DOUBLE DOWN, TRIPLE UP.

20 SOLUTIONS IN ACTION

SOLARIMPULSE FOUNDATION

Global Renewables Alliance

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SOLARIMPULSE
FOUNDATION

WORDS FROM BERTRAND PICCARD

OUR CURRENT WAY OF OPERATING IS BOTH UNSUSTAINABLE AND IRRATIONAL.

More than two thirds of the energy produced ends up being wasted through inefficient production and consumption processes. Why? Because our world is still using outdated infrastructure and systems that were invented 120 years ago at the beginning of the oil era: thermal engines, badly insulated buildings, inefficient heating and cooling, without even mentioning the obsolete industrial processes and dirty energy sources.

This is not only detrimental to the environment, it is also tremendously expensive: 4,6 trillion dollars are lost every year!

By harnessing the full potential of existing technical solutions and optimising the way we use resources, we can drastically reduce emissions while driving economic and social welfare.

This publication showcases real-life energy efficiency stories - a year after the "Double Down, Triple Up" COP28 pledge- , and together with the Global Renewables Alliance, we want to show that change is underway; that efficiency and renewables are a credible and urgent path forward.

Efficiency is in the DNA of the Solar Impulse Foundation. Flying around the world in a solar-powered airplane would not have been possible without renewable energy, obviously. But efficiency was also at the heart of the project, to ensure we could cope with the amount of energy given by the sun. Since the flight, through the Solar Impulse Efficient Solution Label, we dedicate our efforts to identifying, labelling and promoting all the solutions that can take the world towards more efficiency.

Every sector, from energy to transportation, holds immense untapped potential for efficiency improvements, offering the most immediate and impactful opportunities for change. Now is the time for a collective push to prioritise smarter energy use, minimise waste, and accelerate the transition to a low-carbon economy.

Renewables and efficiency: two sides of the same coin, leading us to a more sustainable world and a more profitable economy!

President of the Solar Impulse Foundation

WORDS FROM BRUCE DOUGLAS

AS WE STAND AT A CRITICAL JUNCTURE IN THE GLOBAL ENERGY TRANSITION, THE URGENCY FOR AMBITIOUS ACTION HAS NEVER BEEN MORE PRONOUNCED.

Achieving our dual targets of tripling renewable energy capacity and doubling energy efficiency by 2030 will enable the phase out of fossil fuels and deliver 80% of the emissions reductions necessary to limit global warming to 1.5°C. This goal is vital for securing a sustainable, inclusive, and economically resilient future, particularly for emerging markets and developing economies.

In 2023, record investments in renewable energy reached USD 570 billion, with solar and wind now recognised as the most cost-effective energy sources globally. However, we must confront significant challenges, including inadequate policy implementation and enduring fossil fuel subsidies that impede our progress.

The Global Renewables Alliance is proud to partner with the Solar Impulse Foundation to launch this project, which seeks to inspire tangible actions towards our ambitious targets. This publication presents compelling examples from around the world, illustrating how companies together with governments and communities are pioneering solutions that not only advance our objectives but also enhance energy security and create green jobs.

These case studies demonstrate that delivering on our global targets is indeed possible with the right enabling frameworks. They illuminate the concrete actions necessary for building a clean, secure, and just energy future. As we continue to push for greater ambition and accountability, the GRA remains committed to keeping the focus on the clean energy goals secured at COP28.

Together, we can chart a route forward, driving the critical actions needed at COP29 and beyond. I invite you to explore these solutions and join us in this essential journey toward a clean, secure and just energy future for all.

Chief Executive Officer of the Global Renewables Alliance

DOUBLE DOWN.
TRIPLE UP.

SOLARIMPULSE FOUNDATION

Global Renewables Alliance

MEETING THE DUAL TARGETS OF *TRIPLING RENEWABLE ENERGY CAPACITY AND DOUBLING ENERGY EFFICIENCY BY 2030* COULD DELIVER 80% OF THE EMISSIONS REDUCTIONS NEEDED TO LIMIT GLOBAL WARMING TO 1.5°C.

This combined approach is essential: expanding renewable energy increases the sustainable energy supply, while efficiency cuts demand, ensuring the best use of clean resources. Together, they pave a route away from fossil fuels toward a clean energy future and strengthen economic resilience, especially in emerging markets and developing economies reliant on stable and affordable energy.

Ahead of COP28, the "Double Down, Triple Up" campaign was launched by the Global Renewables Alliance (GRA) with over 250 partner organisations to secure a unified global commitment to renewable energy and efficiency goals.

The campaign's call is twofold: "Triple Up" highlights the need to increase global renewable energy capacity threefold by 2030, driven by strategic investments, policy support, and innovation across solar, wind, and other renewable technologies to create a cleaner, more reliable energy mix. In parallel, "Double Down" underscores the critical role of energy efficiency, a rapid, cost-effective way to lower CO_2 emissions. Through efficiency measures, the campaign aims to reduce energy demand, optimise the use of renewables, and enhance energy security.

Uniting a wide range of voices, from industry leaders to policymakers, the campaign reflects an urgent, coordinated focus on renewables and efficiency as essential elements of a stable energy transition. Achieving these targets promises not only emissions reductions but also significant economic benefits, including job creation and enhanced resilience.

This publication supports the "Double Down, Triple Up" campaign's mission by sharing practical, real-world examples that illustrate how actors worldwide are advancing these targets.

Each case offers a concrete solution - whether through cutting-edge energy-saving technology or community-owned renewable projects - providing both vision and tangible actions to help shape a clean, secure and just energy future for all.

SOLAR**IMPULSE**
FOUNDATION

> ENERGY EFFICIENCY

ENHANCING ENERGY EFFICIENCY PROGRESS UNTIL 2030 IS A KEY STEP IN EFFORTS TO REACH INTERNATIONALLY-AGREED CLIMATE OBJECTIVES.

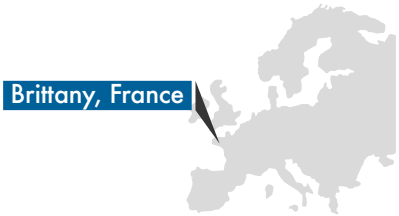
According to the IEA[1], energy efficiency is the "first fuel" in clean energy transitions: it provides some of the quickest and most cost-effective CO_2 mitigation options while lowering energy bills and strengthening energy security. Doubling the pace of energy efficiency progress can lead to approximately 40% of the necessary CO_2 emissions reduction by 2030. Energy efficiency and renewables are two interwoven dimensions. For a renewable-based energy system to meet the needs of all sectors, including hard-to-abate industries, efficiency must be built in from the start.

Energy efficiency is achievable across every domain: electricity, gas, heat, buildings, agriculture, water, ICT, transport, industry, etc. There is no one single action to take to reduce our consumption but a myriad of small actions that will together make a difference. By identifying water leaks, we reduce energy consumption. By insulating buildings, we reduce energy consumption. By re-using waste heat, we save energy. Each of these levers have a role to play - and must be activated now. Equally, all stakeholders - from industries and SMEs to households, national governments and local authorities, must engage.

Energy efficiency is an attitude, a way of doing that should prevail in a virtuous economy based on the respect of our planetary boundaries, because energy efficiency also leads to resource efficiency.

This isn't just about CO_2 reduction. Lowering energy consumption also cuts related costs, boosts industrial competitiveness, and eases household energy bills. Worldwide, energy efficiency could save annually $4.6 trillion[2]. Money much needed to modernise our infrastructures and invest in our cleantech industry. Energy efficiency and renewable energies should be integrated and planned together to amplify each other's benefits. Our current way of living is inefficient and outdated. It's time to modernise our infrastructure, production, mobility, and food systems.

THE MOMENT TO ACT IS NOW.



EUREDEN
LA TERRE NOUS RÉUNIT

ecorobotix

DOUBLING DOWN BY...

REDUCING CHEMICAL USE IN AGRICULTURE *WITH PRECISION WEED CONTROL TECHNOLOGY*

> FRENCH FARMS REDUCE CHEMICAL AND FUEL USE THANKS TO PRECISION TECHNOLOGY, CUTTING CHEMICAL EXPOSURE AND BOOSTING CROP YIELDS.

Eureden, a leading agricultural cooperative in France, sought a sustainable solution to reduce chemical treatment (herbicides, pesticides, liquid fertilisers) use in their crop management. They implemented the ARA precision sprayer from Ecorobotix, an advanced weed control technology that uses real-time image analysis to accurately target unwanted plants.

During the 2023 bean season, this technology was tested across 100 hectares, leading to an impressive 85% reduction in chemical use while maintaining crop quality and yields. Encouraged by these promising results, Eureden plans to expand the use of this innovative tool to other crops like carrots and spinach. Eureden has partnered to offer financial support, backed by the Morbihan département, to farmers using ARA, encouraging the adoption of practices that reduce crop protection products and promote environmental sustainability.

WHY IS IT IMPORTANT?

Agriculture accounts for 27% of global greenhouse gas (GHG) emissions and must transform to meet the demands of a growing population, nearing 10 billion by 2050. Pesticide use in traditional farming has surged from 1.71 million tonnes in 1990 to 3.70 million tonnes in 2022, posing risks to both human health and the environment.[1] If current practices persist, CO_2e emissions are projected to rise by 15 to 20% by 2050.[2]

Precision farming improves input accuracy, reducing chemical use and GHG emissions.

