



**House Consumer Affairs Committee**  
**Public Hearing on Solar Energy in Pennsylvania**  
**Testimony of Joel M. Harrington, Enel North America, Inc.**  
**August 26, 2021**

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Good morning Chairman Marshall and Chairman Matzie, and distinguished members of the House Consumer Affairs Committee, thank you for the opportunity to speak today on utility scale solar development in the Commonwealth of Pennsylvania.

My name is Joel Harrington, I am the Director of Public Policy & Institutional Affairs for the Eastern U.S. Region for Enel North America, Inc. I am here today to testify on behalf of the Mid-Atlantic Renewable Energy Coalition (MAREC). Our company, Enel North America, is a member of MAREC and I sit on MAREC's board of directors.

As the world's largest private operator of renewables with a presence across 18 US states and one Canadian province, Enel Green Power's expertise is unmatched. Enel Green Power North America is a leading developer, long-term owner and operator of renewable energy plants in North America. The company operates 70 plants with a managed capacity of over 6.7 GW powered by renewable wind, geothermal and solar energy. We're also developing and constructing a large portfolio of hybrid projects that pair solar power generation with utility-scale battery energy storage. Our projects have generated over \$188 million in lease payments to landowners and \$89 million in new property tax revenue in the U.S. since 2016. We have invested more than \$11 billion in the U.S. and Canada since 2000.

Another business line that is active in Pennsylvania is Enel X North America, that provides distributed and customer-sited services and technologies, including demand response, distributed battery energy storage and electric vehicle charging and services. PJM is our largest footprint in North America for Enel X.

### **Enel's Presence in Pennsylvania**

Enel has operated in Pennsylvania for more than a decade and has employees who live and work in the Commonwealth. You may be familiar with our demand response programs where we currently have 484 MW enrolled in Demand Response programs for some of Pennsylvania's largest commercial and industrial customers, generating ~\$19 million in payments that go back to those customers.



Four of our Pennsylvania utility-scale solar projects are slated to come online in by the end of 2022, each are paired with a 19.9MW battery storage system.

### **About the Mid-Atlantic Renewable Energy Coalition (MAREC)**

MAREC Action is a nonprofit organization that was formed to help advance opportunities for renewable energy development in Pennsylvania and the broader region where the PJM Regional Transmission Organization (RTO) operates. MAREC members include utility-scale wind and solar energy developers, wind turbine and PV solar panel manufacturers, and affiliated organizations. Many of MAREC's members have developed or are developing projects in Pennsylvania.

### **Benefits of Utility Scale Solar to Pennsylvania Consumers**

The renewable energy industry has already invested approximately \$3 billion in the Commonwealth, these projects provide approximately \$11.4 million in annual payments to farmers and other landowners in the Commonwealth.

Some of these benefits include:

**Cost – Effective:** Solar power is not only cost-competitive with conventional electric generation—it eliminates fluctuating fuel and transportation cost risks.

**Reliable:** Solar photovoltaic systems demonstrate high availability levels and provide reliable power during peak electrical demand periods.

**Creates Grid Diversification and Energy Security:** Solar power provides additional diversification to the nation's electric generation mix and increases stability and security of the electric grid.

**Produces Positive Economic Impacts:** Solar power electric generation contributes to the economic revitalization of local communities through increases to the local tax base, which creates an influx of new funding to local schools, and dollars for landowners and the local community during the construction process.

### **Utility Scale Solar and PJM Capacity Market**

PJM is the grid operator for 13 states and D.C. PJM is technology and fuel neutral. Its job is to maintain a reliable transmission grid at the lowest reasonable cost.

