Energy Policies: The Road Ahead

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EBT 554E – Energy Market Management 29.12.2022

The road ahead - Summary

- Markets work within the framework of available technologies
- If technologies change, markets have to change
 - Insurance markets with autopilot mode cars
- Price is a compressed information of today and expectations
- Markets are social constructs, they can be reconstructed if needed
- Price should be signal for investment or deterring investment
- Markets do not adapt to policies easily
- So a transition is a very gradual process

What is statistics?

number + unit + metadata

100 million barrels/day oil (is biodiesel included?) of demand

BP methodology

Oil production

Oil production data includes crude oil, shale oil, oil sands, condensates (lease condensate or gas condensates that require further refining) and NGLs (natural gas liquids – ethane, LPG and naphtha separated from the production of natural gas). Excludes liquid fuels from other sources such as biofuels and synthetic derivatives of coal and natural gas. This also excludes liquid fuel adjustment factors such as refinery processing gain. Excludes oil shales/kerogen extracted in solid form.

World oil production tables are available in both thousand barrels daily and million tonnes.

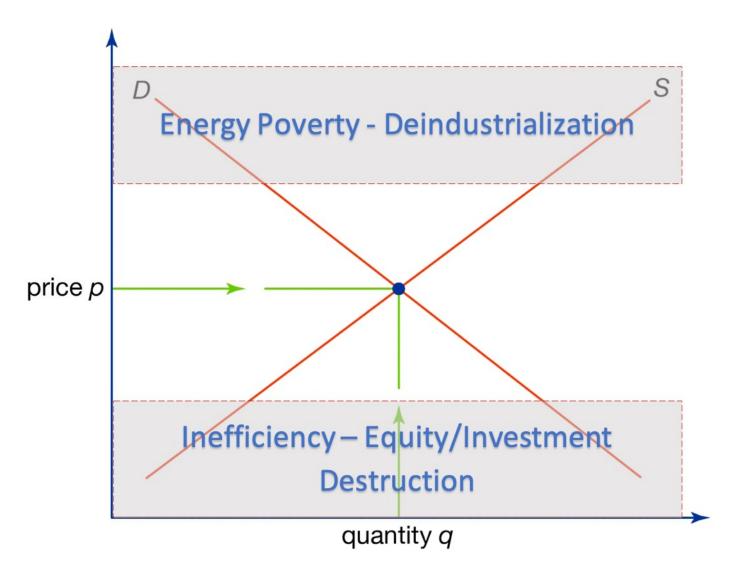
Liquids, oil and oil product consumption

Oil consumption as defined in previous *Statistical Reviews* (i.e. including biofuels) has been renamed 'liquids' consumption and a table is still included on this original basis. In addition, more granularity has been included on the product split of both oil products and biofuels (breaking out ethane & LPG and naphtha in oil products and the ethanol/biodiesel split of biofuels).

Total liquids consumption comprises inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of biogasoline (such as ethanol), biodiesel and derivatives of coal and natural gas are also included.

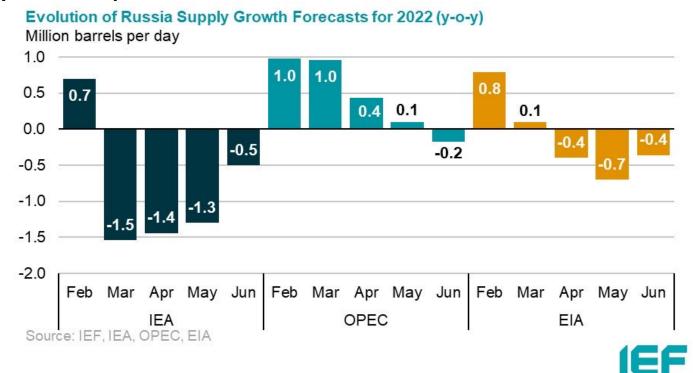
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Is it just Supply-Demand story?

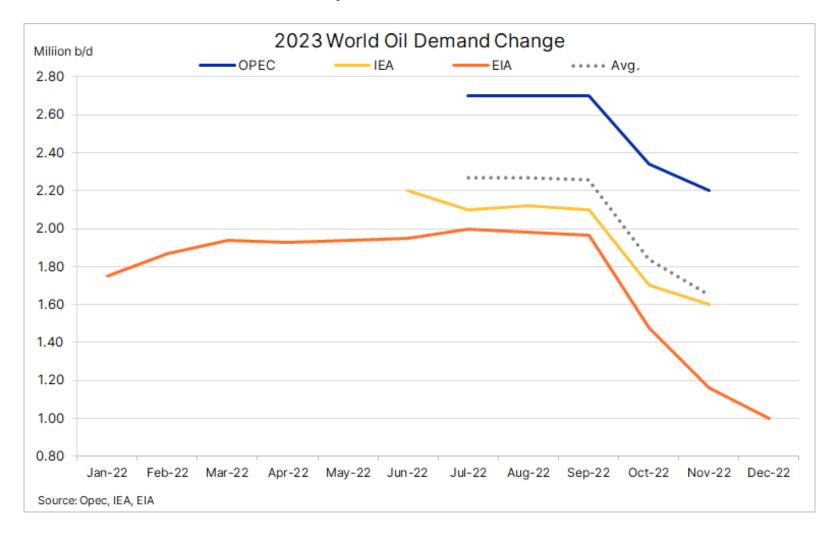


How forecasts work?