In the U.S., it has cut herbicide use by 9% (15 million kilograms) and saved 500 million litres of fuel by improving monitoring and reducing task overlap.[3] In developing countries, precision techniques minimise pesticide use and enhance resource efficiency, protecting ecosystems in vulnerable regions. If adopted by 15-25% of farms globally, it could increase crop yields by 10-15% by 2030, boosting productivity while reducing the environmental impact of traditional farming.[4]

>ARA®

ARA is a precision spot sprayer equipped with real-time image analysis to identify and target weeds or crops with pinpoint plant protection product application (herbicides, insecticides, fertilisers, growth treatment). This 6-metre-wide trailer, towed by a tractor, uses 156 nozzles to deliver treatments precisely, guided by user-selected settings from its software.

"After a successful large-scale trial last year, in 2024 we launched a weed control service on beans and flageolets with ARA. 380 ha were successfully weeded as a catch-up, with an average herbicide reduction of 71%!"

> Julien Prat, Assistant Manager, industrial vegetables, Eureden Cooperative

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

- **Up to 90% energy savings in application of plant protection products and fertilisers due to their usage reduction**
- **Able to detect and spray a plant within square of 6x6cm, leaving a plant outside of this surface untouched**
- **Savings in fuel consumption, estimated at 2.5kg CO_2/ha**

> ECONOMIC & SOCIAL BENEFITS

- **Drastic cost cuts for treatment products**
- **Improved yields and crop quality therefore increasing their potential value once on market**
- **With 44% of farmers poisoned by pesticides annually,[5] reducing plant protection product use significantly improves their health and safety**

For many more agriculture efficient solutions, visit:

AQUA4D®

SF ALMACIGOS

DOUBLING DOWN BY...

REDUCING WATER AND ENERGY CONSUMPTION INDUCED BY *SALINE AGRICULTURE*

> PERUVIAN PLANT NURSERIES CUT ENERGY USE BY 3,000 TIMES WHILE PRESERVING WATER IN SALINE-AFFECTED AGRICULTURAL AREAS

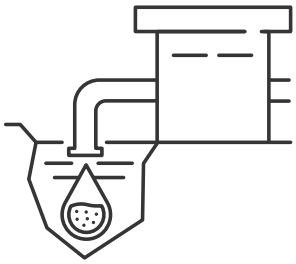
SF Almácigos, a plant nursery in Peru, struggled with high soil salinity, which affected crop yields and plant health. Initial methods used to address the issue, like Reverse Osmosis (RO), proved costly and unsustainable due to water scarcity and high energy consumption. In 2020, they implemented the AQUA4D system, which significantly reduced soil salinity as effectively as RO but with far greater efficiency. **Over an 80-day period, AQUA4D consumed 3,000 times less energy than RO, using just 1.78 kW/m³ compared to RO's 3,549 kW/m³, while also preserving the water's natural composition.** This shift to AQUA4D allowed SF Almácigos to lower operating costs and reduce environmental impact, making it a more sustainable, cheaper and energy-efficient solution for long-term water and soil management.

WHY IS IT IMPORTANT?

Approximately 23% of the world's cultivated land is impacted by salinity.[1] While soil salinization occurs naturally in arid and semi-arid regions, human activities and climate change can worsen it, negatively impacting crops, pastures, and trees by disrupting nitrogen uptake, limiting growth, and preventing plants from reproducing. Particularly, poorly managed irrigation systems can increase salt concentrations in soils, while rising sea temperatures, unpredictable rainfall, and sea level rise contribute to seawater seeping into freshwater sources. This worsens soil salinity, **threatening agricultural productivity**.

This problem is especially pronounced in coastal areas, where the excessive accumulation of soluble salts can be damaging for arable lands.[2]

In Peru, this issue is significant, with around **300,000 hectares of irrigated land affected by salinization**, half of which suffer severe salinity levels. Over 40% of Peru's coastal agricultural areas face this challenge, making it crucial to address for sustaining agriculture and food production in the region.[3]



>AQUA4D®

AQUA4D is a water-smart irrigation system that integrates into existing setups, enhancing efficiency and reducing soil salinity. Installed at the pump station, this machine uses low-energy technology to restructure water, improving nutrient absorption and flushing salts from soil. This boosts crop health and conserves water and energy, ideal for sustainable farming.

"AQUA4D is the only technology which solves salinity by saving water in the process. In this sense, we can truly see this approach as a revolution for the management of salt in soils"

> Enrique Rebaza,
Peru-based Agronomist

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

- 30% fertiliser optimisation due to better nutrients uptake
- Water savings range between 15 to 30%
- Reduces energy consumption
- Reduces water and consumables waste

> ECONOMIC & SOCIAL BENEFITS

- Reduces water, energy and consumables consumption, lowering farming costs
- Ensures reliable crop yields, supporting food security

For many more agriculture efficient solutions, visit:

HOLCIM

DOUBLING DOWN BY...

USING INNOVATIVE INSULATION MATERIALS FOR CONSTRUCTION AND RENOVATION

> ALGERIAN BUILDINGS SAVE 12.21 MILLION KWH ANNUALLY THROUGH INSULATION

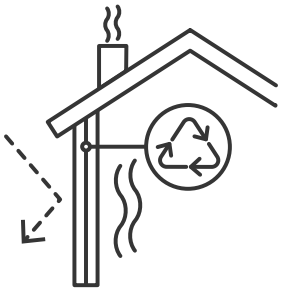
What began as a one-off roof renovation at Belgaid secondary school in Oran, Algeria, has grown into a large-scale energy-saving initiative. Over 220,000 m² of buildings, including schools, hospitals and homes across the country, have since been insulated with Airium™ mineral foam, **resulting in annual energy savings of 12.21 million kWh and preventing 5,104 tonnes of CO_2 emissions.** This groundbreaking material, with an average thickness of 12 cm, improves thermal comfort by up to 2°C during winter, with up to 61% reduction in heating needs and 45% lower cooling demands, translating to significant energy savings.

Airium, in its roofing systems application, has now expanded beyond Algeria and is now available in Morocco, Jordan, Mexico, Oman, the UAE, Qatar, and Poland, bringing significant environmental and energy benefits to these regions.

WHY IS IT IMPORTANT?

The building sector is responsible for nearly **40% of global energy use and generates 33% of the world's greenhouse gas emissions.**[1] Despite advancements in insulation, many older buildings — like the 85% of European structures built before 2000, of which three-quarters have poor energy performance[2] — still lack sufficient energy efficiency. **Enhancing the insulation of buildings can dramatically cut energy consumption and reduce carbon emissions**, as it requires less energy to maintain comfortable temperatures—both in winter and in summer.[3]

In Algeria, the **annual energy consumption more than doubled over the last 20 years**, rising from 305 TWh in 2004 to 705 TWh by 2023, while 99.73% of the country's energy still came from fossil fuels that year.[4] Nearly 30% of the nation's total energy consumption goes to the residential sector, with 70% of that used for heating and cooling.[5] Innovative insulation materials are key to significantly lower energy use, directly addressing the growing demand for heating and cooling, and the need to reduce fossil fuel reliance.



>AIRIUM™

Airium™ mineral foam is a cost-effective, on-site produced insulation for new builds and renovations. Its mobile production unit minimises waste, while providing continuous insulation without thermal bridges. Four times lighter than traditional (polystyrene) materials, Airium™ is also easy to recycle, making it an environmentally responsible choice for large-scale projects.

"We chose Airium for its ease of use, lightness, and ability to eliminate thermal bridges, providing better thermal comfort. It replaced two materials at once, making our project more efficient."

> Sarra Boualem & Mohamed Fouad Aitamer, Architect and Commercial Agent at Ben Melissa real estate development.

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

- Unlike Polystyrene, Airium is fully recyclable and can be ground with demolition waste just like concrete
- Aterial is foamed on site, reducing the need for importing, transporting, and storing
- Reduces by ~61% heating and 45% cooling energy needs for individual housing

> ECONOMIC & SOCIAL BENEFITS

- More than 10% cheaper in installed cost per m² compared to traditional alternatives
- Increases affordability for low-income households through reduced energy consumption
- Savings of 195€ per year in heating and cooling costs for a 107m² house per year

For many more construction efficient solutions, visit:

Dakar, Senegal

COOL ROOF

pullman HOTELS AND RESORTS

DOUBLING DOWN BY...

REDUCING COOLING NEEDS WITH *REFLECTIVE ROOF TECHNOLOGY*

> DAKAR HOTEL REDUCES ELECTRICITY USE BY 36% AND ENERGY CONSUMPTION BY 13%, MITIGATING THE URBAN HEAT ISLAND EFFECT

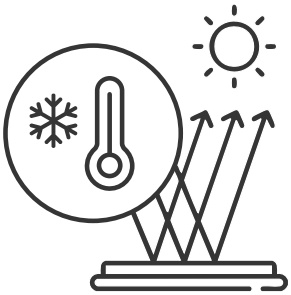
In Dakar's business district, the Pullman Dakar Teranga hotel faced persistent overheating across its 1,500 m² of terraces, contributing to excessive energy use for cooling. To address this challenge, the hotel implemented the CoolRoof solution, completing the installation in just 15 days at the end of 2021.

The results were striking: in 2022, **energy consumption fell by 13% compared to 2019 when accounting for Unified Degree Days (UDD)** [1] **and by 10% without it**. Adjusting for the hotel's occupancy rate, electricity use decreased by 36% during the same period. This reflective roofing technology not only lowered cooling demands but also demonstrated the potential of such solutions to mitigate urban heat in regions increasingly affected by rising temperatures and heat waves.

