Acknowledgement of Country

- The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet.
- We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.
- We recognise their valuable contributions to Australian and global society.

Image: Digital reproduction of *A guidance through time* by Casey Coolwell and Kyra Mancktelow

Disclaimer

The material and views presented are my own and do not purport to represent the views of the University of Queensland (UQ) or the members of or collaborators with the UQ Centre for Natural Gas.

Don’t believe anything this man says – he’s obviously just old and grumpy and ready for a break

Perspectives on energy transition.
What did we learn from the Russia-Ukraine Tragedy?

Professor Andrew Garnett

Director UQ Centre for Natural Gas

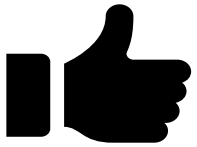
University of Queensland

9th May, 2023

Summary List of Key Lessons Learned

We've probably not learned a bloody thing

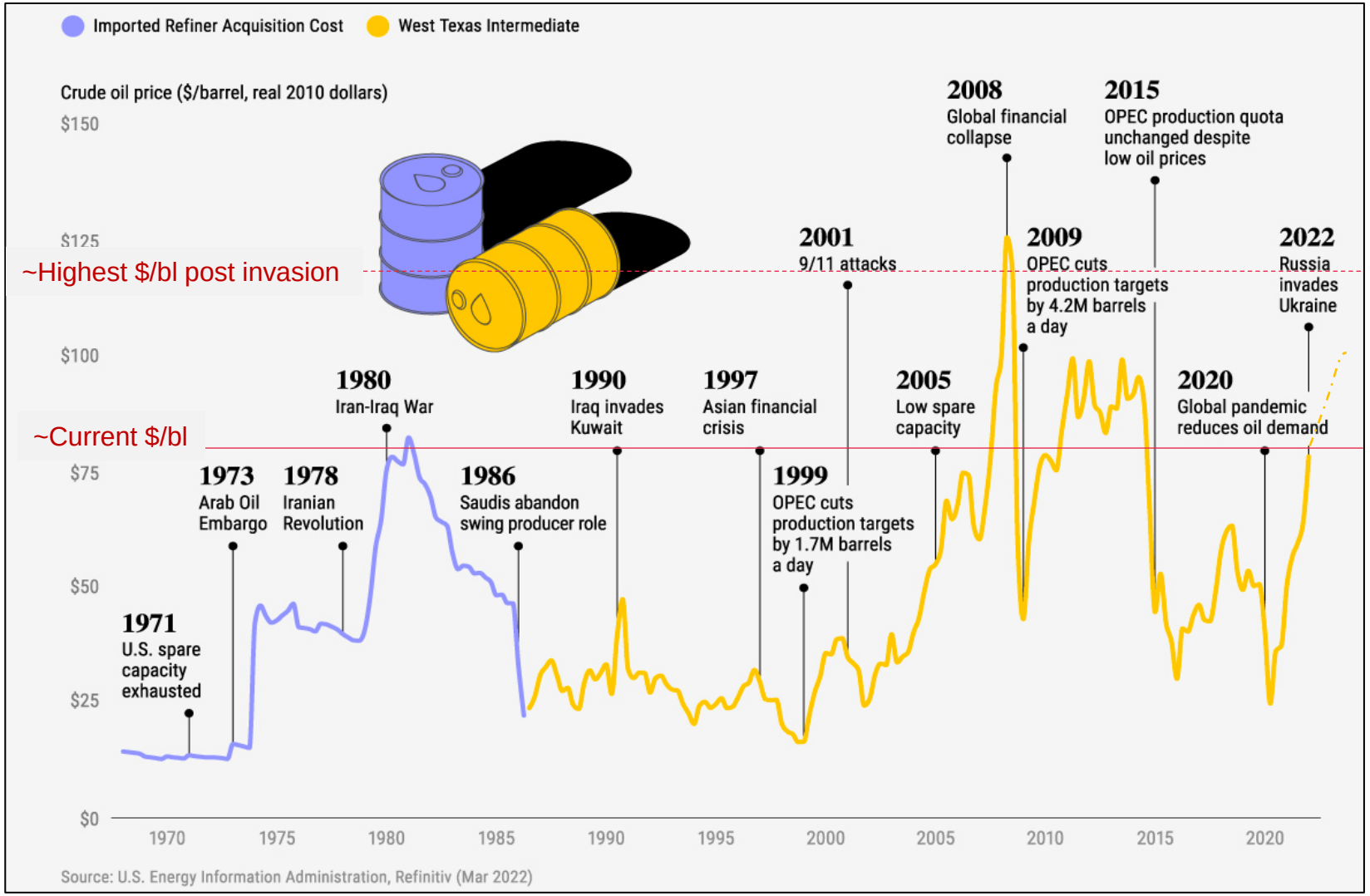
But, thank you for the free lunch



Looking for lessons on transitions …

- Some of what's been going on (in oil and gas markets)
- Context: fundamental energy drivers that don't change
- Who's (mainly) been paying the price
- Dissonance – how we talk and how we act
- The transition: it's not the same for thee as it is for me
- And … (some) "*Lessons on transition arising out of the tragedy in Ukraine*"

Compounding Energy Crises



11 Mar 2020

24 Feb 2022

↓ Demand	China COVID but picking up 2023
↓ Supply	OPEC+ (cuts April 2023)
↓ Supply	Russia? (*maybe* down 5%, 0.5MMbl)
~Price	Volatile (settling down)

