Brunswick Landing Electric Utility District

Electric Transmission and Distribution System
Upgrade Plan for Climate Resilience

Introduction

The Midcoast Regional Redevelopment Authority (MRRA) is a municipal corporation and a public instrumentality of the State created by statute 13 MRSA §13083-G. The purpose of the MRRA is to implement the reuse plans for the former Naval Air Station Brunswick (NAS Brunswick) and the Annex Facility in Topsham. The authority is governed by an eleven-member board of trustees appointed by the Governor and confirmed by the Maine Legislature.

Naval Air Station Brunswick (NASB) was designated for closure in May 2005 under the 2005 Federal Base Realignment and Closure (BRAC) action. The former NASB, now known as Brunswick Landing, Maine's Center for Innovation, is a 3,200-acre property with state-of-the-art facilities, over 1.7 million square feet of commercial and industrial space, and a world class aviation complex. MRRA's Reuse Master envisions Brunswick Landing to be a science and technology park in a campus setting with centers of excellence in advanced technologies (composites, biomed, renewable energy, IT), a regional executive airport, business-focused educational facilities, and on-site renewable energy development and opportunities for high quality job creation in Aviation and Aerospace, Energy, Composite Technologies, Information Technology, Biotechnology and Biomed, and Education. There were also 533 housing units associated with Naval Air Station Brunswick at the Bath Road site.

During the development of the Reuse Master Plan staff from Central Maine Power and the Reuse Plan consultants (Matrix Design Group of Denver, Colorado and Wright Pierce Engineering of Topsham, Maine) reviewed the nature and layout of the electrical infrastructure and indicated that, while the quality of the infrastructure is generally sound, there are a number of areas in which the standards of construction were at variance with Central Maine Power Company. Some of these differences included pole height (BNAS had

higher poles), maximum number of risers per pole, the use of 750 kVa transformers and use of 4000 kV as a distribution voltage.

The electric transmission and distribution infrastructure serving Brunswick Landing was transferred to MRRA by the Navy in September 2011. MRRA began operations of that system on October 1, 2011 and began providing service to the Navy, as there was still an active mission on the campus and a handful of MRRA tenants based on engineering estimates of electrical consumption as there was only two Central Maine meters at the time of conveyance with no individual building meters on campus. With a grant from the Economic Development Administration in 2015, MRRA installed electric meters on all commercial and residential buildings.

In July of 2021, MRRA became a regulated public utility by the Maine Public Utilities Committee with the acceptance of MRRA's proposed Terms and Conditions for the operation of the electric distribution system at Brunswick Landing and will be known as the Brunswick Landing Electric Utility (BLEU) district. As of November 2023, there are 225 residential customer accounts, 163 small commercial accounts and 4 large commercial accounts (consume more than 100,000 kilowatt hours per month).

One key component of MRRA's Reuse Master Plan for Brunswick Landing called for the development of a Renewable Energy Center focusing on clean tech industries. The goal for the Renewable Energy Center is to help establish and grow a new clean tech cluster around renewable energy, combine energy technology business operations with on-site, alternatively fueled energy production, and allow new technologies to be developed, manufactured, and deployed on our "smart" microgrid for test and evaluation.

At present, the existing electric power distribution system, originally constructed by the Navy, adequately serves the majority of the developed portion of Brunswick Landing. Brunswick Landing is served electricity by Central Maine Power (CMP), that enters the east side of Brunswick Landing from Route 24 (Gurnet Road) just past Cooks Corner shopping center, alternatively known as "Navy Feed". The Gurnet Road feed is on CMP's Large General Service, Primary, Time-of-Use (LGS-P-TOU) rate schedule.