WHY IS IT IMPORTANT?

Dakar, with a population exceeding 1 million, experiences average temperatures ranging from 25 to 32°C year-round.[2] These persistently high temperatures contribute to health issues such as hypertension, diabetes, and dehydration. Globally, access to air conditioning remains limited in developing regions, where affordability and unreliable electricity infrastructure create barriers.

Urban areas, such as Dakar, face the additional challenge of the urban heat island effect, where cities are significantly warmer than surrounding rural regions. This occurs because urban surfaces, such as roofs and pavements, absorb and retain large amounts of sunlight. **These surfaces cover about 60% of urban spaces and absorb over 80% of the sunlight they receive, further intensifying the heat.**[3] Installing cool roofs with solar reflectance can reduce heat absorption and keep homes cooler. Conventional roofs can reach temperatures of 65°C or more on a sunny summer afternoon, while reflective roofs can stay over 28°C cooler under the same conditions.[4]



>COOL ROOF

A white thermo-reflective coating that reflects 90% of the sun's heat, creating a complete thermal shield. It can be applied to various substrates, such as bituminous bilayer, steel, roof tiles, and asbestos. Additionally, it helps reduce the urban heat island effect from black roofs in summer, benefiting surrounding neighbourhoods.

ONE SOLUTION, MANY EFFICIENCY GAINS

ENVIRONMENTAL BENEFITS

- Reduces surface temperatures, easing the strain on local energy grids during peak demand and helping prevent power disruptions in heatwave-prone areas
- 20 to 40% energy consumption savings on building air conditioning annually

ECONOMIC & SOCIAL BENEFITS

- Mitigates the urban heat island effect, making cities more livable during extreme heat events
- Cost reduction due to energy consumption reduction (for example, in France, with a kWh price of €0.22, the saving is €5/m²)
- Reduces indoor temperatures by up to 8°C, lowering the risk of heat-related illnesses like heatstroke and dehydration in urban communities

For many more cooling solutions, visit:

ETC

wienerberger

DOUBLING DOWN BY...

CAPTURING AND REUSING *INDUSTRIAL WASTE HEAT*

> WORLD'S LARGEST BRICK PRODUCER RECOVERS 2,100 MWH OF WASTE HEAT ANNUALLY, SAVING 450 TONNES OF CO_2 AND OVER €100,000 IN ENERGY COSTS.

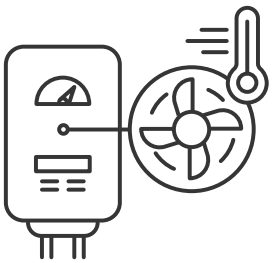
Wienerberger AG, the world's largest brick producer, partnered with Eco-Tech Ceram to recover waste heat from six kilns to supply six dryers at its Pontigny site in France. Using Eco-Stocks®, waste heat is captured, stored, and recycled, enabling 100% waste heat usage for drying roof tiles, eliminating natural gas consumption, and achieving carbon-free drying.

This solution is expected to save 2,100 MWh annually and reduce CO_2 emissions by over 450 tonnes per year. With a carbon footprint of 350 tCO_2e and a 20-year lifespan, the system offsets its impact in just over nine months. Wienerberger avoided upfront investment by purchasing decarbonised heat "as a service," representing annual savings of €105,000 at a natural gas price of €50/MWh.

WHY IS IT IMPORTANT?

Industries worldwide, from cement, steel production and oil and gas to data centres, lose substantial amounts of heat during their processes. **In France alone, recovering this industrial waste heat could generate enough energy to power 1.6 million homes**, highlighting the significant potential for energy savings.[1]

Despite the clear benefits of waste heat recovery, **more than 3,100 TWh of recoverable heat—equivalent to 50% of total energy inputs—remains untapped globally.** Leveraging this potential could have a major impact; **utilising waste heat for energy could globally save up to €140 billion annually**, comparable to the EU's natural gas imports.[2]
Much of this waste heat, generated at temperatures above 40°C, could be repurposed for district heating networks.[3] However, only 9% of global heating needs are currently met through district heating, with 90% still relying on fossil fuels.[4]



> ECOSTOCK®

The EcoStock® thermal storage unit recovers waste heat from furnaces, which can lose up to 70% of their energy. A fan draws fumes into a ceramic-filled container, capturing heat up to 600°C and storing up to 3 MWh per cycle, which can be reused for drying, preheating, and hot water production.

"With its Eco-Stock® solution, Eco-Tech Ceram will allow us to recover waste heat from the six Pontigny kilns and to use this waste heat in our dryers. This will allow us to avoid any gas consumption in the dryers and to save 480 tons of CO_2 per year."

> Robert Lacroix,
Director of Sustainable Development,
Wienerberger France

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

5,889 MWh saved since 2019 with an emission factor of 0.216

1,293 tonnes CO_2 avoided by mid-2024 since 2019

> ECONOMIC & SOCIAL BENEFITS

264,000 € saved since 2019 with gas prices at 50€/MWh

For many more waste-heat management efficient solutions, visit:

DOUBLING DOWN BY...

OPTIMISING HVAC-R ENERGY MANAGEMENT IN LOGISTICS OPERATIONS

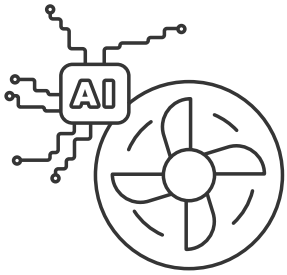
>GLOBAL LOGISTICS LEADER REDUCES ENERGY USE BY 37%, SAVING $600,000 ANNUALLY AND CUTTING 1,000 TONS OF CO_2 THROUGH AI-DRIVEN ENERGY MANAGEMENT PLATFORMS

Since 2018, DHL's Advanced Regional Center in Singapore has been working with BeeBryte to tackle inefficiencies in its storage system operations. The 90,000 m² warehouse was consuming significant amounts of energy for cooling. The objective for DHL was to further enhance energy efficiency through predictive and adaptive control, rather than traditional reactive methods, while ensuring comfort and meeting operational requirements. Hive Optimal improved DHLs understanding of Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC-R) systems, reduced maintenance response times, and strengthened the resilience of the facilities. This resulted in a **37% annual energy reduction, saving $600,000 and preventing 1,000 tons of CO_2 emissions per year.**

WHY IS IT IMPORTANT?

Singapore ranks among the top three countries globally for per capita energy consumption, largely due to its reliance on imported natural gas, which supplies over 90% of the country's energy needs.[1, 2] As a leading global logistics hub, Singapore's logistics sector is projected to grow by $5 billion by 2025, increasing demand for energy, particularly in warehouses[3]. Refrigerated warehouses, for example, use up to 60% of their electricity on cooling, and energy costs can account for a significant portion of operational expenses[4].

Globally, the warehousing market is projected to reach $1,007.5 billion by 2028, driven by e-commerce[5]. As the number of warehouses continues to grow, optimising energy use with advanced management systems becomes essential for reducing costs, cutting emissions, and improving operational efficiency[6]. **This is particularly important for Singapore, which has set an ambitious goal of improving energy efficiency by 36%** from 2005 levels by 2030, aligning with its broader sustainability and economic objectives.



>HIVE OPTIMAL

A remote operation & maintenance service for large HVAC-R systems using a predictive control technology, functioning without any equipment replacement. Using AI, it leverages weather forecasts and activity patterns to anticipate energy demand, adjusting equipment operations and set points. It improves the reliability of the installations (early detection of anomalies) and reinforces temperature uniformity in different zones, guaranteeing compliance with prescribed constraints, such as air quality.

"BeeBryte's Hive Optimal has actually helped us reduce our carbon footprint, and of course, it's part of our global goal to reduce our carbon emissions. At times, whenever there is an upsurge or downsurge, they will ask us, is there something wrong with the aircon system today? Are you doing something in the background? The results have been very optimistic so far. We have seen a 15% reduction in our electricity bill for our aircon consumption at ARC warehouse level 1."

> Cham May Lin, Assistant Manager, Operations Excellence DHL Supply Chain

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

- **Up to 40% savings in annual HVAC-R energy consumption**
- **Increased system reliability**

> ECONOMIC & SOCIAL BENEFITS

- **Early detection of anomalies to avoid downtime**
- **Improves occupant comfort with better temperature management**
- **Up to 40% energy cost savings**

For many more HVAC-R efficient solutions, visit:

SOLARIMPULSE FOUNDATION

GO TO-U

DOUBLING DOWN BY...

SPEEDING UP THE TRANSITION AWAY FROM INEFFICIENT THERMAL ENGINE CARS

> 1,000 CHARGING HUBS DEPLOYED IN UKRAINE, PROVIDING 5.66 GWH OF ENERGY—ENOUGH TO POWER THOUSANDS OF EVS AND ACCELERATE THE SHIFT TO ELECTRIC MOBILITY

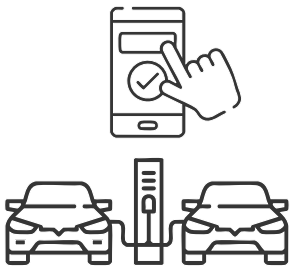
In 2023, despite the ongoing war and related energy challenges, Ukraine took important steps to expand its electric vehicle (EV) infrastructure. Equipped with the GO TO-U platform, high-speed charging stations were installed in Lviv, Rivne, Kyiv, Ivano-Frankivsk, and other regions. As a showcase location, the Uman hub, features six chargers and delivered 36,256.3 kWh of energy in August 2024 alone. By increasing the accessibility of charging points along major routes and in urban centres, these hubs make EV ownership more practical and appealing. Despite power grid damage, this initiative, backed by European investment, highlights Ukraine's resilience.

