

The awesome progress of renewable energy

Andy O'Brien, Bristol Energy Cooperative

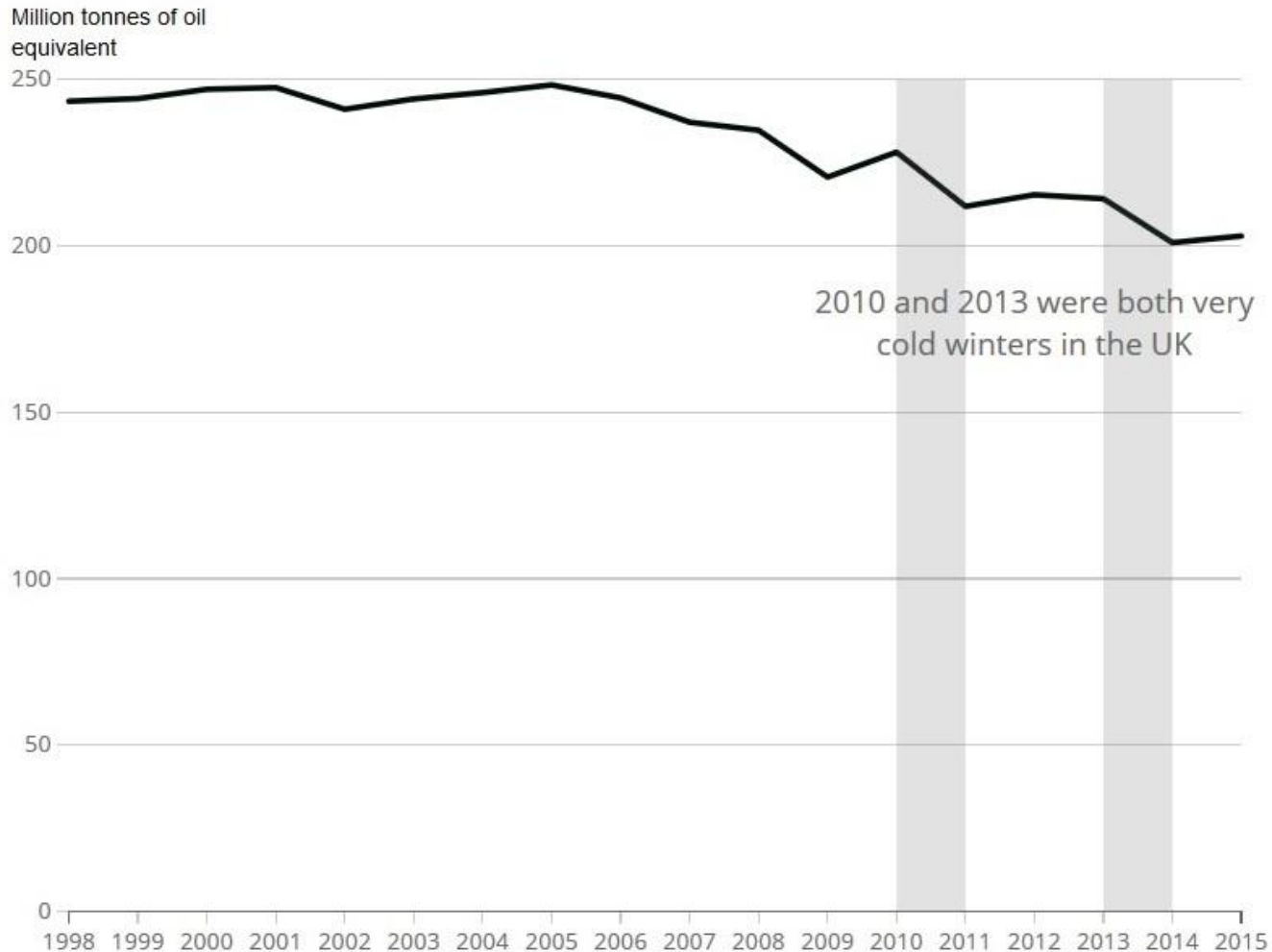
Not so long ago England got its power from 50 large power stations.