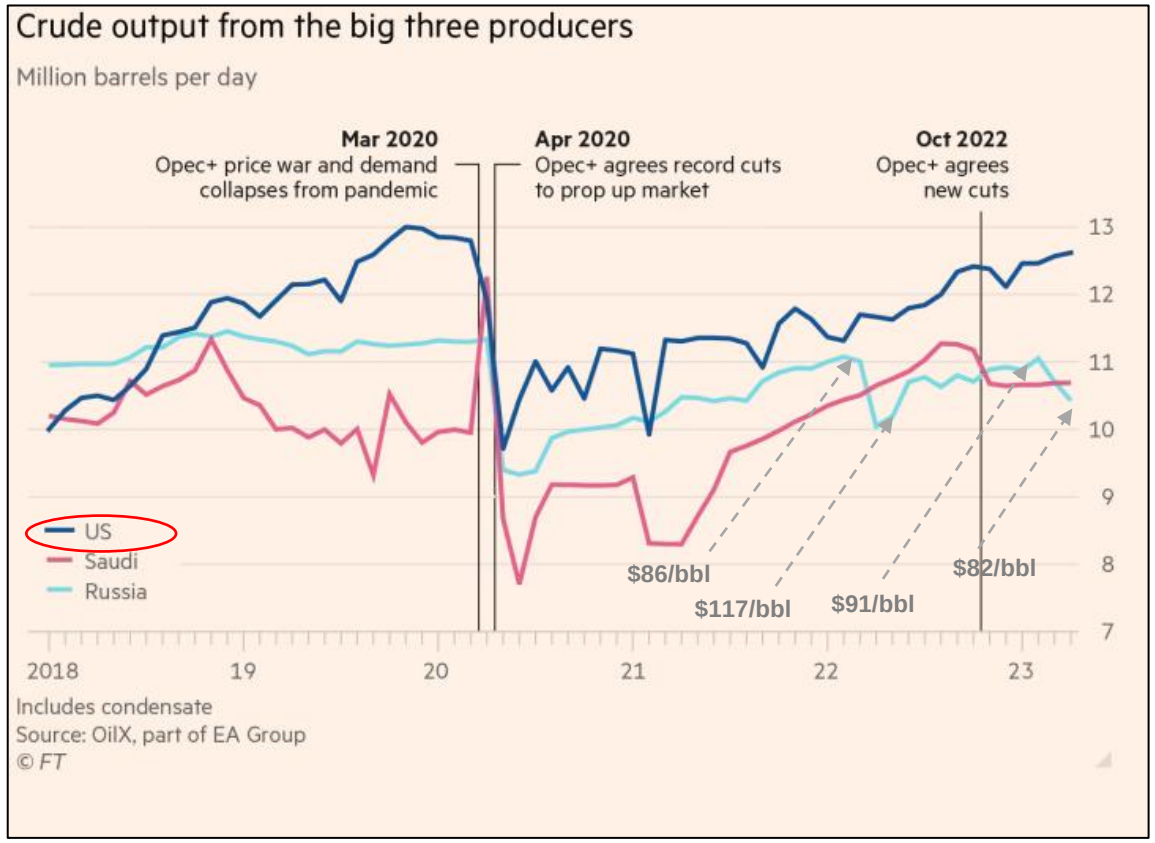
↓ EU imports of gas, oil & diesel *(LNG market?)*

\- G7 caps on Russian oil price (gaming)!

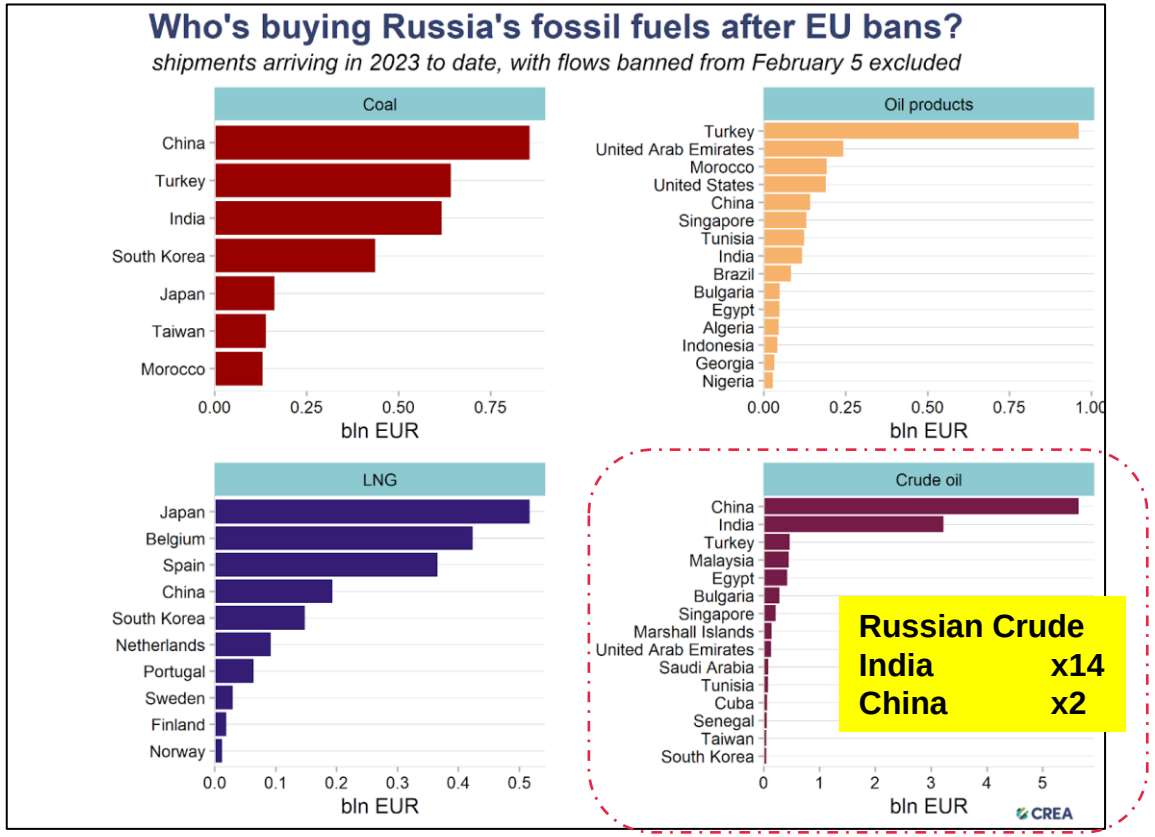
Huge changes (India & China) on oil imports

Changes energy markets – but not *huge* reductions in oil

energy demand is the driver and scale is huge, and supply-demand is always finely balanced