Since 2020, GO TO-U has facilitated nearly 1,000 charging stations across 200 locations in Ukraine, supplying 5.66 Gigawatt-hours of energy in the last 12 months.

WHY IS IT IMPORTANT?

Ukraine's energy infrastructure has been significantly destabilised due to the ongoing war, making energy efficiency and resilience top priorities. The government has set 2030 energy efficiency targets and adopted the National Energy Efficiency Action Plan to build a decentralised energy system.[1] **In fact, while internal combustion engine (ICE) vehicles operate at about 30% efficiency, electric motors exceed 80%, making EVs a far more efficient solution.**[2]

In addition, with Ukraine's electricity mix being largely low-carbon and mainly local — 70.43% coming from nuclear and renewable sources— shifting from oil to electricity for its mobility needs will boost the country's energy independence and lower its reliance on oil imports.[3] Beyond hardware, digital solutions are crucial for optimising charging networks, simplifying usage for consumers, and reducing grid strain. Strengthening EV infrastructure is key to meeting rising demand and enhancing energy independence while rebuilding the nation's energy resilience amid ongoing challenges.



> GO TO-U

GO TO-U is a digital platform with a mobile app that connects users to over 500,000 chargers in 67 countries. Its advanced reservation technology allows users to schedule charging sessions conveniently along their routes, while partnerships with local businesses create efficient charging hubs for EV drivers.

"Collaboration with GO TO-U has given us the opportunity to create a truly unique charging hub that stands out in the Ukrainian market. For our business, this has been a major advantage, as the efficient distribution of stations and the use of GO TO-U's innovative solutions have led to a consistent increase in profits. We are genuinely pleased with how this partnership has transformed our approach to managing charging stations and given us a competitive edge."

> Semen Sapaiev,
Uman charging hub owner

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

33,710 kg of CO_2 emissions prevented per month/ business location

Accelerating the transition away from fossil fuels and promoting system efficiency

> ECONOMIC & SOCIAL BENEFITS

More than 500,000 chargers across 67 countries

5x higher utilisation rate of the EV charging stations

For many more electric vehicles solutions, visit:

SOLARIMPULSE FOUNDATION

OpenAirlines

norwegian

DOUBLING DOWN BY...

ADOPTING FUEL-OPTIMISING CLOUD-BASED *AVIATION SOFTWARES*

>NORWEGIAN AIRLINES REDUCED FUEL CONSUMPTION BY 2% BY USING DATA-DRIVEN SOLUTION THAT EMPOWERS PILOTS TO OPTIMISE FUEL EFFICIENCY

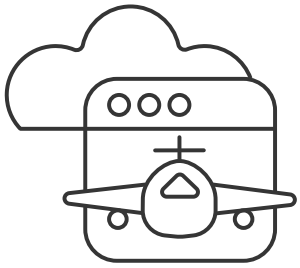
In 2018, Norwegian Airlines transported 37 million passengers. Its fleet consisted of over 170 aircraft aged 3.8 years on average, making it one of the youngest and most fuel-efficient fleets globally. While fuel efficiency was a priority, the existing system provided KPIs to management but lacked the ability to offer accurate, actionable recommendations to analysts and pilots. Since early 2019, Norwegian Airlines has been using SkyBreathe® eco-flying solution to identify opportunities to increase its savings and reduce its CO_2 emissions.

As a result, the airline has been able to reduce their fuel consumption by 2%. **Since 2019[1], the savings reached more than 253,900 tonnes of CO_2. In 2023, the company saved 19,200 tonnes of fuel, equivalent to 60,600 tonnes of CO_2**, by using SkyBreathe® Analytics to manage the fuel program and MyFuelCoach app to boost pilot engagement.[2]

WHY IS IT IMPORTANT?

Aviation contributes 2% of global CO_2 emissions, with emissions projected to triple by 2050 in view of the aviation trends. **Despite annual fuel efficiency improvements of 1.8% from 2010 to 2019, demand for air travel grew by over 5%, outpacing efficiency gains.**[3] Non-CO_2 emissions, including contrails and nitrous oxides, further intensify the sector's environmental impact by trapping heat at high altitudes.

Additional efficiency gains of 1.8% by 2030, from approximately 2% today, are needed to align with climate goals[4], yet current measures fall short. While sustainable aviation fuels and aircraft technical improvement offer long-term promise for decarbonisation, production remains limited.[5] Operational practices, like optimising flight routes and minimising fuel consumption, can provide immediate fuel gains and reductions in emissions. Importantly, optimising fuel use directly enhances energy efficiency, lowering emissions and costs. Ignoring energy efficiency in favour of long-term solutions risks delaying urgently needed emissions reductions at a time when they are most critical.



>SKYBREATHE®

SkyBreathe® is a cloud-based software that leverages big data to help airlines reduce fuel consumption and CO_2 emissions. By analysing flight data, including black box, weather, and traffic information, it identifies best practices for fuel efficiency. Over 70 airlines, including Air France and EasyJet, use SkyBreathe® globally.

"We wanted pilots to be able to see what they were doing well and what they were able to improve [...]. Now we have a higher application rate on fuel-saving best practices, especially Engine-Out Taxi-In and Pilot extra fuel. Also, one of the main benefits of using SkyBreathe is that it brings up a higher understanding and awareness of fuel performance."

> Stig Patey, Fuel Saving Manager and Captain on the 737 at Norwegian

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

1,400,000 tons of CO_2 saved globally in 2023

420,000 tons of fuel saved globally in 2023

Up to 5% less CO_2 emissions per flight

> ECONOMIC & SOCIAL BENEFITS

Up to 5% fuel savings per flight without any modification on the existing aircraft

490 Million USD saved for the airlines in 2023

For many more aviation efficient solutions, visit:

AQS by aliaxis

DOUBLING DOWN BY...

USING ACOUSTIC MONITORING TO DETECT WATER LEAKS AND REDUCE ASSOCIATED ENERGY CONSUMPTION

>ITALY'S LARGEST MULTI-UTILITY COMPANY SAVES 1.4 MILLION M³ OF WATER ANNUALLY THROUGH LEAK DETECTION, REDUCING ENERGY USE BY 1 MILLION KWH

A2A Ciclo Idrico, part of Italy's largest multi-utility company, oversees 3,000 km of water pipes in Brescia and nearby areas, serving 1.5 million people. In 2019, A2A set a goal to reduce water losses by 40% and implemented Aliaxis' AQS technology to detect leaks and lower energy consumption. During a pilot test in Brescia, 39 underground acoustic sensors were installed along 15 km of pipeline, identifying 10 hidden leaks within the first week. Following this success, A2A expanded the use of the AQS solution.

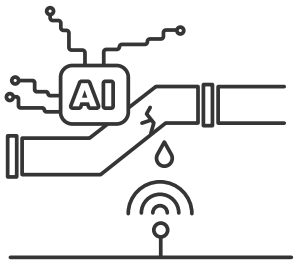
By 2022, 92 km of pipes were monitored, revealing over 170 leaks, and the repairs saved 1.4 million cubic metres of water annually, worth €560,000. By reducing the need to pump and treat excess water, **the initiative also lowered energy consumption by 1 million kWh per year and reduced greenhouse gas emissions by 504,000 kg annually.**

WHY IS IT IMPORTANT?

Water is a finite resource, and as global population growth, urbanisation, and climate change intensify, efficient water management becomes crucial. Even minor losses in water-scarce areas can significantly impact agriculture, industry, and the well-being of communities reliant on these resources. Globally, the estimated volume of non-revenue water — water that is produced but lost or unaccounted for — stands at 346 million cubic metres per day, amounting to 126 billion cubic metres annually. Valued conservatively at USD 0.31 per cubic metre, **these losses represent a staggering USD 39 billion each year.**[1, 2]

And when water leaks from distribution pipes, energy is lost twice.[3]

In Italy, approximately eight billion cubic metres of water enter the public distribution network yearly, yet **42% is lost due to leaks in ageing infrastructure, enough to supply 43 million people.** While Europeans average 125 litres of water consumption per day, Italians consume nearly double that, up to 236 litres a day.[4]



> AQS®

AQS by Aliaxis uses fixed acoustic sensors and mobile devices, integrated with AI, for advanced leak detection. Independent of pipeline type, it detects leaks above or below ground, generating alerts with precise locations. Field teams are then dispatched to repair leaks based on these accurate alerts.

"A2A Ciclo Idrico is committed to reducing water loss and enhancing efficiency for more sustainable operations that align with European standards. With AQS by Aliaxis technology, our continuous monitoring enables us to effectively address leaks in ageing infrastructure and strengthen the resilience of our water network, making significant progress toward a more sustainable future."

> Tullio Montagnoli,
Managing Director
at A2A Ciclo Idrico

ONE SOLUTION, MANY EFFICIENCY GAINS

> ENVIRONMENTAL BENEFITS

Enables a reduction of around 1 million kWh in energy consumption per year for 1,400,000 M³ of water saved

Enables water savings, reducing the non-revenue water by up to 20%

> ECONOMIC & SOCIAL BENEFITS

Reduces water loss, resulting in annual savings of around 560,000 € for 1,400,000 M³ of water saved

Ensures more reliable access to clean water for communities, especially in water-scarce regions

For many more water efficient solutions, visit:

salvi lighting barcelona

DOUBLING DOWN BY...

