



Energy Markets and Prices

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Pandemic impacts

Energy Prices and Markets

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- International Board level experience in Energy, Environment and Infrastructure in UK, US, Europe and Emerging Markets.
- Founder Director and former CFO of the UK's Nuclear Decommissioning Authority, responsible for business processes, systems, procurement and controls and re-financing UK decommissioning programmes.
- Career includes: E&Y, British Railways, TXU, UK Gov, CFO at NDA and the European Commission.
- Non exec roles in pension, insurance and energy companies and in an educational charity.



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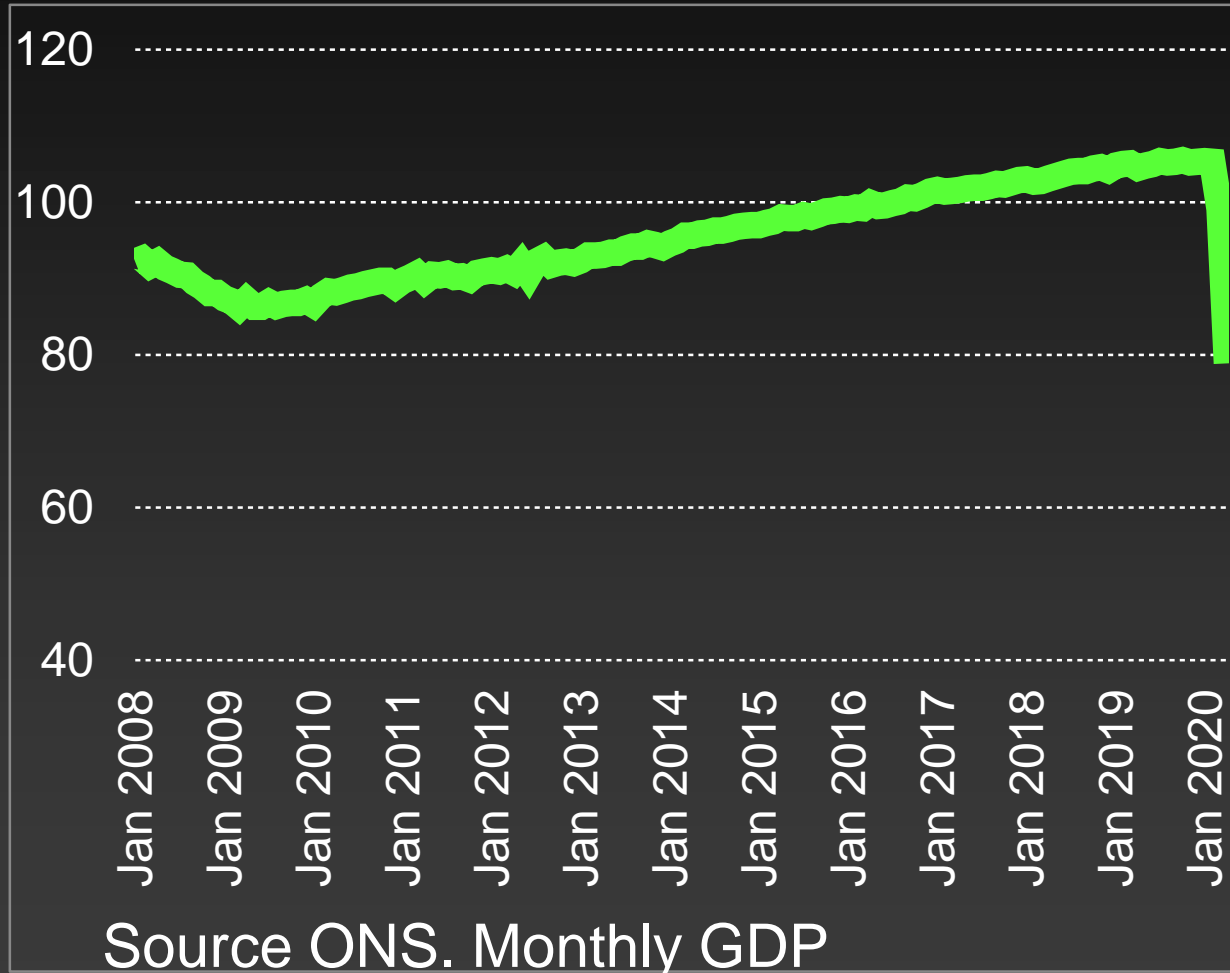
Pandemic
has swapped
Business as Usual
for a
Leap into the dark



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GDP

Between March 2020 and April 2020, **GDP** has fallen by **20.4%**,



The monthly decline in GDP in April 2020 is three times greater than the fall experienced during the 2008 to 2009 economic downturn.

Source ONS. Monthly GDP

Index: June 2016 = 100

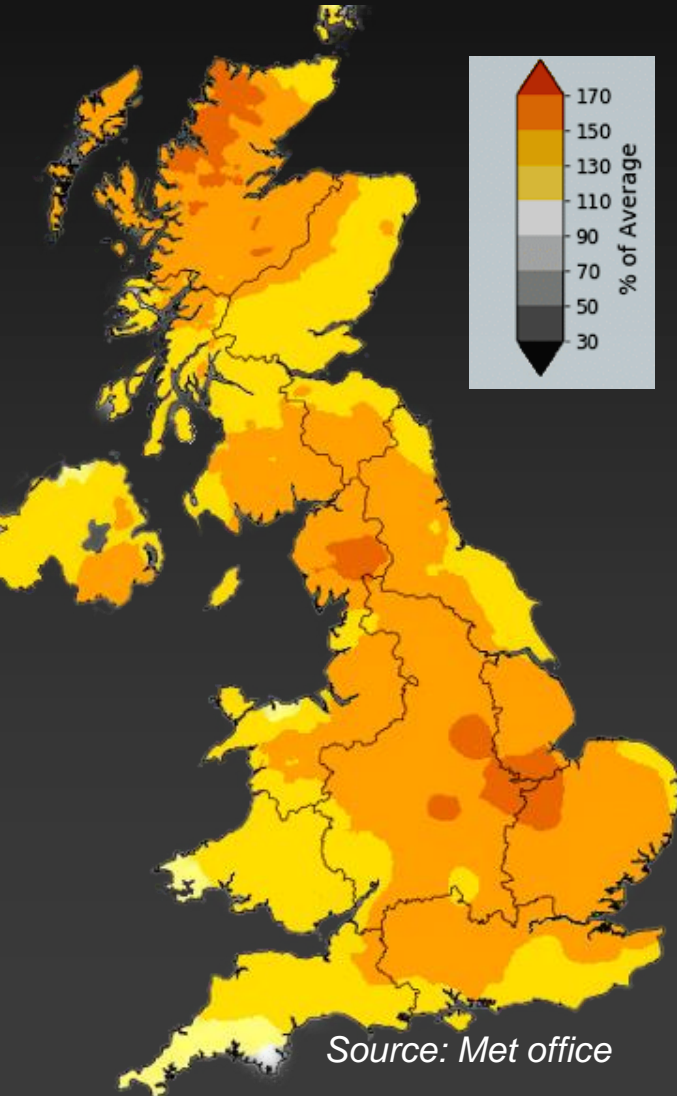
<https://www.ons.gov.uk/economy/grossdomesticproductgdp/articles/coronavirusandtheimpactonoutputintheukeconomy/april2020>



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Lockdown impact

What happened to energy consumption

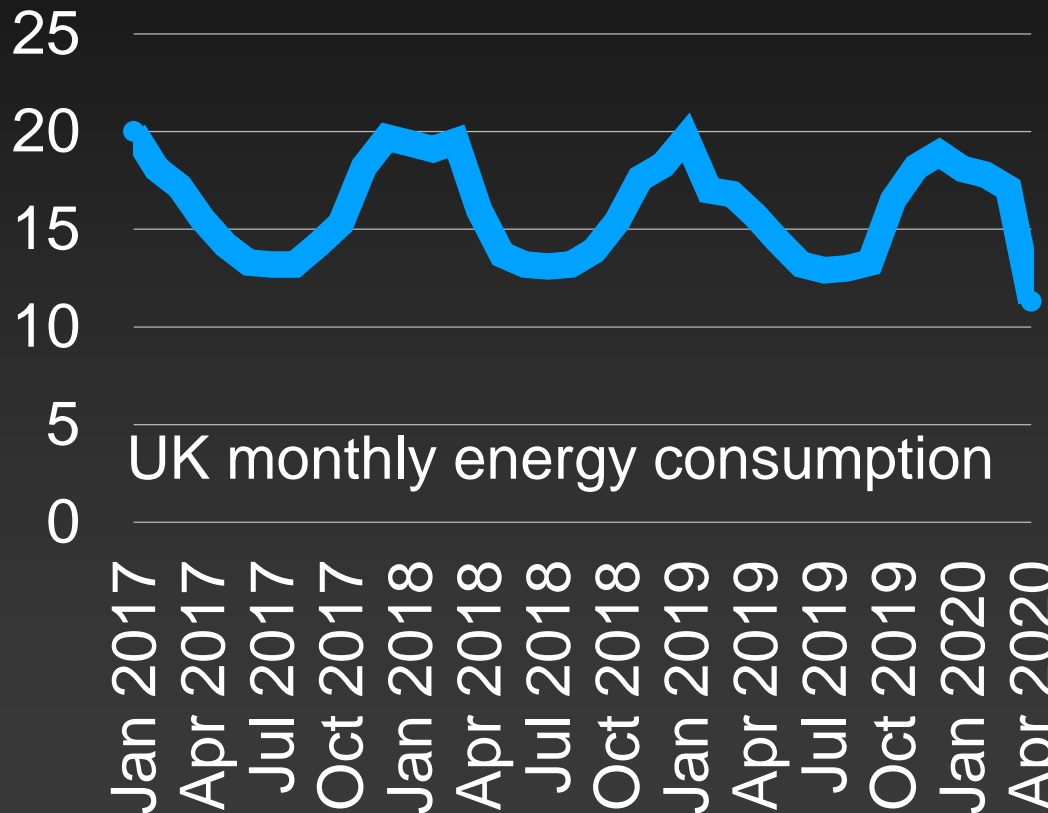


- Much of the UK population spending more time in their homes because of a full month of lockdown restrictions, created an increase in **domestic** use of electricity and gas, of around 9%
- But because of less demand from **industry**, which outstripped the increase in domestic use energy consumption fell sharply
- The almost complete cessation of **transport** caused fuel consumption to fall very sharply
- Record fall in demand for aviation fuel as a result of reduced international air travel
- UK's Warmest April on record, with **>65% more sunshine** than average, and average temp 2 degrees higher reduced **heating** demand