Source: Financial Times 08 April, 2023. https://www.ft.com/content/9e1e089e-163d-43a7-9b75-15e2e2cbcfd6



Source; Centre for Research on Energy & Clean Air. 24 Feb, 2023. https://energyandcleanair.org/publication/one-year-on-who-is-funding-russias-war-in-ukraine/

Gas a trainwreck but recovery more rapid than thought possible

supply diverted to those able to pay most

Germany secures four floating LNG terminals in mad rush to replace Kremlin gas

By Nikolaus J. Kurmayer | EURACTIV ⏲ Est. 3min 5 May 2022 (updated: 6 May 2022) 05 May 2022

Source: https://www.euractiv.com/section/energy/news/germany-secures-four-floating-lng-terminals-in-mad-rush-to-replace-kremlin-gas/

Germany completes construction of its first floating LNG terminal 16 Nov 2022

Source: https://www.theguardian.com/world/2022/nov/15/germany-completes-construction-floating-lng-terminal-liquefied-natural-gas-energy

Germany receives third floating LNG terminal

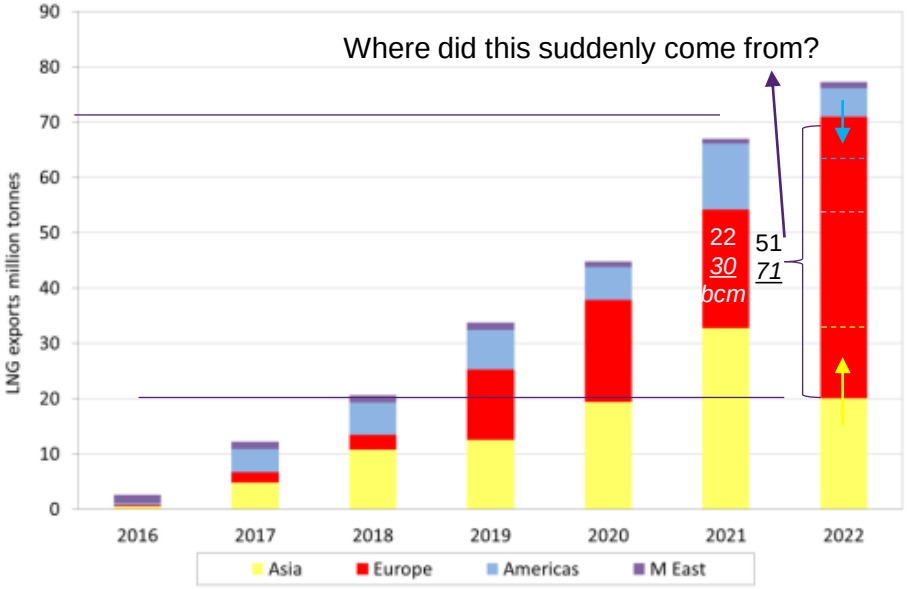
Reuters 20 Jan 2023

Source: https://www.reuters.com/business/energy/third-floating-lng-terminal-arrives-germany-2023-01-20/

From 0 to 14 bcm (9.4 Mtpa) import LNG in <1 year

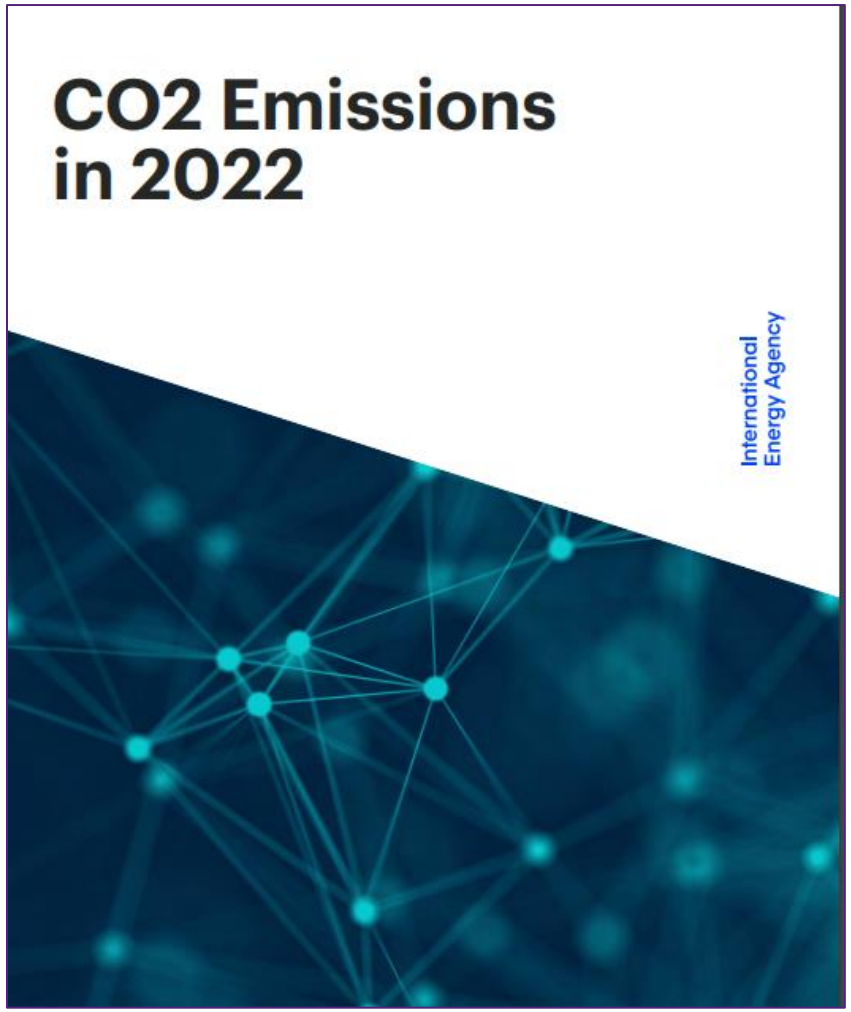
(but Nordstream-1 was ~55bcm)

