Sahara solar could soon rescue Britain's broken energy system

A new energy order based on cheap desert solar will undercut and replace Opec and Russia's oil hegemony

AMBROSE EVANS-PRITCHARD © Daily Telegraph Business 20 April 2022

Within five years, the world's longest undersea cable will link Devon to a vast territory of solar panels in the Sahara Desert, supplying electricity directly into Britain's grid at a fraction of today's power prices.

A second cable will land two years later in 2029. Together they will provide 3.6 gigawatts (GW) of constant baseload power, equivalent to two Hinkley-sized nuclear reactors. The difference is that we will be able to afford it. That, at least, is the plan.

The £16bn Xlinks Morocco-UK Power Project, chaired by former Tesco chief Sir Dave Lewis, has an elegant feature. It combines wind and solar in perfect geographic circumstances to make near-constant power for 20 hours a day.

Trade winds on the coast of North Africa raise the average "capacity factor" of onshore wind turbines to 54pc. A desert convection effect creates a regular wind current in the early evenings and smooths the handover from solar to wind.

"It picks up every afternoon just as the sun is setting," said Simon Morrish, the project's chief executive. This overcomes the curse of intermittency, with lithium batteries in the desert to cover the remaining gaps.

Xlinks will be a park of 580 square miles at Guelmim Oued Noun on the 28th parallel south of Agadir, picked because it is at the top of the global horizontal irradiance index. The yield is three times higher than in the UK. The sun shines for 10 hours a day in winter.

"The space is unlimited. We could in theory put up 500 of these projects in Morocco," he said. The consortium is already planning a second hub to power Benelux. It could multiply the scale several times over for the UK, constrained only by the safe limits of energy security.

The power will reach Britain through a pair of HVDC cables (high-voltage direct current) developed by XLCC in Glasgow using British-made steel – probably made in Teesside – and laid by specially designed ships that will make the UK the world leader in undersea cable technology.

It will run along the seabed for 2,360 miles. This is four times more than the North Sea link to Norway, currently the world's longest, which has just come into service on schedule and €300m under budget. It will be built by the same team. "We hope to break ground in September and start laying the first cable in 2025," said Mr Morrish.

Such long cables would have leaked too much power to be viable in the past. Modern HVDC technology at 515 kilovolts has shaved the total loss to 15pc, including the conversion of electricity at both ends.

The coming generation of 800 or 1,000 kilovolts will shave the loss rate further. New methods of laying cables will open up the most direct deep-sea routes instead of having to hug the coasts, cutting transmission lines from Morocco by a quarter.

"We are going to see an explosion of long-distance interconnectors criss-crossing the seas. You could even link up the US and UK, since it is a similar cable distance," said Mr Morrish.

India's Narendra Modi championed a futuristic vision of this at Cop26 in Glasgow, backed by the UK and the US. One Sun, One World, One Grid talked of an interlinked chain of cables crossing time zones: chiefly solar for sub-45 latitudes, with wind substituting for solar paupers in the high north.

The Xlinks Consortium is asking the Government for a CfD (contract for difference) supply deal at a strike price of £48 per megawatt hour for the first project. This compares to an inflation-adjusted price of £92.50 for Hinkley C, supposedly falling to the low £70s for Sizewell C and its successors, if they ever happen.

Wholesale "day-ahead" electricity prices have been near £240 over recent weeks, and year-ahead prices are around £200. So unless you think global energy prices are going to collapse and stay there – which they won't after a seven-year drought in global energy investment – the Xlinks strike price is a reverse subsidy.

It is hard to see how these giant EPR reactors – already blighted by the closure of Taishan 2 in China due to a design flaw – are ever going to compete with Saharan solar. Nor is big nuclear as versatile.

The grid had to pay Sizewell frightening sums to shut down power during the pandemic. "We can switch power on and off in a heartbeat," said Mr Morrish.

The next generation IV wave of small modular reactors will be more flexible, quicker to build, and perhaps significantly cheaper. But it is a racing certainty that the Government's plan for up to eight giant reactors of the old vintage – culminating in a 24 GW nuclear park by 2050 – will look ridiculous long before the ground is even cleared. In my view they will be dropped quietly.

Vladimir Putin has reminded everybody about the risks of energy blackmail, and so has Emmanuel Macron in his charming way by threatening to cut off the UK's electricity interconnectors over Brexit.

No country is going to bet entirely on power cables beyond their control or that may be at risk of sabotage by submarines. Nor will any bet too heavily on any North African state within striking distance of ISIS cells in the Sahel, even though Morocco is a relative haven of stability, largely untouched by the turmoil of the Arab Spring.

The larger point is that we are being catapulted into a new energy order. It will be based on renewable power wherever it is cheapest on the planet, and produced at colossal scale for transcontinental demand. It will be exported either by electricity cable – surely the most efficient – or by hydrogen pipeline, or in the form of green ammonia shipped in tankers, much like crude oil or LNG gas today.

Australian tycoon Twiggy Forrest has just signed a deal with Germany's E.on to supply up to 5 million tons a year of green ammonia by 2030 from a solar and wind domain in the Pilbara outback. This alone is equivalent to one third of Germany's entire hydrocarbon imports from Russia, measured by calorific content. It is just the start of Mr Forrest's imperial dream for a 1,000 GW nexus of renewable power spanning the globe, though where he will find enough electrolysers to pull it off has yet to be answered.

CWP Global plans similar giant hubs in Patagonia and the Sahara, making clean ammonia for seaborn shipment. These are the biggest projects in the world, each akin to another North Sea of oil and gas. Ultimately, they will undercut and replace the OPEC-Russia system. Nothing can compete with desert solar already testing $10 per megawatt hour.

You would hardly know that the Xlinks project existed if you followed the debate about the Government's Energy Security Strategy earlier this month, a document that did an agonising split between big nuclear and big wind, like trying to straddle two horses galloping off at different angles. The British energy debate is strangely insular at times. One wonders if the Government and the veteran policy experts – many of them – have grasped the elemental point that ultra-cheap and transferable energy from places they have never heard of is going to blow away the old regime. They seem to talk past the real world.

Xlinks will be our first taste of this new order, and it is coming very soon in historical energy time.