



# Clean Cut Quarterly

## NJARNG Sustainability Newsletter

*In collaboration with Rowan University*

April 2020 Volume 5 - Issue 2



IMAGE: [U.S. DOE](#)

## Pathway to 2050

Earlier this year, the roadmap for how New Jersey plans to reach its carbon reduction goals was revealed. See the strategies on [page 2](#).

A combined heat and power success story from Maine—and how it can be implemented by the NJARNG. Read all about it on [pages 3 and 4](#).



IMAGE: [U.S. EPA ENERGYSTAR](#)



IMAGE: [NJDEP](#)

Major retailers have joined forces to accelerate the adoption of electric vehicles. See [pages 5 and 6](#).

# New Jersey's Energy Master Plan Revealed

By: Jennifer Crown

On January 27, 2020, Governor Phil Murphy revealed New Jersey's Energy Master Plan (EMP) that established guidelines for the state to achieve the goal of 100% clean energy by 2050[1]. The EMP is one of the most aggressive plans in the nation with regards to responding to the threat of climate change and reducing carbon emissions. The recommendations in the EMP were selected based on findings from the New Jersey Department of Environmental Protection (NJDEP) and comprehensive climate change reports authored by Rutgers University. The consequences of climate change include rising sea levels that pose a threat to coastal communities and health issues such as increased rates of asthma.



Governor Phil Murphy

THE STATE OF NEW JERSEY

## Governor Signs Executive Order

To put the EMP into action, the Governor signed Executive Order (EO) No. 100, that directs the NJDEP to adopt Protecting Against Climate Threats (PACT) regulations. The NJDEP Commissioner was directed to issue an administrative order, which will be continuously updated, that identifies the regulations that the agency plans to update to integrate climate change considerations.

In the Energy Master Plan, the following 7 strategies were set forth to combat climate change and environmental injustices:

- 1: Reducing Energy Consumption and Emissions from the Transportation Sector
- 2: Accelerating Deployment of Renewable Energy and Distributed Energy Resources
- 3: Maximizing Energy Efficiency and Conservation, and Reducing Peak Demand
- 4: Reducing Energy Consumption and Emissions from the Building Sector
- 5: Decarbonizing and Modernizing New Jersey's Energy System
- 6: Supporting Community Energy Planning and Action in Underserved Communities
- 7: Expand the Clean Energy Innovation Economy

## Sustainability at NJARNG Sites

The NJ Army National Guard (NJARNG) is already adopting techniques and strategies to increase sustainability and resilience. The Sustainable Facilities Center (SFC) at Rowan University assists in this mission by conducting comprehensive building energy and water assessments. Engineering students conduct building audits and write reports, recommending how to improve the energy- and water-use efficiency of the readiness centers. This spring, students conducted audits at the Jersey City, West Orange, and Riverdale armories. Another way the NJARNG is contributing to a sustainable future is encouraging energy and water awareness programs. Increasing sustainability and resiliency is important so that the NJARNG is prepared for critical missions. ■

[1] "Official Site of The State of New Jersey," *Governor Murphy Unveils Energy Master Plan and Signs Executive Order Directing Sweeping Regulatory Reform to Reduce Emissions and Adapt to Climate Change.*

<https://nj.gov/governor/news/news/562020/approved/20200127a.shtml>.