Now there are over **900,000** renewable energy installations across the country, with **24GW** of capacity installed in the last 6 years.

Our energy needs:





- Power
- Transport
- Heating

Total UK energy consumption (Mtoe) 1998-2015



Source: Digest of UK Energy Statistics (DUKES) 2016, Department for Business, Energy and Industrial Strategy (BEIS)

Changing GB electricity capacity

	Capacity 2010/11	Closed* since 2010	New Cap added	Current 2015/16	<u>Closed by 2030 ???</u>
	Coal 26 GW	13.3 GW		12.8GW	12.8 GW
	Gas 30.2 GW	4.5 GW	8.5GW	33.7 GW	16.5 GW
	Renewables 8.6 GW		24.8 GW	33.3 GW	3.5 GW
	Nuclear 10.7 GW	1.4 GW		8.9 GW	7.7.GW
	77.8 GW	22.9 GW	33.2 GW	90 GW	41.4 GW

* Closed, partially closed, converted to biomass or mothballed

UK wind energy

- Over 7,000 turbines (on-shore and off-shore combined).
- 15.9 GW capacity (July 2017 figures).
- Powering equivalent of over 10 million homes.
- The world's largest offshore wind farm (Hornsea One) under construction off the Yorkshire coast.



Burbo Bank wind farm off coast of Liverpool Bay



17 Jan 2018:

The UK wind generation record was smashed at around 2pm yesterday, National Grid recorded 10.75 GW of generation coming from wind sources. At times, over 30% of the total demand was being met with wind generation and it even exceeded generation from gas sources early this morning to become the largest source of generation on the system.

'Historic', 'unprecedented', 'astounding': Industry reacts to falling offshore wind costs

September 2017: UK government auctions see offshore wind costs halve over the last two years to set a record low-strike price of £57.50 per MWh, for the biggest offshore wind farm in the world, off the North-East coast of England.

The equivalent strike price for Hinkley was £92.50 per MWh. This makes **offshore wind cheaper than both nuclear and gas.**



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Solar power reaches a record high as it surges past nuclear and coal