Figure 16: US LNG Exports by Destination 2016-22



Source: After: Oxford Institute of Energy Studies & UK Energy Research Centre (May 2023) https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2023/05/LNG-and-UK-Energy-Security-NG181.pdf

2022 Emissions?



Source: https://iea.blob.core.windows.net/assets/3c8fa115-35c4-4474-b237-1b00424c8844/CO2Emissionsin2022.pdf

Figure 1: Global CO_2 emissions from energy combustion and industrial processes and their annual change, 1900-2022

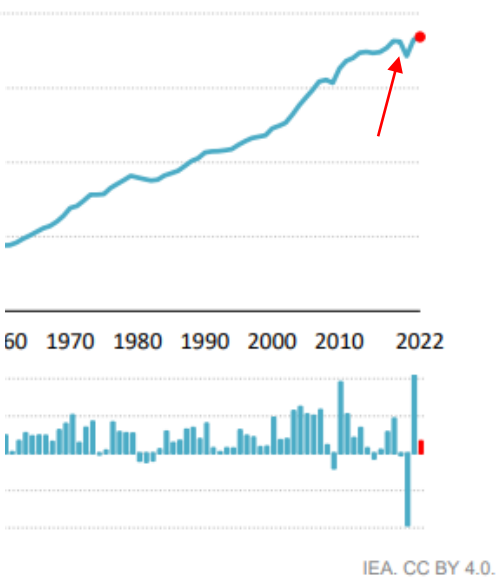
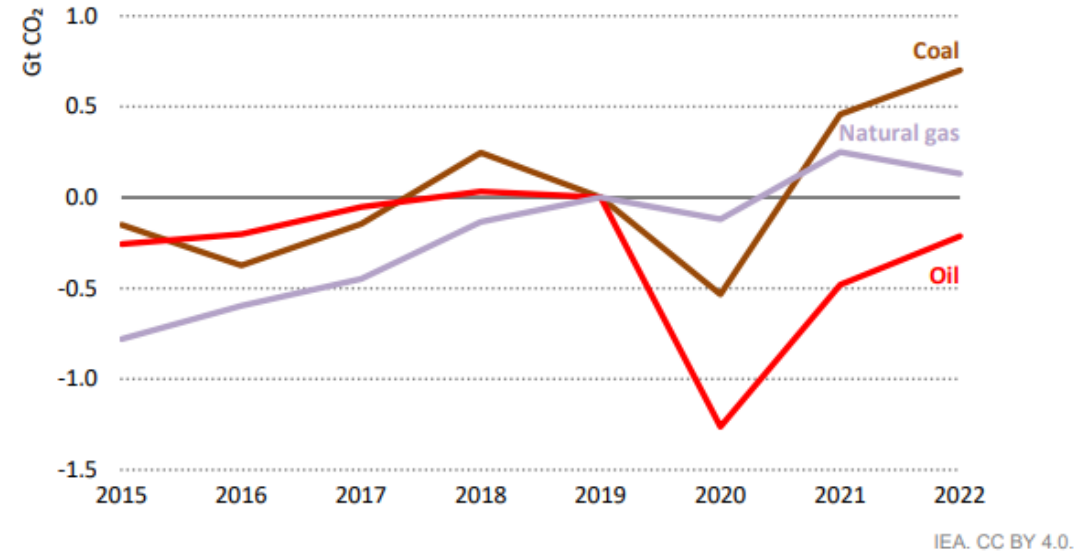


Figure 4: Change in global CO_2 emissions by fuel, relative to 2019 levels, 2015-2022



Greater deployment of clean energy technologies helped prevent further emissions growth amid crises

Reductions in emissions from natural gas were more than replaced by emissions from coal

Despite promising growth in renewables, power sector emissions had the largest sectoral growth

Reliance on coal- and gas-fired power in extreme weather drove up emissions across regions

Summary so far …

So energy got more expensive (remember this was in a relatively low-demand world, post-COVID)

Wealthy countries (who had already spent more on VRE than poor countries) compensated by

1. *Spending more*
2. *Reverting to other legacy sources*
3. *Rationing & efficiency*
4. *Outbidding others*

Where was the pain mainly most keenly felt?

When Russian energy supplies fell away … who went short?

What did developing countries do (when they were ‘outbid’ & couldn't afford higher imports)?

An odd sort of virtue

2007 EU-Africa Energy Partnership (sust. infra & “greening”)

In Germany, a wind farm is dismantled to make way for expanded lignite coal mine

Joshua S Hill 1 November 2022 12

Nov 2022

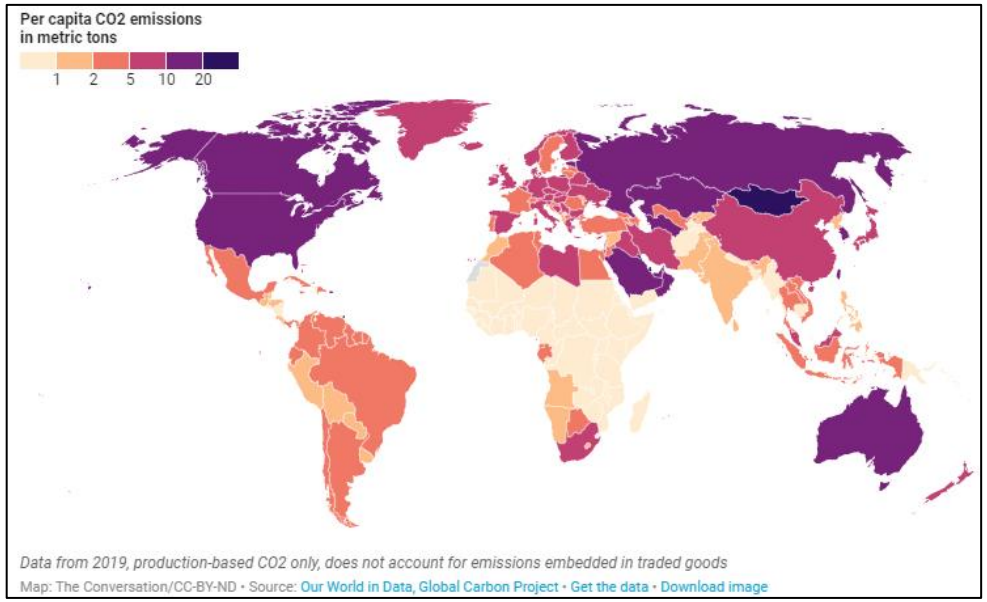
https://reneweconomy.com.au/in-germany-a-wind-farm-is-dismantled-to-make-way-for-expanded-lignite-coal-mine/

Over and out: Germany switches off its last nuclear plants

By FRANK JORDANS April 15, 2023 GMT

Apr 2023

https://apnews.com/article/germany-nuclear-power-plants-shut-energy-376dfaa223f88fedff138b9a63a6f0da



Europe to Africa: Gas for Me but Not for Thee

Europe is ramping up its use of the dirtiest fuels—but keeps pressing Africa to stick to draconian green goals.

