



# ACCOMPLISHMENTS

# Q4 FY24



# NETL ACCOMPLISHMENTS

## Quarter 4 – Fiscal Year 2024

### **NETL Projects Resulted in the Installation of the First of Thousands of Solar and Battery Systems in Puerto Rico**

NETL officials joined U.S. Secretary of Energy Jennifer M. Granholm and other DOE personnel to commemorate the installation of the first of thousands of solar and battery systems on low-income homes across Puerto Rico. DOE anticipates installing up to 3,000 systems by the end of 2024. The work is part of the DOE Grid Deployment Office's Puerto Rico Energy Resilience Fund (PR-ERF) to support Puerto Rico's grid resilience efforts and achieve the goal of meeting 100% of its electricity needs with renewable energy by 2050. On behalf of DOE's GDO, NETL released a funding opportunity announcement (FOA) on July 31, 2023, for up to \$450 million to support residential solar and battery storage installations and offer consumer protection and education resources. In late 2023, 10 entities were selected under the FOA, including major solar and battery system companies Generac and Sunnova, as well as other community groups and non-profit organizations. The first solar and battery systems were installed under these agreements in July 2024 with approximately 3,000 systems expected to be installed by the end of 2024.

### **NETL Teamed With the University of Pittsburgh To Win R&D 100 Award**

Researchers at NETL and the University of Pittsburgh received a prestigious R&D 100 Award for their collaborative effort that resulted in the development of revolutionary technology to protect and monitor pipelines, bridges, spent nuclear fuel storage canisters and other crucial components of the nation's infrastructure. The team's innovation, UltraSonic Photonics, uses a combination of fiber-optic sensing and ultrasonic acoustic non-destructive evaluation to provide 24/7 monitoring of infrastructure and equipment and issue alerts and warnings before a failure occurs.



### **New Information on Rotating Detonation Engine Waves Revealed in NETL Study**

NETL researchers investigated rotating detonation engine waves and discovered that what had been previously understood to be unstable behavior is actually a repeatable and persistent mode of operation observed over longer time frames. This new information could help design more reliable and efficient power generation systems in the future that will help reach the nation's decarbonization goals. The study, "Limit Cycle Oscillating Detonation Wave Behavior Analysis Within a Rotating Detonation Engine" was published in the Journal of Propulsion and Power.

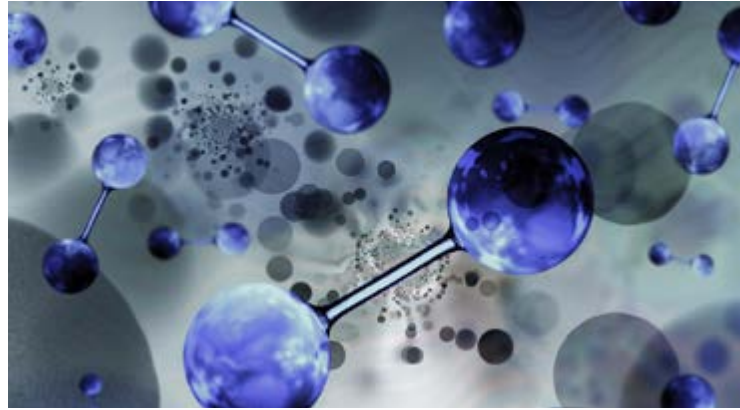
### **NETL and Cecilia Energy Incubate New Technology to Address Plastic Waste**

NETL and Newark, New Jersey-based Cecilia Energy combined their strengths in a novel Cooperative Research and Development Agreement (CRADA) that aims to solve one of the world's greatest environmental challenges while creating upcycled products in the process. Plastic is integrated into our modern life, but 90% of it isn't being recycled and most plastic is incapable of being recycled with today's solutions. In fact, half of all plastic that has ever existed was made in just the last 15 years. By 2050, the world will have exceeded crisis levels without a way to mitigate plastic waste. NETL and Cecilia Energy have already been working on such a solution.



## NETL-Led Consortium Receives Feedback To Develop Alloys That Meet Hydrogen-Related Challenges

Several of the nation's top engineers shared insights during a recent meeting with members of eXtremeMAT-H2, an NETL-led consortium of national laboratories, to accelerate the development of reliable, cost-effective alloys that can withstand long-term exposure to hydrogen-containing environments at elevated temperatures, such as environments found in advanced, hydrogen-fueled power plants and other industries. The use of hydrogen as a fuel is an integral part of the nation's efforts to achieve net-zero greenhouse gas emissions by 2050 because it offers significant potential to reduce carbon dioxide emissions in sectors that are difficult to decarbonize, including power generation, heavy-duty transportation, chemical production and industrial heating.



## First-of-Its-Kind Software Integration With Wafer-Scale Engine Achieved

NETL researchers took a significant step forward in harnessing the power of the world's largest computer chip — the Wafer-Scale Engine (WSE) — by using an application programming interface designed in-house to connect commercial computational fluid dynamics (CFD) software through data-file sharing with the next-generation computing technology. CFD software enables researchers to model the complex behavior of energy systems to help increase efficiency and performance. Typically, CFD relies on high-performance supercomputing, but such systems based on the WSE hold the promise to run high-fidelity simulations hundreds of times faster and with far less energy.

## NETL Carbon Mineralization Article Highlighted Lab's Achievements in Research Field

NETL's work in developing carbon mineralization technologies, which presents an alternative pathway toward a decarbonized power sector and economy, is gaining widespread recognition from the greater research community. The Lab's established role as a key technical contributor in this field is evidenced by an article co-authored by NETL experts published in the Wiley journal ChemBioEng Reviews. The authors were notified that their review article, "Mineralization of Carbon Dioxide: Literature Review" is among the journal's most read articles (top 40 most read, recently and all-time) and most cited articles (top 30 most recently, and all-time). That the article stands out among ChemBioEng Reviews' readership highlights the impact of NETL's work in the field of carbon management.

