



Elecxit:

The Impact of Barriers to Electricity Trade after Brexit

Joachim Geske,
Richard Green,
Iain Staffell

3rd Power Swarm meeting
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Imperial College, London

Introduction

The screenshot shows a web browser window with the URL <https://www.independent.co.uk/news/uk/home-news/brexit-energy-bills-gas-electricity-excl>. The page features the Independent logo and a navigation bar with categories like NEWS, POLITICS, VOICES, FINAL SAY, SPORT, CULTURE, VIDEO, INDY/LIFE, INDYBEST, LONG READS, AIDSFREE, INDY100, and VOUCHERS. The main headline is "Brexit added £2bn to UK energy bills in year after referendum, report claims". Below the headline, a sub-headline states: "Households paid an extra £75 a year in wake of vote which experts warn has been 'principal factor' driving up bills over past two years". The article is by Alex Matthews-King, published 2 days ago, with 14 comments and 1.3K shares. The article text discusses how Brexit has added billions to the UK public's energy bills, with households paying an extra £61 a year, according to research by University College London. It mentions that the 2016 referendum was the "principal factor" driving up gas and electricity bills, and that households paid an extra £75 each, on average, in the year after the vote. The report, commissioned by energy watchdog Ofgem, found a spike in prices in the wake of the referendum. It warns that leaving without a deal is likely to further deflate the value of sterling, knocking around 12 per cent of its value relative to the euro, amounting to £1.51 for every £1. The article is part of the indy100 trending section, which also lists other stories like Theresa May getting locked in her car, anti-manspreading campaigns, and Alexandria Ocasio-Cortez calling out double standards. A subscription banner at the bottom offers "Independent Minds" for €6.99 a month.

Brexit added £2bn to UK energy bills in year after referendum, report claims

Households paid an extra £75 a year in wake of vote which experts warn has been 'principal factor' driving up bills over past two years

Alex Matthews-King | 2 days ago | 14 comments | 1.3K shares

Brexit has already added billions to the UK public's energy bills and leaving without a deal could wreak further havoc and cost the average household an extra £61 a year, according to research by University College London.

The 2016 referendum has been the "principal factor" driving up gas and electricity bills over the past two years, driven largely by the collapse in the value of the pound and additional volatility in wholesale prices, the authors said.

As a result, households paid an extra £75 each, on average, in the year after the vote following an 18 per cent rise in wholesale electricity prices and a 16 per cent hike in gas.

The report, commissioned by energy watchdog Ofgem, sought to establish the key drivers of energy price increases in the UK and other European states between 2012 to 2017, and found a spike in prices in the wake of the referendum.

It warns that leaving without a deal is likely to further deflate the value of sterling, knocking around 12 per cent of its value relative to the euro, amounting to £1.51 for every £1.