Energy consumption fell 28%

Millions Tonnes Oil Equivalent



April 2019 15.7 MTOE (
182 TWh)

April 2020 11.3 MTOE
(131 TWh)

**28% year on year
reduction** in the monthly
consumption

Source BEIS ET1.2Jun 20

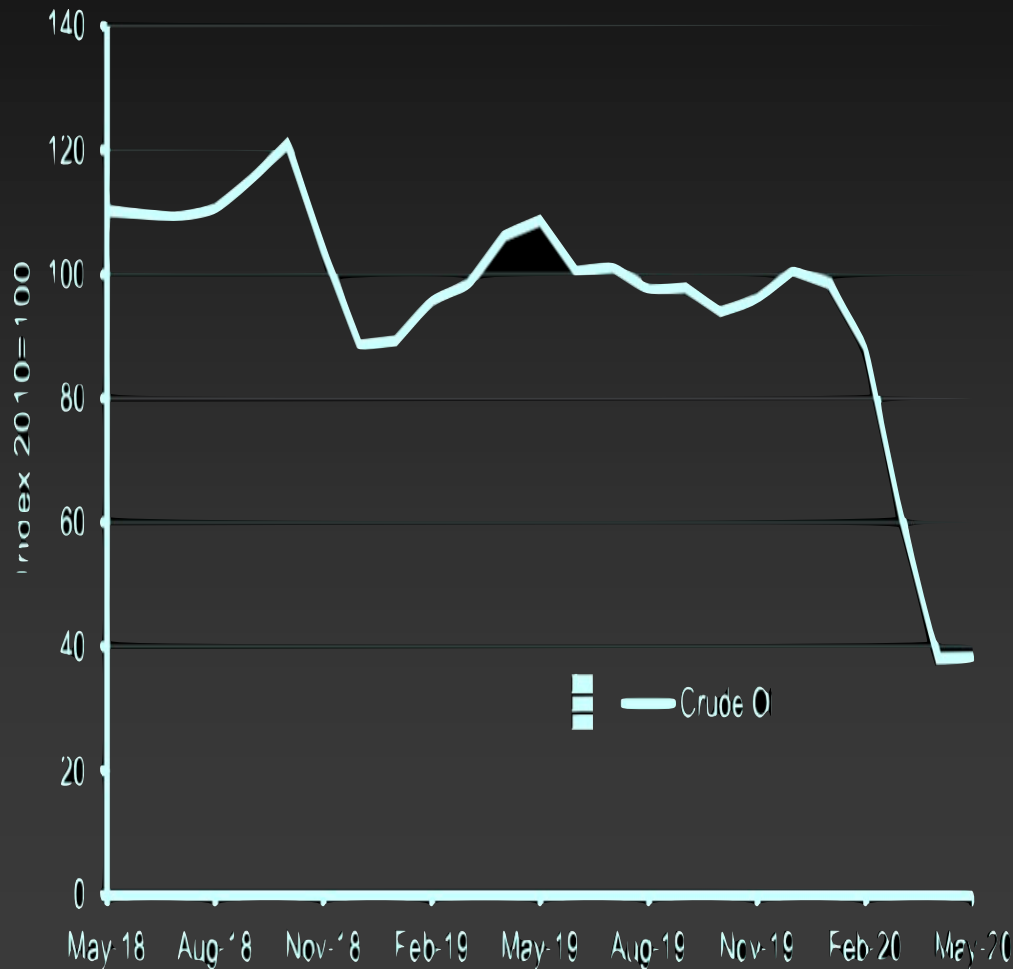
<https://www.gov.uk/government/statistics/total-energy-section-1-energy-trends>



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Oil (and Gas) prices tanked

Pandemic caused both Over-supply + Demand-drop



In May 2020 brent crude price was **65 per cent lower** than that of a year ago.

The fall in May 2020 was largely due to the impact of the coronavirus outbreak on demand, and continued oversupply from countries needing income during the lockdown

Source: BEIS QEP Jun 2020



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So what?

Polling question #1

- A. It's a blip** - these reductions don't matter long term
- B. Minor damage** has been done, energy markets will bounce back stronger than ever
- C. Major damage** is being done, the markets will re-emerge greatly changed and with new players
- D. It's a catastrophe** - governments need to make dramatic interventions

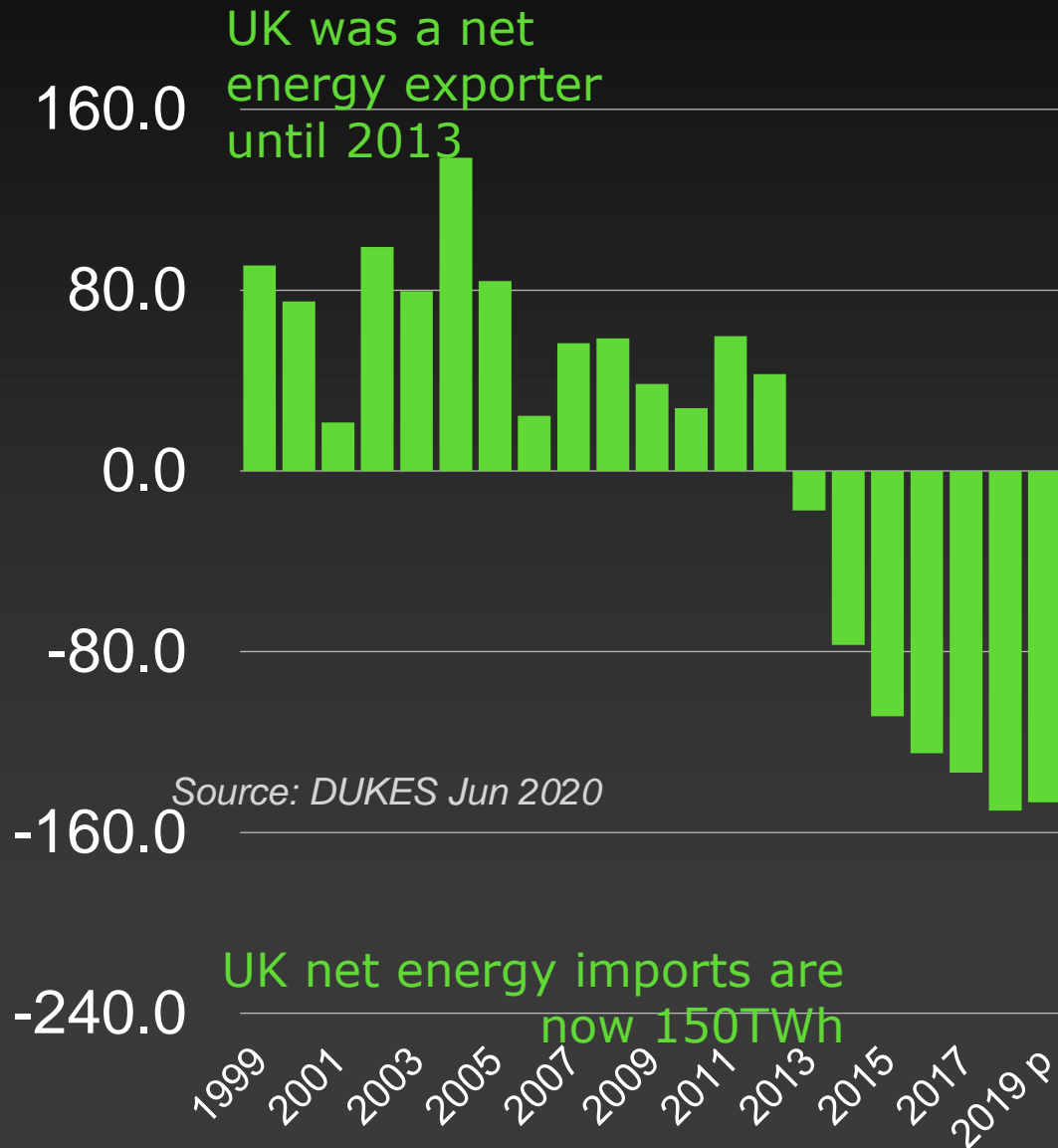


Return to business
as usual?
Or to
a new green dawn?



