The Current Energy Trilemma

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Natural Resources PC

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1. The energy crisis that started in the summer 2021; EU policies

Root causes of the 1st energy crisis :

- Energy demand up ‘post-covid’ as was then thought
- Coal and hydrocarbon investments stalled internationally as a result of zero-carbon, climate-change, UN-driven campaign; of the EU Green Deal, and the resulting very high emissions prices; and [more recently] of Joe Biden’s Clean Energy Plan. Sometimes, actual production stops announced, eg Dutch NG.
- EU policy design ie 1. rush to electrification based on renewables, disregarding need for servicing of baseload energy eg with natural gas or electricity and other storage; 2. Problematic electricity market design; in retrospect, European overdependence on Russian gas imports
- Germany [but not Japan -- or China] stopped nuclear plants post-Fukushima, resisting calls to ease energy crunch by restarting them

Grave effects, notably gas and electricity prices way up [with blame put on gas!], including on industrial minerals

2. Russia in the Ukraine in Feb 22 exacerbating the energy crisis; ensuing EU policies; consequences so far…

…

- EU adopts packages of sanctions on Russia, *ia* discouraging NG imports, banning imports from Russia of cement, coal and other solid fossil fuels, prohibiting all Russian vessels from accessing EU ports etc…ie more constraints on EU energy supply
- Frans Timmermans, European Commission Executive VP for the European Green Deal: 'Currently, switching to coal is no longer taboo despite climate consequences'…in an effort to relax energy supply constraints
- Retail electricity market pressured, regulatory decisions crucial: who is to blame? gas, electricity market structure or emphasis on transition?

… 2. Russia in the Ukraine in Feb 22
exacerbating the energy crisis;
ensuing EU policies; consequences so far
…

- Germany still resisting calls to ease energy crunch by restarting nuclear plants
- Moscow's race against time to divert energy exports from Europe to Asia
- **The NG paradoxical case**: end ’19 EIB, belonging to member-states, announces end of NG financing; end ’21 due to the energy crisis that started in the summer 2021 EC names NG and nuclear as climate-suitable technologies, hence financeable; … ’22 EU bans Russian gas, causing further rush to gas from EU and other sources; June ’22 European Parliament likely to vote against naming NG and nuclear as climate-suitable technologies!!

3.Goals of current EU policies in place – for now…

Current hierarchy of policies

•No1:
independence from Russia/Belarus ie security of supply

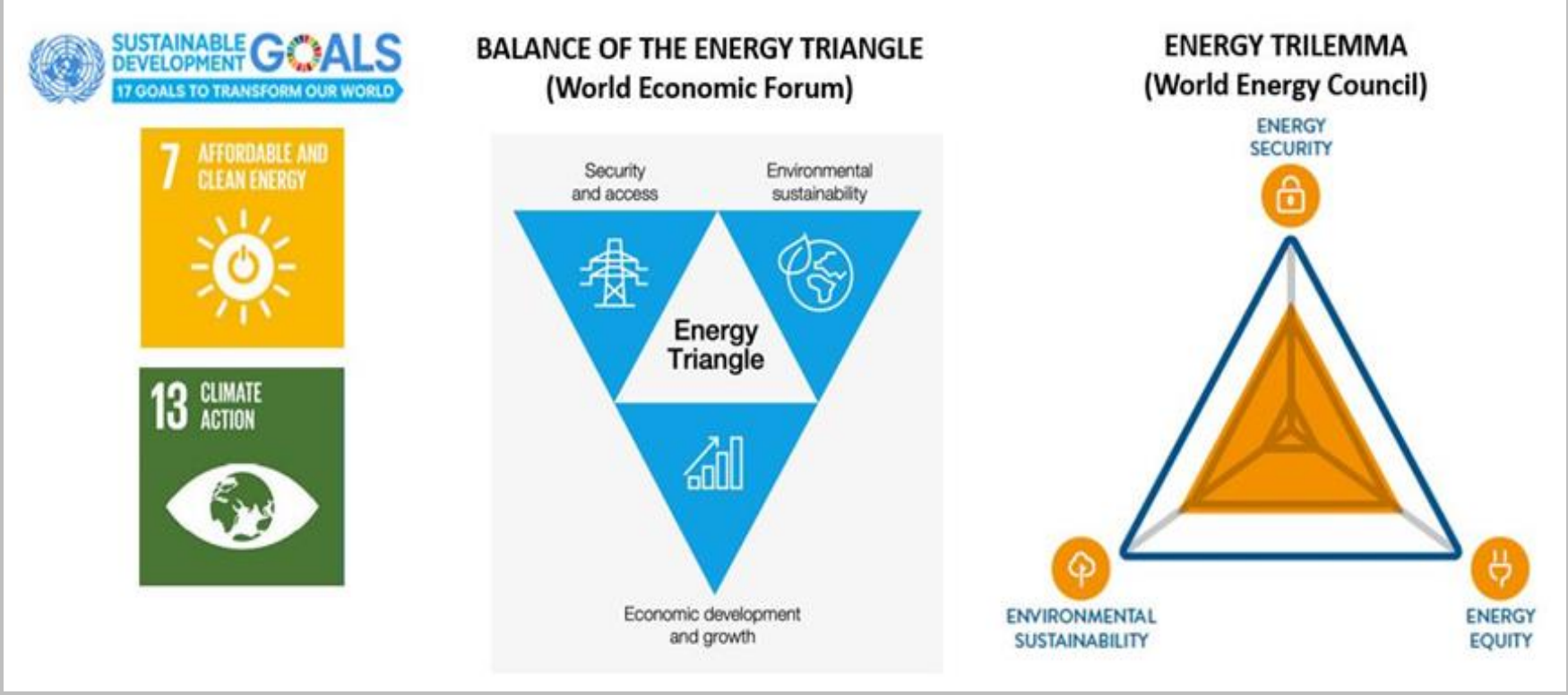
•No2:
energy affordability, avoiding energy poverty for population, strengthening competitiveness for business, large and small