ADOPTING EFFICIENT *CITY SERVICES MANAGEMENT PLATFORMS*

>RWANDAN CITIES CUT PUBLIC ENERGY CONSUMPTION BY 70% PER STREETLIGHTS ACROSS 950 KM, THANKS TO SMARTEC®

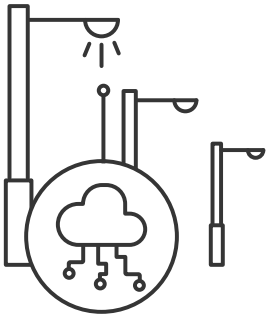
Salvi Lighting has partnered with the Energy Development Corporation, a division of Rwanda Energy Group, to improve public lighting installation and management across Rwanda. By implementing Smartec® technology, Salvi Lighting installed 20,000 smart communication nodes along 950 kilometres of urban infrastructure. This technology combines energy-efficient LEDs with sensors and connectivity, **reducing energy consumption from 1,075 kWh to 329 kWh per year per luminary and projecting savings of 149 GWh over 10 years.** These improvements will enable cutting energy use by up to 70% and lowering maintenance costs by 50%, while also enhancing public safety and infrastructure management.

Building on this success, Salvi Lighting plans to expand beyond Rwanda with a street and urban lighting extensive project of more than 100,000 solar intelligent luminaires in Senegal, which has the potential to create 500 to 1,000 jobs.

WHY IS IT IMPORTANT?

Countries across Sub-Saharan Africa are grappling with the dual challenge of expanding energy access while addressing climate change. As Rwanda's urban population is projected to triple by 2050[1], the rapid urbanisation places immense pressure on the country's infrastructure and energy systems. The government's ambitious efforts to expand electricity access—from just 6% in 2009 to over 75% by 2024[2] — must be coupled with robust energy efficiency measures to avoid locking in inefficient energy consumption patterns that could strain cities' resources.

Energy efficiency is central to Rwanda's sustainable urban development goals, **offering a path to reduce electricity consumption by up to 22%**, according to the World Bank[3]. By improving energy efficiency, Rwanda can enhance energy security, reduce dependency on costly energy imports, and alleviate pressure on its national grid, especially in rapidly growing urban areas. Furthermore, optimising the electricity supply chain, reducing transmission losses, and implementing energy-efficient technologies will not only cut greenhouse gas emissions but also support the country's broader economic transformation, ensuring that Rwanda's cities can grow sustainably while improving the quality of life for their residents.



"In line with the promotion of green city initiatives, the City of Kigali has commissioned solar street lights that are friendly to the environment."

> City of Kigali

>SMARTEC®

A cloud-based city infrastructure management platform that helps optimising all connected city services, including lighting. Smartec® combines hardware (nodes fixed to new or existing infrastructure) and software. It can apply for adaptive lighting projects, with, for instance, a speed radar sensor dimming lighting in accordance with the real-time traffic flow to save energy use.

ONE SOLUTION, MANY EFFICIENCY GAINS

ENVIRONMENTAL BENEFITS

- Reduction of up to 70% of emissions thanks to lighting management
- Up to 70% less energy consumption

ECONOMIC & SOCIAL BENEFITS

- Can provide work for dozens of people and facilitates the transfer of their technological, industrial, and commercial knowledge
- 50% savings in maintenance
- Possible savings of more than 1000€/year per km
- Improved public safety

For many more smart cities efficient solutions, visit:

Global Renewables Alliance

> RENEWABLE ENERGIES

ACHIEVING THE AMBITIOUS GOAL OF TRIPLING GLOBAL RENEWABLE ENERGY CAPACITY TO 11,200 GIGAWATTS BY 2030 WILL REQUIRE AVERAGE ANNUAL GROWTH IN NEW RENEWABLE CAPACITY TO REACH 1,044 GW PER YEAR - A COMPOUND ANNUAL GROWTH RATE OF 16.4%[1].

This transition is essential not only to reduce carbon pollution and build resilience, but also to expand energy access and enhance economic security, as renewable power has now become the most affordable source of new electricity in nearly every country[2]. In 2023, a remarkable 81% of new renewable capacity, amounting to 382 GW, generated electricity at a lower cost than fossil fuel alternatives.[3]

Despite these advances, significant challenges remain. Investments in renewable capacity reached a record high of USD 570 billion in 2023, yet this figure is still well below the USD 1.5 trillion required annually from 2024 to 2030 to maintain the necessary growth trajectory[4]. Furthermore, renewable deployment remains concentrated in a few regions—China, the European Union, and the United States accounted for 84% of global renewable investments in 2023, whilst Africa's share was just 1.6%, with investment in the continent declining by nearly half compared to the previous year[5].

Collective action from governments, local communities, and both public and private sectors is crucial to accelerating the pace of renewable energy deployment, especially in emerging markets and developing economies. Priority actions include setting ambitious local targets, speeding up permitting processes, developing robust grid infrastructure, fortifying supply chains, and redirecting finance to renewables in underrepresented regions.

As we progress towards the global objective to triple renewable energy by 2030, the following success stories highlight projects around the world that are demonstrating scalable solutions to bridge these investment and deployment gaps. Through innovative financing, groundbreaking technology applications, and collaborative approaches, these cases illustrate that, with the right strategies, clean energy solutions are achievable, affordable, and transformative.

Global Renewables Alliance

ERM

TRIPLING UP BY...

COMBINING RENEWABLES WITH *ECOSYSTEM RESTORATION*

> ACCELERATING RENEWABLE ENERGY DEPLOYMENT WHILE RESTORING BIODIVERSITY IN SCOTLAND

ERM, the world's largest sustainability consulting firm, supported the delivery of over 1000 renewable energy projects in 2024, a 21% increase over 2023. This contributed to over 200 GW of installed renewable energy capacity and over 10 GW of installed energy storage, equivalent to the annual carbon emissions of over 45 million U.S. homes.

ERM and its clients are not just accelerating the energy transition—they are also seizing opportunities to restore degraded ecosystems. A recent example:

ERM and its client BayWa r.e. partnered on designing the expansion of the Corriegarth wind farm operating in the Monadhliath mountain range east of Loch Ness, Scotland. The project will restore 100 hectares of degraded peatland. As the land recovers, locals will witness the return of native mosses, plants, invertebrates, wading birds, raptors, and otters. The area will become more flood resilient and, once again, sequester large volumes of carbon. The project will supply electricity to nearly 50,000 homes, 16% of the population of the Scottish Highlands.

WHY IS IT IMPORTANT?

Compared to fossil fuels, renewable energy significantly reduces greenhouse gas emissions and improves air and water quality. But material extraction, land use, and waste disposal present other environmental challenges which can become a threat to the sector's growth.

Fortunately, with the right actions, developers can accelerate renewable energy deployment while reducing the associated environmental downsides and, as is the case of the Corriegarth wind farm, go further to generate new sources of environmental benefits.

By leveraging the Corriegarth wind farm expansion project to restore the biodiversity of an iconic Scottish landscape, BayWa r.e. strengthened its reputation with the local community and won approval from local authorities.

Global Renewables Alliance

"Accelerating renewable energy adoption does not have to amplify associated environmental impacts. In fact, with the right actions, companies can turn some of these impacts into added benefits, maximising renewable energy's environmental gains."

> Andrew Angle,
Research & Networks Manager,
ERM Sustainability Institute

>ERM

Strong sustainability performance makes renewable energy developers more competitive and resilient. This research paper from the ERM Sustainability Institute details four steps:

1. Using green production processes
2. Adopting circular alternatives
3. Minimising environmental footprints
4. Considering wildlife in development plans

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

- Reduce supply chain and construction emissions
- Reduce virgin material extraction and waste
- Avoid unintended negative impacts on wildlife
- Support local biodiversity

> ECONOMIC & SOCIAL BENEFITS

- Reduce compliance costs
- Reduce financial and reputational risks
- Capture new business opportunities

Global Renewables Alliance

sse

TRIPLING UP BY...

BUILDING *MORE RENEWABLES*

> VIKING WIND FARM AND SUBSEA CABLE BOOSTS U.K. CLEAN ENERGY FROM SHETLAND

With a capacity of 443MW, the £580 million Viking Onshore Wind Farm in Shetland (an archipelago in the North of Scotland) is the United Kingdom's third largest onshore wind farm and the biggest to be built in the U.K. for almost 10 years. The project began construction in 2020 and became operational in September 2024.

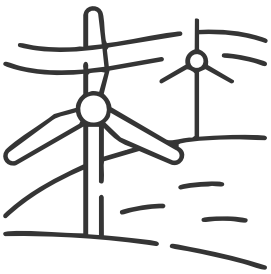
Viking has the capacity to be one of the U.K.'s most productive onshore wind farms. Its 103 turbines can produce enough energy to power almost half a million homes annualy while saving around 0.5 million tonnes of CO_2 emissions each year.

WHY IS IT IMPORTANT?

The project enabled the U.K. to achieve the threshold for 30GW of installed wind energy, playing a significant role in supporting the U.K. and Scotland's transition to net zero and greater home-grown energy security.