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Import dependency



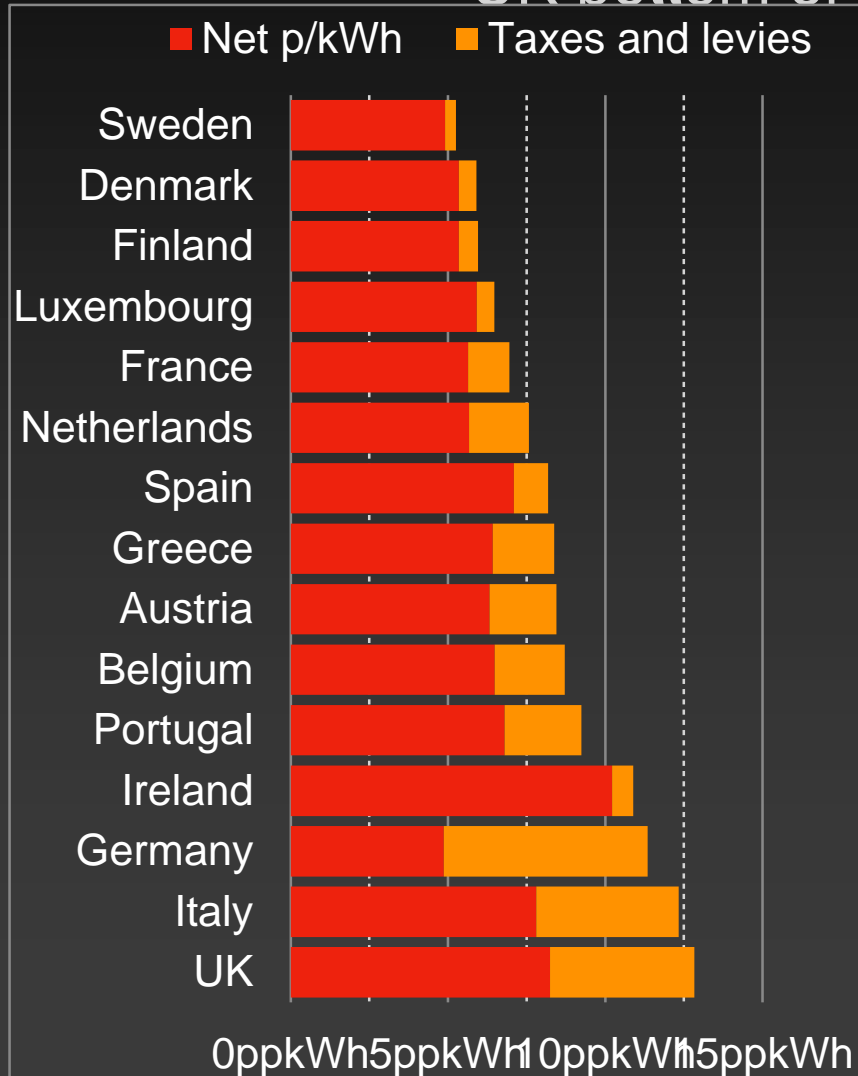
The UK reliance on imported energy has been growing due to gas field depletion and closure of coal and nuclear power plant

- Import dependency
- Q1 2019 : 39.0%
- Q1 2020 : 34.4%
- What about foreign owned production?



Industry pays more for power in the UK

UK bottom of the table



UK industrial electricity prices are twice those in the US, and the highest in the EU15.

Chart shows price for medium consumers (2-20GWh) in the EU15 July – December 2019.

Mix of generation, transmission costs and environmental levies

note: UK gas prices are second lowest in the EU 15



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Fossil Fuel dependency

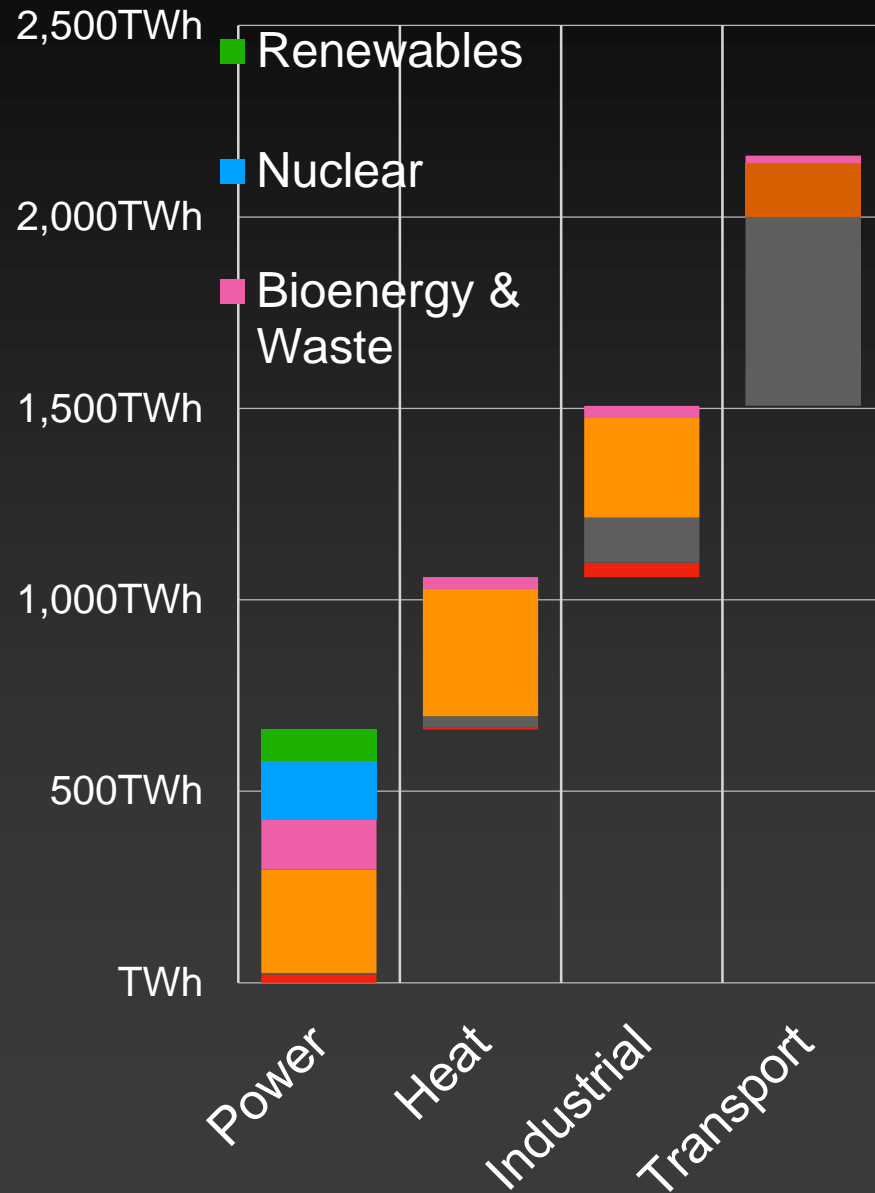


Chart based on BEIS ET 1.3
Jun 20, converted to TWh. (*nb contains estimates*)

Supply ~2,100TW

Consumption ~1800TWh

Low carbon share is ~20%

Fossil fuel dependancy ~77%

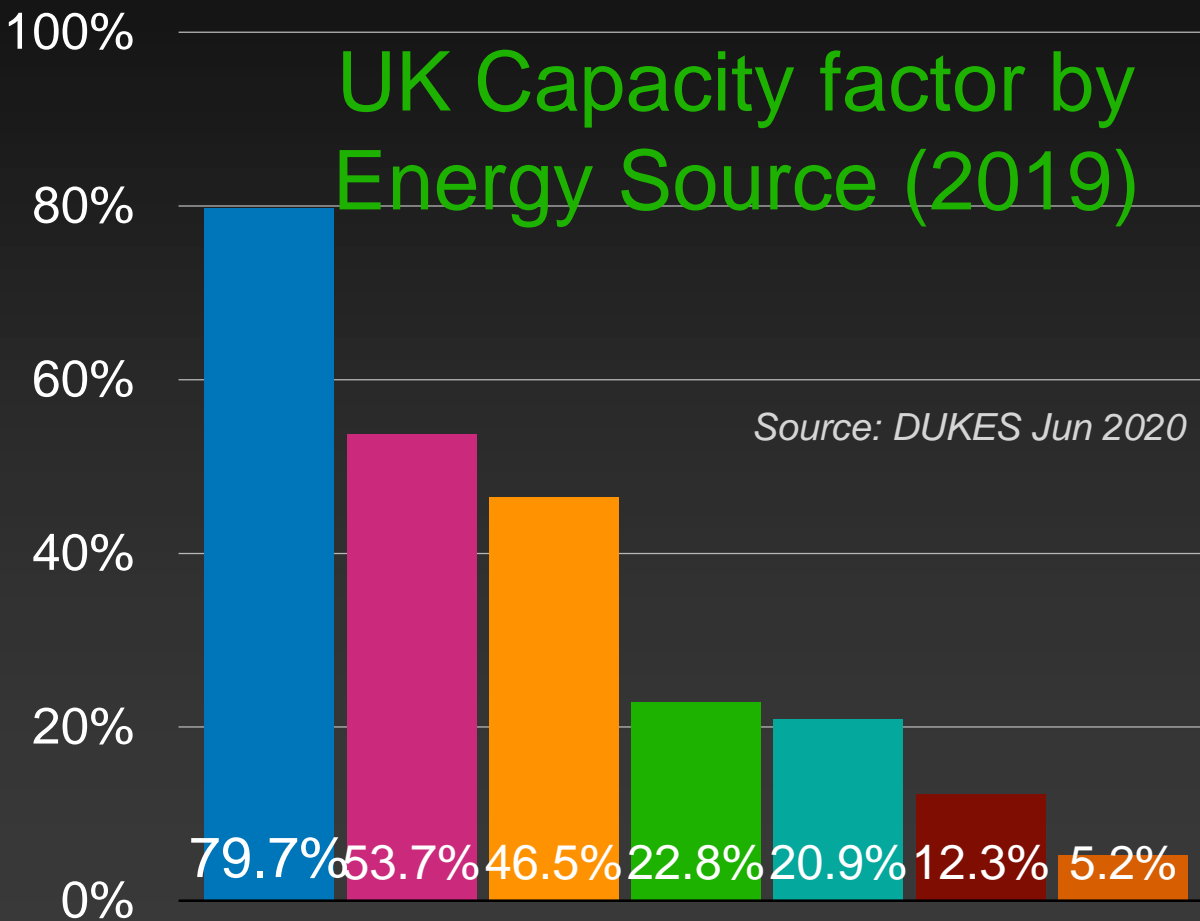
To decarbonise - **need to replace ~1,200 TWh by 2050**



