

## The Optimal Grid

The Optimal Grid is the smallest and cheapest grid possible.

Minimal generation as well as minimal transmission, equipment and land.

## Electricity

- With every added share of RE the price of electricity goes up!

Pause. Does this make sense to you?

The price of electricity creates ripples across our entire society. It goes up, everything gets dearer and harder. For businesses and people alike.

Global phenomenon.

You see it often reported in media as “Network constraints”.

If you add RE to our legacy grids, you will introduce three problems.

Congestion, instability and timing problems.

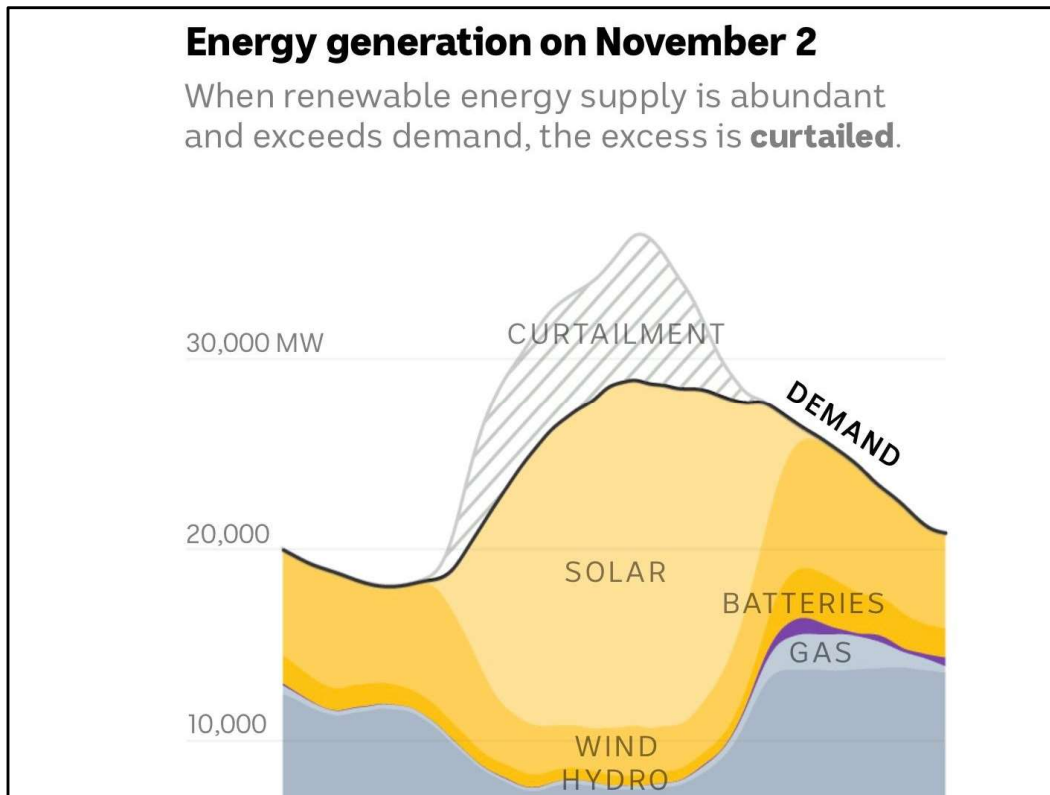
Congestion means curtailment. We will immediately get a higher price of electricity. And then we have to compensate for all three problems by upgrading and expanding our grid. This raises the price of electricity PLUS it will increase our taxes.

This is what you would call an “inverse investment”. Every dollar into this projects means you have to pay more now and even more in the future.

When was the last time someone suggested you to join a project going for a reverse investment?

They are pretty rare. And yet, it is happening here, right before our eyes.

Would this be the reason no one talks about the price of electricity perhaps?



Graphic representation.

