

EPB

City of Chattanooga

(Gold Certified under PEER v2)

CASE STUDY

July 2021

The city of Chattanooga, Tennessee has once again set a high benchmark through the achievement of PEER Gold recertification.

EPB, one of America’s largest publicly owned electric power providers, is committed to creating a sustainable community and improving their customers’ quality of life with reliable energy and resilient infrastructure.

Founded with the mission to “enhance the quality of life & to support the local economic growth,” EPB began serving customers in 1939 as an independent board of the City of Chattanooga. In 2008, EPB secured a bond to begin construction of Chattanooga’s Smart Grid, a next-generation electric system that includes communication capabilities. These capabilities help reduce power outages, improve response time during grid disturbances, reduce theft, and support customers in managing their electric power usage. Building upon ten years of research and development, Chattanooga’s Smart Grid is now the most advanced, automated system in the United States.

After becoming the first municipal utility to earn PEER certification in 2015, EPB continued to improve grid performance. In 2021, the utility earned Gold recertification, having the largest number of customers served by a PEER-certified municipal utility in the United States. Through their PEER recertification, Chattanooga has achieved the most resilient and reliable certified utility power grid in the United States.

RELIABLE POWER ENSURING MAXIMUM UPTIME

With the advanced smart grid system in place, EPB ensures power reliability and is constantly on the watch for grid disturbances that would affect their customers. Their intelligent self-healing grid is supported by smart switches, a redundant distribution network, a community-wide 100% fiber-optic backbone, and smart meters. This help EPB deliver unparalleled services, from reliable, automated energy to the world’s fastest internet to their customers.

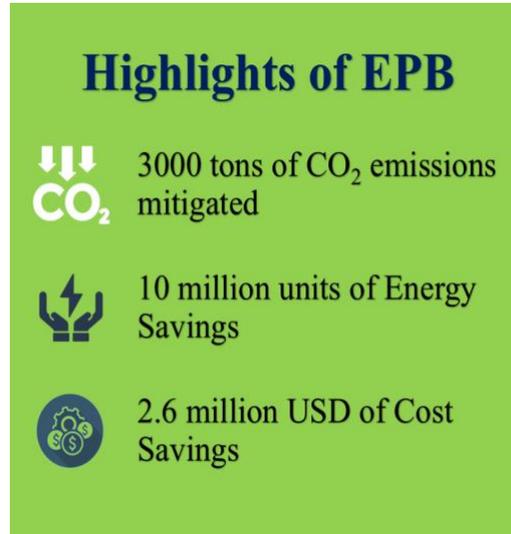


Figure 1: Highlights of PEER Gold certified EPB

EPB has installed Smart Meters for all homes and businesses in their 600 square mile service area. By integrating these meters with the Smart Grid Management System, six billion data points are collected annually. This system provides automated meter reading and billing, outage and voltage anomaly detection, automated connect and disconnect, and theft detection.



Figure 2: Installation of Smart Switches across EPB distribution network



Figure 3: Installation of Smart Meters by EPB personnel for homes

To further strengthen their grid infrastructure, EPB implemented better power quality optimization and demand management strategies such as Power Factor Optimization with Volt-VAR Control (VVC) methods and Conservation Voltage Reduction (CVR) control systems. With these grid modernization strategies implemented, EPB achieved energy savings of 10 million kWh per year and cost savings of about \$2.6 million per year. These measures have also helped Chattanooga EPB to mitigate about 3000 tons of CO₂ emissions annually, which is equivalent to removing the emissions of 972 cars a year.

The reliability metrics of their power system, i.e., the System Average Interruption Duration Index (SAIDI) is 64.4 minutes, which denotes that customers of EPB have faced downtime of just 64.4 minutes in a year. Similarly, their System Average Interruption Frequency Index (SAIFI) is 0.60 denoting that the frequency of downtime in the EPB's operation is also very low, showcasing the reliable and resilient performance of the whole grid infrastructure.