The main electrical service to Brunswick Landing electrical distribution system is from a single 34.5kV delivery point from Central Maine Power's 217D3 Circuit on Gurnet Road which is fed from CMP's Cooks Corner Substation ("Navy Feed") and serves everything east of the runways. Just ahead of the point of delivery, CMP has 100 Amp "T" speed fuses that isolate the Brunswick Landing Campus from the CMP 34.5kV system in the event of a fault on the MRRA system. CMP's primary revenue metering is located immediately after the 100 Amp fuses. From the CMP point of delivery, MRRA continues with a 34.5kV overhead line that extends approximately one conductor mile within the Brunswick Landing Campus. Four internal distribution circuits originate from the MRRA distribution center and extend throughout the Brunswick Landing Campus. The circuits are numbered 1 through 4.

The electrical distribution system at Brunswick Landing consists of miles of overhead conductors, hundreds of primary voltage transformers (both pad and pole mounted), switches, and associated protective devices such as reclosers and fused cut-outs. MRRA currently serves 392 connected loads including a data center, a medical device manufacturer, a senior living facility, a memory care facility, a college campus including a dormitory, multifamily and single-family housing units, and a general aviation airport. The Brunswick Landing campus collectively consumes about 22 million kilowatt hours of energy per year.

Power System Engineering (PSE) was contracted by the MRRA in January 2014 to complete an electrical transmission and distribution system analysis of the electrical facilities owned and operated by MRRA (study is available on our website at www.mrra.us. PSE found the MRRA electrical facilities to be "generally … in good condition". PSE concluded that up to 5 MVA of load can be served on each of the MRRA internal circuits with N-1 contingency capability maintained; however, the total load on the MRRA system cannot exceed 6 MVA with only one source of supply from the CMP system.

BLEU currently purchases its power needs from NextEra Energy Systems Maine, LLC through a multi-year contract (ending October 31, 2025) and a 1-megawatt photovoltaic array owned by Pegasus Solar, LLC. BLEU reads meters monthly and then bills our various tenants and utility customers for energy consumed, transmission and distribution and our own systems maintenance fee. MRRA has a contract, it initiated in 2014 with Village Green Ventures to purchase energy from a one-megawatt anaerobic digester. MRRA purchased energy from Village Green from April 2016 through July 2021, when it was no longer operational. The anerobic digester is now owned by Inverdale Capital Management of Dallas, Texas.

Upon the recommendation of Power Systems Engineering in 2016 MRRA invested in excess of $400,000 to upgrade the primary incoming feeder and main electrical distribution center to improve reliability and performance of the Brunswick Landing electrical grid. The scope of the upgrade project included the demolition of the existing pad-mounted "substation" at the corner of Admiral Fitch Avenue and Pegasus Street and replaced it with four new overhead reclosers and replace the service line coming in from Bath Road for the entire length of Admiral Fitch Avenue to Pegasus Street. The new advanced reclosers have automated controls which allow for additional flexibility in coordinating with Central Maine Power as well as form the basis for the development of a smart microgrid on the Brunswick Landing campus.

The Brunswick Landing Electric Utility District is a very small electric distribution service provider with only 733 metered customers. In order to meet our statutory redevelopment mission, the Authority works to assure that the costs of public goods and services provided by MRRA and its subsidiaries are similar to those outside the fence, so to speak. BLEU passes along the retail transmission and distribution charges of Central Maine Power, and our collective supply cost (NextEra Energy Systems Maine, LLC and Pegasus Solar) along with BLEU distribution service charge of $0.0320 per kilowatt-hour for large service customers, $0.0367 kilowatt hour for commercial customers and $0.0879 per kilowatt-hour for residential customers.

While BLEU has very limited financial capacity, it does recognize the urgent need to assess its electric transmission and distribution system to minimize the anticipated effects of climate change on utility assets. Pursuant to "An Act Regarding Utility Accountability and Grid Planning for Maine's Clean Energy Future," codified as 35-A M.R.S.A. § 3146, BLEU hereby presents this ten-year plan for addressing the effects of climate change on BLEU's distribution assets. This comprehensive plan outlines specific actions to enhance the resilience of the utility infrastructure, ensuring a reliable and sustainable energy supply to its customers in the face of changing climate conditions.

