine structural adequacy for roof mounted systems. The newer warehouse type buildings are high probability whereas the older SJPC buildings may not be suitable.
- Existing solar PV will be integrated to the microgrid control system to be able to operate on black sky days.

3.7 Integration of Energy Storage [3.3.4]

The Project will integrate Battery Energy Storage Systems ("BESS") with new PV and existing PV assets to serve two critical functions. The first function will be to provide the PV with the necessary voltage and frequency reference to enable them to operate during a black sky event. They will also serve as a load management and energy balancing resource during black sky operations.

During normal blue-sky operations, the BESS enable shifting output from solar peak to grid peak and can participate in PJM frequency regulation programs.

3.8 Incorporation of Electric Vehicle Charging [3.3.5]

As introduced in Section 2.3, NJ Transit's Newton Ave. bus terminal will be one of the Project's Nanogrid Cluster customers. The site will host EVSE infrastructure for eight electric bus chargers, with additional opportunity for expansion in the future as NJ Transit continues to electrify their fleet. NJ Transit is supportive of the concept as discussed in Section 2.2.

3.9 Reduction of Peak Grid Demand [3.3.6]

The microgrid will reduce peak grid demand by approximately 15 MW. The annual peak is expected to be ~15 MW and during peak hours, imports from the grid will reach up to a maximum of 0.1 MW. Some level of grid import will be required for approximately 0.2% of the year (~20 hours).

Figure 5 shows the microgrid's generation stack in the form of a load duration curve, with percent of annual hours on the x-axis and Project demand on the y-axis.

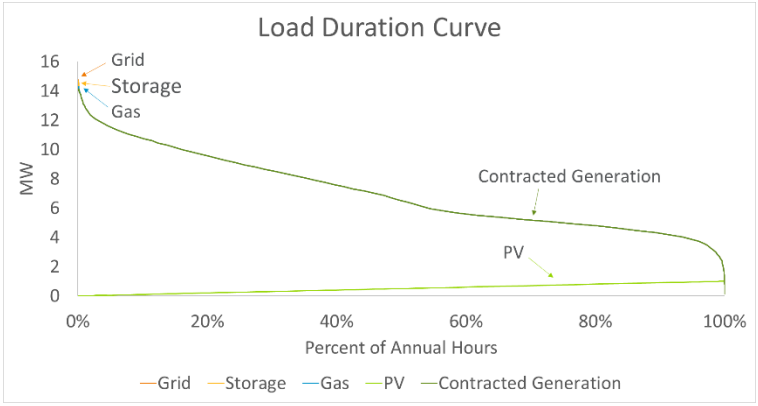

Figure 5: Project Load Duration Curve with Peak Grid Demand Reduction

3.10 Reduction of Greenhouse Gas (GHG) Emissions [3.3.6]

The reduction of GHG Emissions derives from the addition of PV, battery storage, and efficient natural gas engines that change the business as usual case, with these assets substituting for existing less-efficient assets elsewhere in the grid during grid peak operating hours. For the purpose of this analysis, GHG Emissions includes carbon dioxide emissions resulting from fuel combustion and all other EPA Global Warming Potential gases, including methane, nitrous oxide, fluorocarbons, and fluorides. In aggregate, this combination of gases is referred to as "CO2e."

In the business as usual, or baseline, case GHG Emissions are wholly attributed to the electricity generation supplied from the grid. The EPA's eGRID analysis shows that for the RFCE subregion where Camden, NJ is located, the average emissions for non-baseload generation are 1,248.6 lbs. of CO2e per gross MWh of energy produced. The baseline uses the non-baseload emissions factor because the Project's assets economically displace the generation that would otherwise only operate during peak hours.

The Project assets relevant to GHG Emission reduction include 1 MW of Solar PV combined with 2 MW of battery storage, 1 MW of large gas generation, and 6.95 MW of multiple small gas generation units. The Solar PV offsets all GHG Emissions for the energy generated and the gas engines reduce the emissions by about 16% for all energy generated relative to the base case for planned asset operating hours. Compared to the business as usual case, the Project reduces about 5% of the total annual CO2e emissions caused by Project-served loads, as shown in Figure 6.

Note that NOx and low elevation ozone are not GHG emissions and so they are not included in this analysis. However, the emissions controls on the gas assets and other investments will achieve reductions in local NOx, low altitude ozone, and particulate matter. Additionally, the reinvestment in Covanta's class II facility preserves and extends the plant's useful life along with all associated negative carbon benefits relative to the municipal waste methane emitting landfill alternative.