RENEWABLES & ENERGY CONSERVATION DRIVING SUSTAINABILITY

PEER emphasizes renewable energy uptake and demand-side management strategies for utilities such that they might reduce their environmental impact and minimize losses associated with operations.



Figure 4: Ground-mounted solar PV panels in the City of Chattanooga as part of the 'Solar Share' community solar program

Through the opportunities identified during the PEER v1 Certification process, EPB can now provide community-friendly solutions such as renewable energy options that improve the energy mix and offset the environmental impact of the energy consumed. In 2017, EPB launched Solar Share, Chattanooga's first community solar program, which lowers the barriers for customers to participate in renewable energy. Energy generated locally from these 4,408 solar PV panels is available to customers for as little as \$5 per month. Solar Share customers receive solar generation credits equivalent to the generation from the number of panels they lease.

Because power generation from solar varies unpredictably with weather patterns, an increased reliance on renewables can make the whole grid less stable. To overcome this challenge, EPB installed a battery energy storage system (BESS) which is used for a wide variety of applications including solar integration, voltage regulation, backup power, advanced microgrid operations, and energy management. Integrating the BESS with their intelligent grid supports EPB in peak shaving processes and helping them save \$5,000 per month.

Along with these strategies, to raise awareness about efficiency and to reduce energy costs for their customers, EPB launched several energy conservation programs that include:

- **Home Uplift Program (HUP):** This program helps economically challenged homeowners with high energy bills by providing them with a home energy renovation at no charge. Participants save over \$400 annually on average and many report health benefits and greater comfort.
- **Smart Build Home:** A first-of-its-kind program that incentivizes homebuilders to construct new homes that are built to meet energy efficiency standards and are ready for next-generation fiber optic services. EPB Smart Build is a partnership with a growing list of local home builders and offers several certification benefits for new home buyers.
- **Home Energy Checkups:** The Home Energy Checkup is a free comprehensive evaluation of the customer's home. An Energy Pro will look at every portion of the home, analyze, evaluate and advise the customer of most cost-effective upgrades they can make to improve the overall energy efficiency of the home.

All these initiatives helped EPB achieve a PEER Energy Efficiency and Environmental (EE) Index score of 60, much higher than the State of Tennessee’s EE Index score of 44.

Thus, EPB and every customer in the utility’s 600 square mile area, including all of the homes and businesses in the City of Chattanooga, are supporting grid modernization and helping the utility to be reliable, resilient, and efficient.

PEER CERTIFICATION

PEER is a certification that measures and improves power system performance and electricity delivery systems. The rating system evaluates the utilities/ cities performance across six categories that includes:

- “ Reliability and Resiliency (RR)
- “ Energy Efficiency and Environment (EE)
- “ Operations, Management and Safety (OP)
- “ Grid Services (GS)
- “ Regional Priority (RP) &
- “ Innovation (IN)

PEER Certification for City & Utility Projects

Certified 07 July 2021

Total Points Achieved	61
Reliability and Resiliency	15
Energy Efficiency & Environment	11
Operations, Management & Safety	12
Grid Services	19
Innovations & Regional Priority	04
Total Possible Points	110

Out of a possible 110 points, EPB earned 61 points, and achieved PEER v2 Gold certification. As part of the process, the project identified opportunities for continuous improvements such as:

- Hardening their power system against natural disasters such as floods, storms, and earthquakes & ensuring more reliable service by undergrounding 100% of their distribution network.
- Identifying the critical loads and essential services in the project boundary for providing priority power restoration for those during blackouts or brownouts.
- Conducting a comprehensive risk assessment for critical assets within the EPB’s service area and develop mitigation strategies to avoid risks and reduce the impact on power distribution.

About PEER

Performance Excellence in Electricity Renewal (PEER) is a rating system and certification for defining, assessing and verifying the overall sustainable performance of electricity delivery system design & operations. PEER is designed to deliver sustainable, resilient, and reliable energy around the globe. Learn more: peer.gbci.org