Climate Risk Assessment:

1. ***Collaborative Research:***

With BLEU's limited resources, we have relied upon other studies and assessments to consider climate impacts on the electrical distribution system at Brunswick Landing which have been noted below.

The principal contributor to power outages, and their associated costs, in the United States is extreme weather[1]. Extreme weather includes high winds, thunderstorms, hurricanes, heat waves, intense cold periods, intense snow events and ice storms, and extreme rainfall.[2] Such events can interrupt energy generation, damage energy resources and infrastructure, and interfere with fuel production and distribution systems, causing fuel and electricity shortages or price spikes. Many extreme weather impacts are expected to continue growing in frequency and severity over the coming century,[3] affecting all elements of the Nation's complex energy supply system and reinforcing the energy supply-and-use findings of prior National Climate Assessments.

The distinct seasonality of the Northeast's climate supports a diverse natural landscape adapted to the extremes of cold, snowy winters to hot and humid summers. The recent dominant trend in precipitation throughout the Northeast has been towards increases in rainfall intensity,[4] with increases in intensity exceeding those in other regions of the

[1] USGCRP, 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I. Wuebbles, D. J., D. W. Fahey, K. A. Hibbard, D. J. Dokken, B. C. Stewart, and T. K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA, 470 pp. doi:10.7930/J0J964J6.

[2] Ibid. p 470.

[3] USGCRP, 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I. Wuebbles, D. J., D. W. Fahey, K. A. Hibbard, D. J. Dokken, B. C. Stewart, and T. K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA, 470 pp. doi:10.7930/J0J964J6.

[4] Hoerling, M., J. Eischeid, J. Perlwitz, X.-W. Quan, K. Wolter, and L. Cheng, 2016: Characterizing recent trends in U.S. heavy precipitation. *Journal of Climate*, **29** (7), 2313–2332. doi:10.1175/jcli-d-15-0441.1.

contiguous United States. Further increases in rainfall intensity are expected,[5] with increases in total precipitation expected during the winter and spring but with little change in the summer.[6] Monthly precipitation in the Northeast is projected to be about one inch greater for December through April by end of century (2070–2100) under the higher scenario.[7]

Increases in annual average temperatures in New England have increased about 3°F (1.7°C) since 1901[8]. Although the relative risk of death on very hot days is lower today than it was a few decades ago, the Northeast is projected to experience a significant increase in summer heat and the number and/or duration of heat waves that will further stress summertime energy peak load demands from higher air conditioning use and the greater need to pump and treat water.

This combination of heat stress and poor urban air quality can pose a major health risk to vulnerable groups: young children, elderly, socially or linguistically isolated, economically disadvantaged, and those with preexisting health conditions, including asthma. Vulnerability is further heightened as key infrastructure, including electricity for air conditioning, is more likely to fail precisely when it is most needed - when demand exceeds available supply - with the potential for substantial negative health consequences. Finally, vulnerability to heat waves is not evenly distributed throughout the region. Rather, outdoor versus indoor air temperatures, baseline health, occupation, and access to air conditioning are important determinants of vulnerability. Urban areas are at risk for large numbers of evacuated and displaced populations and damaged infrastructure due to both extreme precipitation events and recurrent flooding, potentially requiring significant emergency response efforts and consideration of long-term commitment to rebuilding and adaptation, and/or support for relocation where needed.

Rising air and water temperatures and extreme heat events drive increases in demand for cooling while simultaneously resulting in reduced capacity and increased disruption of power plants and the electric grid, and potentially increasing electricity prices to consumers. Increased demand for cooling will likely also increase energy-related emissions of criteria air pollutants presenting an additional challenge to meet national ambient air quality standards. Unless other mitigation strategies are implemented, more frequent, severe, and longer-lasting extreme heat events are expected to make blackouts and power disruptions

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[5] Thibeault, J. M., and A. Seth, 2014: Changing Climate Extremes in the Northeast United States: Observations and Projections from CMIP5. Climate Change, 127(2) 273-287. Doi:1007/s10584-014-1257-2.