indyl000 TRENDING

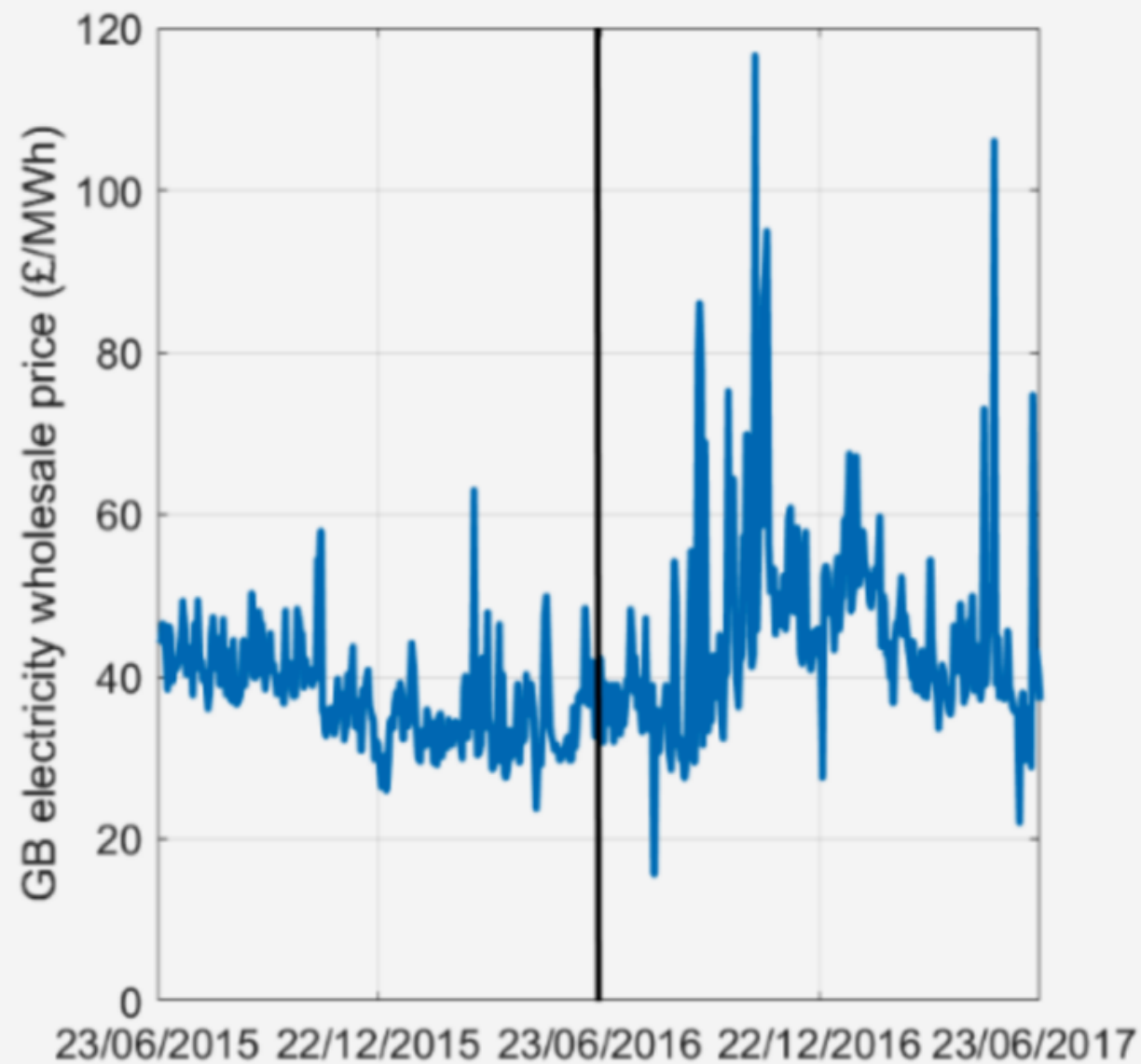
- Theresa May got locked in her car before meeting Angela Merkel and the
- Man calls anti-manspreading campaigns 'hypocritical' and sparks debate
- If you thought you were sick of Brexit, just wait until you see this
- Alexandria Ocasio-Cortez calls out double standards
- Anti-abortion campaign brutally fact-checked on Reddit

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Introduction

- Brexit referendum pushed up energy prices by 18%
 - £39 ± 6 / MWh before, £46 ± 13 / MWh after



Introduction

- The UK is in the process of leaving the EU
- EU energy market regulations may not apply in 9 weeks
- It is conceivable that the UK could leave the Single Electricity Market
- **We ask two questions:**
 1. What does leaving the Single Electricity Market (Elecxit) mean and imply for the electricity system?
 2. What are the medium-term (2030) costs of Elecxit?

