Low Carbon Ukraine

Policy advice on low-carbon policies for Ukraine

IKI INTERNATIONALE KLIMASCHUTZINITIATIVE

Supported by

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

Based on a decision of the German Bundestag

Economic reasons for a green reconstruction programme for Ukraine

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Implemented by

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Structure

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2. Drivers for a green reconstruction
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4. Deep dive: Drivers for a green reconstruction
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    4. EU accession perspective
    5. Energy supply security

Old drivers (already pre-war)

New drivers (since 2022)

5. Deep dive: Implications for reconstruction of sectors

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1. Need for a reconstruction programme for Ukraine

Necessity and general setup

- Ukraine is suffering from immense damage to its infrastructure and fixed assets due to the war started by Russia
  - KSE estimate: USD 84.4 bn as of 18/04/2022
  - Damage both to public (roads, other infrastructure) and private (buildings, industrial enterprises) assets
- A reconstruction programme will most likely be based on massive international funding and be implemented by new, purpose-built institutions

➢ **But reconstruction should not just rebuild assets as they were before**

Importance of green reconstruction

- Many economic drivers of reconstruction were there before the war
- War with Russia and new geopolitical situation has added further drivers

➢ **Green reconstruction is not an expensive luxury**

➢ **Should be seized as an opportunity for the modernisation of the economy**

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2. Drivers for a green reconstruction

	Driver	Explanation/examples	Impact on green reconstruction
Challenge	***Higher cost of green reconstruction***	*Low- or zero-emission facilities will cost more than rebuilding damaged assets as they were*	-
Old drivers (pre-war)	**Climate policy obligations/ commitments**	Nationally Determined Contribution (NDC), Industrial Emissisions Directive (IED)	**(+)** Insufficient on its own
	Existing inefficiencies of dirty technologies	Known deficits in coal mining economics, lack of energy efficiency of building stock	**+**
	Cost decrease of green technologies over time	Strong cost decrease over time e.g. for renewable electricity sources	**+** Often still more expensive
New drivers (since 2022)	**Increase of global energy prices / price volatility**	Short-run impact of war on global energy prices, risks/expectations for long-run prices	**+**
	EU accession perspective	Increased requirements to implement/comply with climate-related policies	**+**
	Energy supply security	Eliminating import dependence on Russia, war-related risks to domestic energy production	**+**

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3. Technology options for a green reconstruction

Examples of „green" reconstruction options for damaged/destroyed assets

Sector	Old asset	New technology	
Electricity and heat	**Coal TPPs**	**RES** (solar, wind, …)	Already technol. competitive
	Fossil heat plants	**Heat pumps**	High efficiency, but higher investment cost
Industry	**BF-BOF steel plants**	**DRI-EAF steel plants**	Technology still in pilot stage, but available
Residential	**Energy inefficient buildings**	**Thermal insulation**	No problem at all
Transport	**Urban infrastructure**	**Electromobility**	Selecting specific infrastructure will be a challenge

- Technology options should be investigated further (which options exist, how do costs and fossil fuel requirements compare, impact on GHG emissions…)

➢ **„Green reconstruction" criteria should be built into reconstruction programme for Ukraine from the outset**

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Deep dive:
4. Drivers for a green reconstruction

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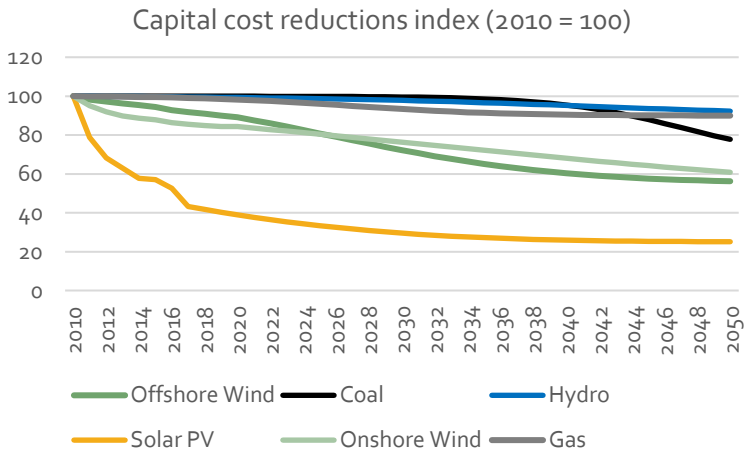
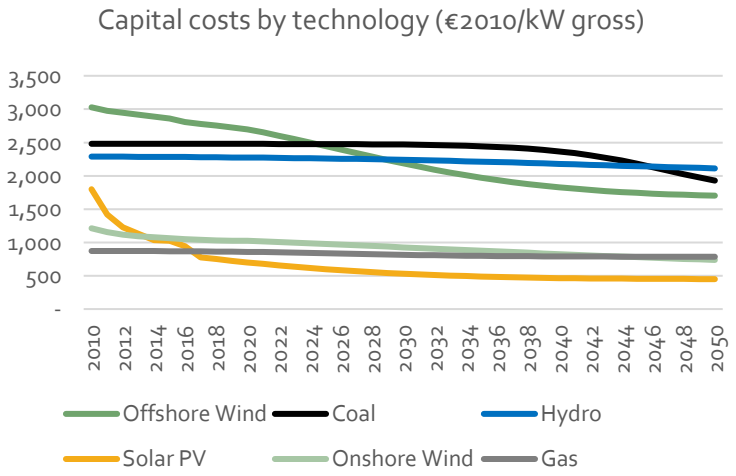
4.1 Cost reduction of green technologies