[6] Lynch, C., A. Seth, and J. Thibeault, 2016: Recent and projected annual cycles of temperature and precipitation in the northeast United States from CMIP5. *Journal of Climate*, **29** (1), 347–365. doi:10.1175/jcli-d-14-00781.1.

[7] Ibid. 347-365.

[8] Runkle, J., K. E. Kunkel, D. Easterling, B. C. Stewart, S. Champion, L. Stevens, R. Frankson, and W. Sweet, 2017: State Climate Summaries: Rhode Island. NOAA Technical Report NESDIS 149-RI. NOAA National Centers for Environmental Information, Asheville, NC, 4 pp. URL.

more common, increase the potential for electricity infrastructure to malfunction, and result in increased risks to public health and safety.

The Nation's economic security is increasingly dependent on an affordable and reliable supply of energy. Every sector of the economy depends on energy, from manufacturing to banking, healthcare, telecommunications, and transportation.[9] Increasingly, climate change and extreme weather events are affecting the energy system (including all components related to the production, conversion, delivery, and use of energy), threatening more frequent and longer-lasting power outages and fuel shortages.[10]

At the same time, the energy sector is undergoing substantial policy, market, and technology-driven changes. Natural gas and renewable resources are moving to the forefront as energy sources and energy efficiency efforts continue to expand, forcing changes to the design and operation of the nation's gas infrastructure and electrical grid. Much work remains to establish a climate-ready energy system that addresses present and future risks.

In short, the greatest risks to the electric distribution system at Brunswick Landing are:

- Hurricane, High Winds and Lighting Strikes
- Extreme Heat
- Extreme Cold, Ice and Snow Loads
- Cyber Threats

2. ***Vulnerability Assessment:***

Over the next eighteen months (January 2024 to June 2025) the Brunswick Electric will conduct a climate vulnerability assessment study, building on the work of 2014 Power System Engineering (PSE) study to identify and categorize risk and establish a conceptual framework for anticipating, managing and recovering from the effects of a potentially hazardous events related to climate change. The assessment will help BLEU better understand threats and vulnerabilities, determine acceptable levels of risk, and develop a capital improvement investment strategy and operational procedures to enhance infrastructure resilience and operational procedures to limit system failures.

- Identify critical assets within the transmission and distribution network vulnerable to climate-related risks.
- Prioritize assets based on their vulnerability and importance to overall system functionality.

[9] Department of Energy, 2017: Transforming the Nation's Electricity System: The Second Installment of the QER. DOE/EPSA-0008. U.S. Department of Energy (DOE), Washington, DC, URL

[10] Department of Energy, 2015: Climate Change and the U.S. Energy Sector: Regional Vulnerabilities and Resilience Solutions . DOE/EPSA-0005. U.S. Department of Energy (DOE), Washington, DC, 189 pp

In the meantime, BLEU will continue to replace porcelain insulators with polymer insulators which are lighter in weight than the porcelain type, which are subject to cracking in a northeast climate and exploding. In general, the polymer insulator is considered a better insulator for both heat and electricity due to its unique electrical, mechanical, chemical, and thermal properties.

Infrastructure Resilience Enhancement:

3. ***Advanced Technology Integration:***

In an era where electricity powers our daily lives, any disruption in the power distribution network can have severe consequences. Whether it is an extreme weather event, a cyber attack, or system failures due to aging infrastructure, power outages can lead to significant economic losses, compromised safety, and disrupted essential services. Implementing state-of-the-art monitoring systems enables utilities to detect issues in the power grid in real-time.