PJM is uniquely large and geographically diverse. It spans two time zones, varying load patterns, and different areas rich in solar and other clean energy technologies. The geographic diversity and architecture of PJM makes it easy to reliably and inexpensively



integrate clean energy resources, since energy and load variability in one part of PJM is offset by a different kind of variability in another area.<sup>1</sup>

## What is a Capacity Market?

Capacity represents a commitment of resources to deliver when needed, particularly in case of a grid emergency. A shopping mall, for example, builds enough parking spaces to be filled at its busiest time – Black Friday. The spaces are there when needed, but they may not be used all year round. Capacity, as it relates to electricity, means there are adequate resources on the grid to ensure that the demand for electricity can be met at peak periods and at all times.<sup>2</sup>

In PJM's case, that means that a utility, or other electricity supplier, is required to have the resources to meet its customers' demand plus a reserve. Suppliers can meet that requirement with generating capacity they own, with capacity they purchase from others under contract, through demand response – in which end-use customers reduce their usage in exchange for payment – or with capacity obtained through PJM capacity-market auctions.<sup>3</sup>

The Capacity Market ensures long-term grid reliability by securing the appropriate amount of power supply resources needed to meet predicted energy demand on a three-year-forward basis. Resources receive a payment for being available to meet peak electricity demand. Capacity market payments cover some or all of the fixed costs of building and maintaining generating resources.<sup>4</sup>

Under the “pay-for-performance” model, resources must deliver on demand during system emergencies or owe a significant payment for non-performance. Think of this like an insurance policy – the cost of reserving capacity to be available to the grid when needed and will perform as directed by PJM--consumers will have greater protection from power interruptions and price spikes during weather extremes.<sup>5</sup>

By matching power supply with future demand, PJM's capacity market creates long-term price signals to retain and attract needed investments to ensure adequate power supplies.

Utility scale solar participation in the capacity market accounts for - 10% of PJM's capacity mix, 89% is fossil fuel. Shifting peak is mitigated by pairing solar with storage and new tracking technologies. PA is very close to a lot of load in the competitive PJM

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<sup>1</sup> *Growth of Solar on PJM's Horizon*. PJM Inside Lines. August 2019.

<sup>2</sup> PJM Learning Center. Capacity Market. August 2021.

<sup>3</sup> PJM Learning Center. Capacity Market. August 2021.

<sup>4</sup> PJM Learning Center. Capacity Market. August 2021.

<sup>5</sup> PJM Learning Center. Capacity Market. August 2021.





market with many PA based companies, municipalities, and colleges/universities that are taking an increasingly active role in their electricity purchase decisions or wanting to invest in clean energy technologies.

Without energy diversity, it is like putting all your eggs in one basket and creates risk as supply prices and availability fluctuate.

### **Our Development Approach**

Beyond the millions of dollars in tax revenue and lease payments our projects generate in rural communities across the US and Canada, we invest in opportunities to create shared value with our host communities. This includes areas such as civil infrastructure improvement, community well-being, recreation and cultural events, education, economic development, environmental conservation and resiliency.

### **KEY DEVELOPMENT STEPS:**

**Site Prospecting:** Before groundwork begins, we conduct desktop research to find the best locations in specific markets. Selected sites have the right combination of being a high solar resource; flat, open ground; proximity to electrical infrastructure; environmental suitability; compatible land use and more.

**Land Acquisition:** We secure rights to develop our solar projects on a landowner's property through purchase options or long-term lease agreements that may run for 30-40 years. During the site development process and prior to construction, landowners receive annual lease payments so they can continue to own and operate their land without interruption.

**Electrical Interconnection:** We file with regional transmission system operators (RTOs) to inject power on the transmission grid. Then, we coordinate with the RTO and electric utility companies on engineering studies to determine how projects will work with the local transmission system. We identify costs for facilities required to accommodate the injection and delivery of wholesale power.

**Detailed Assessment:** Once a potential site is deemed viable, we conduct several environmental surveys and perform initial engineering and design of the solar array and other subsystems. We also begin the process of obtaining all necessary federal, state, and local permits.

**Power Marketing:** Before construction, most solar power projects require a contract with utility companies or commercial/industrial customers to purchase the power from the project. Our experienced team markets and promotes our solar power projects to





potential customers and secures long-term power purchase agreements (PPAs) or other contract structures.