Impact channels for Elecxit

- **Fees for electricity exchange**

- Transmission system use fee for 3rd country

- **European institutions**

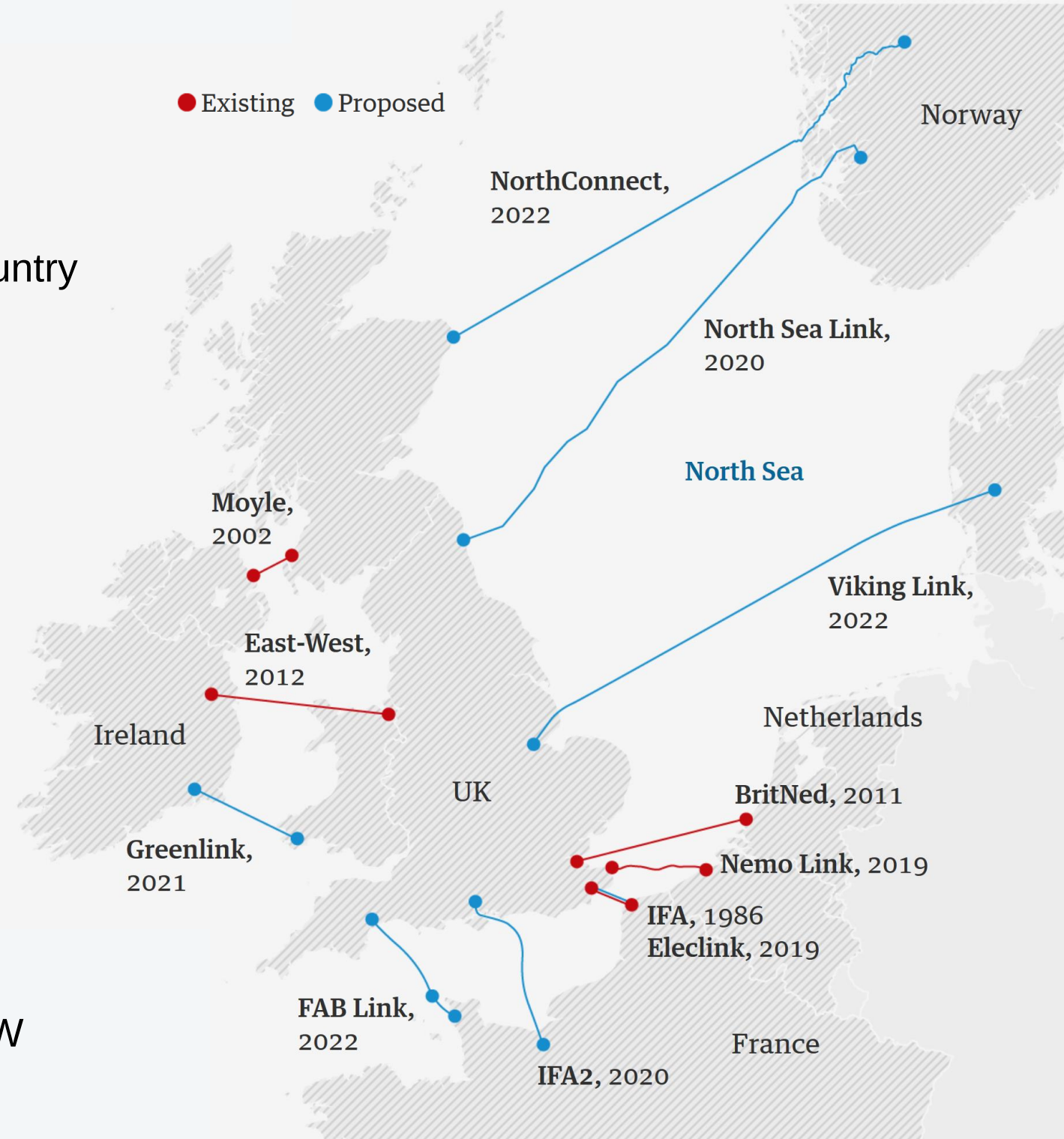
- ENTSO-E and ACER
- Carbon pricing (EU-ETS)
- Renewable Energy Directive
- Euratom (inc. fusion)

- **Market coupling**

- Single platform for balancing, day ahead, intraday, forwarding interconnector capacity

- **Investment in infrastructure**

- Expected interconnection: 4GW → 12GW
- Financing at risk ∴ EU funding, reduced profitability, uncertainty.

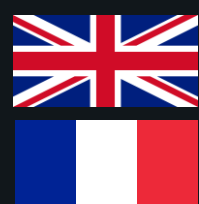


Elecxit scenario:

1. Reduced interconnector capacity expansion
2. Market uncoupling

Simplified model of electricity trading in coupled markets...

Day ahead UK&FR auction
Round 1 price proposal:



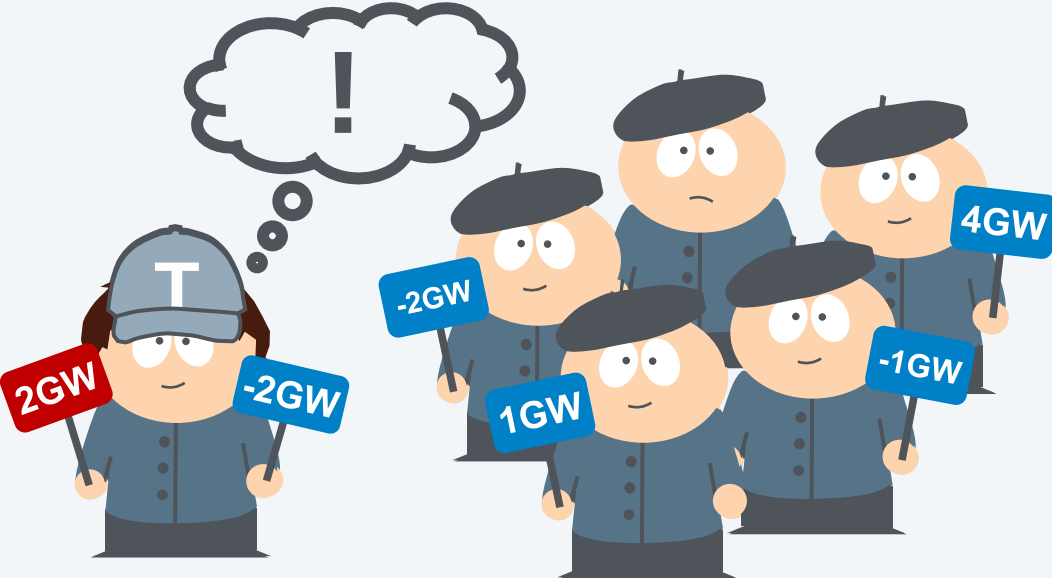
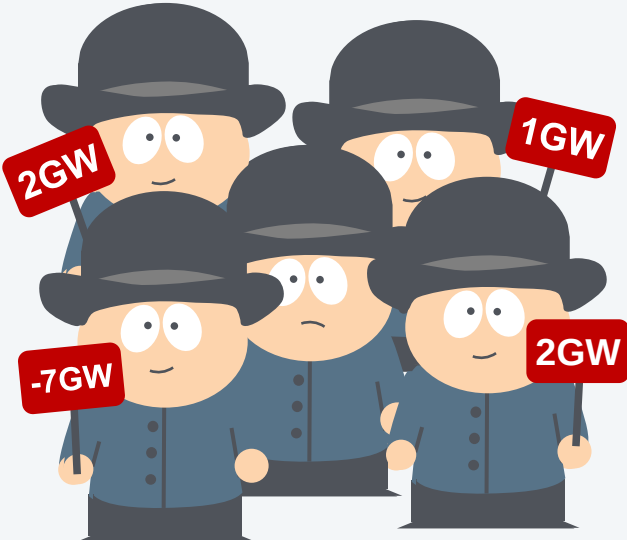
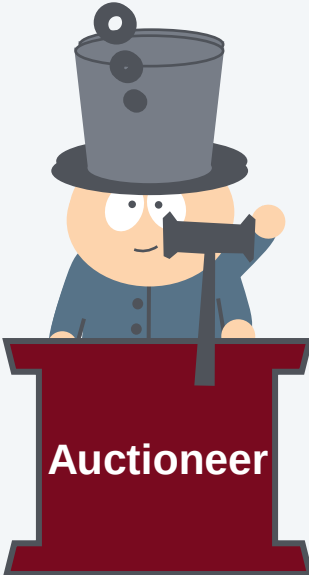
60 €/MWh
80 €/MWh