# Combined Heat and Power May Fire Up Resiliency for NJARNG Readiness Centers

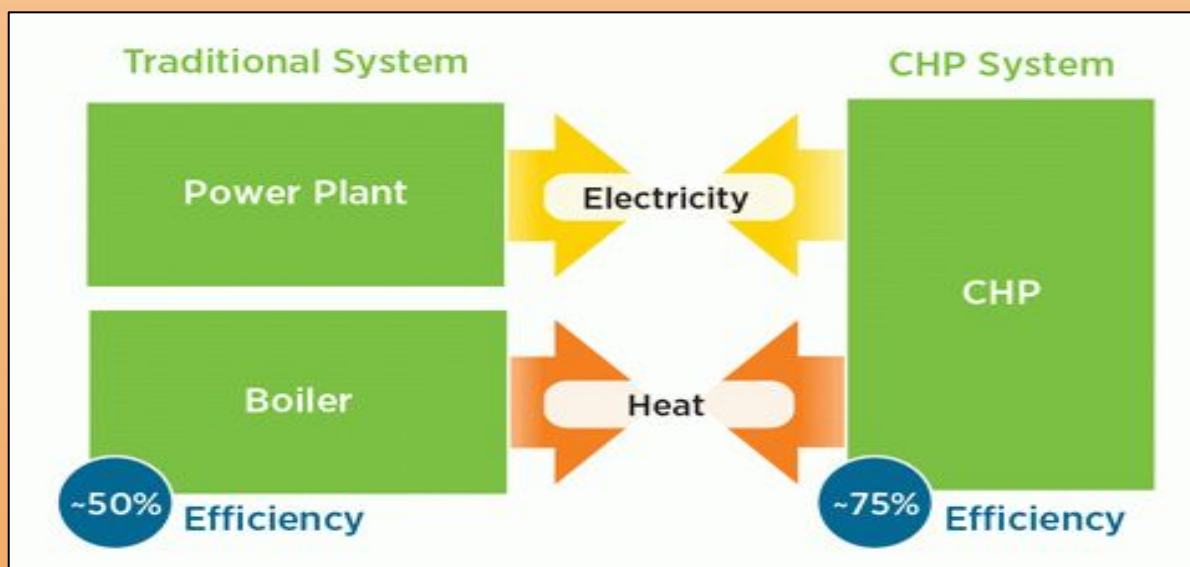
By: Samuel Ramos

An important goal for NJARNG facilities across the state is to have resilient and reliable energy sources. To support this goal, the Rowan University SFC conducts research on the feasibility of power sources that could increase resiliency at guard facilities. Combined Heat and Power (CHP) is one energy source that has much potential for application by the NJARNG.

In 2015, the Maine Army National Guard (MEARNG) installed a CHP system that yielded promising energy generation results. The savings on energy bills that resulted from the installation paid for the initial cost of the project in just a few years. Here, we discuss the results of this case study in Maine and examine the possibility that this technology could be utilized at NJARNG readiness centers.

## CHP Defined

CHP, also called cogeneration, is a technology that produces electrical and thermal energy (see diagram). Engines, turbines, or other pieces of machinery that produce or use electricity have components that physically produce heat. This heat is normally wasted —lost to the atmosphere through ventilation or is reduced through the use of a coolant. However, in a CHP system, that waste heat is considered a useful form of energy. Uses for this heat include heating water and keeping buildings warm in the winter. Because the waste heat is used, fuel is used more efficiently in CHP systems than in many other forms of energy generation. According to the U.S. Environmental Protection Agency (EPA), “CHP can achieve efficiencies of over 80 percent, compared to 50 percent for conventional technologies[1].” This technology also reduces greenhouse gas emissions, as the EPA website also states, “CHP’s principal benefits are reduced electricity cost, reduced emissions of greenhouse gases and other pollutants, and increased electricity-supply reliability.”



U.S. DEPARTMENT OF ENERGY

*A comparison of a CHP system and a traditional system.*

## MEARNG Project

In 2015, the MEARNG initiated a case study to determine the feasibility of CHP systems at their facilities[2]. This project was conducted at the 123,500 ft<sup>2</sup> Army Aviation Support Facility in Bangor, Maine, where a 75 kW prototype CHP system was added to their existing heating system.

The facility's boiler/heating system initial configuration consisted of four boilers. When the CHP system was installed, it not only delivered 75 kW of electricity to the building, but the waste heat was also captured and used to heat water, making the fourth boiler unnecessary.



MAINE ARMY NATIONAL GUARD

MEARNG 75 kW CHP System

Overall, the MEARNG considered this pilot project a success and recommended it for other facilities that have total square footage between 50,000 ft<sup>2</sup> and 200,000 ft<sup>2</sup>. The average annual cost of energy for the facility was about \$210,000, and after the project was installed, the facility's saved \$58,500 in FY16. By generating on-site electricity, \$29,000 was saved on electric utility bills. Additionally, less fuel was consumed by the facility's boilers, resulting in another \$29,500 in savings. With the total project cost around \$425,000, it was estimated that the project would pay for itself in about 7 years. Accordingly, the report's conclusion was that the CHP installation was success from both an energy generation and economic perspective.