Shows the NEM. We have a lot of solar in Australia. 35% to 65% curtailment.  
<https://www.pv-magazine-australia.com/2025/07/14/aemo-forecasts-increased-solar-curtailment-in-nem/>

Scotland has the same problem with wind, 37% curtailment.  
<https://www.theferret.scot/why-are-scottish-wind-farms-paid-billions-to-switch-off/>

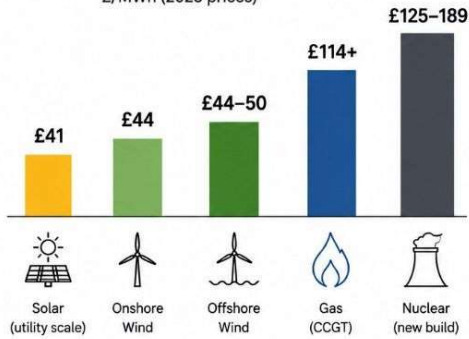
“This means that only 63% of the energy which could have been generated made it to the grid.”  
<https://felicitymartin.substack.com/p/why-we-dont-need-more-wind-turbines>

# What Is the Real Price of UK Wind and Solar?

Cheap to generate. More to build a reliable system.

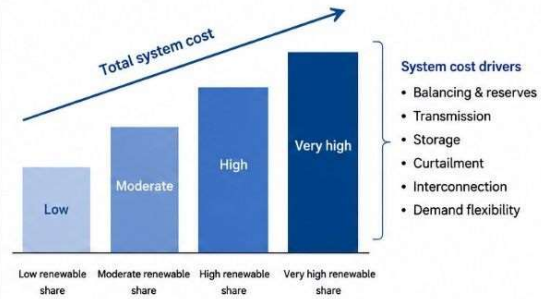
## 1. GENERATION COSTS (LCOE)

Average cost to produce electricity  
£/MWh (2025 prices)



## 2. SYSTEM COSTS

Additional costs increase as more wind and solar  
are added to the system.



Wind and solar are low-cost sources of electricity,  
but the *real price* is what it costs to build a reliable, secure, low-carbon system around them.

And this is how Tom Baxter in the UK described the phenomenon on LinkedIn on the 17 May.

# Current Grid



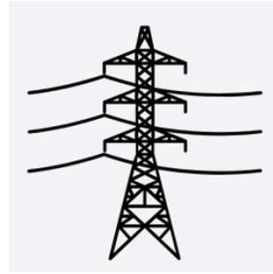
7 GW Nuclear power  
**55 GWh** per day



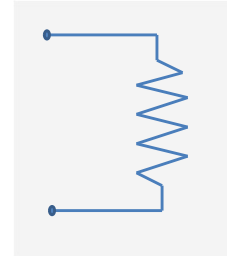
Wind power  
17 GW  
30% capacity factor  
**122 GWh** per day



Hydro power  
17 GW  
**408 GWh** per day



Transmission  
28 GW



Peak 7 h 14 GW  
= 98 GWh  
(Max peak 26 GW)  
Low 17 h 7 GW  
= 119 GWh  
**217 GWh** per day

Total generation:	<b>41 GW / 585 GWh</b>
Transmission:	<b>28 GW</b>
Average demand:	<b>9 GW</b>

Currently hydro, nuclear and wind power.

...

Now to the interesting part.

RE + storage provides us with an opportunity that we have never had before.

We can now design and implement an Optimal Grid.

What does that mean. A minimal grid. Minimum generation, transmission, equipment and land.

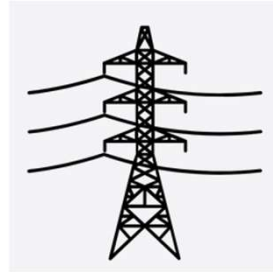
The smallest and cheapest grid possible.

A grid that caters for average demand, rather than peak demand.