- A forecast is a frequently updated projection
- Monthly Oil Reports



2023 Oil Demand Expectations



Energy Balances (Table Format)

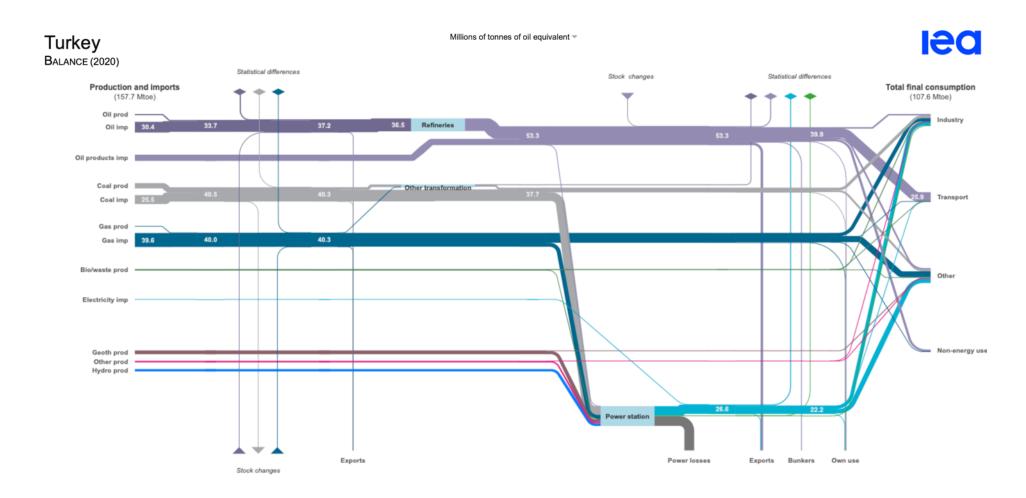
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Energy Balances – (Baris Sanli format)

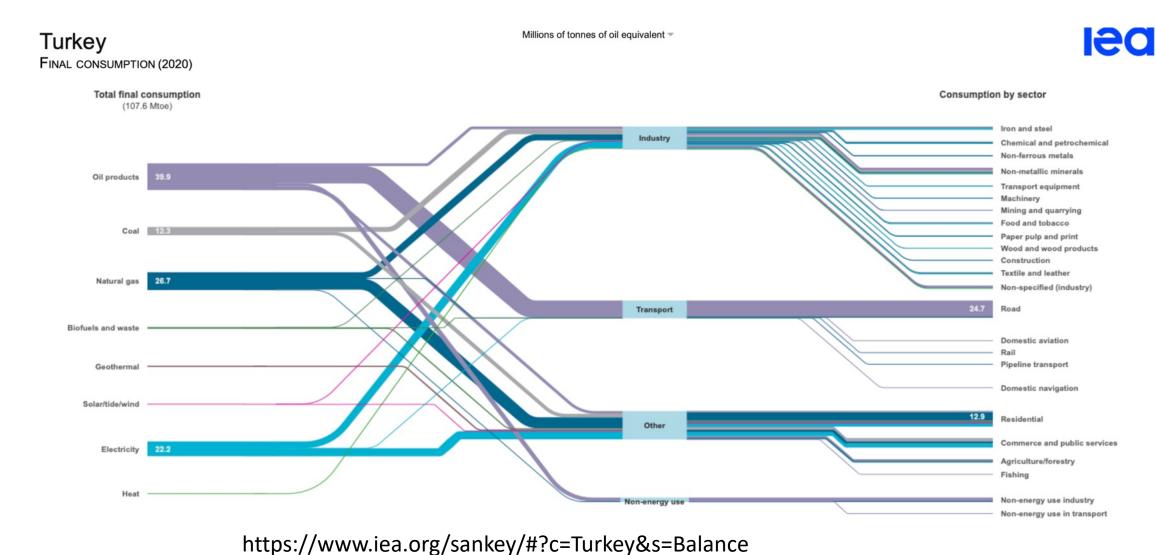
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Toplam Birincil Enerji Arzı	1,74	1,84	2,06	1,04	-0,01	0,00	6,68
Çevrim	-1,09	0,01	-0,80	-0,81	1,03	0,17	-1,49
Elektrik üretimi	-1,00	-0,01	-0,76	-0,81	1,21	0,09	-1,28
Toplam Nihai Enerji Tüketimi	0,64	1,85	1,26	0,24	1,02	0,17	5,19
Sanayi	0,45	0,11	0,47	0,06	0,48	0,16	1,74
Ulaştırma	0,00	1,25	0,01	0,01	0,01	0,00	1,28
Konut	0,16	0,02	0,58	0,12	0,22	0,00	1,09
Konut Ticaret ve Hizmetler	0,16 0,03	0,02 0,02	0,58 0,16	0,12 0,02	0,22 0,27	0,00	1,09 0,51
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Ticaret ve Hizmetler	0,03	0,02	0,16	0,02	0,27	0,00	0,51

