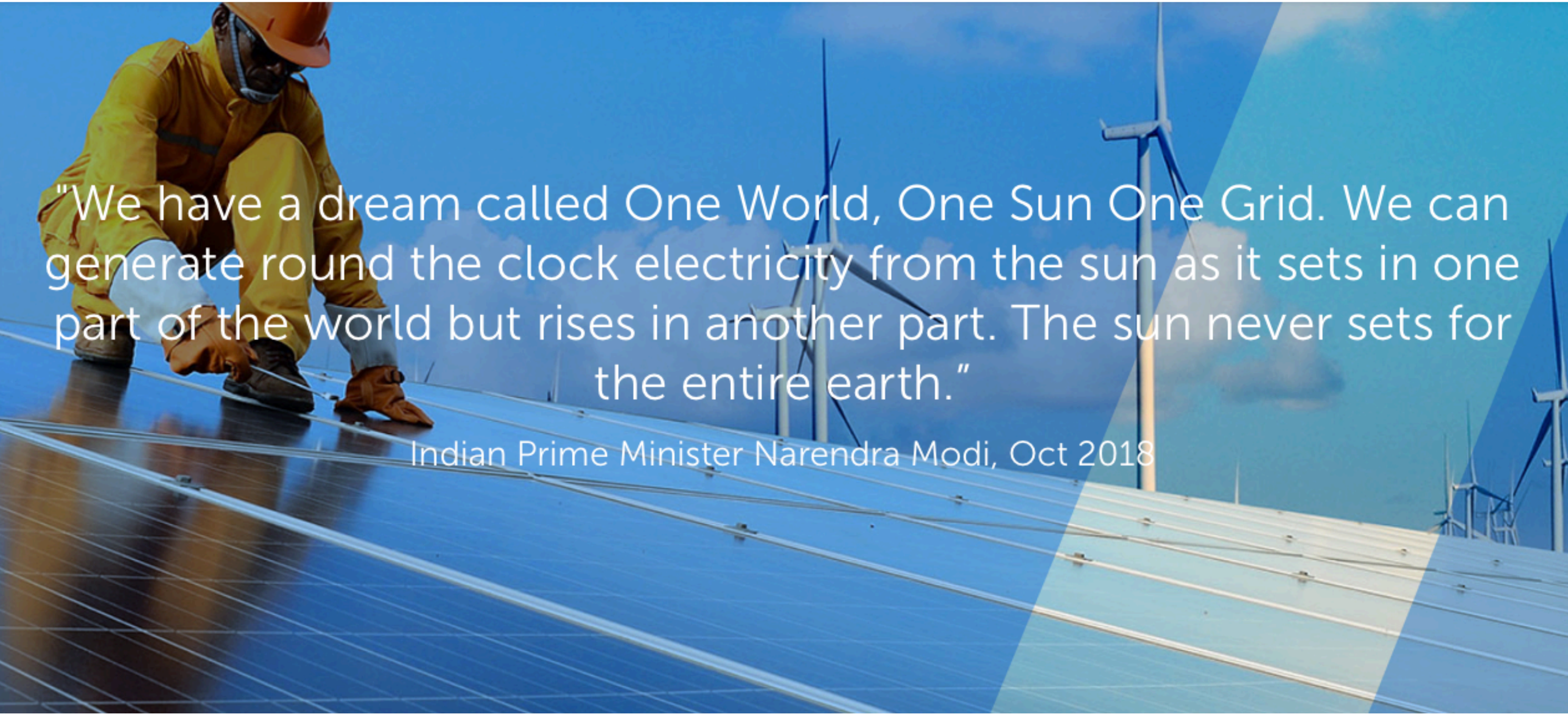
Xlinks - Sustainable Energy from Morocco to the UK

Farnham u3a Climate Change group


"We have a dream called One World, One Sun One Grid. We can generate round the clock electricity from the sun as it sets in one part of the world but rises in another part. The sun never sets for the entire earth."
Indian Prime Minister Narendra Modi, Oct 2018

Agenda.

Who are Xlinks?

What is their proposal?

What are the challenges and the economics?

What progress has been made?

Questions and Discussion

Who are Xlinks?

Xlinks is a privately held UK Company on track to become a ‘B Corporation’.

Investors include Octopus Energy.

They aim to produce sustainable energy in those countries with lots of it and transmit it to those with not enough.

For their first project Xlinks plans to generate renewable energy in Morocco and send it via four undersea cables to the UK in such a way that it can be considered as ‘firm’ energy, with equivalent availability to nuclear power.

A similar project (not Xlinks) is proposed linking Australia and Singapore)

What is their proposal?

200km² of Solar **7 Gigawatts** **with space for more** (13GW in the UK today)	**3.5 Gigawatts** **of Wind** (25GW in the UK today)
3,800km of High Voltage **DC undersea cable** **- times 4**	**5GW of battery storage** **in Morocco**

This will provide 8% of the UK's total energy requirements.

12 million panels over 70 sq.m 530 turbines over 300 sq.m

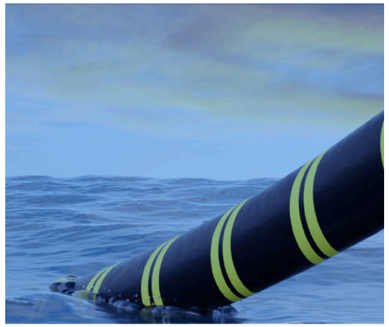
What is their proposal? and why does it work?

- Morocco has 350 days a year with 10hrs+ of sunshine. In the area chosen, Guelmim Oued Noun, as the sun goes down the wind comes up so power is available for almost all the time. The capacity factor for wind at this site is 54% (c.f 31% on average in the UK) and the wind is highly reliable.
- Solar and wind energy can be produced in Morocco for ~ £10/kWh locally
- High Voltage DC cables are used to reduce losses which are calculated at 13% (plus 2% for switching and conversion)
- Battery storage in Morocco is used to smooth the supply and increase the utilisation of the cables from 70% to 80%. The cables represent half the total cost, so maximising their use is vital.
- 10.5 GW of wind and solar capacity will reliably produce 3.6GW for the peak 8 hours each day for 99%of the time with high predictability.

The Challenges and the Economics

Wind and Solar technologies

Battery Technologies



High Voltage DC cables (1.8GW) bipolar

Europe's HV Cable manufacturing capacity is one seventh of what Xlinks needs and there's a 4+year waiting list. Solution - build two cable manufacturing plants. (XLCC)

These cables are too large (160kn lengths) for the largest existing cable laying ships. Solution - build a world's largest cable layer. Twice the capacity of the existing largest .

£

Finance:

Hinckley CFD price in 2012 was £92.50, index linked is £112 at June 2022 prices.

Xlinks CFD price is £48.00

Current offshore wind is £37.35 (started at £150)

The cost of all this is £16-18Bn - approx 25% equity, the rest debt. Most of this is earmarked pending Gov't approvals.

Progress to Date

Tendering now for four DC converters/connectors.

All development funding in place for both XL and XLCC

Detailed undersea surveys underway (15cm accuracy)

Planning permission granted for first XLCC Cable Factory in Ayrshire (includes training…) A second factory is planned for Teesside

Everything now depends on BEIS and J R-M

Xlinks and Hinckley ‘C’

	Hinckley Point ‘C’	Xlinks
Cost	£25B -£26Bn	£15Bn-£18Bn
Cost/MWh	£112 (2021 I/L)	£48 (2022 I/L)
Output	3.2GW	3.6GW
Completion	2028	2029
Other	Waste?	

“If nobody asked questions, then we would never learn anything.”

Brandon Sanderson, Oathbringer