Market closure



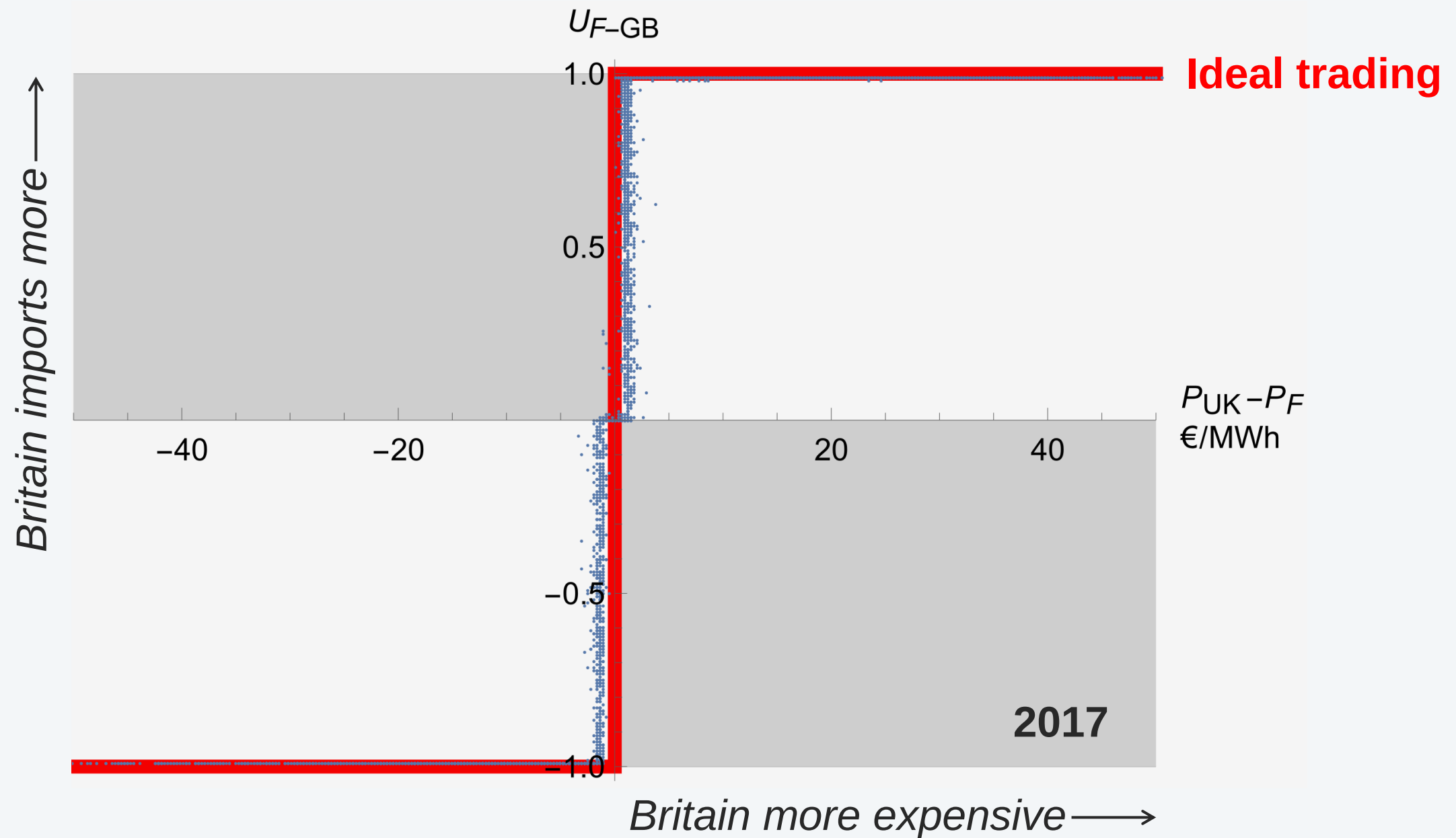
Generators&Demand

Trader



The easy way to trade power

- Great Britain and France currently have coupled markets



.... And in uncoupled markets

Day ahead auction UK
Round 1 price proposal:



? ? ? ? ?