Energy Balances - Sankey



Energy Balances – Final Consumption- Sankey



What is oil/gas/electricity price?

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Question 1) How prices are formed?
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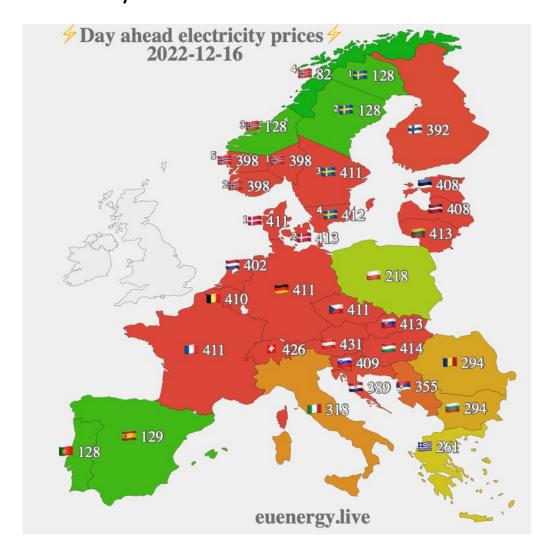
- a) Bilateral
- b) Central exchange
 - b.1) Marginal?
 - b.2) Pay-as-bid?

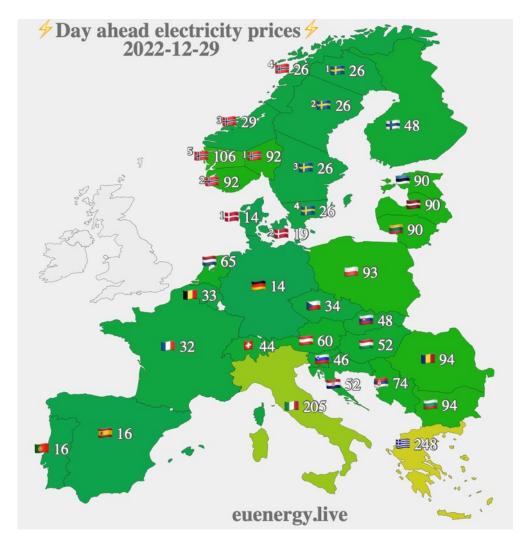
Question 2) Who declares the price?

- a) PRA (Price reporting agency)
- b) Central exchange

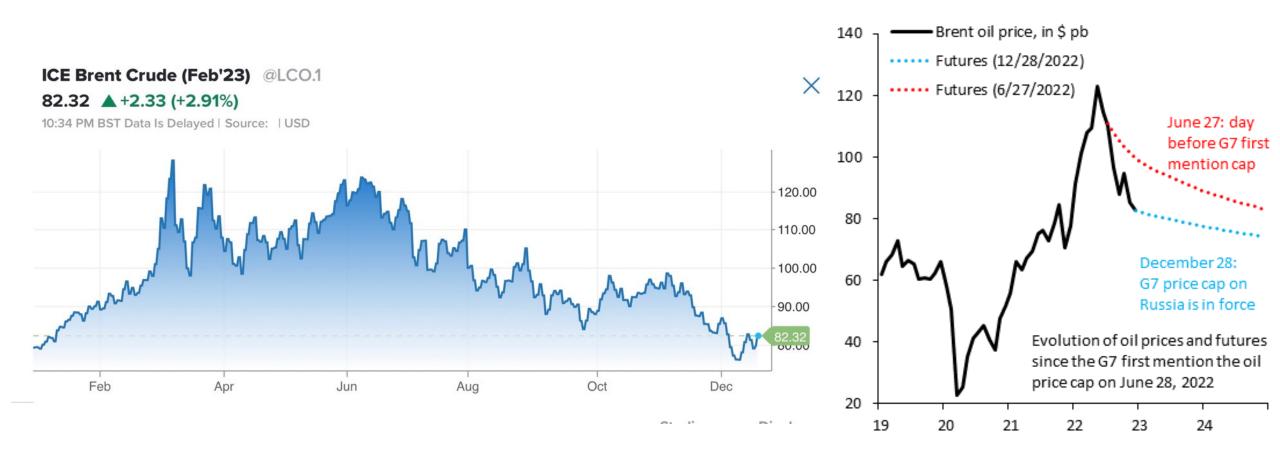
How many rules are there to form a market price?