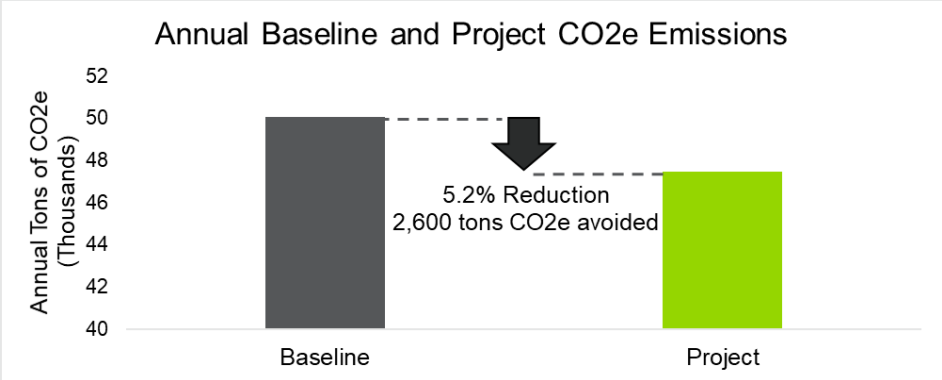

Figure 6: Project Greenhouse Gas Emissions Compared to Base Case

3.11 Implementation of Energy Conservation Measures [3.3.7]

In 2013, CCMUA completed an energy audit report, covering 15 facilities owned and operated by CCMUA, including its Camden facility. Following the completion of the audit, CCMUA installed several LED lighting units. CCMUA has also operated its 1,807 kW solar PV array since 2011, which substantively offsets their grid electricity demand.

While Covanta has not conducted an energy audit, it will consider conducting one and possibly implementing any recommended Energy Conservation Measures in order to support Project energy efficiency. Furthermore, any additional facility to be included in the Project will seek to do the same, including those eligible under the New Jersey Clean Energy Program.

3.12 Permit Requirements [3.3.8]

Table 6 lists the Project's expected permit requirements.

Table 6: List of Expected Required Permits

	Authority Having Jurisdiction (AHJ)	Permit Required
1	City of Camden	Soil Disturbance
2	City of Camden	General Construction
3	NJ Department of Environmental Protection (DEP)	Air permit for any distributed generation ("DG")
4	City of Camden (after design approval by PSE&G)	Electrical for Substation modifications
5	Camden County	County Road opening (for crossing Broadway)

3.13 Control and Communication Protocols [3.3.9]

The Project's control, status monitoring, dispatch of distributed generation resources ("DER"), load flow balancing, and data acquisition and reporting will all be performed through a flexible and expandable multi-DER microgrid controller. The Project will select a controller from among several commercially available centralized cloud and server systems in order to optimize functionality and performance along the following dimensions:

- Technical capabilities
- Flexibility for adding DER or future and additional off-takers
- Market based interactions
- Condition anticipation intelligence and functional capability
- Transition to and from blue and black sky operation
- 2-way commercial and load flow transactions with PSE&G and PJM
- Cyber-security

The Project's communication and control architecture will adhere to PSE&G, PJM, and NJ BPU guidelines and interconnection technical requirements and is anticipated to include the following components:

- Substation level transformers, breaker and switchgear
- Service level transforms, breakers and switchgear
- Utility relays
- Real Time Automatic Controllers ("RTAC")
- Segregating switches
- Fiber and radio communication

3.14 Cyber Security Measures [3.3.10]

The Project will be designed to adhere to the latest cyber security standards including:

- National Institute for Standards and Technology Cybersecurity Framework ("NIST CSF")
- Electricity Subsector Cybersecurity Capability Maturity Model ("ES-C2M2")
- NERC-CIP

The Project's primary points of vulnerability will be the point of interconnection with PSE&G and through the microgrid communication interface. Our approach will use best practices and adhere to a "Defense in Depth" cybersecurity approach with multiple layers of cybersecurity controls that provide overlapping protection, including:

1. **Asset controls:** Server and desktop hardening, antivirus, and whitelisting to improve the resiliency of systems if attacked.
2. **Information controls**: Protections for information at rest and in transit from unauthorized access through data or communications encryption.
3. **Network controls:** Measures to manage and protect data transmission across networks, including managing the ability of different users to gain access to sensitive systems and data compliance with cybersecurity standards, and address any potential cybersecurity threats.
4. **Cybersecurity management controls**: Tools and processes to monitor systems and networks, ensure continuous compliance with standards, and address potential threats.