**Creating Shared Value With Communities:** Enel is developing two utility-scale solar projects in York County with a combined capacity of over 120 megawatts of clean power. These projects are slated to come online in late 2023 and will produce the equivalent amount of energy needed to power 23,000 U.S. households and avoid 170,000 tons of carbon dioxide emissions. Furthermore, we're pairing each project with a 20-megawatt battery system that will help smooth the supply of energy to the grid and support power reliability and resiliency for Pennsylvania consumers. York County stands to reap substantial economic benefits from solar power. Just one of our solar farms in development – the 60-megawatt Dover solar project – is projected to stimulate 339 jobs, \$21.6 million in labor income and \$55.1 million in local economic output for York County during its construction phase.

During its operational life, we're looking at an annual local impact of over half a million dollars in associated labor income and \$1.7 million in local economic output, along with 8 long-term jobs.

So when you extrapolate those figures across the many more potential solar projects that could be built in York County and beyond, you can see that this is a significant economic engine. And in an era when so much economic gain is being concentrated in big cities, this is a sector where the growth occurs almost exclusively in rural communities like those in York County.

*Agrivoltaics:* Enel has been a pioneer in the implementation of dual-use solar, an approach to solar development that yields benefits for both power generation and the local ecosystem. This includes practices like conservation grazing, planting native grasses and forbs, promoting bee populations with pollinator-friendly vegetation, and even crop production known as agrivoltaics.

**Project Construction and O&M:** Once a project is contracted, our construction team begins work on roads, fences, the solar array, and other subsystems. The project is then connected to the electric grid. Once constructed, the solar power facility will have full-time Enel Green Power staff to manage long-term operations and maintenance.

**Project End-Of-Life:** Once a solar power project has reached the contracted term expiration and is no longer deemed active, project decommissioning begins. The entire solar array and other subsystems are dismantled, and the land is restored to its original condition.

The entire process can take anywhere from 18 to 24 months.



## **Conclusion**

Thank you for providing me the opportunity to testify before you today with regards to the incorporation of solar into the PJM grid and the responsibilities of Enel and other solar developers with regards to ensuring the resiliency and reliability of local solar projects. At this time, I will avail myself to answer any questions the Committee may have with regards to my remarks.

Thank you,

Joel M. Harrington  
Director of Public Policy & Institutional Affairs – Eastern U.S. Region  
Enel North America, Inc.

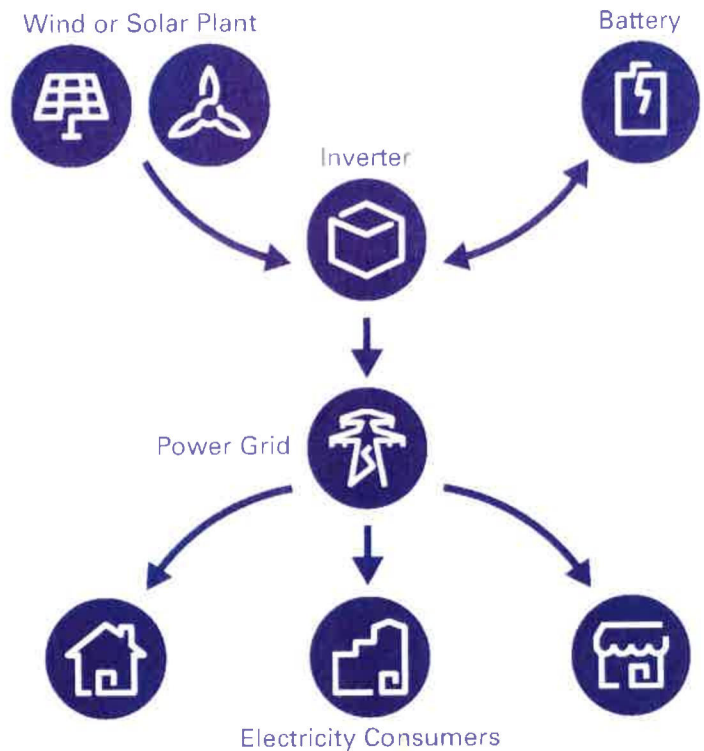
# Battery Energy Storage Systems (BESS)