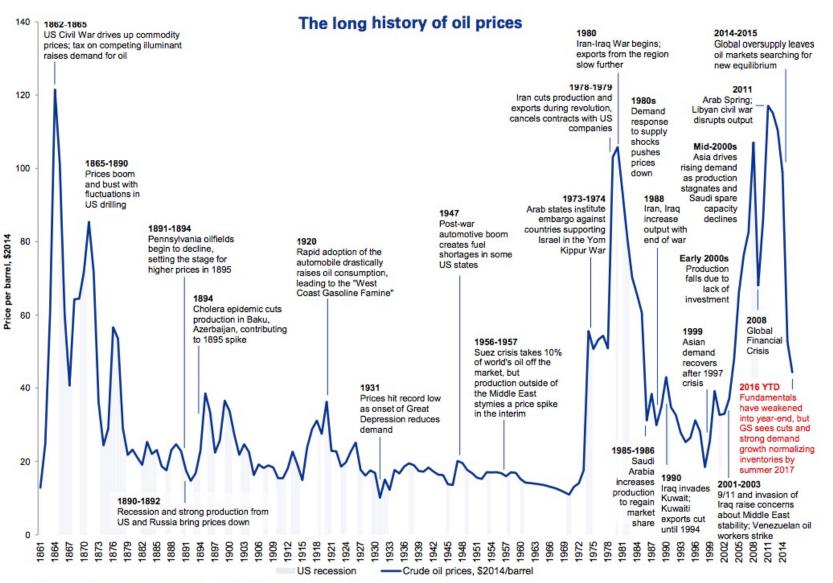
$P_{electricity} = f(weather, weather forecast)$?





P_{CrudeOil} = f(Producers, Demand, Stocks, Policies)?





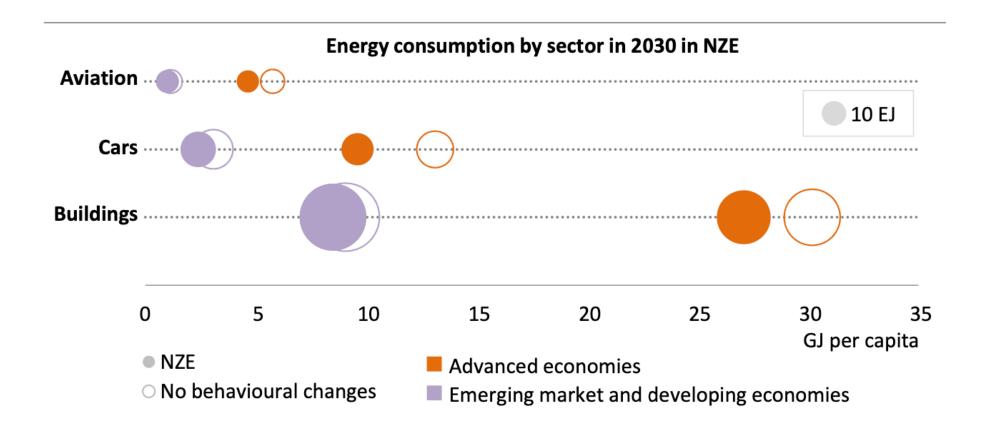
An earlier version of this chart appeared on pg. 16 of Top of Mind Issue #52: OPEC and Oil Opportunities.

Note: 2016 price shown is YTD average as of Dec. 19, 2016.

Source for data: BP, NBER/Federal Reserve Bank of St. Louis, Haver Analytics.

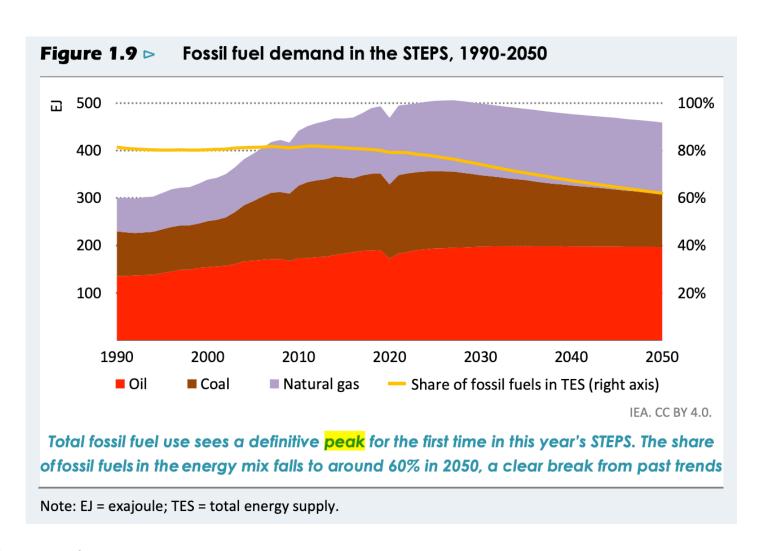
Source for annotations: @James Hamilton, "Historical Oil Shocks," University of California, San Diego, February 2011; various news sources; Goldman Sachs Global Investment Research.