## Potential for NJARNG

Based on the MEARNG case study, it could be reasonably determined that this technology would yield similar results for NJARNG facilities. However, the building size limitations suggested by the MEARNG narrows down how many facilities could install CHP in New Jersey. Larger facilities, such as the Jersey City armory, could see many benefits from the installation of a CHP system, allowing them to become more resilient through generation of on-site electricity and reduced fuel consumption. Completing a life cycle analysis for potential facilities will provide clarity on whether CHP is a good investment. ■

[1] United States Environmental Protection Agency. "Combined Heat and Power," *United States Environmental Protection Agency*. <https://www.epa.gov/energy/combined-heat-and-power>.

[2] A.J. Ballard. Presentation, Topic:"Maine Army National Guard Combined Heat and Power Project." Jan. 4, 2017.

# Major Retailers Align to Adopt EVs

*By: Jennifer Crown*

Amazon has partnered with other major retailers to accelerate their usage of electric vehicles (EVs) with the goal to make their fleets across the U.S. more environmentally friendly. This effort was orchestrated by Ceres, a non-profit organization whose mission is to advance sustainability leadership among investors, companies, and capital market influencers. Ceres works to promote sustainability across the government and private industry sectors including banking and finance, food and agriculture, oil and gas, water infrastructure, insurance, transportation, and electric utilities.



[U.S. DEPARTMENT OF ENERGY](#)

*Electric vehicles powering up at a charging station.*

## Corporate Electric Vehicle Alliance

To encourage the adoption of sustainable transportation, the Corporate Electric Vehicle Alliance was established[1]. Member of this group include Amazon, AT&T, Clif Bar, Consumers Energy, DHL, Direct Energy, Genentech, IKEA North America, LeasePlan, Lime, and Siemens. The alliance helps participating members make and achieve commitments towards fleet electrification. The expectation is that the adoption of EVs by large companies will result in the expansion of the EV market as other companies and industries recognize the magnitude of the corporate demand for such vehicles. The alliance also serves as a platform for members to organize and reinforce federal and state policies that promote the use of EVs.

## Why EVs?

Sustainable transportation is an important part of mitigating the climate crisis. It is essential to decarbonize transportation, and transition to EVs.

The U.S. Department of Transportation (DOT) reported that an estimated 3,240,327 million highway miles were driven in the U.S. in 2019[2]. This figure includes various methods of transport such as motorcycles, light duty vehicles, buses and trucks. Trucks, which are often used as delivery methods by large corporations such as Amazon, transport more than 70% of the nation's freight. Therefore, reforming this sector would result in considerable reductions in greenhouse gas (GHG) emissions. Ceres' Vice President of Climate and Energy, Sue Reid, has stated, "With companies controlling more than half the vehicles on the road in the U.S. today, they have a tremendous role to play in leading the transition to electric vehicles -- both in terms of electrifying their own fleets and in leveraging their buying power to send a strong market signal to automakers and policymakers alike. The Corporate Electric Vehicle Alliance is where the rubber hits the road."

Participants also have financial motivation to electrify their fleets. Using EVs allows companies to save money on fuel and maintenance and provides them freedom from dependence on fluctuating gas prices. Some EVs have advanced safety features, improve the company reputation, and boost employment interest and retention in the company.

## The Climate Pledge

Because of the benefits of becoming more sustainable overall, Amazon has signed The Climate Pledge, committing to achieve net zero carbon. Kara Hurst, Head of Worldwide Sustainability at Amazon, stated, “As part of The Climate Pledge, which includes the purchase of 100,000 Rivian electric delivery vans and a commitment to deliver 50% of shipments with net zero carbon by 2030, we are pursuing the highest standards in transportation sustainability.” Mike Parra, CEO, DHL Express Americas, pledged, “As part of our commitment to achieve net zero emissions from transport activities by 2050 globally, we have set the ambitious interim target of performing 70% of first- and last-mile operations with green vehicles by 2025.” ■



[NJ DEPARTMENT OF TRANSPORTATION](#)

*A congested roadway in Passaic County, NJ.*

## New Jersey Plugs In

*By: Editorial Team*

In January 2020, a new New Jersey law made it easier for the state to meet EV goals and build EV charging infrastructure.

The law also created the *Plug-in Electric Vehicle Incentive Fund*. All New Jersey residents that purchase or lease a plug-in hybrid or all-battery EV with an Manufacturer Suggested Retail Price (MSRP) of up to \$55,000) are eligible to apply for a rebate.