MRRA began building the backbone of this advanced system back in 2014, when it began installing electric meters on buildings at the former Naval base that never had individual building meters. With a grant from the Economic Development Administration, MRRA installed new Automatic Meter Reading (AMR) Flexnet Sensus electric meters. These meters use long range radio wave technology for meter reading and data transmission. The meters have the capability to support real time data delivery, metering, alarms and outage management.

The next step was to set up more advanced sensors and IoT devices that can collect data on voltage, load, temperature, and other crucial parameters. This data-driven approach helps in quicker response times, reducing downtime, and optimizing energy distribution. To tackle these issues BLEU retained Newtility, a Brunswick, Maine based engineering company specializing in renewable energy, power generation and control systems to design a Net Metering and Supervisory Control and Data Acquisition (SCADA) system to add to our current system. That scope of that work (September 8, 2023 proposal) which begin in early 2024 will include the following:

Newtility will design, oversee the purchase and installation of a new point-to-multipoint wireless network that will serve as a multi-purpose backbone for Brunswick Landing's new "Flexible Utility Network" capable of providing various communications functions:

- AMI Network (Advanced Metering Infrastructure), enabling the establishment of more remote meter reading radio boosters across the campus for our installed smart meters affording more instantously available information.
- Communications from BOS Control System to the new NET meter, enabling historical data collection of campus loads as well as future reverse power protection or curtailment functionality.

- Communications from BOS Control System to each recloser, enabling monitoring of individual circuit's loads and alarming when trips or similar events take place.
- SCADA communications to existing smart meters.

Through the installation of this advanced communications and control technology as well as automation systems BLEU will have new abilities to monitor - and potentially lower -electricity usage in real time. These technologies provide operators with access to real-time communications for outages and better tools to prevent outages and manage restoration efforts.

For the electric micro grid at Brunswick Landing the improved system will allow BLEU the opportunity to analyze generation resources, electricity demand, and usage patterns will help BLEU evaluate opportunities for energy storage, demand response, smart grid technologies, energy efficiency, and distributed generation including solar and fuel cells.

The upgraded and timely distribution system information will help inform long-term capital investment strategies, system operation and resilience. Electricity demand response programs and energy efficiency programs may be able to help shift or reduce electricity usage during peak periods, improving grid reliability without increasing power generation. A central challenge to such planning is dealing with the broad range of uncertainties inherent to infrastructure investment planning (for example, climate, technology, and load). Advanced tools are being developed that help inform investment decisions that balance costs as well as risk exposure in an uncertain future.

By adopting advanced technologies, implementing modern strategies, and investing in resilient infrastructure, power distribution systems can overcome these challenges and provide a reliable supply of electricity to consumers. BLEU will continue to evaluate and consider upgrades sensors and automation to enhance the system's ability to detect and respond to climate-related disruptions promptly.

BLEU will work with our network and information technology partner, Compass Technology Managers of Freeport, Maine to extend their extensive network security system to our new SCADA system to guard against cyber-attacks.

4. ***Hardening and Redundancy:***

Generally speaking, the overhead and underground facilities that make up the BLEU's 34.5kV and 4.16kV system are consistent throughout and inherently demonstrate standardization of construction and design by the Navy. The system had been designed for and operated as a four-wire wye system with a multi-grounded neutral. The nominal voltage of the 34.5kV

system is 34.5kV phase-to-phase and 19.9kV phase-to-neutral. The nominal voltage of the 4.16kV system is 4.16kV phase-to-phase and 2.4kV phase-to-neutral.

The vast majority of the system is three-phase construction consisting of 55-to-60-foot class 2 or 3 poles, crossarm framing, and pin type porcelain insulators. Riser poles consist of fused cutouts on an upper crossarm, and arresters and cable terminators mounted on a lower crossarm framed approximately 4 feet below the upper arm. Cutouts and arresters are a mix of porcelain and polymer depending on their age[11]. All new cutouts and arresters installed after 2014 are polymer.