 32 Comments



By **Jillian Ambrose**

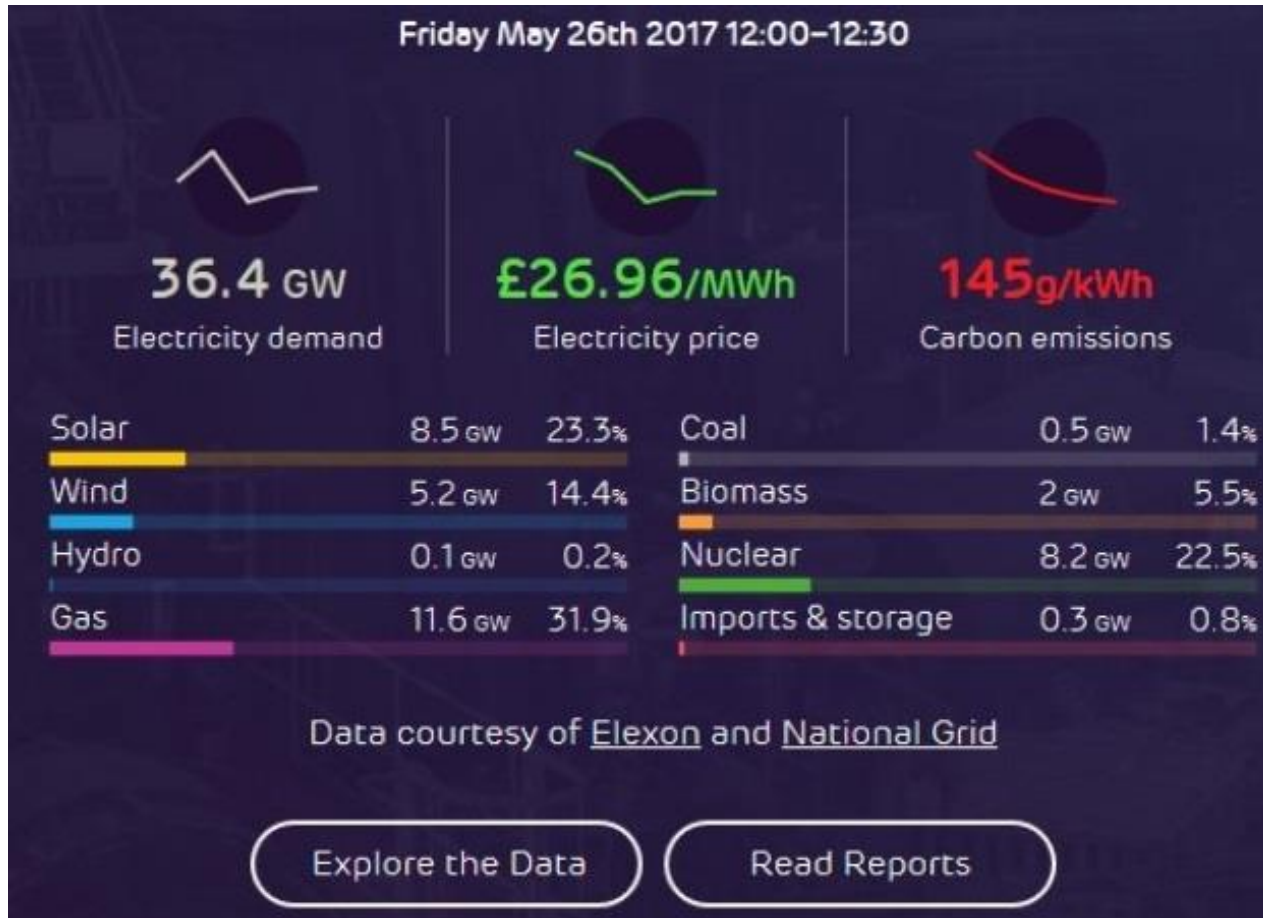
26 MAY 2017 • 5:11PM



On 26 May 2017 the nation's solar panels generated 8.7GW of power, **more** than nuclear and coal power combined.

Solar power was the second most used generating technology behind gas-fired power and made up around 25% of the UK's electricity.

The UK now has **12.5 GW** of solar capacity in place, the same production capacity as eight new-generation nuclear reactors.



www.electricinsights.co.uk
www.gridwatch.co.uk

	2017	PCT	
	Solar max	26.25%	09/04/2017 14:33:43
	Wind max	40.59%	19/03/2017 05:33:43
	Intermittent Renewables max	46.98%	09/04/2017 15:33:43
	Low carbon max	70.93%	09/04/2017 15:33:43



MyGridGB
@myGridGB



Today saw 4 records.

Highest ever solar generation: 26%

Highest ever renewable generation: 47%

Highest ever low carbon generation: 71%#wow!

4:35 PM - Apr 9, 2017

5 221 161

www.MygridGB.co.uk

Indian solar power prices hit record low, undercutting fossil fuels

Plummeting wholesale prices put the country on track to meet renewable energy targets set out in the Paris agreement



i Solar panels for sale at a market in New Delhi. India's solar power prices have fallen to 2.62 rupees per kilowatt hour. Photograph: Saurabh Das/AP

The Guardian, 10 May 2017

Solar power growth leaps by 50% worldwide thanks to US and China

The Guardian, 7 March 2017



i A worker maintains photo-voltaic panels at Xinyi station in Songxi, China. Photograph: Feature China/Barcroft Images