## What is BESS?



**BESS units allow energy to be stored and dispatched on demand.**

At utility-scale, BESS units consist of lithium-ion batteries housed in containers which are arranged on a parcel of land, connected to the power grid, safeguarded by advanced safety features and monitored digitally and remotely for safe and efficient operation



### Benefits of BESS:



**Balancing Renewables:** Battery storage mitigates the intermittency of renewable resources like solar energy by charging when production is high and dispatching when production is low or nonexistent.

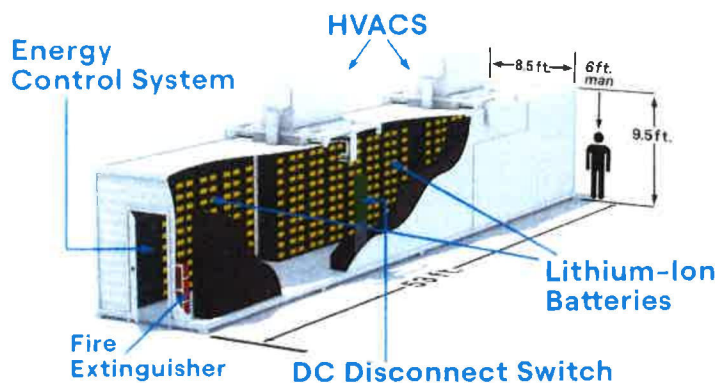


**Grid Resiliency:** Batteries help stabilize the power grid by drawing excess load and dispatching energy during periods of high demand.



**Energy Arbitrage:** Battery storage generates financial value by storing power when prices are low and dispatching when rates are high.

## Battery Energy Storage System



## Enel's Experience

**Enel is a leader in operating battery storage projects in North America and around the world.**

Enel currently has more than 20 battery storage projects in operation in North America, with a robust pipeline of projects expected to become operational in the coming months

Existing Enel projects in New York City include the 4.8 MW/16.4 MWh in-front-of-the-meter battery system, NYC's largest BESS, located at the Gateway Center Mall in Brooklyn, the solar-plus-storage microgrid at Marcus Garvey Apartments in Brooklyn, as well as storage and demand response for a number of properties owned by luxury real estate group Glenwood Management

As a global energy leader, Enel has industry-leading expertise in developing and operating battery storage projects in a variety of geographies and technologies around the world

Enel is a member of the Energy Storage Association and is a party to leading industry standards such as NFPA 855 Standard for the installation of Stationary Energy Storage Systems



# Safety & Sustainability

## Safety is Enel's top priority.

Enel's first priority, as always, is ensuring the safety of our workers, contractors and the surrounding communities at each of our projects

Throughout the development and construction of our battery storage projects, we work closely with local fire departments to meet each community's safety requirements. Enel is a party to fire safety standards such as NFPA 855

Enel is a leader in battery storage deployments in New York City, due in large part to proactively working directly with the FDNY to meet the department's stringent safety requirements for lithium-ion batteries

Additionally, Enel signed the Energy Storage Association's Corporate Responsibility Pledge, further demonstrating our commitment to safety when deploying energy storage resources



## Industry-leading software allows us to monitor battery performance and ensure safety in real time.

We utilize our own software that features a cloud-based component and a site-based component that, under normal conditions, monitors the storage asset's energy usage and production in real-time.

The software enables communication between the storage system, the site and the network operations center for real-time monitoring. In the event of an operational or environmental event or alarm, the software notifies the site and the operations center to address the situation as quickly as possible

## Battery storage is compatible with safe grid operation.

Adding energy storage to the grid does not increase the safety risk associated with the safe operation of the grid. In fact, storage is a crucial part of modernizing the grid to make it more resilient, reliable and efficient.