4. FINANCING AND BUSINESS MODEL [3.4]

4.1 Estimated Design Cost and Funding Sources [3.4.1, 3.4.2, 3.4.3, 3.4.4]

Table 7 shows a total estimated design phase cost of $1,974,500, which represents 3.3% of the total development, finance, and construction cost reported in section 4.3 below. This total amount is proposed to be funded equally by the NJBPU (50%) and a still-to-be-procured developer (50%).

Table 7: Design Cost Funding Sources

Funding Source	Total Estimated Design Cost ($)	Total Estimated Design Cost (%)
NJBPU	$987,250	50%
Developer (TBD)	$987,250	50%
Total	**$1,974,500**	**100%**

4.2 Project Business Model [3.4.5]

CCMUA and Camden County value the benefits that will result from this Project. Both are committed to the creation of a durable mechanism that will guarantee the delivery of these benefits. A business model derived from a public-private partnership between Camden County and an external investor/owner offers the best path to success with a minimum of risk to CCMUA and the County.

This new business will provide “resilient energy-as-a-service” to a variety of customers in and around the Port of Camden, including CCMUA. The business will function as a platform connecting energy customers that value the resilient energy products and services offered by the new business to largely community contributors that will build and operate this business. Alongside this, the business will provide many energy-driven benefits to the larger Camden community – storm resilience, lowered greenhouse gas emissions, improved local air quality, aquifer conservation, and economic development, among others.

The proposed public-private partnership will allow the external investor/owner to create this new business on the County’s behalf, providing the County with the means to improve its energy infrastructure, sustain local business, and improve the lives of residents. Power purchase agreements (PPAs) and a community benefits agreement (CBA) between the energy business, the County, and other project customers and beneficiaries will guarantee delivery of these promised benefits over the multi-decade life of the Project.

This third-party platform business model gives the County the ability to create a broad impact well beyond its existing risk tolerance, resources, and capabilities. The external investor/owner will provide the necessary financial, human, and technical resources, while working in partnership with the County to marshal and combine existing community resources and relationships into a new and innovative configuration. The new business will assume substantial liability and risk that accompanies complex energy infrastructure development and operation, transforming a daunting up-front investment into a simple operating expense for all concerned. The business will be financially incentivized to assume risk, naturally, but it will also be constrained in its profit potential while the County’s long-term interests are put first.

Figure 7, a business model canvas for the Project, provides a snapshot of the business model design elements that together will enable the new platform business to be desirable, feasible, viable, supportable, and financeable: The business model canvas is a tool that enables clear articulation of each element in a clear, structured, and concise fashion.

This business model canvas illustrates how the new business's principal partners, activities, and resources feasibly combine to produce desirable value propositions that can each be delivered to long-term secured customers. This canvas also illustrates how the combination of up-front capital investment and long-term operating expense can be more than offset by ongoing customer-paid revenue commitments to result in financial and social profit. The social profit benefits will primarily be distributed to the County's residents and thereby enable the new business to be supportable by our community. The financial profit will enable the sustained and self-sufficient financial viability of the business itself. This profit will also provide sufficient prospect of cash distributions back to the new business's owner to enable the new business to be financeable and thereby adequately incent the owner's contribution of the up-front at-risk investment required to bring this new business into operation.