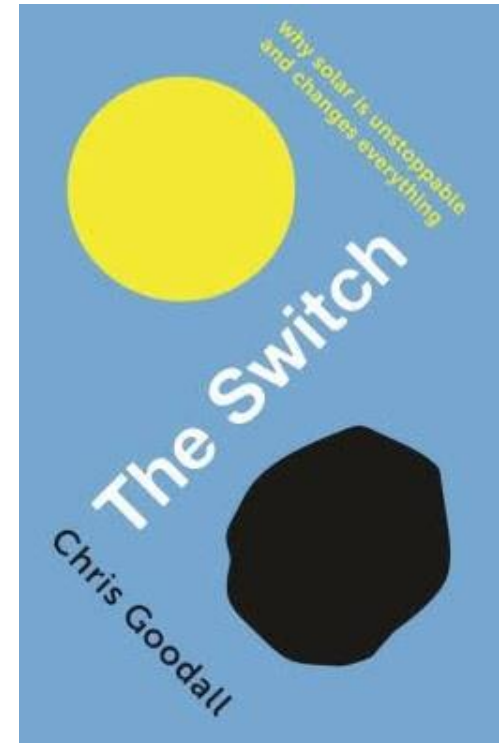
Solar's awesome progress

The Switch, by Chris Goodall, 2016.

Recommended reading!

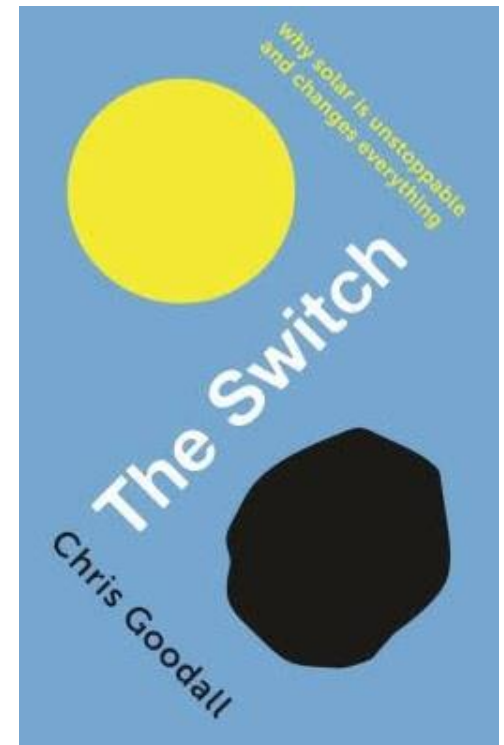
Key points:

- Solar is simply becoming by far the cheapest energy technology. Every two years solar energy is doubling in size and falling 20% in price. This is following the “experience curve” seen in the semi-conductor/hard-disk industries, and other sectors, where costs have reduced rapidly as production ramps up.
- The speed of change has taken analysts and governments by surprise.
- Further solar panel efficiency improvements and new PV technologies will bring the costs down still further.



Solar's awesome stats

- Solar's excess electricity can be converted into hydrogen through electrolysis, with further conversion to methane and liquid fuels possible / being developed.
- Demand response, smart grids and energy efficiency are also part of the mix.
- In the sunnier parts of the world, these combinations may be enough to meet all the local energy needs. In less sunny parts of the world, including the UK, other technologies will also be needed - wind, biomass, hydro, etc.



All renewables to compete on cost with fossil fuels by 2020, says IRENA

15 January 2018, source [edie newsroom](#)

A fresh report has predicted that all renewable energy technologies will compete, and even undercut, fossil fuels on price within the next two years.



UK flexibility plans 2017

Interconnection



10-15 GW

New links planned to France, Norway, Ireland, Denmark and Belgium.

European Energy Market

Storage



10-12 GW

Large and small scale storage from pumped hydro, commercial and small scale battery storage

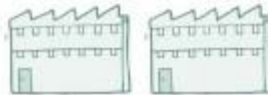
Peak demand shift



1-2 GW?

Smart meters and Time of Use Tariffs. Heat pump and EV charging off-peak. Smart appliances

Demand side Response (DSR)



2-4 GW

Contracted DSR – energy user peak demand reduction and demand turn up as needed

Battery storage

Going through similar cost reductions and speed of deployment to solar.

6 months ago: 1.5 GW capacity in pipeline.

Now: 8 GW capacity in pipeline.

**It's awesome, and it's now.
Don't keep it a secret!**