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Capacity factors are a factor

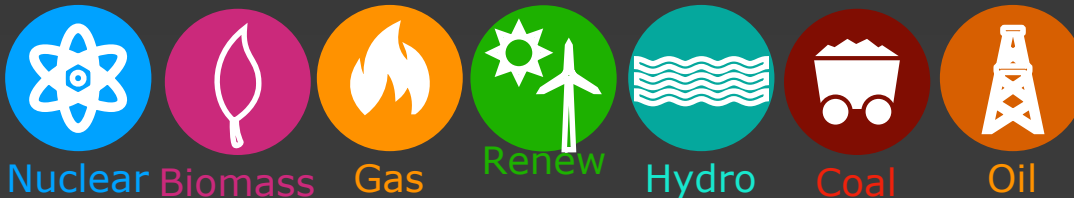
UK Capacity factor by Energy Source (2019)



Intermittency means Wind, solar and hydro assets have low utilisation

Storage will improve their capacity factor

Nuclear's great advantage is its capacity factor, but build cost and flexibility need addressing



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So What?

Polling question #2

- A. Business as usual** is great, so let's keep it
- B. Energy security** is our priority, control over our borders and our energy, so we'll invest in reducing import dependence, and limit foreign owned production
- C. Restoring the economy** is our priority, we need to reduce industry power prices, reduce tariffs
- D. Net zero by 2050** means we need serious carbon pricing and ~100 new nuclear power stations, so let's get on with it
- E. Just Chill** - OFGEM, Boris, and Dom have it covered.



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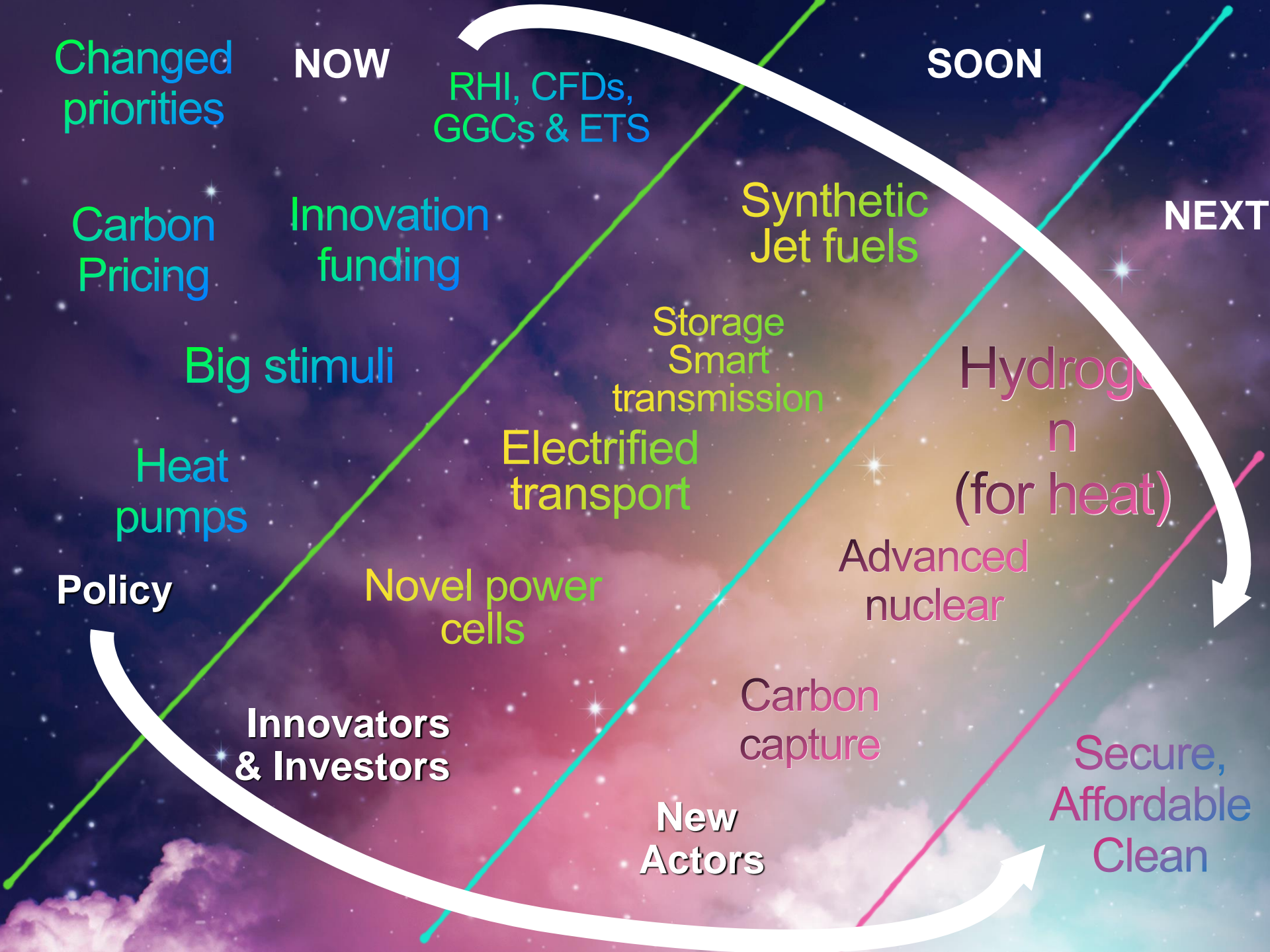
“The best way to
predict the future is
to invent it”

Alan Kay in 1971*

**Alan Kay in 1971, inventor of Smalltalk which was the inspiration and technical basis for the Macintosh and subsequent windowing based systems (NextStep, Microsoft Windows 3.1/95/98/NT, X-Windows, Motif, etc...*



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Thank you

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EnergyBridge

UK GAS & ELECTRICITY MARKETS:



Gas markets:



Seasonal Gas Graph

Gas Seasons

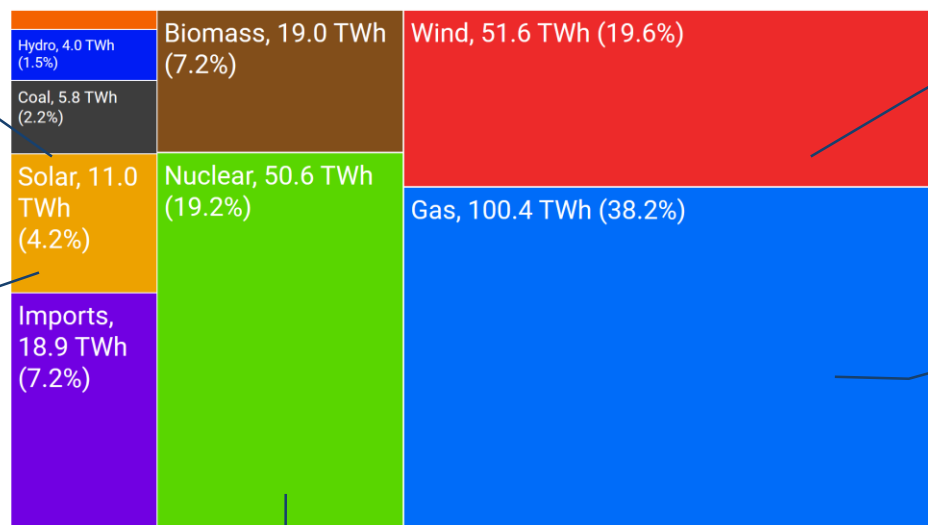


Record lows:

- Warm winter....storage full
- Surplus LNG
- Oil prices
- ...and then Covid

UK Electricity: Fundamentals have shifted- new records for 2020

May 2019- April 2020 Generation Mix



(Source: mygridgb.co.uk)

Hinckley...Sizewell C?...