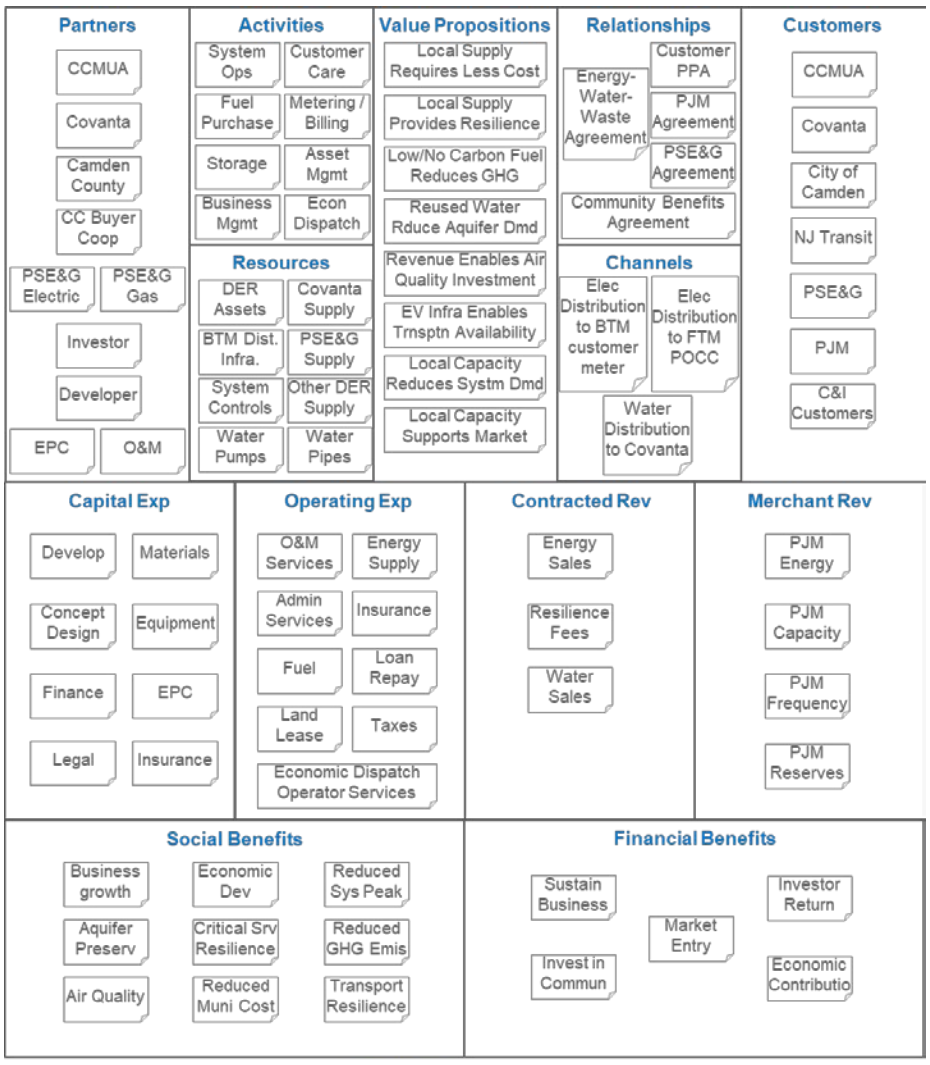

Figure 7: Model of the New Project Business

4.3 Estimated Development, Financing & Construction Cost and Financing Sources [3.4.6]

Project development, financing, and construction costs are expected to total $58,950,000. The breakdown of these costs by financing source is shown in Table 8.

Table 8: Development, Financing and Construction Cost Funding Sources

Funding Source	Total Estimated Dev & Const Cost ($M)	Total Estimated Dev & Const Cost (%)
Sponsor Equity (Developer - TBD)	$23.2	39%
Tax Equity Investor / Term Debt Lender (TBD)	$34.8	59%
Grant Provider (NJBPU)	$1.0	2%
Total	**$59.0**	**100%**

4.4 Description of Supporting Tariffs [3.4.7]

The County has identified six potential Electric Distribution Company ("EDC") and Gas Distribution Company ("GDC") currently effective tariffs that may be applicable to the proposed Project, as identified in Table 9, below. The County has not undertaken any additional consultation with either EDC or GDC beyond that which we engaged during the Feasibility Study Phase I of this Incentive Program.

Table 9: List of Tariffs that May be Needed to Support Operation

	Offeror	Rate or Payment Schedule (Tariff)	Need Basis
1	PSE&G Electric	HTS: High Tension Service	For supply received in front of project substation(s) at sub-transmission voltage.
2	PSE&G Electric	LPL: Large Power and Lighting Service	For supply received behind project substation(s) at primary voltage.
3	PSE&G Electric	GLP: General Lighting and Power Service	For supply received behind project substation(s) at secondary voltage.
4	PSE&G Electric	PEP: Purchased Electric Power	For Qualifying Facility ("QF") sale of surplus energy and capacity.
5	PSE&G Gas	GSG: General Service	For supply received at single-building backup emergency generators.
6	PSE&G Gas	LVG: Large Volume Service	For supply received at microgrid system primary dispatch generators.

4.5 Discussion of Beneficiaries and Payers [3.4.8]

Once again, the customer list we are providing is a list of potential eligible participating facilities. No facilities have been contracted at this early stage. The cost recovery numbers below are early-stage

estimates that will be refined during Phase II. The figures below are based on a cost recovery term of 30 years.