The safe operation of the electricity grid has been ensured through the development of industry protocols, standards and regulations to ensure the safe operation of electricity facilities, including energy storage resources. Professionally designed and installed battery storage systems are built to stringent safety standards with modern monitoring systems, which means that incidents are extremely rare.

Across North America, Enel is developing and deploying front-of-the-meter and behind-the-meter battery storage projects to increase grid resiliency and reliability, help reduce peak demand and ease grid congestion. We conduct our own safety tests at each of our projects and work with the local authorities to ensure we meet their safety requirements before entering the project into operations.

## Battery units are sustainable.

Beginning in 2020, all of Enel's battery suppliers have committed to recycle or repurpose batteries at the end of their useful lives, ensuring Enel's storage projects are sustainable and follow best practices for circularity.

Enel is a multinational power company and a leading integrated player in the global power, gas and renewables markets. Enel operates in the US and Canada through two companies: Enel Green Power and Enel X. Enel Green Power is a leading owner and operator of renewable energy plants with a presence in 15 US states and one Canadian province. The company operates around 59 plants with a managed capacity of over 6.1 GW powered by wind, geothermal and solar energy. Enel X in North America has around 4,500 business customers, spanning more than 35,000 sites, representing approximately \$10.5B in energy spend under management, approximately 4.7 GW of demand response capacity and over 70 battery storage projects that are operational and under contract. Enel X is revolutionizing the EV charging market with its smart charging solutions, deploying around 60,000 charging stations in the US.

The Enel logo, consisting of the word "enel" in a lowercase, sans-serif font. The letter "e" is stylized with a white dot.



## Taking a Community-First Approach

Enel Green Power is a leading developer, long-term owner and operator of renewable energy plants, taking a community-first approach in all aspects of our operations. In the U.S. and Canada, we operate 58 power plants representing over 6.6 GW of capacity powered by wind, solar and geothermal energy.

Enel generates electricity that is renewable *and* sustainable. We integrate sustainable design, safety and performance throughout the entire value chain to create positive environmental and social impact while maximizing long-term asset performance. From project development through operations and second-life applications of our assets, sustainability is at the center of everything we do.

### DEVELOPMENT

As we scope and perform diligence on greenfield projects, we proactively work with local stakeholders and the community to **identify priorities and needs**, implementing our Creating Shared Value model and developing a Sustainability Project Plan, all while taking a community-first approach to each aspect of siting, permitting and community engagement.

### CONSTRUCTION

We build all infrastructure projects in accordance with our Sustainable Construction Site model, a collection of best practices aimed at **minimizing the impact of plant construction** on the environment, waste, water and people.

### OPERATION & MAINTENANCE

We operate plants using our Sustainable Plant model, which aims to **minimize the impact of operations** and generate long-term, positive benefits for the environment and community.



Our Aurora solar project in Minnesota is a prime example of dual-use solar in action. At Aurora, sheep are involved in a conservation grazing plan, native vegetation is maintained in coordination with local partners, and bees kept just outside the fence line produce honey and pollinate nearby farms.

## Dual-use Solar

Sustainable design, construction and operations are key pillars for Enel. At our solar farms, we work to integrate agricultural and ecologically beneficial practices, including partnering on leading-edge research and asset management practices. We also work to identify and install pollinator-friendly and native seed mixes to create new wildlife habitat and opportunities for livestock grazing for sustainable land management. These dual-use practices support a resilient and sustainable ecosystem and co-benefits for the environment and local communities. Examples of our dual-use practices and their benefits:



**Native Vegetation:** Cultivating native vegetation at solar sites is a regenerative practice that stores nutrients in the landscape for long-term ecological and biodiversity value, even after decommissioning. It also establishes favorable conditions for stormwater protection and carbon sequestration.