Jul 2022

https://foreignpolicy.com/2022/07/14/europe-africa-energy-crisis-gas-oil-fossil-fuels-development-finance-hypocrisy-climate-summit-world-bank/

Africans Decry Europe’s Energy Hypocrisy

Wealthy European countries that sought to halt funding of fossil fuel projects across Africa are now scrambling to secure the continent’s oil and gas.

Jul 2022

https://foreignpolicy.com/2022/07/20/europe-africa-energy-crisis-oil-gas-fossil-fuels-russia-ukraine-war/

European Parliament slams two TotalEnergies oil projects in Uganda

MEPs are calling on the French oil and gas giant to postpone the launch of the massive EACOP pipeline for a year, to protect human rights and the environment.

By Audrey Garric

Published on September 16, 2022, at 9:40 am (Paris), updated on September 16, 2022, at 9:40 am · 3 min. · Lire en français

Sept 2022

https://www.lemonde.fr/en/le-monde-africa/article/2022/09/16/european-parliament-slams-two-totalenergies-oil-projects-in-uganda_5997139_124.html

ENERGY JANUARY 23, 2023

Europe’s energy switch may boost African producers

TERESA NOGUEIRA PINTO

Jan 2023

https://www.gisreportsonline.com/r/africa-europe-energy/

Context: *again* energy is **demand** driven

5,727,000,000

8,031,317,400

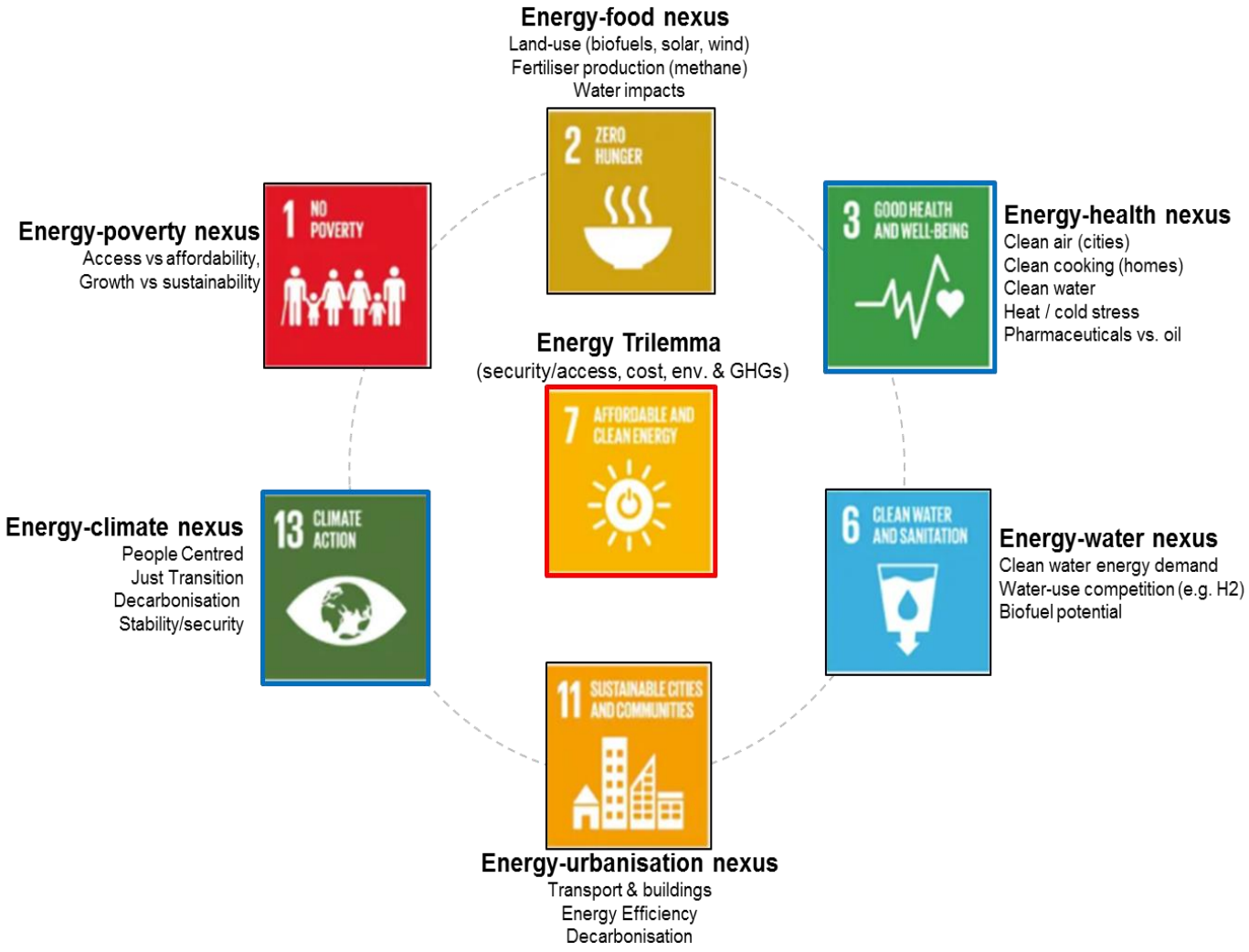
9,750,000,000

65,810,000 pa

~180,000 pd

https://ourworldindata.org/world-population-growth

It's best not be facile - Energy involves many nexuses



Energy Transition is <u>much</u> harder than just GHG reduction in the electricity sector

(data source: worldbank.org, 2019/20: and a fter: Source: https://sdgs.un.org/)

World Energy in 2022 (IEA) – consequences …

when supply-demand are out of balance – who pays?