End of energy use?



https://www.iea.org/reports/world-energy-outlook-2022

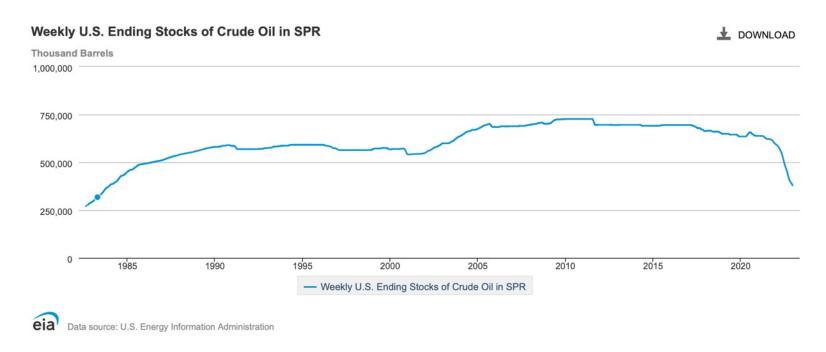
Is it the end of fossil fuels?



https://www.iea.org/reports/world-energy-outlook-2022

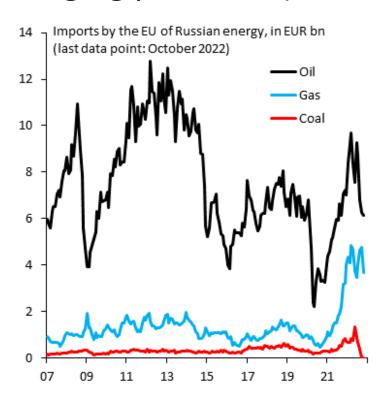
Global Energy Crisis?

Diverging priorities – US (crude oil)

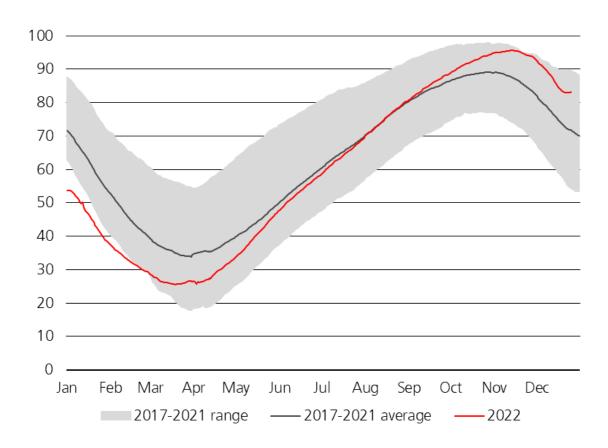


Global Energy Crisis?

Diverging priorities (EU – Gas)



http://agsi.gie.eu



Electricity generation costs



Prices and Markets

- Prices are compressed information (a vector?) of now and expectations
- Markets are social constructs
- If there is concensus
 - New definition
 - New price formations are possible

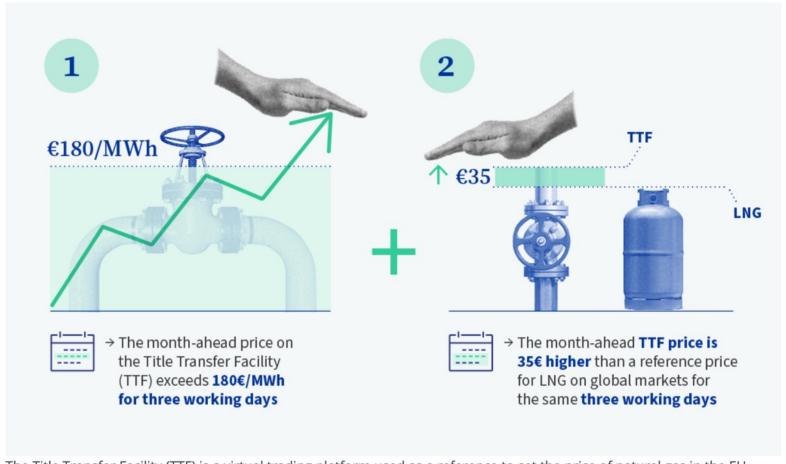
Example: EU Gas Cap

Market Correction Mechanism



https://www.consilium.europa.eu/en/infographics/a-market-mechanism-to-limit-excessive-gas-price-spikes/