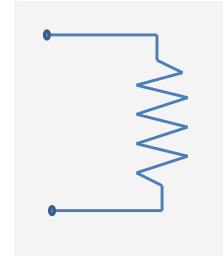
# Optimal Grid



Wind power  
17 GW  
30% capacity factor  
**122 GWh** per day



Transmission  
10 GW



9 GW  
**217 GWh** per day



Hydro power  
17 GW  
**408 GWh** per day



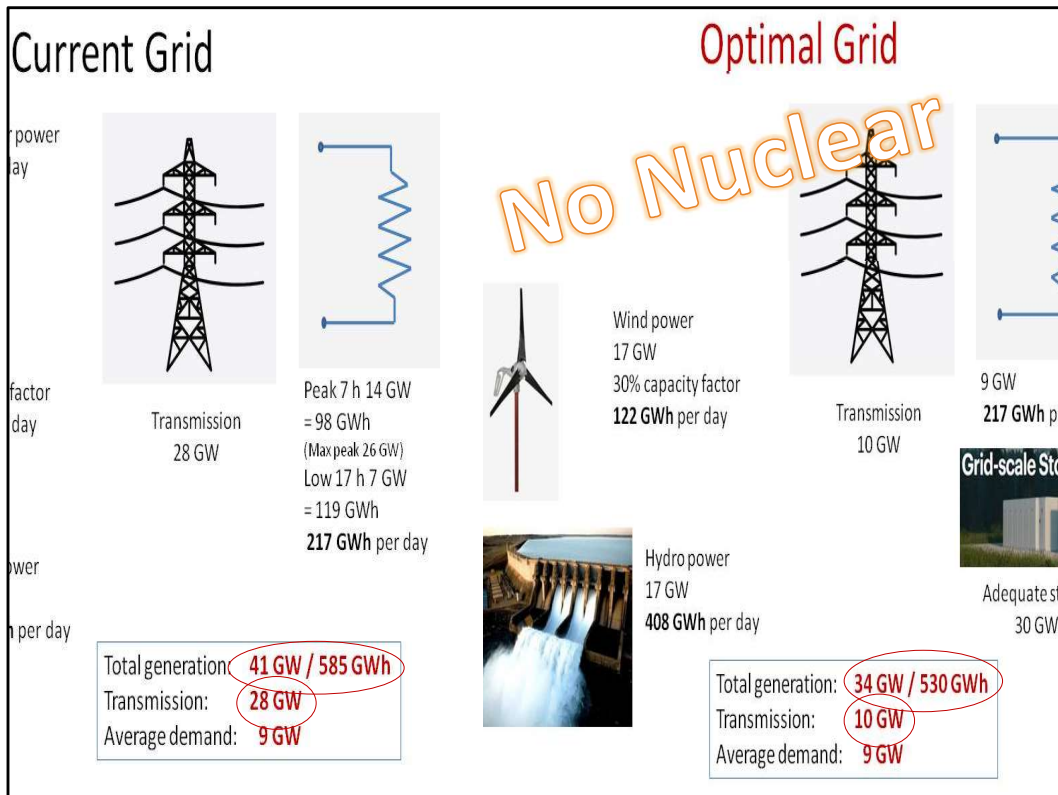
**Grid-scale Storage**

Adequate storage  
30 GWh

Total generation:	<b>34 GW / 530 GWh</b>
Transmission:	<b>10 GW</b>
Average demand:	<b>9 GW</b>

Peak 7 h 14 GW  
= 98 GWh  
(Max peak 26 GW)  
Low 17 h 7 GW  
= 119 GWh  
**217 GWh** per day  
Average demand = 9.04 GW

9.5 GW x24 h => 228 GWh capacity  
7 h need 14 GW = 98 GWh and will need 7x4 = 28 GWh backup = required storage  
17 need 7GW and will allow for 17x3= 51 GWh potential storage



Lower generation and almost one third transmission, equipment and land.

Adequate storage  
for Sweden  
(demand side only)

**30 GWhrs**

About 30 sq. kms. if using LI-ion batteries.

Batteries will work but important to remember is that this is the demand side, premium urban land, so the cost of land could be an issue.

1 GWh LI-ion covers about 1 sq. km.

Adequate storage  
for Sweden, hydrogen.  
(demand side only)

**60 GWhrs**

A large two-storey home holds roughly 1,000 cubic  
meters (a 10 m cube).

With 50 bar hydrogen, means no compression,  
we need 650 of these.

Hydrogen provides energy security.  
Would need 60 GWhrs

25 l at 700 bar = 1 kg

1 cu. m. = 40 kg

10 m cube = 40 tonnes = 1.33 MWhrs

Costco in Ardeer = 16,653 sq m x 10 m = 166,530 cu. m.

A ten m cube holds 40 tonnes at 700 bar = 1.33 MWh

22.5 cubes hold 30 GWhrs

1 kg 350 bar hydrogen occupies 46 l => 22 kg per 1 cu. m.

## The Optimal Grid will give us:

- ✓ Cheaper price of electricity.
- ✓ Lower taxes.
- ✓ Accelerated transition to renewable energy.
- ✓ Pathway to RE growth,  
RE fuels  
and renewable energy security.  
... If hydrogen used for storage

Final question:

If renewable energy is worth going for, then surely cheap RE is better?



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