**Pollinator Habitats:** Planting native seeds, forbs and other grasses within and surrounding the solar arrays creates a habitat for bees and other pollinator insects, benefiting the surrounding ecosystem. The increased presence of pollinators is also believed to increase crop yield for nearby farms and pollinator-dependent crops, such as soybean and apples. Currently, Enel solar sites involve local beekeepers that co-locate apiaries and bring honey products to market.



**Conservation Grazing:** Using sheep in place of traditional lawnmowers avoids the impact of mechanical mowing on the land. As sheep move and graze under operating solar panels, they enhance soil and vegetation by acting as pollinators, carrying and spreading seeds from plants around the landscape.



**Agrioltaics:** Pilot projects are demonstrating the potential of growing crops under solar panels. As temperatures rise due to climate change, early research suggests that in warmer areas and over time, solar panels can be used to increase the yield of certain crops and may be able to help compensate for the impact of extreme weather conditions. This will reduce water use and may increase food production.



# Transitioning Toward an Inclusive Circular Economy

Our sustainable future is dependent on the transition to a circular economy – a model of development that reduces waste and consumption while promoting a more sustainable use of resources.

Examples include:

- Partnering in the Re-Wind Network to demonstrate the viability of reusing wind turbine blades in civil and structural applications such as transmission line poles
- Creating a global Open Innovation challenge to develop new life cycles for wind turbine blades
- Supporting recycling efforts at project sites and in local communities, such as the 4RKids program in Oklahoma
- Requiring all battery suppliers to reuse or recycle battery components for new-life uses

## Engaging Local Communities

Healthy and resilient communities are the foundation for creating long-term, shared value. We live and work in the same communities as our projects and partners, and when seeking to develop new economic activity and jobs in a local community, we are committed to understanding their needs and opportunities to establish new partnerships, projects and initiatives that generate lasting impact.

Enel values being a good neighbor and strives to become a trusted community partner. We involve local stakeholders in a shared value creation plan that first listens, then responds to the needs of the community, building on principles of inclusiveness and equity to generate a measurable impact for landowners, local stakeholders and the community at large.

Since 2001, when our first wind project came online in upstate New York, we have formed lasting, community-based partnerships with more than 100 organizations in more than 20 states. This collaborative approach creates positive, long-term impact in the communities where we live and work. **We support more than 100 community partners across 21 U.S. states, Alberta and Ontario.**

"Enel continues to invest in the community and provide some things we couldn't normally provide. They're working on projects now to help get the folks in the community and the surrounding areas trained in CPR. They've helped us fund some communications projects to extend our radio coverage here at the Tonkawa Fire Department. They've helped to provide some temporary jobs during the construction phase and permanent jobs for the upkeep of the site, so that has provided employment opportunities for the local community."



– Justin Kienzle, Fire Chief and EMS Director, Tonkawa, Oklahoma

Enel Green Power supports the Tonkawa Fire Department, whose firefighters protect the community that hosts one of Enel's Pioneer Ranch wind farms.



## Our Focus Areas Include:

<b>Education</b>	K-12 STEAM (science, technology, engineering, arts and mathematics) programs, scholarships and partnerships with renewable energy technology programs at local colleges and universities across 10 states and Alberta
<b>Resilient and sustainable communities</b>	Support for over 50 volunteer fire departments, hospitals, health foundations and food banks
<b>Economic development</b>	Partnerships with local chambers of commerce and economic development corporations to support clean energy job transitions and Main Street revitalization initiatives
<b>Civil infrastructure improvements</b>	Upgrades and maintenance of roads, public spaces, parks, playgrounds and public lighting
<b>Environment</b>	Partnerships and projects that promote and support environmental sustainability, including land conservation, biodiversity and wildlife protection
<b>Climate and social equity</b>	Partnerships that advance an inclusive and just energy transition, supporting organizations and communities that create and sustain equitable solutions for all people
<b>Community well-being, recreation and cultural events</b>	Support for more than 15 community-based, nonprofit organizations whose missions and purpose improve community wellness, recreation, sports and culture