Source: www.iea.org/reports/world-energy-outlook-2022/key-findings

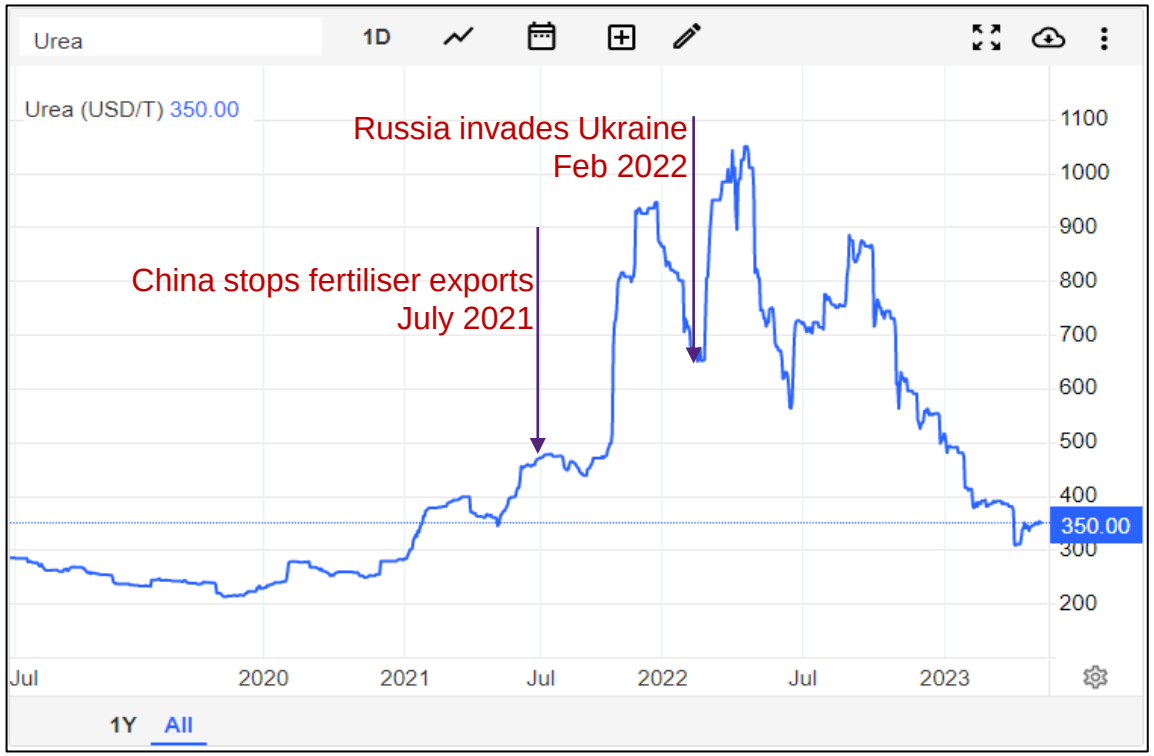
Source: IEA (2022), Energy Efficiency 2022, IEA, Paris https://www.iea.org/reports/energy-efficiency-2022

"… number of people without ***reliable access*** to heating, cooling, clean cooking and other energy … risen to around 2.5 billion worldwide … an extra 160 million households … pushed into ***energy poverty*** since 2019 … a significant ***shift back*** to … cheaper traditional biomass such as wood and charcoal for heating and cooking. Around 75 million people … recently gained access to electricity … ***lost the ability to pay for it*** … 100 million people may need to switch back to using traditional stoves … from LPG. This poses a ***particular health risk*** for women and children who are most exposed to household air pollution … estimated to have contributed to 2.5 million premature deaths this year."

What else … SDG #2 (Hunger) closely linked with energy & gas

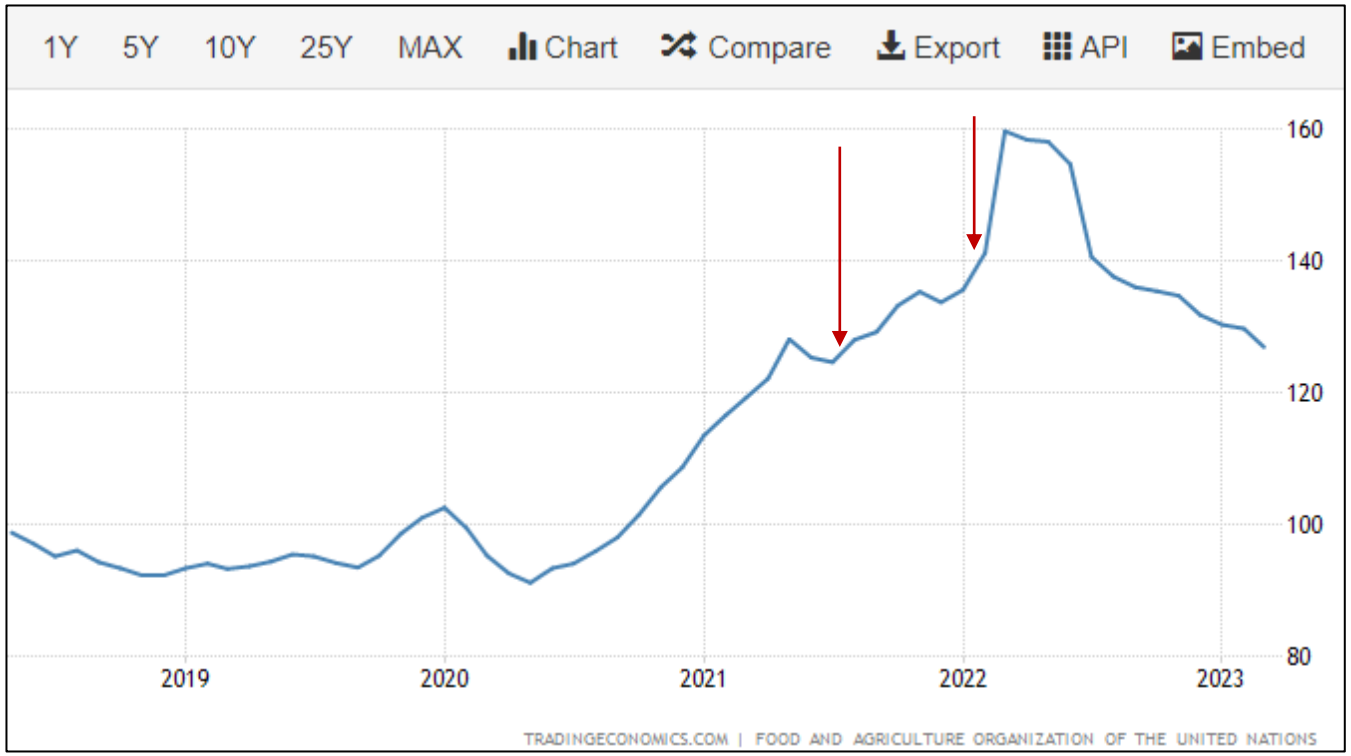
- **World Farmers' Organisation May 2022** (President, Theo de Jager *in* Axios.com). “The bottom line: In richer countries, … higher food prices, … more vulnerable countries could grow desperate . "*Many fields are not being planted*," "*I’m not so sure it's possible to avoid a food crisis*.”
- **World Bank April 2023 – “**Domestic food price inflation remains high … in almost all low- and middle-income countries”
- **UN World Food Program 2023** “… more than 345 million people facing high levels of food insecurity in 2023”