At a local level, the project will help to diversify Shetland's energy mix / economy and is the anchor project that underpins the HVDC transmission connection from Shetland to the Great Britain mainland, linking the islands to the G.B. electricity grid for the first time. The link will play a critical role in Shetland's security of supply needs as well as scope for future renewable development.

The people of Shetland will also benefit from a preferred return on Shetland Charitable Trust's initial financial stake in Viking each year for the lifetime of the wind farm. This is based on a percentage of the gross income of the wind farm and is in addition to the project's index linked community benefit fund.



"The completion of these projects is a significant step in unlocking the green energy potential of the Shetland islands. These developments will not only aid us in our efforts to decarbonise our energy system, but help to stimulate sustainable economic growth in the local area. It is welcome that Scotland's onshore wind capacity continues to expand. This is a vital component of our mission to bring about a just transition to net zero."

> John Swinney,
First Minister of Scotland

>VIKING WINDFARM

Viking windfarm is a ground-breaking achievement for clean energy in the UK, as the Shetland Islands have been connected to the G.B. electricity grid for the first time. A 260km subsea HVDC transmission link transports the generated renewable electricity from the Viking onshore wind farm in Shetland to the mainland. This output is sufficient to power nearly 500,000 homes each year via the subsea cable, marking a significant increase in the U.K.'s clean energy capacity. The development and construction of Viking Wind Farm and the subsea transmission link represent a combined £1 billion investment by SSE, and is part of the company's wider £20.5 billion commitment to U.K. clean energy infrastructure by 2027.
This investment is one of the largest private commitments to clean energy the country has ever seen.

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

Restored approximately 260 hectares of severely degraded peatland to support local biodiversity enhancement

The Viking Community Fund is the largest for a single renewables project in G.B. – totaling over £72 million. Managed and administered by the Shetland Community Benefit Fund, it has already supported over 197 local projects.

> ECONOMIC & SOCIAL BENEFITS

More than 70 local companies have benefited from the project, with around £80 million spent to date in the local supply chain

Site visits were organised for 14 local schools last year, totaling over 500 pupils and teachers to support STEM local programmes

At peak construction Viking created around 400 jobs with a further 35 full-time local operation and maintenance jobs expected throughout its lifetime

Global Renewables Alliance

octopus energy generation

TRIPLING UP BY...

GENERATING *AFFORDABLE CLEAN ENERGY* IN AFRICA

> OCTOPUS ENERGY TO BUILD SIERRA LEONE'S FIRST WIND FARM TO EXPAND ENERGY ACCESS THROUGH AFFORDABLE GREEN POWER

Octopus Energy's generation arm is partnering with Idris Elba to build Sierra Leone's first wind farm, located on Sherbro Island. This is Octopus' first renewables project in Africa. The project will consist of up to five onshore wind turbines, as well as solar panels and batteries to store renewable power when it's abundant so it can be used when it's needed. It will generate affordable clean electricity to power homes and businesses on the island. This will provide a clean, low-cost and reliable electricity supply to help grow the local economy, including the fishing industry. Importantly, it will help create new industries and provide an opportunity to create jobs and training in the local communities.

WHY IS IT IMPORTANT?

There is a significant opportunity to bring affordable clean energy to more people in Sierra Leone and across the continent. Around 29% of people in Sierra Leone have access to electricity, which drops to only 5% for rural communities.

Wind and solar power - which are consistently the cheapest sources of energy - can help plug this energy access gap, and bring low-cost energy to communities and businesses who need it.

This project will enable us to collect vital data to seed new models and in turn foster even greater investment into green energy on the island, in Sierra Leone, and beyond. This is only the beginning as we're already exploring ways to expand our work in the future to accelerate energy access to more people.

Global Renewables Alliance

>OCTOPUS ENERGY'S SHERBRO ISLAND WIND FARM PROJECT

Building a first-of-its-kind renewables project on Sherbro Island in Sierra Leone, to accelerate access to affordable green energy.

"This project is a major milestone – marking our first renewables project in Africa. Working with Idris Elba and his team, we'll build a wind farm on Sherbro Island that will generate affordable, clean power for homes and businesses where access to energy is currently very low. We can also leverage vital renewables data we'll collect to help unleash even more green energy projects in the country and across Africa."

> Zoisa North-Bond,
CEO of Octopus Energy Generation

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

- Providing clean energy to an area where energy access is low
- Building more green energy to help reduce reliance on fossil fuels
- Contributing to the country reaching its clear renewables targets

> ECONOMIC & SOCIAL BENEFITS

- Expanding access to affordable clean energy in an area where energy access rates are very low
- Providing opportunities for jobs creation and training in the local communities
- Low-cost and reliable electricity to help grow the local economy

Global Renewables Alliance

adani Renewables

TRIPLING UP BY...

DEVELOPING THE *WORLD'S LARGEST RENEWABLE ENERGY PLANT*

> TRANSFORMING A WASTELAND, FIVE TIMES THE SIZE OF PARIS, INTO A SUSTAINABLE ENERGY HUB THAT WILL POWER OVER 16 MILLION HOMES

Adani Green Energy Limited (Adani Green) is developing the world's largest renewable energy (RE) plant on 538 km^2 of barren land in Khavda, Gujarat, India. An emblem of global climate action, the Adani Khavda RE plant is accelerating the transition to sustainable energy and decarbonisation. Once completed, it will be the planet's largest power plant, generating 30 GW of clean, reliable, and affordable energy. Adani Green recognised the potential of the wasteland in Khavda and embarked on this bold endeavor after years of meticulous research and planning. The challenges were unprecedented, set against hostile weather in a no-man's land, highly saline soil, among several others, yet they were confident they could overcome it.

Despite the obstacles, Adani Green has operationalised 2,250 MW of renewable energy at Khavda. This includes 2,000 MW of solar power in March 2024, operationalised within 12 months of breaking ground, and 250 MW of wind capacity brought online in July 2024.

WHY IS IT IMPORTANT?

The Adani Green Khavda renewable energy plant addresses rising global energy needs with affordable, green electrons. It serves as a model for climate-resilient development and provides a scalable blueprint for ultra-large-scale renewable energy projects worldwide. The Khavda RE plant is also a critical addition to India's goal of energy independence by 2047 and net-zero emissions by 2070.

India aims to produce 500 GW of electricity from non-fossil fuel sources by 2030. Adani Green Energy has pledged to contribute 10% (50 GW) towards this target, with the Khavda RE plant playing a crucial role in delivering 60% (30 GW) of that commitment.

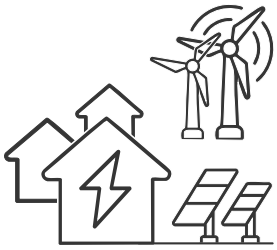
Unlocking the potential of the wasteland at Khavda is a remarkable endeavor. The location is ideal for harnessing wind and solar resources due to its high solar irradiation of approximately 2,060 kWh/m^2 and optimal wind speeds of around 8 meters per second.

The world needs multiple projects like Khavda to accelerate the clean energy transition. The project exemplifies how this objective can be achieved with unprecedented speed and scale.

Apart from renewable energy generation, Adani Green Energy is actively engaged in community development initiatives across several villages around the project site, focusing on education, health, women empowerment, water conservation, and enhancing community infrastructure as part of its ESG efforts.

Adani Green is also developing a hospital that will cater to the healthcare needs of over 8,000 people at the site. This demonstrates a holistic commitment to enhancing the social and natural capital in the region.

Global Renewables Alliance



"We are delivering one of the world's largest greenfield capacity additions in Renewables- 50 GW of affordable clean energy by 2030 – and over 11 GW is already operational. Our bold actions to decarbonise the grid at unprecedented speed and scale underscore our commitment to the low-carbon economy. We are proud to be developing the world's largest renewable energy plant in Khavda, Gujarat. This once desolate region is transforming into a hub for clean power and green jobs, becoming an emblem of sustainable progress."

> Mr Sagar Adani, Executive Director, Adani Green Energy

>THE KHAVDA RE PLANT

The Khavda RE plant, built in the harsh Kutch landscape, exemplifies innovation and resilience. Adani Green's meticulous planning included seismic studies, infrastructure development, ensuring energy evacuation infrastructure is commissioned even before a single green electron was fired, creating a robust vendor network. Digitalisation, AI, and robotics accelerated execution, while waterless cleaning conserved resources. Advanced technology, including bifacial modules and custom turbines, optimised output and efficiency.

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

Greening the grid by delivering ~81 billion units of clean electricity. The energy output can power entire nations such as Belgium, Chile, Switzerland

16.1 million households to be powered (equivalent to the number of homes in the entire country of Poland, Canada)

1,716 million liters of water to be saved through the waterless robotic cleaning systems

58 million tonnes CO_2 emissions will be avoided

Emissions avoided are equivalent to:
- carbon sequestrated by 2,761 million trees
- 60,300 tonnes of coal avoided
- 12.6 million cars off the roads

> ECONOMIC & SOCIAL BENEFITS

15,200+ green jobs by 2030

Enabling India's goal to meet 50% of its energy needs from renewable sources

A supply chain and vendor development program was developed to promote new vendors in emerging areas and enhance their existing capacities and capabilities. This ensure value creation not just for Adani Green but also benefits the industry.

Supporting 'Make in India' with use of indigenous wind turbine and solar panels

Global Renewables Alliance

illuminate USA

Invenergy

TRIPLING UP BY...

