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CASE STUDY · MARLUC SYNOPSIS

NESO AI solar forecasting with Open Climate Fix

IMPLEMENTED 2021–2025 · ENERGY AND UTILITIES · UK · BAND C · CLAIMED ONLY

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Great Britain's grid operator uses a forecasting tool from a non-profit, Open Climate Fix, in its control room to forecast solar output and set how much reserve to hold. NESO and the developer report savings of about £30 million a year; the figure has not been independently checked.

ABOUT THIS SYNOPSIS

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Facts and figures are as reported by the sources listed below, which may be incomplete, self-reported or out of date. Check the original source before relying on any figure.

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NOTICE WORDING LAST UPDATED 16 NOVEMBER 2026

AT A GLANCE

AI used: Machine learning forecasting: satellite imagery, weather and generation data used to forecast solar output, refreshed every few minutes.

Implemented: 2021–2025. Grade: band C, Process change, Claimed only.

Headline result, as reported: By NESO's account, Quartz Solar AI forecasting now runs in the control room and delivers savings of about £30 million a year; Open Climate Fix reports it halved large forecast errors

1 · The case

The facts, as reported by the 5 sources listed at the end. Where a source is silent, the field says "Not reported".

Organisation

National Energy System Operator (NESO), with Open Climate Fix. Great Britain's electricity system operator, which balances supply and demand across the transmission system. Open Climate Fix is a not-for-profit climate-technology organisation founded in 2019. Canvas block: 4. Operations and process. Also 6. Data and technology.

Business challenge

The challenge. NESO identified solar as one of its key sources of uncertainty, per Open Climate Fix. NESO says accurate solar forecasts help it operate more efficiently and lower costs for consumers. In 2021 NESO said uncertainty in forecasts meant it kept reserve power, often flexible gas plants, ready for unexpected changes.

How it was addressed. NESO's energy forecasting team and Open Climate Fix developed Quartz Solar. It combines machine learning, live satellite imagery and weather data to forecast solar generation up to 36 hours ahead, refreshed every minute by NESO's account and at 15-minute intervals by Open Climate Fix's account. It began as an innovation project supported by NESO's AI Centre for Excellence and, after testing, was integrated into control room operations. [1] [2] [3] [4] [5]

Who implemented it

Open Climate Fix (Software vendor): Not-for-profit developer of the Quartz Solar forecasting tool..
In-house (In-house): NESO Energy Forecasting team: Developed the tool with Open Climate Fix and integrated it into control room operations..
Open Climate Fix's announcement credits NESO's AI Centre for Excellence with supporting the project. The lead's mention of Google DeepMind weather models was not confirmed in sources opened.

Technology (SEAM pillar E)

SEAM types: T8 Predictive / ML models. Deployment: Not reported. Vendors and products: Open Climate Fix, Quartz Solar, PVNet.

Where it was built in: Feeds NESO's control room solar forecast and, per Open Climate Fix, the Dynamic Reserve Setting model and the demand forecast. Uses satellite imagery, ECMWF and Met Office weather data and PV Live generation data.

What changed

Before: NESO used traditional forecasting that Open Climate Fix says updates roughly every six hours. After: Quartz Solar feeds control room engineers' real-time balancing and the Dynamic Reserve Setting model that decides how much backup the grid holds, per Open Climate Fix. NESO says it informs decisions on how much energy to hold in reserve. [1] [2] [3] [4] [5]

What it cost

Not reported. Open Climate Fix says the project was part of NESO innovation work funded through the Network Innovation Allowance, Network Innovation Competition and Ofgem's Strategic Innovation Fund; the amount spent on this tool is not reported.

What it saved

NESO: savings of approximately £30 million each year, which could rise to £150 million annually by 2035. Open Climate Fix: halved large errors, 2.8 times more accurate than previous tools, about 300,000 tonnes of CO_2 a year avoided, and an 8% lower error in NESO's demand forecast. These are the organisations' own estimates. [1] [2] [3] [4] [5]

Governance and control

NESO says the tool was thoroughly tested before integration. The developer's code is open source, per pv magazine. Human control room engineers use the forecast; the model gives a most likely case plus 10th and 90th percentile cases. Accountable owner and ongoing monitoring: Not reported.

S2 · Accountable owner · Not reported
Not reported.

A1 · Safe use · Claimed
NESO says the tool was thoroughly tested before being integrated into the control room. [2]

A2 · Human in the loop · Claimed
The forecast informs control room decisions on reserve; the model supplies most likely, 10th and 90th percentile cases, per pv magazine. [2] [3]

A3 · Monitoring and assurance · Not reported
Not reported.