Stay tuned! More details will be forthcoming as the Charge Up New Jersey program that will issue the rebate is still under development. Anyone interested in the program can contact the Board of Public Utilities ([BPU](#)). ■



[NJ BOARD OF PUBLIC UTILITIES](#)

*For more information on the EV rebate and other clean energy incentives, visit <https://www.njcleanenergy.com/>.*

[1] Ceres. “Corporate Electric Vehicle Alliance,” <https://www.ceres.org/corporate-electric-vehicle-alliance>

[2] U.S. Department of Transportation. “U.S. Vehicle-Miles,” <https://www.bts.gov/content/us-vehicle-miles>

# NJARNG-Rowan University Partnership Recognized

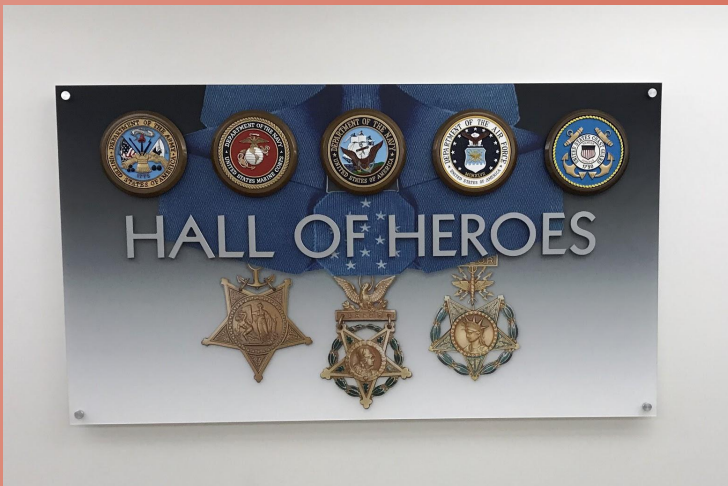
By: *Samuel Ramos*

Over the years, Rowan University has maintained a strong professional partnership with the NJARNG. This is demonstrated through the work of the Rowan's SFC, which has provided services to readiness centers across the state.

In November, NJARNG and New Jersey Department of Military and Veterans Affairs (NJDMAVA) personnel attended a ribbon-cutting ceremony to celebrate the official launch of the SFC. In December, Rowan staff traveled to the Pentagon to attend the "Army Community Partnership Program - 2019 Recognition Ceremony". Among those that attended on behalf of Rowan were Kathy Mullins, NJARNG facilities management advisor, and Steve Berg, GIS specialist.



**Photo courtesy of Kathy Mullins**  
*Left to Right: Kean S. Castillo (1LT), Vernon Hicks, Justin Costa, Kathy Mullins, Steve Berg, and Colonel Michael Lyons*



**Photo courtesy of Kathy Mullins**  
*Hall of Heroes Memorial within the Pentagon.*

At the Pentagon, other military installations, along with the Montana Army National Guard, were commended for partnerships established with nearby universities and cities. The NJARNG was honored for their partnership with Rowan University's SFC. At the ceremony, Rowan was awarded the "2019 Army - Community Partnership Award," an award that signifies the many contributions made by Rowan University to the NJARNG through their internship program. The work of the interns supports the mission of the NJARNG through conducting work related to reducing the environmental impacts and improving the facility operations of the readiness centers.

Rowan University's SFC have contributed much to the NJARNG, and is honored to be able to continue such work not only throughout the semester, but into the summer as well. ■

# Meet the Editors

## **Jennifer Crown**

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Jennifer's interest in sustainability helped her become the president of the Green Team in junior high school. During her college career, she participated in *Engineers Without Borders* and her engineering clinic work supports the resiliency goals of the NJARNG. In the future, she hopes to work at an environmental engineering firm and help make the world a more sustainable, better home for all.



## **Samuel Ramos**

*Civil & Environmental Engineer, Junior*

Growing up reading comic books and watching action movies like *Star Wars*, Sam was placed on a path toward environmentalism by trying to be like the same heroes he idolized, at least in his own way. He has always wanted to contribute to society by making it more environmentally friendly in any way possible, namely through researching sustainable energy technology. In short, he wants to save the world.



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