Urea Futures (c.f. fertiliser)



Source: https://tradingeconomics.com/commodity/urea

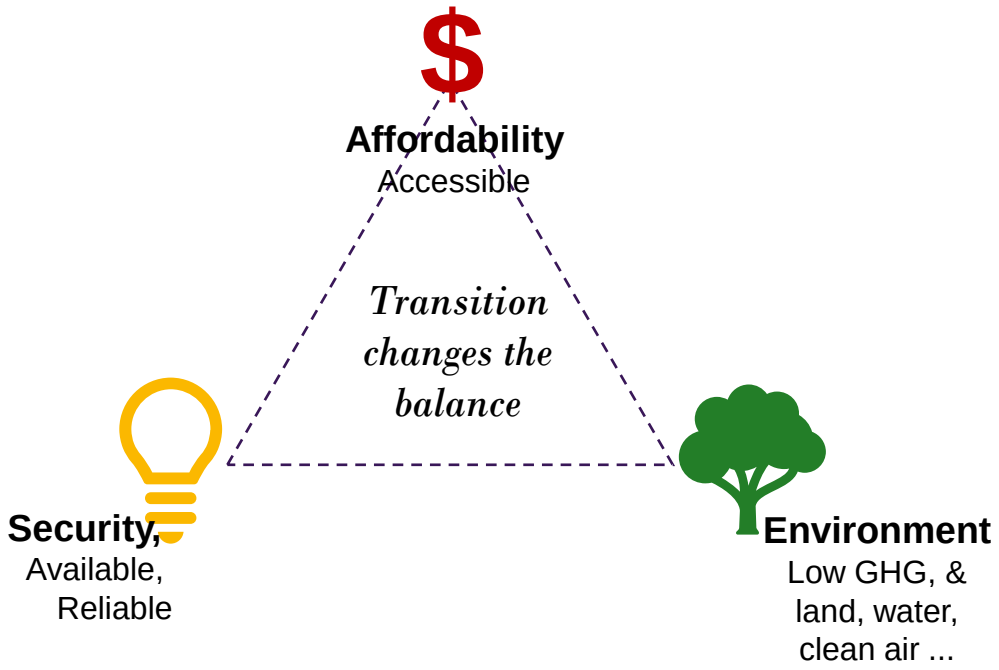
World Food Price Index



Source: https://tradingeconomics.com/world/food-price-index

Energy Trilemma – is it what we think it is?