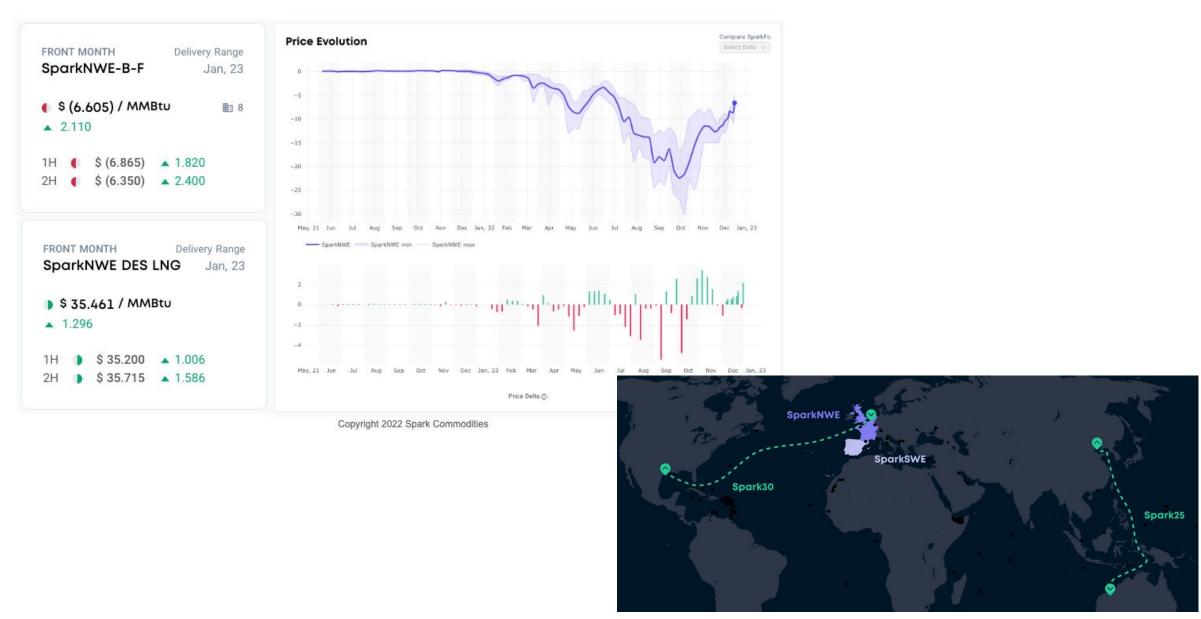
Market Correction Mechanism



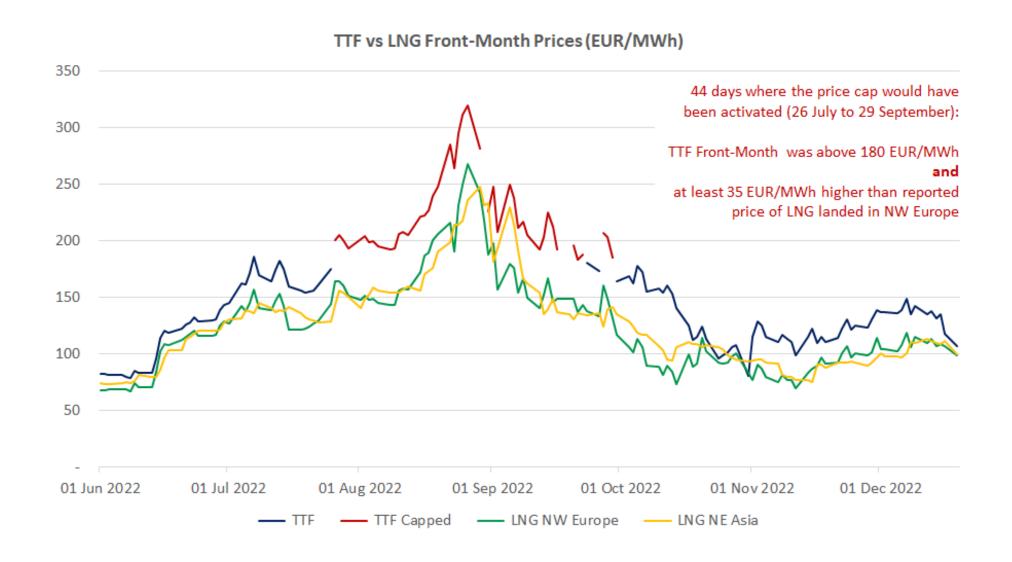
The Title Transfer Facility (TTF) is a virtual trading platform used as a reference to set the price of natural gas in the EU.