Market closure F



Market
closure UK

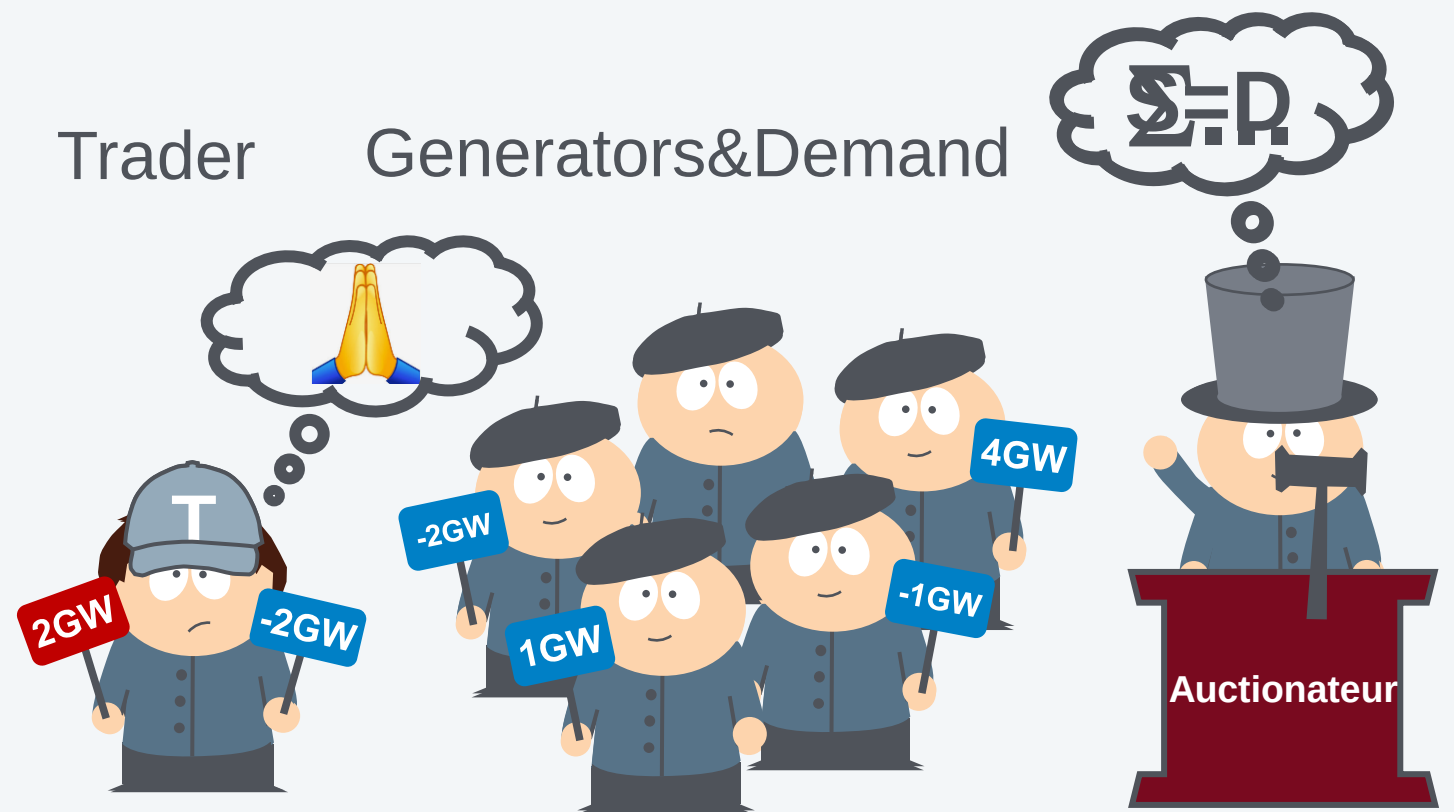
Day ahead auction FR
Round 1 price proposal:



80 €/MWh

Trader

Generators&Demand



.... And in uncoupled markets

Day ahead auction UK
Round 1 price proposal:



60 €/MWh

Market closure F



Market
closure UK

Day ahead auction FR
Round 1 price proposal:



80 €/MWh

Genius!

Poor boy!

Generators&Demand

Disrupter!

God save
the Queen!

2GW

-2GW

-2GW

1GW

-1GW

4GW

Auctionateur

.... And in uncoupled markets

Day ahead auction UK
Round 1 price proposal:



60 €/MWh

Market closure F



Market
closure UK

Day ahead auction FR
Round 1 price proposal:



80 €/MWh

Genius!

Poor boy!

Disrupter!

God save
the Queen!



Not just timing differences:
Perfect information flow...
Simultaneous trading...
Incompatible rules & regs...
(it's a philosophical question)