•No3, down from No1 and only, just a few months ago:
mitigating climate risk

-RePowerEU Plan presented by the EC May 18 criticized by many
-CBAM?

3….Goals of current EU policies in place – for now

- The Energy Trilemma



4. …Technological, geopolitical, macro-economic and sectorial repercussions…

- EU: Coal & hydrocarbons acceptable -- for now, renewables [especially with storage] and hydrogen fully supported with EU renewable hydrogen law in May; nuclear back in favor incl. new tech ie mini reactors, thorium etc…relaxing energy supply constraints

- May 27 ’22 EUAs at 81.40 € /mt CO2, having neared 100.00 – but not in other jurisdictions, especially China ?¿
- April 14 ’22 Brussels warns EU countries that ruble gas payments may breach sanctions…some EU companies succumb
- Gas traders eg Gunvor reporting highest profit since 2015
- Globalization >> ‘*Slobalization*’, if not reversed

4. …Technological, geopolitical, macro-economic and sectorial repercussions

- Most sectors to suffer from slowdown, a few to benefit: see below
- Impact on China, a large consumer of energy, incl. coal, nuclear and renewables, largest GHG emitter, most important hydrogen producer, biggest source of IMs: *VN article, Dec '21: 'China's Role in the Energy Sector', Natural Resources PC website Library.* Current slowdown
- *Independently, China's power crunch: at its height H2 2021*
- Covid19 resurgence and associated lockdowns, notably in Shanghai:

May '22 'Zero Covid' & the Shanghai lockdown: The impact on China's economy, global supply chains, & foreign business in China

5. Effects incl. on the European+ industry

- On supply

cost up, including FOB energy↑↑ but also in- and out- freights

supply chain problems

supply issues from Russia, Belarus -- and Ukraine

- On demand

mostly down, except for those items related to the production of coal, oil & gas, hydrogen, renewables, defense

supply chain problems at the customers' end

- Other

Macro economy↓, Slobalization, Cybersecurity, …

6. Case studies For now…

Minerals benefiting: the ones associated with the **energy transition**

plus those like frac sands linked with **hydrocarbons**

Minerals linked w/ Energy transition

Lithium↑↑

The biggest winner, used in batteries lithium prices nearly doubled in 2022 amid insane commodity rally

April ’22 Lithium-ion battery output tops 82 GWh in Jan-Feb

Rare earths ↑ used in PV, wind turbines, cars etc

Graphite↑ used ia in rechargeable batteries

Nov 1 ’21 A bullish graphite price forecast for 2022

Bauxite ↑ Al used in new transmission lines eg from renewable plants, incl. new offshore wind plants.

Chinese bauxite prices climb on rising freight costs, WFA spread narrows, IM April ’21

7. Outlook: Alternative Scenaria…

Scenario modeling should be used to incorporate short- as well as long-term comprehensive forecasts of the future

Best Outcome: The War ends in 2021, EU Green policies continue unabated. Open question: When will sanctions on Russia be lifted? Which technologies will advance? This Scenario is favored by EU.

Baseline: War drags on for long. Russia a pariah. China lingers. Energy & Critical Raw Materials [CRM] became scarce, Europe lacks them for years. A recession. Will energy transition and electrification still be priority goals? US-preferred Scenario.

Most Severe Outcome, still barring nukes and World War III: Globalization 'on hold', Bretton Woods revisited, A New World Order. Russia & China split from the West. Back to 1949, trading blocks. Will the only factor holding all prices from rising, including those of Energy and CRM, be a **depression**?

…7. Outlook: Alternative Scenaria

All three scenaria

should be studied by governments and companies

…given subjective [Bayesian] probabilities…

…and the analysis should consider the consequences on:

…supply, demand – in the EU, China, elsewhere -- for

- energy products ie coal, gas, uranium, oil, renewables, hydrogen, CO2 emissions
- materials such as steel, refractories, rare earths, palladium, aluminum, and CRM [critical raw materials]

Natural Resources PC is here to help!

The Energy Crises and Industrial Minerals: Climate Policy and Case Studies

Thank you very much

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