A4 · Vendor AI · Claimed
Open Climate Fix, a not-for-profit, built the tool with NESO's forecasting team; its code is open source, per pv magazine. [1] [3]

A5 · Agent controls · Not reported
Not applicable: the tool is a forecasting model and no agent controls are reported.

A6 · Standards and regulation · Not reported
Not reported.

What worked, what did not, what is unproven

WORKED

– NESO reports the tool is fully integrated into control room operations and delivers savings of approximately £30 million each year.

– Open Climate Fix reports halved large errors and 2.8 times greater accuracy than previous tools.

– The model returns a most likely forecast with 10th and 90th percentile cases, which gives engineers a range, per pv magazine.

DID NOT

– Not reported

UNPROVEN

– The £30 million, error, accuracy and carbon figures have no independent evaluation in the sources opened. The announcement says the saving is estimated; the NESO page states it as savings delivered.

– How the savings were separated from other changes in balancing costs; the method is not reported.

– The £150 million a year figure for 2035 depends on solar capacity targets being met, per pv magazine.

Timeline

Aug 2021 National Grid ESO and Open Climate Fix announce an innovation project to build solar nowcasting for the control room [4]

Apr 2025 Open Climate Fix publishes a case study saying Quartz Solar is used by control room engineers and in NESO's reserve model [5]

Nov 2025 pv magazine reports the deployment and the forecast data sources [3]

Dec 2025 NESO's own page says the tool is fully integrated into control room operations, with savings of approximately £30 million each year [2]

2 · Grade and SEAM assessment

MarLuc's opinion, made on the evidence above. How cases are graded: marluc.co.uk/case-studies/how-we-rate

Level of change and impact

Claimed: Not applicable. Grade: C, Process change. Proof: Claimed only. Route: Model-led.

Process change (Level 2, band C). A forecasting tool is part of the control room's balancing and reserve-setting processes, with a stated saving. The saving is the organisations' own estimate.

Graded C: the forecast sits inside two control room processes, real-time balancing and the model that sets reserve, and NESO states a measured saving. Marked Claimed only because the £30 million, error and carbon figures come from NESO and Open Climate Fix, with no independent check in the sources opened.

The SEAM view and lessons learnt

The case has a good pattern for a large operator: a small trial in 2021, a developer working inside the operator's forecasting team, then integration into the decisions that cost money, here reserve setting. The reported accuracy gain is specific and the cost claim is stated. What is missing is an independent check of the £30 million, which relies on how the counterfactual is built. A reader should ask for that method before using the number.

1. Start with a small trial inside the team that owns the decision.
2. Connect the forecast to the decision that costs money, not only to a dashboard.
3. Ask for the method behind a savings figure before quoting it.

Evidence

Score 1 of 4. Self-reported: NESO's own page and the developer's announcement; trade press repeats them. No independent evaluation opened.

Evaluation method. Self-reported figures from the operator and the developer; no independent evaluation or audit.

Sources disagree. Open Climate Fix's announcement says the tool is helping avoid an estimated £30 million in imbalance costs, and pv magazine says at least £30 million. NESO's page says savings of approximately £30 million each year. NESO says the forecast refreshes every minute and Open Climate Fix says 15-minute updates.

Status. Ongoing: live in NESO's control room since 2025.

3 · Original sources

Read these in full. To challenge a fact or a grade, use the contact form at marluc.co.uk or the link on https://marluc.co.uk/case-studies/neso-open-climate-fix-solar-forecasting

[1] Open Climate Fix: National Energy System Operator adopts AI solar forecasting to save £30m and slash 300,000 tonnes of CO_2 every year
https://www.openclimatefix.org/insights/neso-adopts-ai-solar-forecasting-control-room

[2] NESO: How solar is providing secure, clean and affordable energy to Great Britain
https://www.neso.energy/news/how-solar-providing-secure-clean-and-affordable-energy-great-britain

[3] pv magazine: AI powered solar forecasting helps UK grid operator reduce balancing costs
https://www.pv-magazine.com/2025/11/07/ai-powered-solar-forecasting-helps-uk-grid-operator-reduce-balancing-costs/

[4] NESO: Former DeepMind expert's AI tool could help boost National Grid ESO's solar forecasts (19 August 2021)
https://neso.energy/news/former-deepmind-experts-ai-tool-could-help-boost-national-grid-esos-solar-forecasts

[5] Open Climate Fix: UK's National Energy System Operator (NESO) case study
https://www.openclimatefix.org/insights/neso

National Energy System Operator (NESO), with Open Climate Fix website: https://www.neso.energy

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