EXPANDING *SOLAR MANUFACTURING*

> INVENERGY'S ILLUMINATE USA DIVERSIFIES THE GLOBAL SOLAR SUPPLY CHAIN

For over 20 years, Invenergy has been accelerating the global transition to cleaner, more reliable, affordable energy. Invenergy and its affiliated companies develop, build, own, and operate power sector infrastructure, including 26GW of solar, wind, and battery storage projects in the Americas, Europe, and Asia.

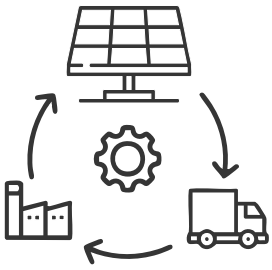
In recent years, Invenergy recognised that the highly geographically concentrated clean energy supply chain presented a global risk to realising a clean energy future. Absent expertise and investment in building this supply chain, energy developers are vulnerable to bottlenecks, delays, disruptions, and uncertainty in a complex global trade policy environment.

Invenergy led the industry to begin addressing this problem by expanding from a leading developer, owner, and operator of clean energy infrastructure to an advanced manufacturer of high-quality solar panels. In 2023, Invenergy established Illuminate USA, a U.S.-based solar photovoltaic (PV) module manufacturing facility, which is now the largest of its kind in the nation.

WHY IS IT IMPORTANT?

Investments like Illuminate help to strengthen and diversify the global solar supply chain, which in turn accelerates renewable deployment to reduce greenhouse gas (GHG) emissions. However, the benefits of a global clean energy transition are not limited to reducing emissions—the transition can also bolster advanced manufacturing investment and clean energy jobs globally.

Illuminate USA's mission is to build and deliver high-quality solar panels, as it diversifies the global supply chain and creates thousands of high-quality local jobs. Illuminate USA brought a $600 million USD investment into Pataskala, Ohio, a town of about 18,000 people, and has created more than 1,500 good-paying jobs in its first year of operations. At full capacity, Illuminate USA will produce 5GW of solar panels, which is equal to 9.2 million solar panels annually and enough to power 1 million American homes. Illuminate USA helps to address growing customer demand for solar and lowers costs for everyday consumers, while also developing an enduring clean energy manufacturing workforce.



"Being an [Illuminate employee] means more than just the great pay or the in-demand skills I'm learning; it's about being part of something bigger that's supporting families in our community with new advanced manufacturing careers. Making one million panels in under six months is astounding—and I'm proud to be a part of this team."

> Robin Heater,
PQC Quality Control Manager at Illuminate USA

> ILLUMINATE USA

Illuminate USA is a solar panel manufacturing facility—located in Pataskala, Ohio—dedicated to producing high-quality solar panels for the U.S. market. Invenergy is the majority owner, land and facility owner, and anchor customer of Illuminate USA.

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

More than 2,000,000 solar panels produced in 2024 since opening in February

9,200,000 solar panels will be produced annually when facility is at full capacity

1,000,000 American homes can be powered with the clean electricity enabled by the annual output of solar panels

> ECONOMIC & SOCIAL BENEFITS

$600 million USD in investment in Illuminate USA's Pataskala center

1,500 local workers employed in 2024 with good-paying, family sustaining jobs

250 union workers employed during peak construction

Global Renewables Alliance

edp

TRIPLING UP BY...

PIONEERING CLEAN ENERGY SOLUTIONS *FOR ISLAND COMMUNITIES*

> PULAU UBIN'S MICRO-GRID TRANSFORMATION

Pulau Ubin, an island in the north-east of Singapore, has historically depended on diesel generators to power its main village which posed environmental risks but also created a dependency on a non-renewable energy source. In November 2023, EDP Renewables APAC, in collaboration with Singapore's Energy Market Authority, integrated the Pulau Ubin's Green Micro-grid project with renewable sources. With Solar Green Roof featuring a 328kWp solar photovoltaic system and introducing Singapore's first utility-scale Vanadium Redox Flow Battery Energy Storage System with 1 MWh, the project is delivering a dependable, renewable energy source to over 30 households and businesses in the island's main village. The success of this project highlights the potential for scaling similar innovations across the region, accelerating the energy transition in Asia Pacific.

WHY IS IT IMPORTANT?

The Pulau Ubin Green Micro-grid project excels in its dual focus on innovation and sustainability.

The Solar Green Roof, featuring a 328kWp solar photovoltaic system, is enhanced by greenery planted beneath the panels to regulate ambient temperatures, boosting efficiency by up to 4%.

Additionally, the Vanadium Redox Flow Battery Energy Storage System helps to mitigate the solar variability and ensures the consistent operation of the grid by actively managing any mismatches in supply and demand. This cutting-edge technology, with a lifespan of up to 25 years, offers significant advantages over traditional lithium-ion batteries, such as reduced fire risks and enhanced long-term sustainability, which makes it most suitable for remote and off-grid environments such as Pulau Ubin.

The solution provided serves as a pioneering model for future green energy solutions on off-grid islands across the Asia Pacific, where similar micro-grid systems could aid in decarbonising other island communities.

> PULAU UBIN GREEN MICRO-GRID

This off-grid renewable solution, combining solar power with a battery system, provides a reliable and clean energy source, establishing a pioneering model for future green energy on remote islands across the Asia Pacific.

"Greenifying Pulau Ubin's micro-grid is part of our reinforced commitment to lead the energy transition. This project contributes to the decarbonisation and innovation efforts of Singapore, as it pilots new technologies and an ecosystem which can be key enablers to a greener and more resilient future."

> Pedro Vasconcelos,
CEO of EDP Renewables APAC

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

- Reduce the island's reliance on diesel by nearly 100,000 litres per annum
- Energy efficiency boosted by up to 4% from greenery planted beneath the panels to regulate ambient temperatures
- Avoid 268 tons of carbon emissions

> ECONOMIC & SOCIAL BENEFITS

- Reliant source of clean energy with mitigation of solar variability and efficient management of energy supply and demand
- Benefit more than 30 households and businesses

Global Renewables Alliance

HUAWEI

国投 SDIC | 雅砻江水电 YALONG HYDRO

TRIPLING UP BY...

COMBINING *SOLAR AND HYDROPOWER*

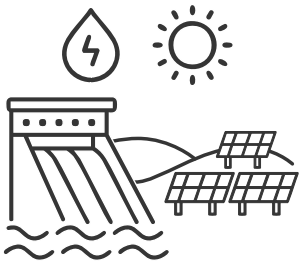
> KELA, THE WORLD'S LARGEST HYDRO-SOLAR HYBRID PROJECT, USES HUAWEI'S SMART STRING ESS TECHNOLOGY TO MAXIMISE POWER EFFICIENCY

Located in Sichuan, China, the Kela PV Plant became operational on June 25, 2023, as the world's first gigawatt-level hydro-solar hybrid power plant. With a capacity of 1 million kW at 4,600 metres altitude, it connects to the Lianghekou Hydropower Plant via 500 kV lines. Generating 2 billion kWh annually, the plant saves 600,000 tons of coal and reduces 1.6 million tons of CO_2 emissions, using Huawei's Smart String ESS technology to ensure stable power integration. Beyond energy production, it plays a crucial role in lowering environmental impact and supporting local communities, contributing significantly to global carbon reduction efforts. The Kela PV Plant project highlights the importance of innovative renewable energy in achieving sustainability goals.

WHY IS IT IMPORTANT?

As the world's first GW-level hydro-solar hybrid project, Kela sets a precedent for large-scale renewable energy integration, especially in high-altitude areas. Combining solar and hydropower, the plant generates 2 billion kWh annually, saving 600,000 tons of coal and reducing 1.6 million tons of CO_2 emissions. Located in a challenging high-altitude and cold environment, Kela leverages Huawei's digital twin and intelligent diagnosis technologies to achieve comprehensive sensing and management.

Despite its vast area, the plant is easily managed and safe due to advanced intelligent systems.
This project not only addresses the challenge of energy production in harsh environments, but also stabilises power output by balancing solar and hydropower generation. Kela's success underscores the potential for large-scale renewable energy solutions to reduce environmental impacts and improve energy efficiency, setting a global precedent for innovative projects in high-altitude regions.



>KELA PV PLANT

- Improved Energy Yield: Advanced technologies boost energy output and reliability
- Intelligent O&M: Smart maintenance platforms ensure precision and safety warnings
- Digital Leadership: Establishes a world-leading digital and smart hydro-solar system
- Efficient Management: Enables efficient and refined management in harsh conditions

"In Ganzi, Sichuan, Huawei Digital Power helped Yalong Hydro build the 1 GW Kela PV Project, which is the world's largest and highest-altitude hydro-solar hybrid power plant. The project leverages digital and intelligent technologies to improve quality and efficiency, setting a benchmark for intelligent power plants."

> Steven Zhou, President of Utility Smart PV Business, Huawei Digital Power

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

- Raised PV modules allow for grazing and vegetation growth
- Removal, maintenance, and restoration of plateau meadows
- Initiatives like "PV + Specialty Industry" boost agriculture and tourism
- Provides ecological management experience for high-altitude projects

> ECONOMIC & SOCIAL BENEFITS

- Raised PV modules support local pastoral needs and grazing
- Initiatives like "PV + Employment" boost local employment
- Promotes local industries including agriculture, tourism, and transportation
- Advances rural development through integrated PV + specialty industry projects

Global Renewables Alliance

PEPSICO

TRIPLING UP BY...