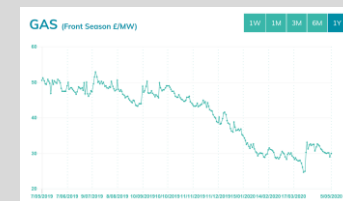
EDF outlines how Sizewell C project will be decided



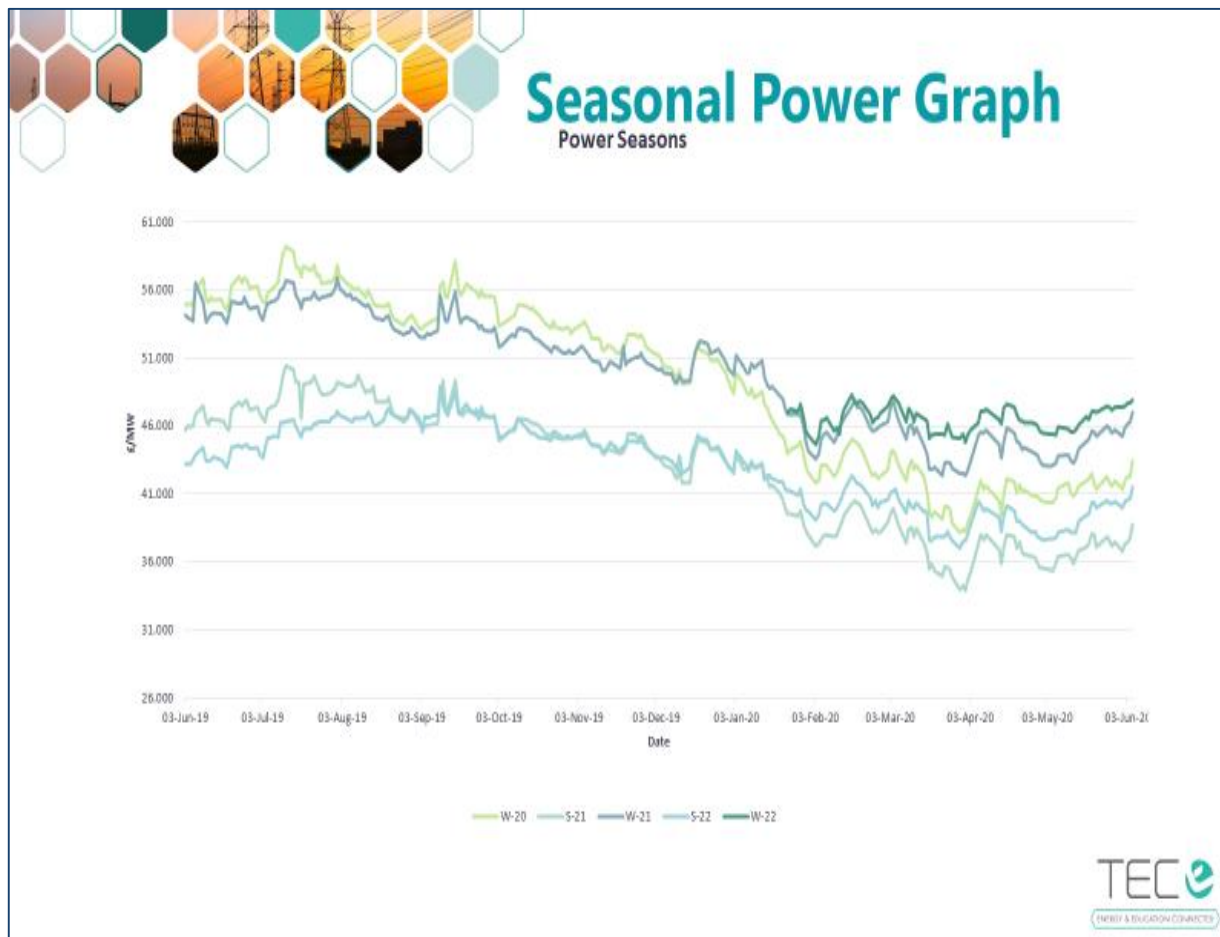
Source: EADT April 2020

Storm Ciara (Feb 20) 56% UK generation from wind

A worldwide glut of gas...



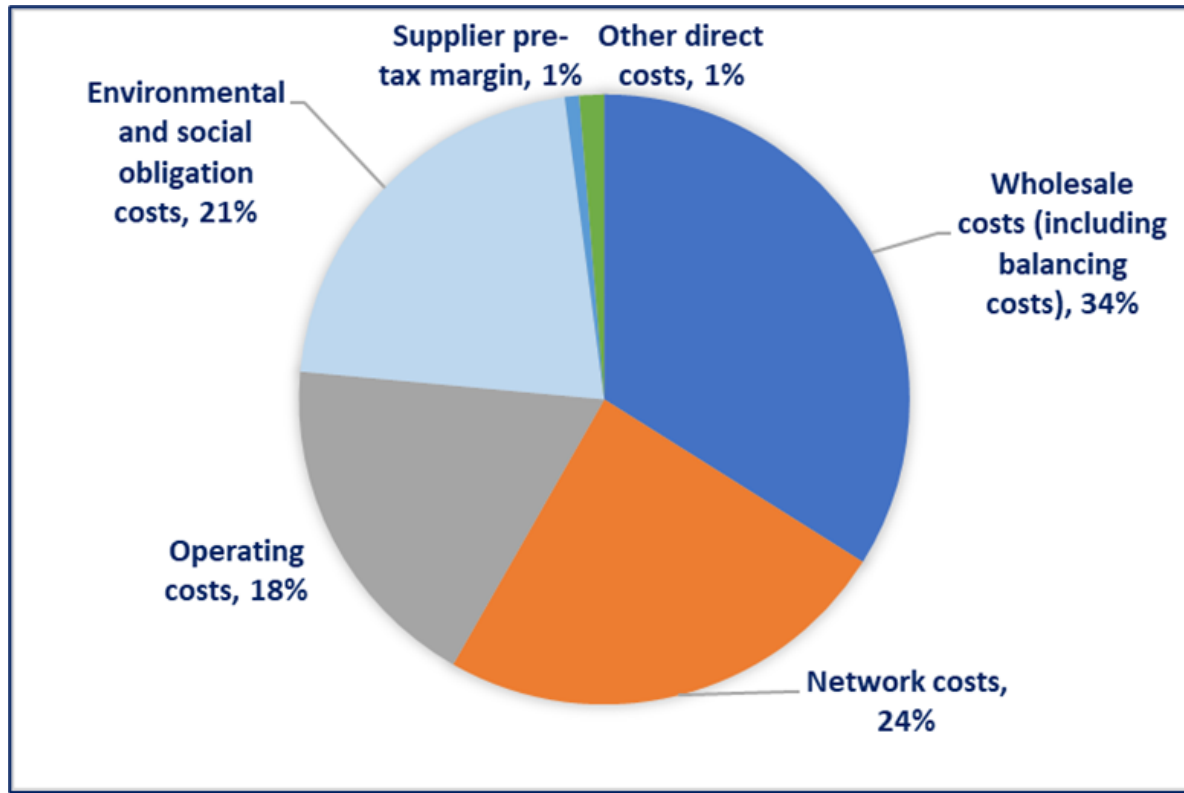
Power Prices:



Downward pressure...

- Demand drop from Covid
- Gas glut
- Sunny/windy weather

But commodity cost is less than half of the story



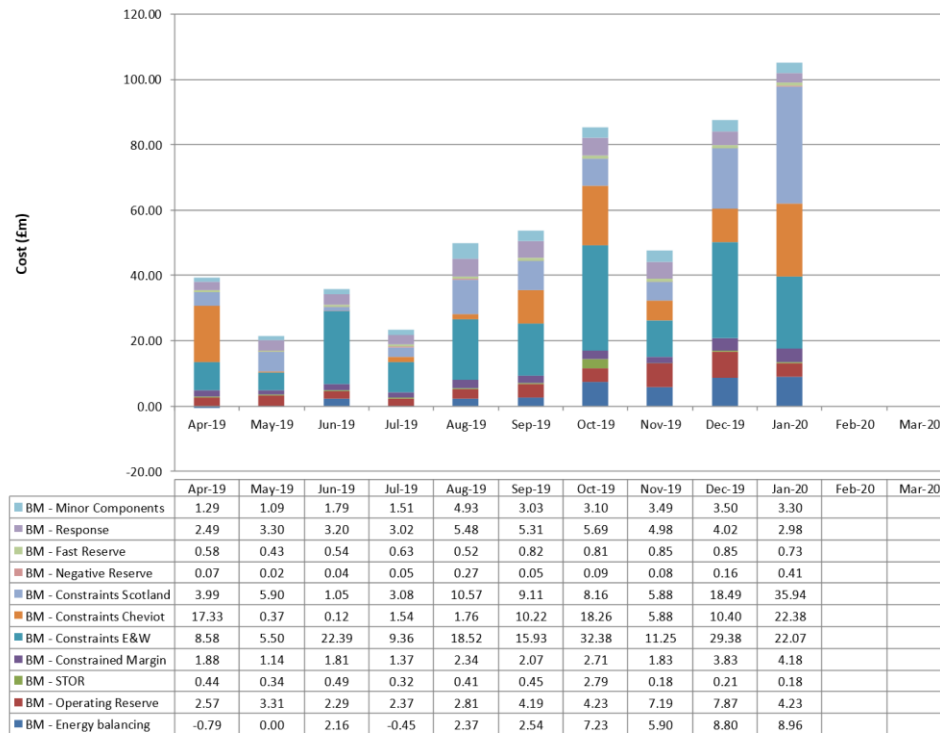
Source: OFGEM

Increasing:

- **Network costs (DUOS, TNUOS)**= funding expansion & investment in networks to support distributed generation
- **Balancing costs (BSUOS)**= costs of balancing system rising- Value shifting to new markets
- **Environmental costs (ROC, FIT, CfD, CM)**= funding incentive schemes for new generation

Value (& cost) is shifting to balancing actions. Negative pricing becoming a reality

Total balancing cost by category, in pounds sterling (£m)

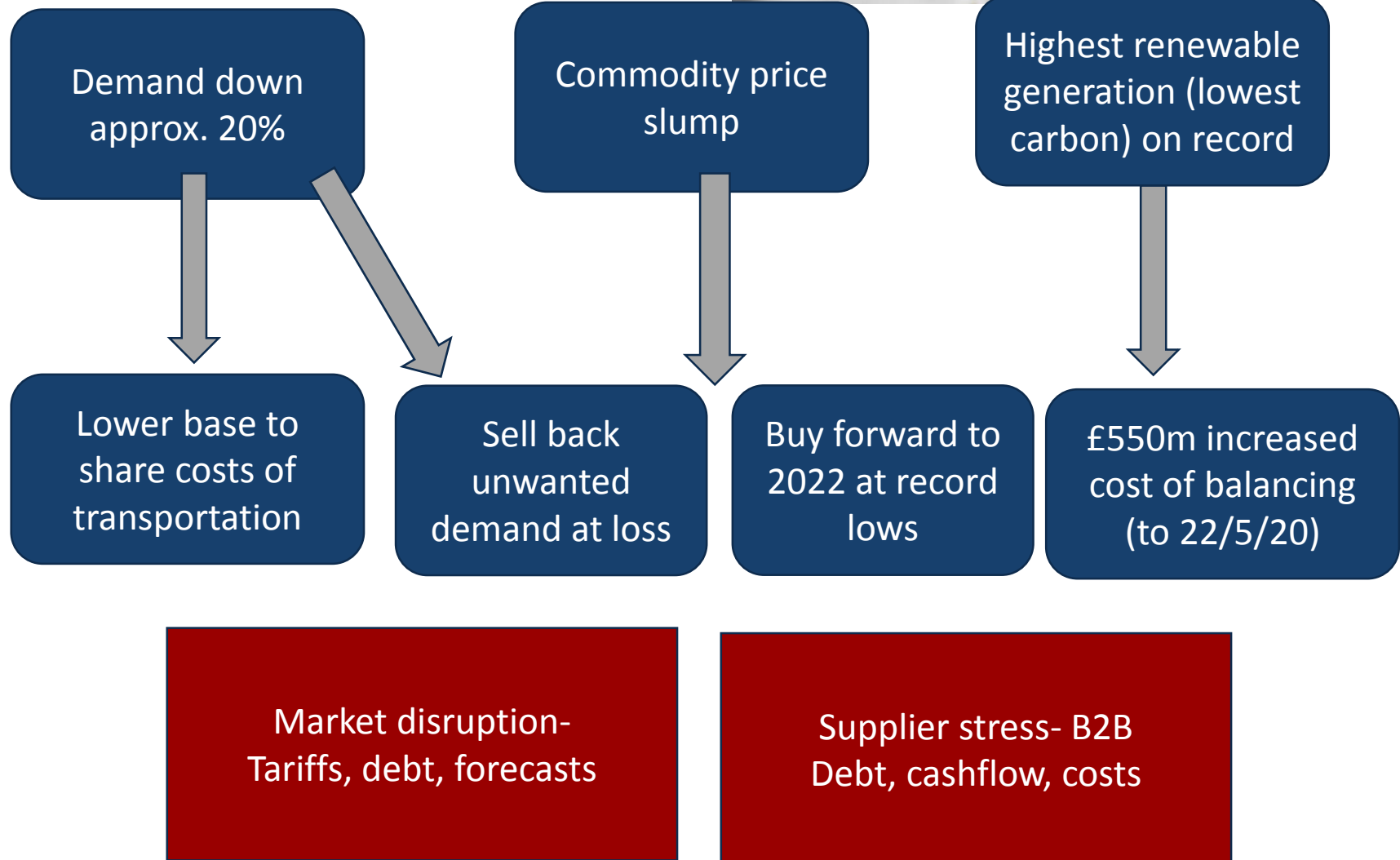
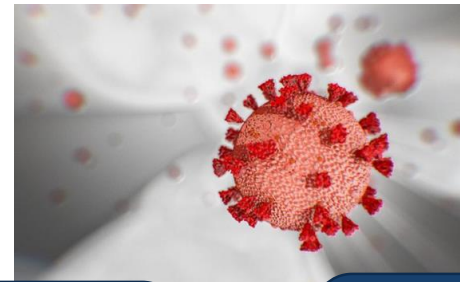


Source: National Grid ESO

- Growth of flexibility markets
- Investment in storage/peak plant
- Transmission & distribution

22 May 2020:
Average day ahead price:
£9.92/Mwh. Falling to
lows of -£52.03/Mwh in
early hours

COVID- Impact



How has OFGEM responded?

1) Instant: Consumer protection- Prepayment

2) Completed changes:

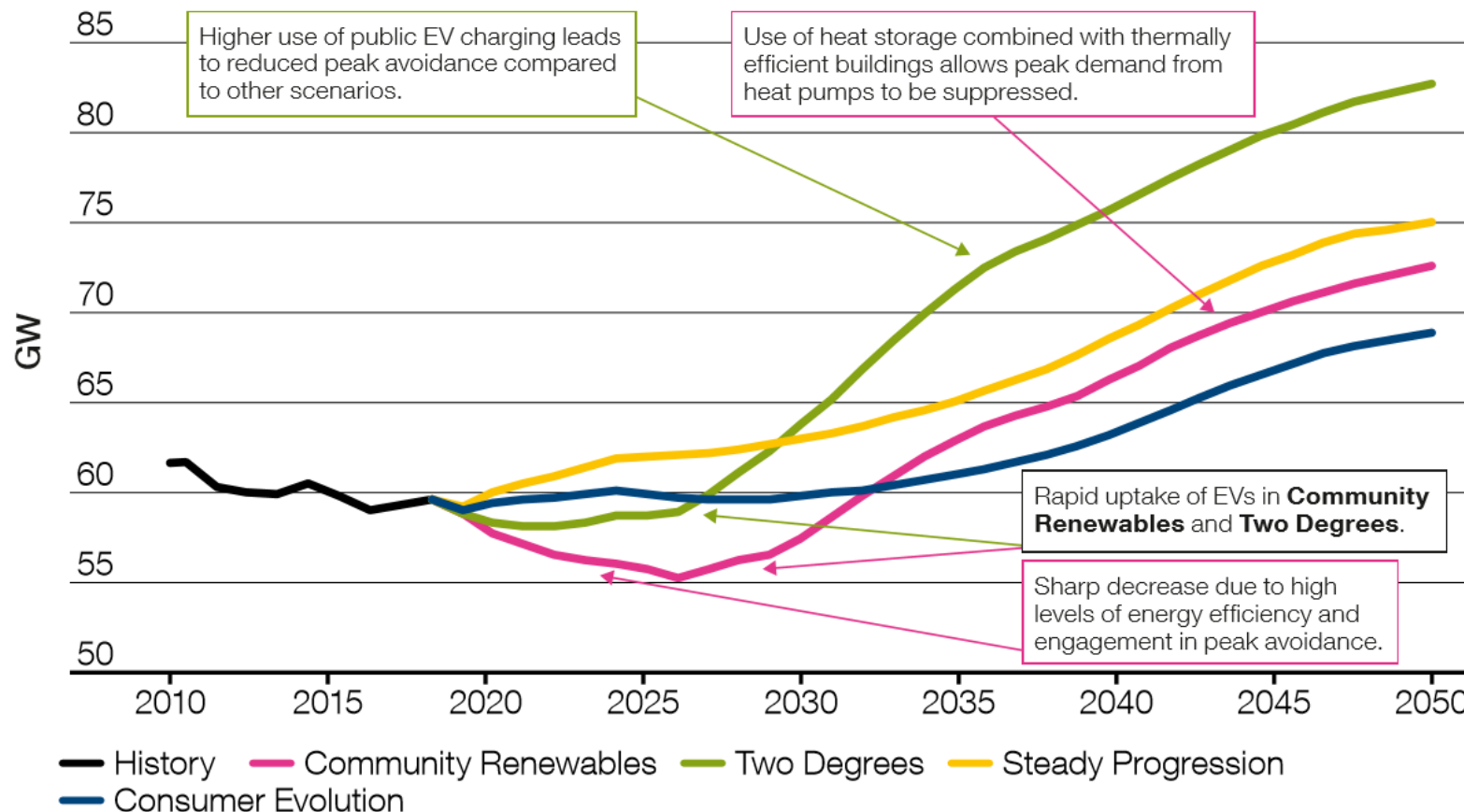
- CfD- cash injection
- Emergency powers to disconnect embedded generation
- Delayed payment terms for transportation costs
- Balancing charges capped- excess to be spread 2021/22

....costs will ultimately be recovered through consumer bills

3) Reform programme delay....3 month or more



Where next?