https://www.consilium.europa.eu/en/infographics/a-market-mechanism-to-limit-excessive-gas-price-spikes/

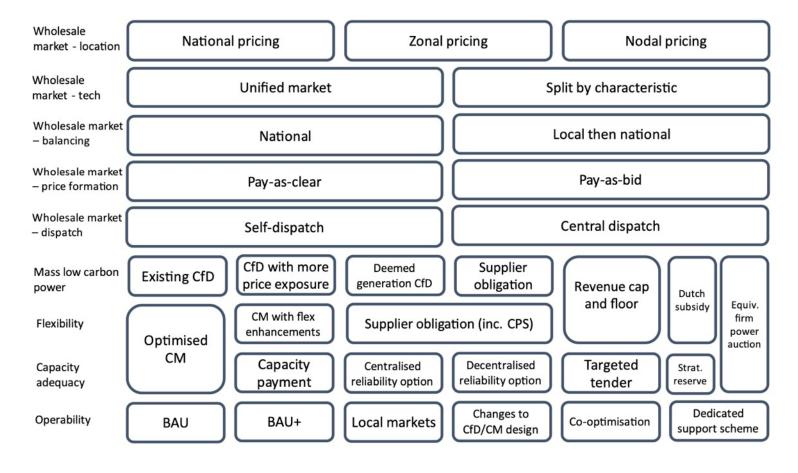
Which price



Red prices - Trigger



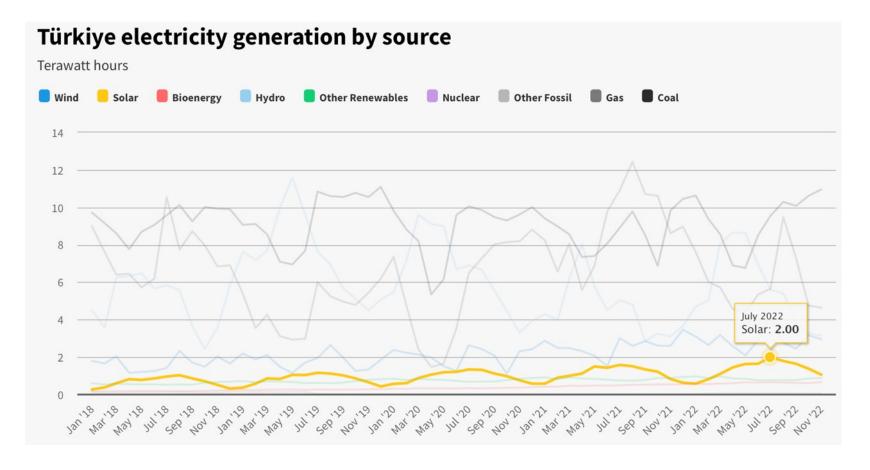
Electricity Market Reform? – Tools:



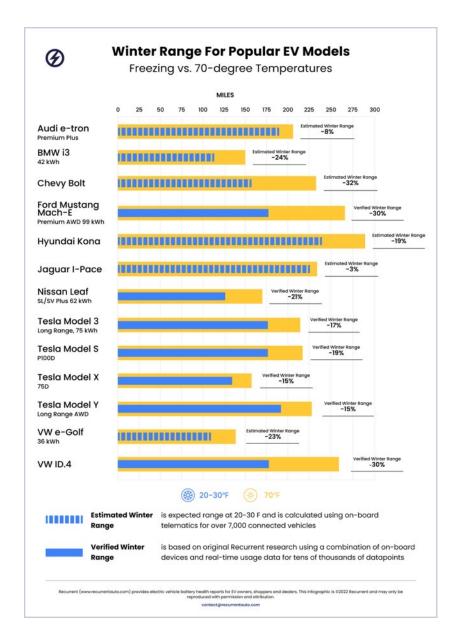


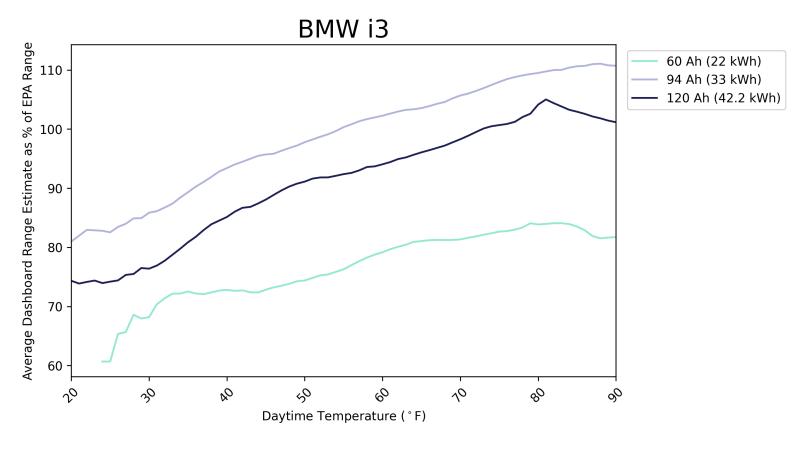
Net Zero – Curse of Zero?