Table 10: Project Paying Customers

Project Cost Recovery Source	Estimated Cost Recovery Price Basis	Project Term Cost Recovery Amount ($)	Project Term Cost Recovery Amount (%)	Products or Services Provided
CCMUA	$30,000 / yr	$4.6M	5%	Black-sky backup power
Holtec	$0.15 / kWh	$17.9M	18%	Resilient power
SJPC	$0.09 / kWh	$11.3M	12%	Resilient power
Georgia Pacific Gypsum	$0.15 / kWh	$20.0M	20%	Resilient power
EMR	$0.15 / kWh	$3.2M	3%	Resilient power
Essroc Cement	$0.15 / kWh	$6.3M	6%	Resilient power
PJM	$0.04 / kWh + Capacity, Reserves, Regulation payments	$11.6M	12%	BTM merchant capacity, reserves, and regulation
Nanogrid Cluster Customers	$0.12 / kWh	$13.7M	14%	Black-sky backup power
Covanta	$4 / 1,000 gal	$9.5M	10%	Water
Total		**$98.1M**	**100%**	

Table 11: Project Non-Paying Beneficiaries

Beneficiary	Benefits Received	Resulting Community Impact
Waterfront South Community	Improved air quality, job training and employment opportunities, economic growth	Reduction in pollution-related illness, increased economic resilience, quality of life improvement
City of Camden overall	Improved air quality, job training and employment opportunities, economic growth, reduction in aquifer use, sustainable transportation, emergency preparedness	Reduction in pollution-related illness, increased competitiveness and economic resilience, shelter and harm reduction during emergencies, quality of life improvement
PSE&G	Reduction of system peak, reduction of stress on overall distribution system, deferral of system investment	Stronger utility distribution system
Taxpayers	New tax revenue for city and state	Increase in available tax dollars for various improvements
Global	Increase in renewable energy generation, reduction in greenhouse gas emissions	Reduction of impact of climate change

4.6 Blue-Sky Operations [3.4.9]

The Project will continuously supply each electrically interconnected customer throughout the year. Each nanogrid cluster customer will continue to be served by PSE&G, albeit at a lower level during peak hours when the Project will satisfy a portion of peak demand when operating as a behind-the-meter resource.

During Blue-Sky operations, power will be delivered by the Covanta QF facility behind the Project's metered point of common coupling ("POCC"). All renewable and DG resources will also be connected behind this POCC. The control, dispatch and management of these resources will be performed by a DER Management system. The Project will operate synchronous to the grid and be able to import or export power and ancillary services as needed, including to generate additional merchant revenue from PJM markets in order to reduce cost to customers.

4.7 Expected Involvement of EDC and GDC in Project Design [3.4.10]

The Project's design and operation will be closely coordinated with the EDC's requirements. The development will require the Project to be connected behind the metered connection of the various customers. The EDC may require a transfer switch or breaker at each service location or to have the existing utility service connection permanently removed. These issues will require detailed design and interactions with the EDC.

At the main interconnection the Project will need to either transfer the existing PJM interconnection or apply for a new interconnection. As this is an existing QF resource and as it will not require incrementally new grid export capacity, any transfer or new application is anticipated to fall within the previously performed interconnection approval analysis.

There is an interstate pipeline accessible to the Project however the size of the proposed DG assets would not warrant or justify a direct connection to the transmission service. Any gas connections that will be required will be served by existing or new GDC metered tariff services.

PSE&G was consulted by the County's study team during Phase I of this Incentive Program and the overall concepts of utilizing the Covanta QF to provide local power to a microgrid was presented. The Project's currently proposed configuration under the terms of EDECA's adjacency definitions is largely influenced by the requirement of the Solicitation that the applicant must comply with current rules and regulations. These and other regulatory issues will be discussed with PSE&G as the regulated utility during Project development.