Covid-19 v the Oil and Gas Industry

ANDREW SNEDDON

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Struan Energy

- ▶ Struan Energy is a small oil and gas consultancy specialising in late life asset management and decommissioning.
- ▶ The company works with the oil and gas industry, Principally in late life asset management and decommissioning.
- ▶ A recent piece of work for the Oil and Gas Technology Centre demonstrated potential savings of between £5bn and £9bn through coaction in decommissioning activities.

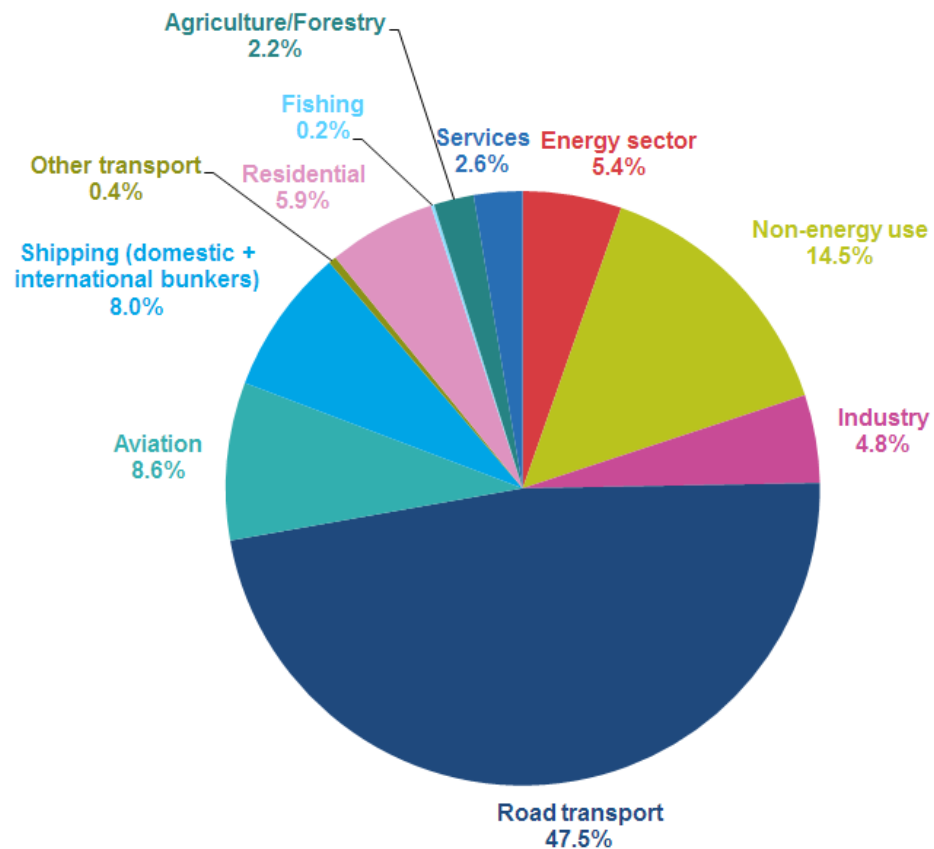
Andrew Sneddon



- ▶ Andrew is Managing Director of Struan Energy and an executive director of a company developing innovative non-carbon power technology.
- ▶ Andrew has worked in a number of different positions in the upstream oil and gas industry including academia as well as Mobil North Sea, Halliburton URS and AECOM providing consultancy and management services such as decommissioning to the E&P Industry.
- ▶ He founded Struan Energy Exploration and Production, acquiring two exploration licences and Clean Water Systems Limited to providing engineering solutions for offshore production.
- ▶ Dr. Sneddon was a Director and Vice-Chair for the decom trade association, Decom North Sea until recently and has worked in: Azerbaijan, Dubai, Equatorial Guinea, Faeroes, Greece, Ireland, India, Netherlands, Norway, Qatar, Romania, Russia, Trinidad, USA, UK, Vietnam.

Polling Question

- ▶ The majority of crude oil produced is used for:
- ▶ 1. Power generation
- ▶ 2. Aviation fuel
- ▶ 3. Road transportation (goods vehicles and cars)
- ▶ 4. Marine vessels

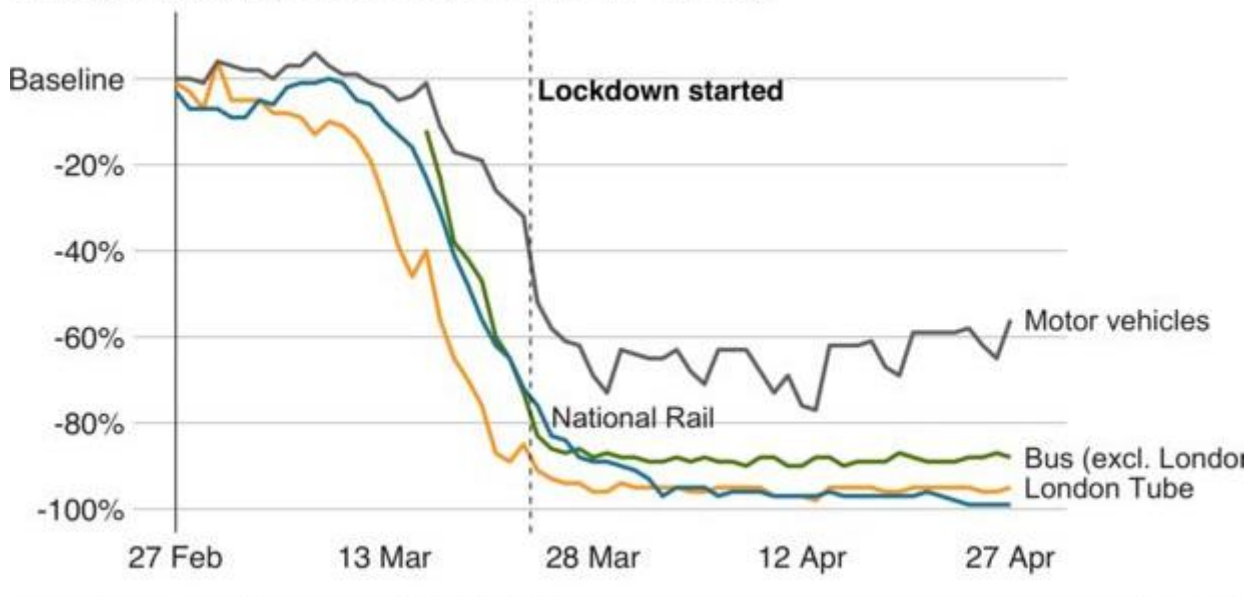


Source: Peak oil Barrel, November 2019

Global Oil Consumption by Sector

UK change in transport use

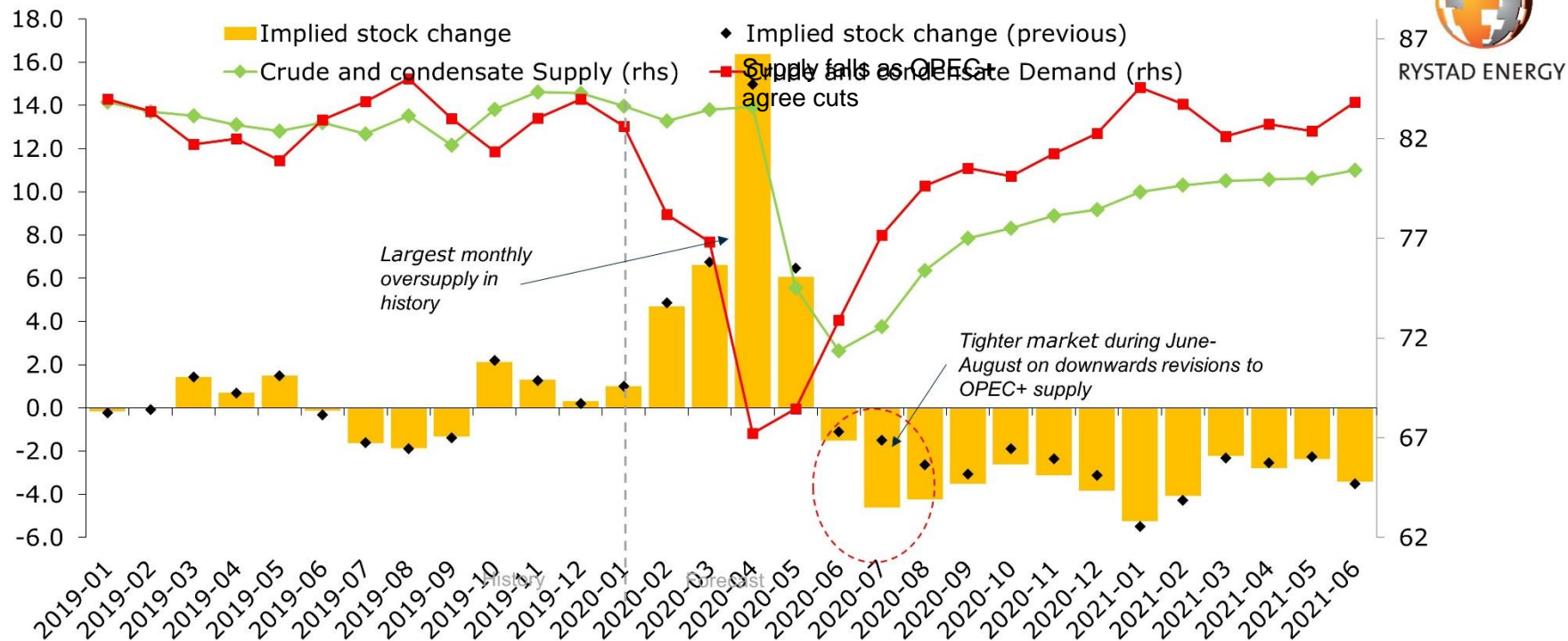
Change in transport use since end of February