• Why?



How EV revolution is going?





https://www.recurrentauto.com/research/winter-ev-range-loss

Lithium charge capacity vs temperature

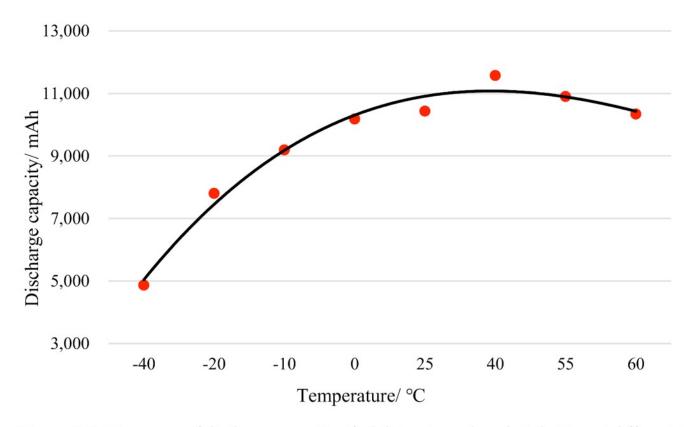
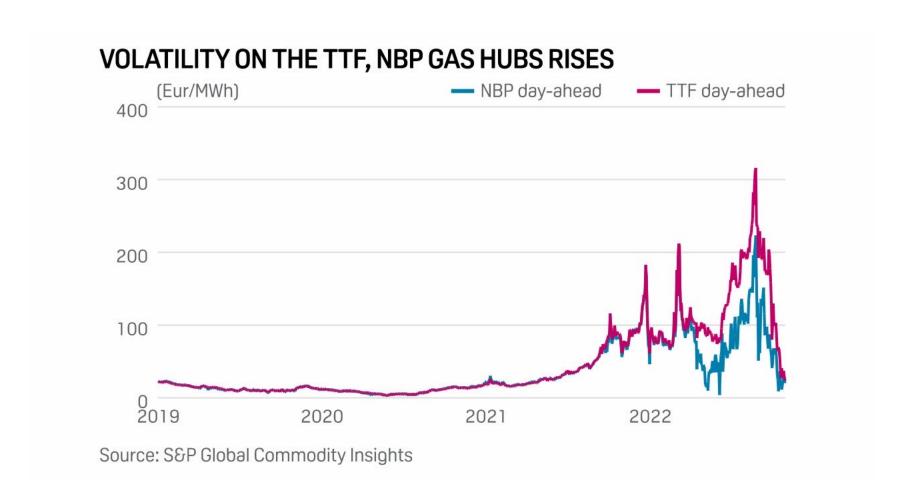


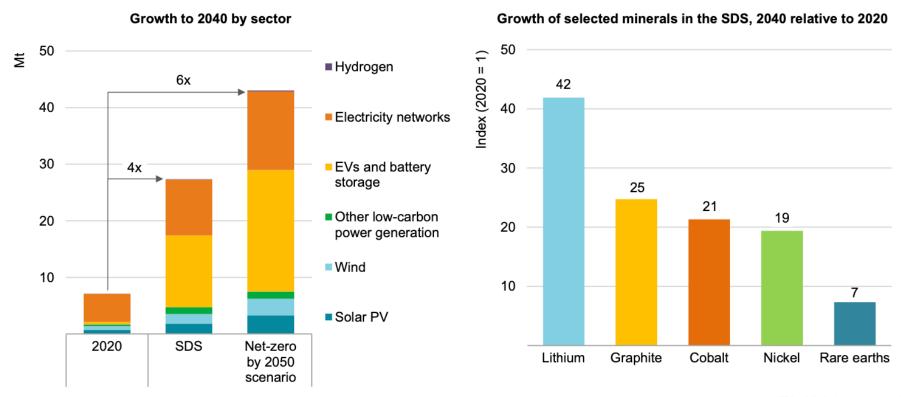
Figure 3. Fitting curve of discharge capacity of a lithium iron phosphate battery at different temperatures.

Algo Trading



Critical Minerals

Mineral demand for clean energy technologies by scenario



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Notes: Mt = million tonnes. Includes all minerals in the scope of this report, but does not include steel and aluminium. See Annex for a full list of minerals.

https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

The road ahead

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