REPURPOSING WASTE

> LEVERAGING ORGANIC WASTE TO PRODUCE A NATURAL GAS SUBSTITUTE AT PEPSICO'S NEW BIOMETHANISATION FACILITY IN TÜRKIYE

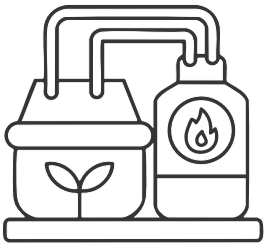
As a convenient foods and drinks company, we're in the unique position to be able to power our plants with some of the organic waste produced during the manufacturing process. We are piloting plants with anaerobic digesters, which produce biogas that can be used to meet the thermal requirements of our operations.

In 2023, PepsiCo opened a biomethane production facility in Manisa, Türkiye, designed to convert organic waste from production into biogas by fermenting them in an oxygen-free environment.

WHY IS IT IMPORTANT?

Manufacturing and distributing our products requires energy, including electricity and fuels like natural gas. Transitioning to renewable energy is an important part of achieving our greenhouse gas (GHG) reduction goals by 2030. Furthermore, our stakeholders expect us to reduce our energy use and transition to renewable energy to create a low-carbon value chain.

At PepsiCo, renewable energy plays an important part in helping us reach our climate goals. We continually explore options for renewable fuel sources for our factories and operations. Our biomethane production facility in Manisa, Turkiye has become a great example, fulfilling approximately 40% of the natural gas needs for PepsiCo's Manisa factory. Building on learnings from Manisa, we're continuing efforts to transition to renewable energy, including continued expansion of our efforts in our own facilities, collaborating with our value chain partners and piloting innovative technologies.



> MANISA BIOMETHANISATION FACILITY

PepsiCo's new biomethane production facility in Manisa, Türkiye, is specifically designed to convert organic waste from production, like potato peels, into biogas by fermenting them in an oxygen-free environment.

"The pledge countries made at COP28 to triple renewables by 2030 needs to now become a reality. PepsiCo is expanding our investments in onsite renewables. Biomethane is one of the promising technologies we're deploying, and it now provides 40% of natural gas needs at our site in Manisa, Türkiye. We are capturing learnings from this installation so we can hopefully scale and expand across other sites."

> Jim Andrew, EVP and Chief Sustainability Officer, PepsiCo

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

This facility ... **produces approximately 1.2 million Nm³ of biomethane annually from 10,000 tons of organic waste annually**

and, **is reducing greenhouse gas emissions by approximately 1,200 tons annually**

> ECONOMIC & SOCIAL BENEFITS

This facility is a result of an investment of approximately 100 million TL and today, continues to employ local communities in and near Manisa

Globally, PepsiCo now has 12 biogas installations

Our Manisa facility received a local sustainable business award and was recognised as a finalist for the European edie awards in 2024

Global Renewables Alliance

Neoenergia

Iberdrola

TRIPLING UP BY...

BUILDING 1,600 *KILOMETRES OF POWER LINE*

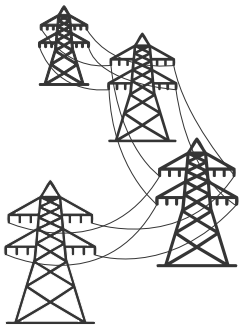
> NEOENERGIA CONNECTS MINAS GERAIS AND SÃO PAULO WITH NEW TRANSMISSION LINE, BOOSTING THE ENERGY TRANSITION IN BRAZIL

Neoenergia won the project "Lote 02" of the auction promoted by the Ministry of Mines and Energy for the construction of the 500 kV Transmission Line (TL) from Arinos (Minas Gerais) to Araraquara (São Paulo) with an extension of approximately 1,600 km, also including Substations and Synchronous Compensators, with a total investment of R$ 3.8 billion. The project, called 'Alto Paranaíba Transmission Line', will strengthen the National Interconnected System and facilitate the transfer of energy between different regions of the country, ensuring that areas with a generation deficit can be supplied by regions with a generation surplus.

WHY IS IT IMPORTANT?

The state of Minas Gerais will benefit from this project with the construction of approximately 1,200 km of Transmission Lines, as well as the construction of one new substation in Nova Ponte (Minas Gerais) and the expansion of two substations (Arinos and Paracatu). These will aim to enable solar energy generation projects in the northern and northwestern regions of the state, positioning Minas Gerais as a leader in the energy transition of Brazil's electrical matrix, strengthening and encouraging a low-carbon economy within the National Interconnected System (SIN).

Meanwhile, the state of São Paulo will benefit from the construction of approximately 400 km of line, connecting the Nova Ponte 3 Substation to the Araraquara 2 Substation, serving the load centres of the southeast that will benefit from this transmission.



> ALTO PARANAÍBA TRANSMISSION LINE

Scheduled for September 2027, this 1,600 kilometre project across Brazil marks our largest grid venture globally. With a €1 billion investment, this expansive infrastructure will boost connectivity between two major economic regions, enhancing energy reliability and fostering growth.

"Delivering a sustainable energy model fully aligned with 1.5°C requires a sustained focus on investment in energy infrastructures to integrate massive renewable energy and achieve transport, heating, and industry electrification. This highlights the need for an enabling policy framework to unlock adequate levels of investments based on anticipatory planning criteria, ensuring efficient and stable remuneration for capital involved."

> Gonzalo Saenz de Miera,
Director of Climate Change and Alliances at Iberdrola

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

- Extensive study of local alternatives ensuring low potential impact of the project, calculated through multi-criteria mathematical modelling (social, environmental, and economic)
- Reduction of vegetation suppression and habitat fragmentation using technologies for cable deployment

> ECONOMIC & SOCIAL BENEFITS

- Generation of over 5,000 direct and indirect jobs during the construction of the project
- Ongoing dialogue with the communities intersected by the line and with public authorities, bringing transparency to the relationships
- Increased energy security for the National Interconnected System
- Investment of R$ 3.8 billion in the region where the transmission line will be built

Global Renewables Alliance

nationalgrid

TRIPLING UP BY...

INVESTING IN *ENERGY INFRASTRUCTURE*

> INVESTMENT WILL ACCELERATE THE DECARBONISATION OF THE ENERGY SYSTEM

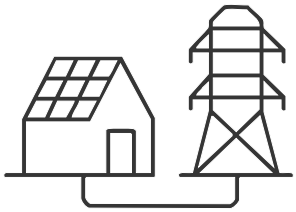
The energy transition represents a monumental shift in the way we generate and use electricity. Until now, much of the world has relied upon fossil fuels for the generation of power, but if we are to successfully transition to a clean energy future, and meet global emissions targets we need urgent action and a shift to cleaner generation sources. The U.K. government has committed to decarbonise the country's power system by 2030, with ambitious targets to grow offshore wind to 60GW by 2030. At the same time, demand for electricity is expected to increase by 50% as more people adopt electric vehicles, heating systems and in response to increasing demand from new technologies and data centres. Decarbonisation will dramatically change the makeup of our electricity grid from one designed to transmit electricity from power plants, built near population centres, to one that will take power from clean energy, such as offshore wind. The grid network and electricity infrastructure is a vital part of the energy transition, and will require significant investment to speed up the connection of renewable energy projects.

WHY IS IT IMPORTANT?

Electricity infrastructure is critical to the U.K. reaching net zero and the prize for everyone is significant – increased growth, more jobs, lower more stabilised bills in the long-term and bolstered security of supply.

To deliver a net zero future, there needs to be a laser focus on delivery, including through the necessary reforms to the planning and connections processes, to enable the connection of more renewable generation at the pace required.

Some of these projects will be new infrastructure that will connect more clean, green and more affordable sources of energy to the grid, whereas others will see the upgrade of existing infrastructure, using what already exists, in the most efficient way possible.



>THE GREAT GRID UPGRADE

National Grid will be investing £60 billion in the five years to the end of March 2029; with more than half of that in the U.K., which is more than double its investment in the last 5 years. In the northeast U.S., it will deliver a 60% increase in investment to £28 billion. This is unprecedented in its scale and ambition.

In the U.K., to take more clean, green energy from where it's generated to where it's needed, National Grid is delivering The Great Grid Upgrade (TGGU), the largest overhaul of the grid for generations. It comprises 17 major infrastructure projects across England and Wales. The business is currently consulting on a number of these projects.

"As one of the U.K.'s energy network operators, National Grid has a vital role to play in the decarbonisation of the U.K.'s energy system – The Great Grid Upgrade is an example of the important work they are undertaking."

> A representative from the Energy Networks Association

ONE SOLUTION, MANY IMPACTS

> ENVIRONMENTAL BENEFITS

- **Investment will accelerate the decarbonisation of the energy system**
- **Commitment to restore the natural environment (BNG) by at least 10% on the land we manage in the U.K.**
- **Overall, National Grid achieved an 11.8% reduction in scope 1 and 2 emissions** against its 2018/19 baseline)

> ECONOMIC & SOCIAL BENEFITS

- **The investment is stimulus for economic growth**
- **Will support tens of thousands more jobs**
- **Connecting more green energy to the grid is the surest way to lower bills in the long term**

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DOUBLE DOWN, TRIPLE UP.

20 SOLUTIONS IN ACTION

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CO_2 Footprint Compensation
My Climate Foundation
www.myclimate.org

SOLARIMPULSE
FOUNDATION

solarimpulse.com

Global
Renewables
Alliance

globalrenewablesalliance.org