Source: Department of Transport, 30 April 2020

Global oil supply and demand by month

Million barrels per day



Crude price per barrel



Source: Financial Times, April 2020

North Sea

- ▶ More than 4,500 North Sea job losses have already taken place in the wake of the Covid-19 outbreak and oil supply war
- ▶ The job loss figure was disclosed to Scottish trade unions by skills agency Skills Development Scotland (SDS)
- ▶ Trade unions and Trade Associations aware of many redundancy consultations currently underway
- ▶ Oil and Gas UK in April warned 30,000 direct and indirect jobs could go in the next 12-18 months out of a total of about 270,000
- ▶ *Source: Energy Voice 16 June 2020*

Short-term pain

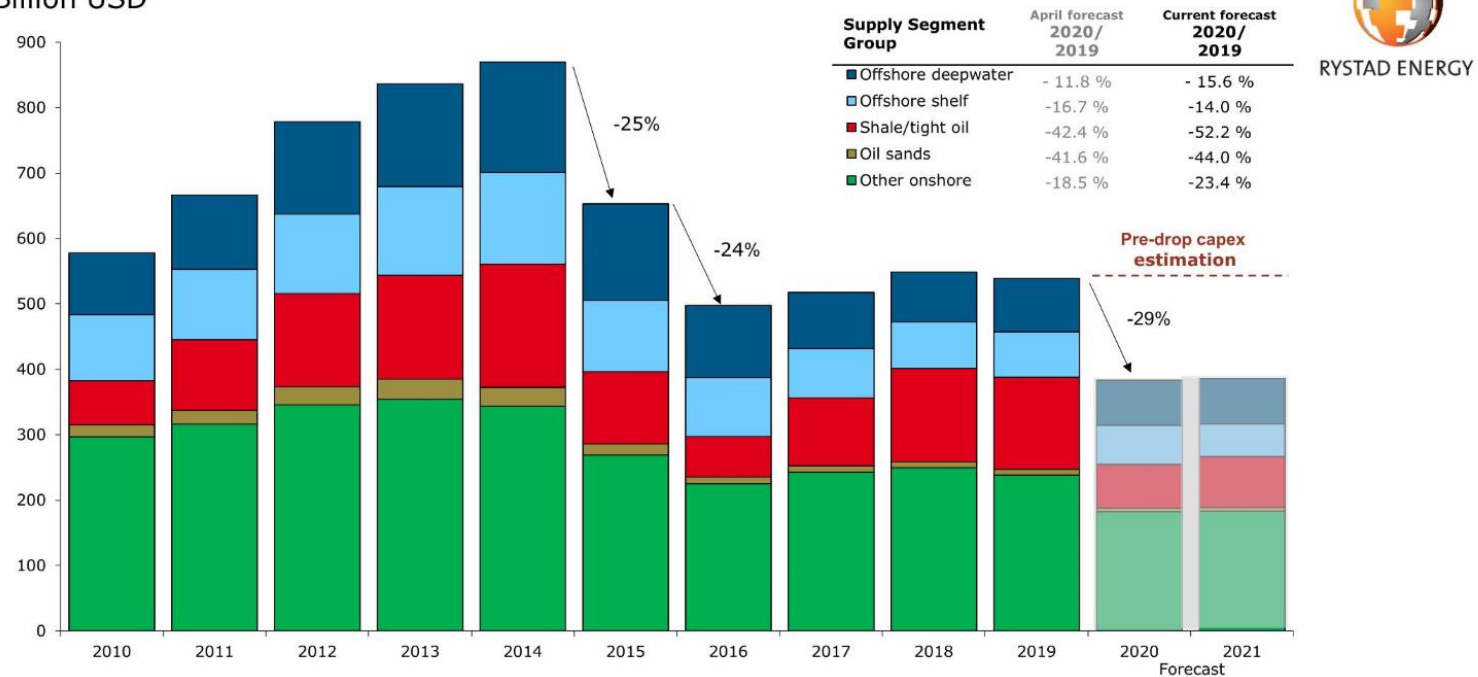
- ▶ Integrated oil companies generally expect swings and roundabouts – high oil prices = higher revenues but lower product profit. Currently a double whammy and after poor results in Q1:
- ▶ ExxonMobil stated lower oil prices will impact oil production earnings by \$2.1 billion-\$2.5 billion in Q2
- ▶ ExxonMobils's marketing and refining earnings impacted by \$700 million-\$900 million in Q2.
- ▶ Last week, Shell warned investors of an after-tax impairment charge of \$15 billion-\$22 billion in Q2.
- ▶ BP also announced a write off \$13 billion-\$17.5 million in after-tax charges in Q2.
- ▶ *Source: Investors Business Daily 2nd July 2020*

Crude price recovery?

- ▶ **If** Covid-19 is contained then transportation, road, aviation and shipping will pick up
- ▶ **If** OPEC+ can maintain their agreement, supply will be controlled
- ▶ Then this will lead to oil price increase,
- ▶ Current production costs for the UK are around \$15/Boe? Predictions are \$40/Bbl which makes UK production sustainable

Drop in oil and gas production investment

Global investments by supply segment 2010-2021
Billion USD

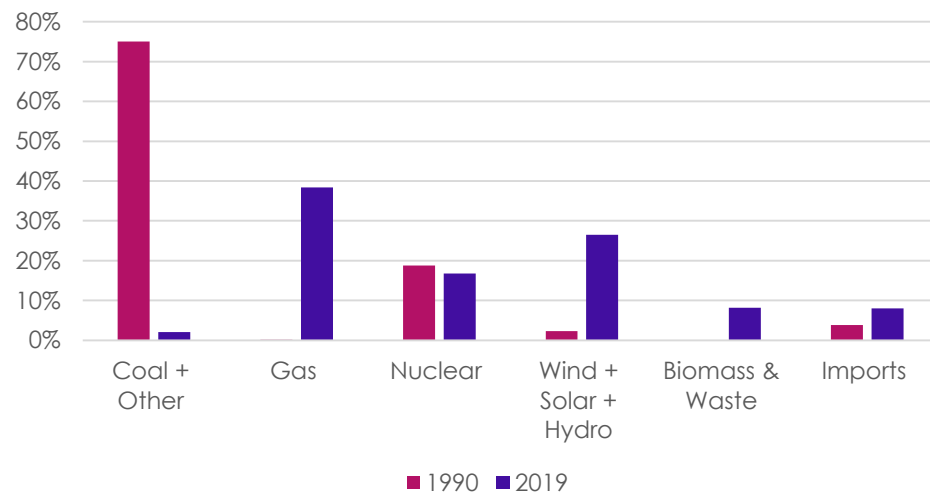


Source: Rystad Energy Ucube, 2020

Mid-term future for fossil fuels

- ▶ UK Net zero by 2050, Scotland by 2045
- ▶ Almost all CO₂ emissions are from the combustion of fuels
- .. ▶ Entire energy system will be transformed in the next 25 years
- ▶ Around 48% of electricity generated today has zero emissions (Q2 2020)
- ▶ Electric car sales soared in the last 10 years but only represent 7% of UK sales

UK Power Generation sources 1990 and 2019



Source: National Grid, July 2020

North Sea - Gloomy or hopeful?

- ▶ Decommissioning projects going ahead – Value £60bn but industry drive to achieve 35% saving for shareholders and HM Treasury
- ▶ Struan Energy working in this space

Re-use of infrastructure

- ▶ Blue hydrogen from Methane
 - ▶ Carbon Sequestration
- ▶ Green Hydrogen

Summary

- ▶ Covid-19 (and OPEC+) has had huge impact on crude prices and supply
- ▶ Mid-term prospects are positive IF Covid is contained/controlled
- ▶ Oil use will be needed in the mid-term - the North Sea industry can have a sustainable future
- ▶ Future is energy transition towards renewables/hydrogen
 - ▶ – North Sea People Process and Technology
- ▶ Struan Energy working with industry to maximise value of assets



Q&A...

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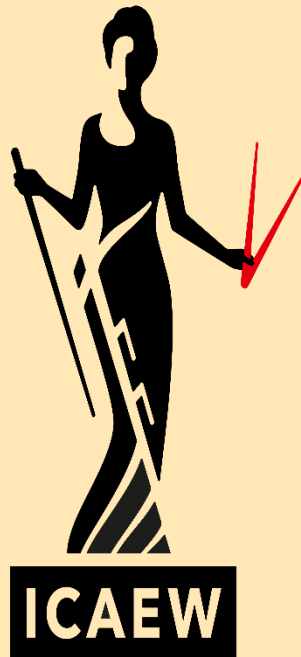
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