With the completion of the Vulnerability Assessment described above, the report will identify any deficiencies in the system and lay out an affordable and achievable plan to invest in the following assets to promote hardening and redundancy to prevent system failures due to climate threats:

- Upgrade and reinforce key distribution lines in high-risk areas or are threatened by the growing frequency of extreme climate events.
- Implement redundancy measures for critical infrastructure components to minimize single points of failure.

Emergency Response and Recovery:

The State of Maine created the Midcoast Regional Redevelopment Authority, 5 MRSA §13083-G as a quasi-state agency and municipal corporation with the broad municipal powers with the exception of taxation and zoning. With the initial transfer of property from the United States Government, MRRA assumed the responsibility of the operations of streets and sidewalks, stormwater collection system, streetlights, and fire hydrant system, an electrical distribution system, a potable water distribution system and sanitary sewer collection system (which has since been transferred to the Brunswick Sewer District) for an area of five square miles. MRRA does rely upon the Town of Brunswick to provide police and fire protection services to the businesses and residents of Brunswick Landing.

With such sweeping responsibilities, MRRA established the following policies and procedures to respond to and manage emergency situations including weather and climate related events:

- Emergency Action Plan
- Business Continuity Plan
- Emergency Information Annex Document

Copies of these documents are attached and included as part of this document.

[11] Power Systems Engineering, *Electrical Transmission and Distribution Analysis for the Midcoast Regional Redevelopment Authority* , May 22, 2014, p.18.

Through a competitive process, has twice selected Enterprise Electric of Lisbon Falls, Maine as its primary heavy electrical contractor to maintain and repair the electrical distribution system at Brunswick Landing. In its fifty-year history, Enterprise Electric had been the primary contractor for the Navy to maintain the electrical distribution system at Naval Air Station Brunswick.

MRRA entered into an agreement with Enterprise Electric to serve as our primary electrical contractor to make emergency repairs to our distribution in the event of a loss of power within our distribution system. Enterprise Electric also has a similar agreement with Central Maine Power Company.

This arrangement has served MRRA and the BLEU over the last eleven years for the intermittent outages that we have experienced at Brunswick Landing. Most of the events we have had are related to bird strikes (mostly Osprey - Pandion haliaetus) and blown cut-outs. Over the last ten years, we have only experienced one climate-caused outage within our distribution system, a wind shear event that occurred in October of 2017. That is not to say that our customers have not been without power periodically due to storm related events, but the climate created event has occurred within Central Maine Power's transmission or distribution system before it reached our primary meter.

Restoring electricity after a major storm or other disruption is a complex task, and a safe and efficient restoration requires significant logistical expertise, skilled line workers, and specialized equipment. As an operator of essentially a microgrid with just over 400 customers, BLEU does not have in-house equipment, vehicles or electricians and line workers to handle a massive system failure. We rely on a single private company, Enterprise Electric, to provide our restoration activities. Larger electric utilities affected by significant outages often turn to the industry's mutual assistance network – a voluntary partnership of electric companies from across the country – to help speed restoration. Mutual assistance is an essential part of the electric power industry's service restoration process and contingency planning.

Over the next eighteen months (January 2024 – June 2026) the Brunswick Landing Electric Utility will evaluate options for increasing the strength of the restoration response in the event of an overwhelming climate event that has destroyed most of the distribution system. What are opportunities to join a mutual aid network when BLEU does not have the staff, equipment or vehicles to assist other participants in a mutual aid organization, such as the American Public Power Association or Northeast Public Power Association of Littleton, Massachusetts serving 78 public power systems (www.neppa.org).