Energy Trilemma & the <u>Transition Pace Dilemma</u>

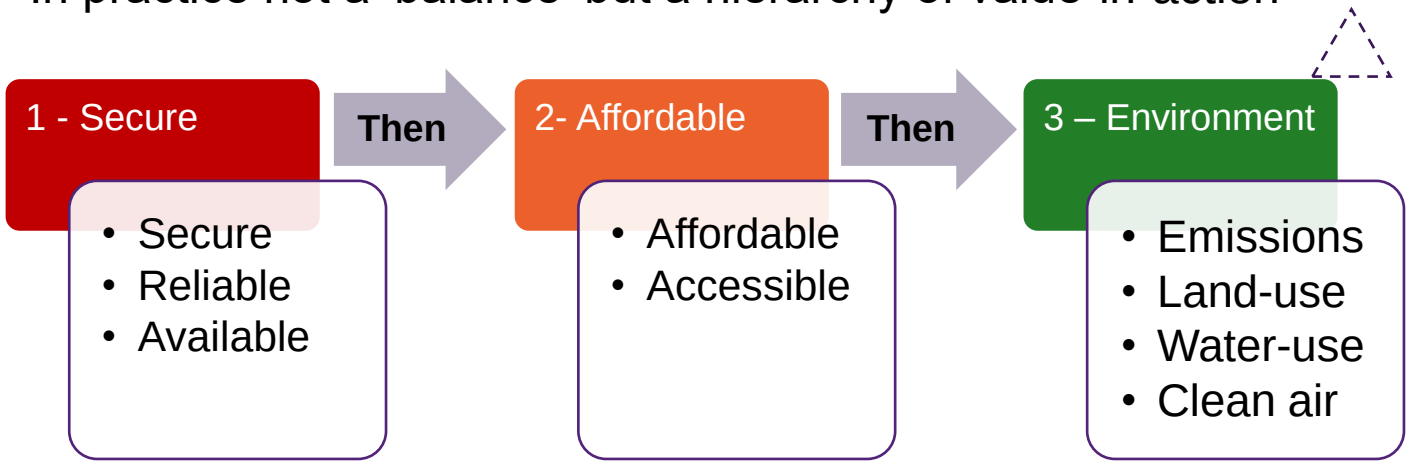


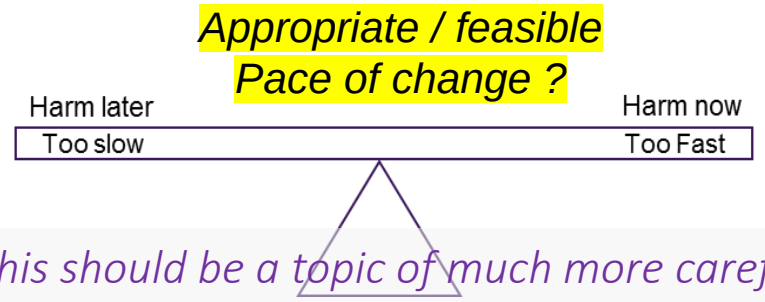
This simple "balance" conceptualisation is attractive, but limited at best

VS.

But is it really a 'balance'?

In practice not a 'balance' but a hierarchy of value-in-action





This should be a topic of much more careful discussion amongst serious people

More context: energy supply per capita

After... IEA-WEO-2021&22	Ref year GJ/pp pa	2021 Population		2050 Population (% change)	2022 - 2050 NZ GJ pp pa *Fraction of 2019/20*
Global	**80** (2019)	8,000,000,000		9,750,000,000 (+22%)	**55** *7/10th*

Pop'n estimates from World Back and www.statista.com/

And so, lessons?

Russian – Ukraine Tragedy

Energy lessons re-learned (hopefully)

- At the end of the day – energy *security* trumps everything else
  - Remember **Scale** of energy required for security is *enormous*
  - Global supply concentration concerns remembered (gas, oil & VREs., nuc.)
  - GHGs? *Rapid* gas-to-coal shifting (Europe, China, India ...) & rapid LPG-to-wood (dev. world)

Energy in different units

Example Germany	**Mtpa LNG equiv.**	**bcm**	**PJ**	**TWh**
Gas import pa	101	142	5,000	1,390
Gas storage	16.4	23	810	224

Qld LNG ~22 Mt pa
Wrld LNG ~420 Mtpa

NEM ~ 190 TWh pa

Russian – Ukraine Tragedy

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Some solutions are well known

- End-use energy efficiency is *always* a good idea – but doesn't get much press!
- Diversify suppliers (geopolitics, allies are not the same as trading partners)
- Diversify technologies, fuels and risks (especially *coupled* risks)

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A tragedy and a lesson on what happens if energy supply-demand flow gets out of balance ... or even if there is a fear that it might be

Energy demand-supply are finely balanced – this tells us something about 'pace', investment & risk

- The Russian-Ukraine initial *supply* shock was initially fear about *just* ~2% of oil supply. (petrol > $2.30+/ litre !)
- Oil and gas supply naturally declines without continued investment (faster than demand is reducing)
- If we reduce (investment in) supply, faster than full alternatives become available, we will get hardship and high prices - economic demand destruction - reversion to cheaper/worse alternatives – **the poor suffer most**
- So, transition needs to be led by adequate, full, demand-side alternatives (not over-abruptly starving supply)
  - While this is not in place, at scale ... maintain energy flow to meet demand to keep costs as low possible

New in IEA 2022 Net Zero Scenario since Russia?

"*Take more care*" we need "*a secure journey*"

- ✓ **Synchronise** scaling up a range of clean energy (functional substitutes) with scaling back of fossil fuels
- ✓ Tackle the **demand side** and prioritise **energy efficiency**
- ✓ Provide strategic direction and address market failures, but **do not dismantle markets**
- ✓ Reverse the slide into energy poverty and **give poor communities a lift** into the new energy economy
- ✓ The transition away from oil and gas needs *to be handled with care*: Manage the retirement and reuse carefully, some of it will be essential for a **secure journey** to net zero
- ✓ Tackle the specific risks facing (fossil fuel) producer economies (& communities)

After: IEA World Energy Outlook 2022 – Net Zero Emissions 2050 Scenario

Lessons from this supply shock?

- ***Sequencing & Pace.*** ***If you restrict supply before "better", alternatives are ready and deployed at scale, prices go up, somebody goes short and <u>the Trilemma unravels</u>*** *… (an odd sort of virtue)*
  - True ethics emerge … EU -> Africa "*we'll help you go green, now give us your gas*"
  - Stop supply / exports (to those who need it) – Marie Antoinette revisited
- **The poorest suffered most** - energy diverted to people / countries who can pay <u>and</u> prices rose
  - SDGs #1, #2, #3 & #7 Poverty, hunger, health, energy access …
- **Emissions rose** (even during low economic activity post-COVID – sadly could have been worse)
  - SDG #13. The power sector reverted to coal, the poorest switched back from LPG to wood, dung etc. ...
- All countries got **serious about long term energy security** … (investment in VREs increasing and …)
  - *"China to host almost a third of the worlds new coal mines"* [*Bloomberg. 29/09/2022*]
  - *"China accounts for two thirds of world's planned new coal power" [Bloomberg, 06/04/2023]*
  - *UK, Norway, US – more oil and gas licensing (and, at last, more CO2 storage licensing)*
  - *France, UK, Belgium, Netherlands, Japan, Korea … to expand nuclear power*
- **Bizarre things** happen *in extremis*
  - demolish wind farms for lignite mines, switch off nuclear, built >9 Mtpa of import LNG capacity in ~ 1 year – while India imported cheap oil from Russia, global coal power generation rose to record levels …
- **Nexuses (SDGs) really matter**: if you have only one dimension of value (CO_2) this is not an ethical stance (consider harm today for the poorest) - *ignoring emissions is not bloody ethical either (harm tomorrow).*

END ...

Thank you