Auctionateur

The hard way to trade power

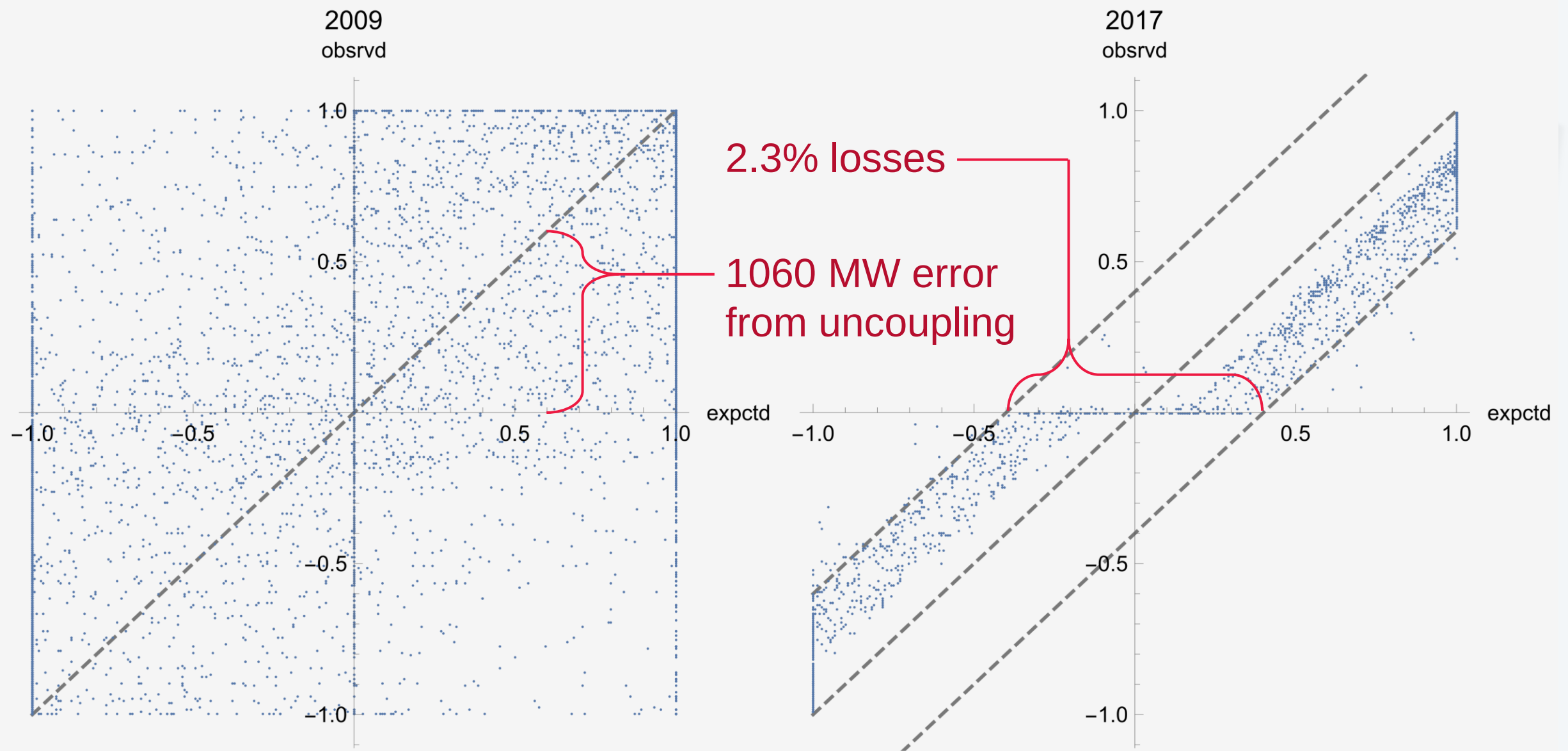
- When markets were uncoupled, traders made mistakes...
- 0.2% cost in total welfare



Modelling uncoupled markets

Model to measure the noise...

- Bilateral equilibrium model of trade (with losses and capacity constraints)
- Applied to the “natural experiment” 2009 (uncoupled) and 2017 (coupled):



Simulation: Elecxit costs

- **Market modelling:**

- distortion depends on 1. supply curvature, 2. size of the anticipation error, and 3. transmission capacity

- **Simulation of Elecxit 2030:**

- ENTSO-E Vision 3: renewable capacity doubles; €71/tCO₂
 - renewable output profiles generated with Renewables.ninja*
 - load profiles generated with the DESSTINEE model†
 - Assume anticipation error scales with renewable capacity

- **Elecxit scenarios:**

- market uncoupling = – market coupling;
Revert to conditions of uncoupled markets (2009)
 - limited interconnector investment not 10 GW but 5 GW

* <https://renewables.ninja>

† <https://wiki.openmod-initiative.org/wiki/DESSTinEE>

Results / Conclusion

Welfare gain [% of market value]		Interconnector Capacity Scenarios	
		5 GW	10 GW
Market Design Scenario	Uncoupled	(Hard Elecxit) –€560m [–1.6%]	–€520m [–1.2%]
	Integrated	–€250m [–0.7%]	Base Case (Soft Elecxit)

- **Elecxit** in the more uncertain future markets may cost **6 times** as much as market coupling improved welfare in the past
- Losing market coupling might cost more than infrastructure
- 60% of losses are felt in GB, so annual cost belongs here:



Thank you



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