Comprehensive Emergency Plans:

As mentioned earlier, MRRA has put in place a general Emergency Action Plan and Business Continuity Plan for all of MRRA operations including the Brunswick Landing Electric Utility. With the requirements of 35-A MRSA §3146 Brunswick Landing Electric Utility has developed the following specific climate response plans for:

- Hurricane, High Winds and Lighting Strikes
- Extreme Heat
- Extreme Cold, Ice and Snow Loads

Each of the documents presents specific actions to: 1) prepare for the extreme climate event, 2) actions to respond to a climate event, and 3) actions to recover from a climate event. Within in each phase of managing the overall event, there are suggestions on how to manage the following resources:

- Planning
- Coordination with Others
- Communications with Customers
- Facilities and Service Area
- Personnel
- Power, Energy and Fuel
- Documentation and Reporting

MRRA will initiate periodic drills and tabletop exercises involving emergency response teams on our staff and contracted electrical service provider (Enterprise Electric) to and coordination with external agencies.

5. ***Communication Protocols:***

The Midcoast Regional Redevelopment Authority has implemented advanced communication systems to disseminate real-time information during emergencies. MRRA staff have the capability to update our website (www.mrra.us) to provide regular and updated information on the status of our electric distribution network. Later this month, a new and improved website will be launched that will present a map of the four circuits on campus so that individuals and companies may learn the current status of any possible outage and an expected time of the restoration of service. The new website is www.brunswicklanding.us . MRRA also has a telephone information system for afterhours information that is available to customers to leave messages and also learn of the most recent update on the status of any power outage. This system is managed and controlled by MRRA staff with regular updates.

IV. Renewable Energy Integration:

7. ***Diversification of Energy Sources:***

MRRA's Reuse Master Plan called for the development of a renewable energy center at Brunswick Landing with a focus on clean tech industries that have potential to put Brunswick Landing at the epicenter of the emerging clean energy market. The goal was to provide low-cost green energy for tenants and other organizations at Brunswick Landing.

In 2011, MRRA received a grant from the Economic Development Administration and EPA Region 1 to undertake a study of alternative energy sources that could support the energy needs at Brunswick Landing and support the vision of the development of the Brunswick Renewable Energy Center. Under a contract through EPA asked the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) to do a comprehensive analysis of the property to look for renewable energy as well as sustainable economic redevelopment opportunities that could be used to redevelop the site. NREL analyzed eight different renewable energy technologies: solar photovoltaics (PV), solar domestic hot water heating (SDHW), solar ventilation preheating, wind, fuel cells, micro gas turbines, biomass combined heat and power (CHP), and geothermal heat pumps as well as opportunities for energy efficiency upgrades in the buildings and infrastructure.

Ultimately, MRRA worked with Village Green Ventures to develop a $10 million 1 megawatt anaerobic digester to produce energy. The facility operated from 2016 through 2021. The facility is currently being sold to a new entity that intends on renovating the existing facility and expanding its capacity to a 2-megawatt facility.

In 2018, Revision Energy completed the construction of a 1.5-megawatt (over 4,500 panels) solar photovoltaic (PV) array at Brunswick Landing provides 13% of the energy needs for Brunswick Landing. According to ReVision Energy, builder of the array, the system produces roughly 1,970,780 kilowatt-hours or 1.9 megawatt hours of electricity each year, offsetting the equivalent of over 3.4 million miles driven in a gas-powered car. This system, owned by Diversified Communications with whom MRRA has a power purchase agreement, allows MRRA to provide electricity at a lower cost than traditional energy sources, thereby helping the businesses located there to be more competitive in the market.

MRRA has also encouraged and collaborated with tenants on campus to support behind the meter alternative energy sources including Martin's Point Healthcare, the Brunswick School Department's Real School, FlightDeck Brewing Company and Wild Oats Bakery. We will work to incorporate their assets into a SCADA system upon installation.

BLEU is continuing to work with the BRAC Transition Office for a possible solar array to be constructed on the 34-acre capped demolition debris landfill at Brunswick Landing.

The Electric Transmission and Distribution System Upgrade Plan for Climate Resilience outlined above represents a proactive and strategic approach to safeguarding the Brunswick Landing Electric Utility District's infrastructure against the impacts of climate change. Implementation of this plan will ensure a resilient, sustainable, and reliable energy supply for the community, even in the face of evolving climate conditions.