5. INDEX OF ATTACHMENTS

A. Required Attachments

1. Applicant Certification

B. Other Attachments

1. New Jersey Transit Letter of Support

ATTACHMENT A. REQUIRED ATTACHMENTS

1. Applicant Certification

Appendix A: Certification

Applicant Certification

The undersigned warrants, certifies, and represents that:

1) I, Scott Schreiber (Name), am the Executive Director (title) of the Applicant Camden County M.U.A. (name) and have been authorized to file this Applicant Certification on behalf of my organization; and
2) The information provided in this Application package has been personally examined, is **true, accurate, complete, and correct** to the best of the undersigned's knowledge, based on personal knowledge or on inquiry of individuals with such knowledge; and
3) The TCDER Microgrid facility proposed in the Application is intended to be designed as described in the Application and **in accordance with all Board rules and applicable laws**; and
4) My organization understands that this Application is **subject to disclosure under the Open Public Records Act**, N.J.S.A. 47:1A-1 et seq., and that sensitive and trade secret information that they wish to keep confidential should be submitted in accordance with the confidentiality procedures set forth in N.J.A.C. 14:1-12.3; and
5) My organization acknowledges that submission of false information may be grounds for denial of this Application or forfeiture of any award granted, and if any of the foregoing statements are willfully false, my organization and/or individuals are subject to punishment to the full extent of the law.

Signature: _____ Date: May 20, 2020

Print Name: Scott Schreiber Title: Executive Director

Company: Camden County M.U.A.

WITNESSED BY:

Signature: _____ Print Name: Kim Michelini

Date: 5/20/2020

Appendix A: Certification

Applicant Certification

The undersigned warrants, certifies, and represents that:

1) I, Ross Angilella (Name), am the Administrator (title) of the Applicant Camden County (name) and have been authorized to file this Applicant Certification on behalf of my organization; and
2) The information provided in this Application package has been personally examined, is **true, accurate, complete, and correct** to the best of the undersigned's knowledge, based on personal knowledge or on inquiry of individuals with such knowledge; and
3) The TCDER Microgrid facility proposed in the Application is intended to be designed as described in the Application and **in accordance with all Board rules and applicable laws**; and
4) My organization understands that this Application is **subject to disclosure under the Open Public Records Act**, N.J.S.A. 47:1A-1 et seq., and that sensitive and trade secret information that they wish to keep confidential should be submitted in accordance with the confidentiality procedures set forth in N.J.A.C. 14:1-12.3; and
5) My organization acknowledges that submission of false information may be grounds for denial of this Application or forfeiture of any award granted, and if any of the foregoing statements are willfully false, my organization and/or individuals are subject to punishment to the full extent of the law.

Signature: _____ Date: May 26, 2020

Print Name: Ross G. Angilella Title: County Administrator

Company: County of Camden

WITNESSED BY:

Signature: _____ Print Name: David McPeak

Date: May 26, 2020

ATTACHMENT B. OTHER ATTACHMENTS

1. New Jersey Transit Letter of Support

Philip D. Murphy, Governor
Sheila Y. Oliver, Lieutenant Governor
Diane Gutierrez-Scaccetti, Commissioner
Kevin S. Corbett, President & CEO

NJTRANSIT
One Penn Plaza East
Newark, NJ 07105-2246
973-491-7000

The Honorable Jeffrey Nash, Camden County Freeholder
520 Market St., 8th Floor
Camden, NJ 08102

Dear Mr. Nash,

On behalf of the NJ TRANSIT, I am pleased to support Camden County's application to the NJ Board of Public Utilities for the Phase 2 Town Center Distributed Energy Resource (TC DER) microgrid grant.

NJ TRANSIT is presently in the design phase for the limited deployment of eight battery electric buses (BEBs). These BEBs will serve the Camden region. The charging facilities and necessary electrical infrastructure for these buses [and subsequent buses to be added in the future] will be based at our Newton Avenue Bus Garage located at 350 Newton Ave., Camden NJ 08103.

The proposed Camden TC DER microgrid promises to bring resilient energy to key facilities at selected locations throughout the city. Such resilience, the ability to recharge buses during an emergency, is extremely important to NJ TRANSIT, the State of NJ, and customers.

With this in mind, NJ TRANSIT will support Camden County's Phase 2 study in the following ways:

- NJ TRANSIT will provide details about planned charging facilities, necessary electrical infrastructure, the buses that will be procured, and other data necessary to evaluate the feasibility of integrating the Newton Avenue Bus Garage into the planned microgrid design.

- NJ TRANSIT will engage with the County's eventual development partner to evaluate the inclusion of resilient bus charging assets in the overall financing of the microgrid project itself.

Steve Jenks will serve as the primary point of contact for NJT to guarantee close collaboration with your team. Please feel free to reach out to me at (973) 491-8528 with any questions or comments.

Eric R. Daleo
Senior Vice President, Capital Programs
NJ TRANSIT
One Penn Plaza East, 10th Floor
Newark, NJ 07105