How AI Is Powering the Future of Clean Energy

New ‘I AM AI’ video highlights how NVIDIA and its partners help manage renewable energy at scale using the latest technologies.

Author: Marc Spieler

AI is improving ways to power the world by tapping the sun and the wind, along with cutting-edge technologies.

The latest episode in the I AM AI video series showcases how artificial intelligence can help optimize solar and wind farms, simulate climate and weather , enhance power grid reliability and resilience, advance carbon capture and power fusion breakthroughs.

It’s all enabled by NVIDIA and its energy-conscious partners, as they use and develop technology breakthroughs for a cleaner, safer, more sustainable future .

Homes and businesses need access to reliable, affordable fuel and electricity to power day-to-day activities.

Renewable energy sources — such as sunlight, wind and water — are scaling in deployments and available capacity. But they also burden legacy power grids built for traditional one-way power flow: from generation plants through transmission and distribution lines to end customers.

The latest advancements in AI and accelerated computing enable energy companies and utilities to balance power supply and demand in real time and manage distributed energy resources, all while lowering monthly bills to consumers.

The enterprises and startups featured in the new I AM AI video, and below, are using such innovations for a variety of clean energy use cases.

Companies are turning to AI to improve maintenance of renewable power-generation sites.

For example, reality capture platform DroneDeploy is using AI to evaluate solar farm layouts, maximize energy generated per site and automatically monitor the health of solar panels and other equipment in the field.

Renewable energy company Siemens Gamesa is working with NVIDIA to apply AI surrogate models to optimize its offshore wind farms to output maximum power at minimal cost. Together, the companies are exploring neural super resolution powered by the NVIDIA Omniverse and NVIDIA Modulus platforms to accelerate high-resolution wake simulation by 4,000x compared with traditional methods–from 40 days to just 15 minutes.

Italy-based THE EDGE COMPANY , a member of the NVIDIA Metropolis vision AI partner ecosystem, is tracking endangered birds near offshore wind farms to provide operators with real-time suggestions that can help prevent collisions and protect the at-risk species.

Energy grids also benefit from AI, which can help keep their infrastructure safe and efficient.

NVIDIA Metropolis partner Noteworthy AI deployed smart cameras powered by the NVIDIA Jetson platform for edge AI and robotics on Ohio-based utility FirstEnergy’s field trucks. Along with AI-enhanced computer vision , the cameras automate manual inspections of millions of power lines, poles and mounted devices.

Orbital Sidekick , a member of the NVIDIA Inception program for cutting-edge startups, has used hyperspectral imagery and edge AI to detect hundreds of suspected gas and hydrocarbon leaks across the globe. This protects worker health and safety while preventing costly accidents.

And Sweden-based startup Eneryield is using AI to detect signal anomalies in undersea cables, predict equipment failures to avoid costly repairs and enhance reliability of generated power.

AI and digital twins are unleashing a new wave of climate research , offering accurate, physics-informed weather modeling, high-resolution simulations of Earth and more.

NVIDIA Inception member Open Climate Fix built transformer-based AI models trained on terabytes of satellite data. Through granular, near-term forecasts of sunny and cloudy conditions over the U.K.’s solar panels, the nonprofit product lab has improved predictions of solar-energy generation by 3x. This reduces electricity produced using fossil fuels and helps decarbonize the country’s grid.

Plus, a team of researchers from the California Institute of Technology, Stanford University, and NVIDIA developed a neural operator architecture called Nested FNO to simulate pressure levels during carbon storage in a fraction of a second while doubling accuracy on certain tasks. This can help industries decarbonize and achieve emission-reduction goals.

And Lawrence Livermore National Laboratory demonstrated the first successful application of nuclear fusion — considered the holy grail of clean energy — and used AI to simulate experimental results.

Learn more about AI for autonomous operations and grid modernization in energy .

Original URL: https://blogs.nvidia.com/blog/2023/07/27/i-am-ai-clean-energy/