- Renewable technology costs have decreased significantly in the past few decades.
- Further expected cost reductions by 2050 (vs 2010):
  - Solar PV – **75%**
  - Onshore wind – **44%**
  - Offshore wind – **40%**
- Power system: renewables, storage, and efficient peaker plants in most cases **already cheaper** than retrofit, lifetime extension of old inefficient coal TPPs
- But costs for some sectors are not yet competitive
  - Costs of technologies such as hydrogen electrolysers, heat pumps, fuel cells, innovative steel production expected to decrease soon

➢ **Power sector: Reconstruction with modern, green technologies clearly preferable**

➢ **In other sectors (e.g. industry), Ukraine could take a pilot role by rebuilding with new technologies, but might need additional financial support**





Source: European Commission Joint Research Center

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4.2 Climate policy obligations

Updated NDC

- -65% of GHG emissions by 2030 (compared to 1990 levels)

National Emission Reduction Plan (NERP)

- EU Directives (IED & LCPD) require expensive retrofitting or decommissioning of TPPs

Climate neutrality 2050 / 2060

- National Economic Strategy until 2030: Net zero GHG emissions by 2060
- European Green Deal: Climate-neutral continent by 2050 (relevant for EU accession perspective)

Post Coal Alliance

- COP26: coal phase-out by 2035/2040

EU Association Agreement

- Obligation to establish an EU-compatible Emissions Trading System (ETS)
- Relevant for EU accession perspective and avoiding CBAM

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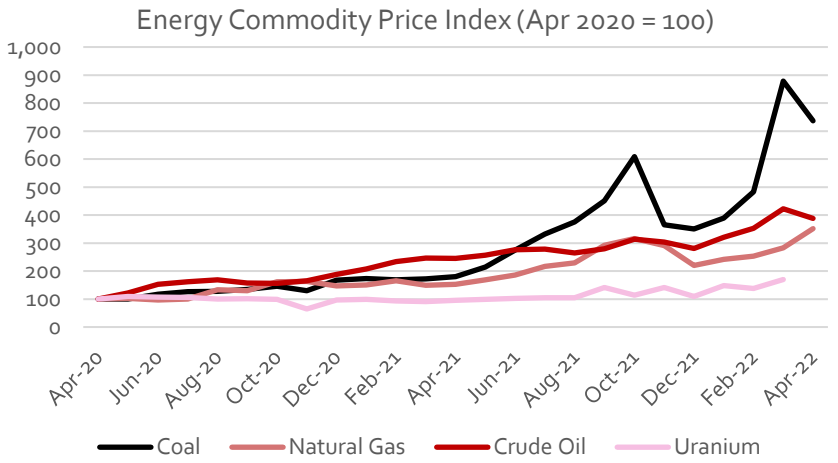
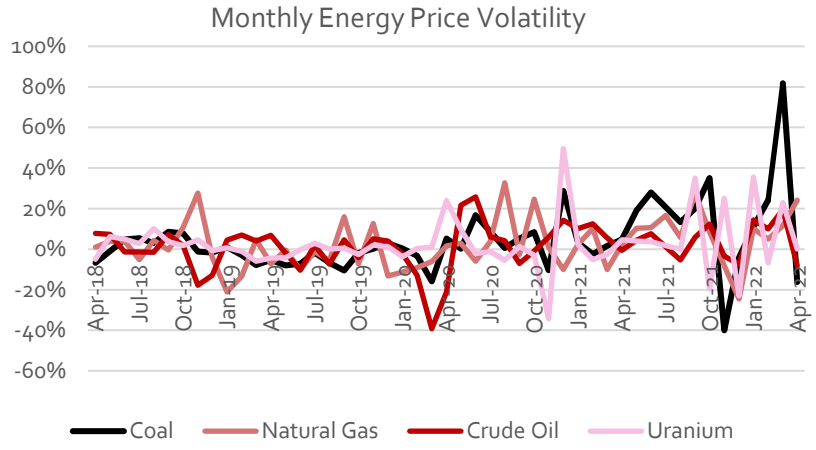
4.3 Global energy prices and price volatility

- Global energy commodity prices increased rapidly since April 2020, with progressively larger **price volatility** due to **demand and supply-side shocks**:
  - Russia's invasion of Ukraine and possible escalation of energy commodity sanctions
  - OPEC+, Middle Eastern and global supply constraints
  - Uncertain growth and demand outlook for China and other major economies
- Persistent **price volatility** and **high prices** can be **expected in the short- to mid-term**:
  - Higher consumer energy prices globally, increasing global inflation (coupled with other drivers)
  - Impacts on industrial and economic production, transportation, logistics and supply chains
  - But also demand destruction and progressive shift to more stable, renewable energy sources
- Longer-term price forecasts and outlook:
  - Consensus that oil prices will rise progressively after 2030 on decreased demand and high production costs.
  - Rapid decarbonisation of economies and focus on energy efficiency a security and economic imperative

➢ **Risk of high and unpredictable fossil energy prices**





Source: Deutsche Boerse

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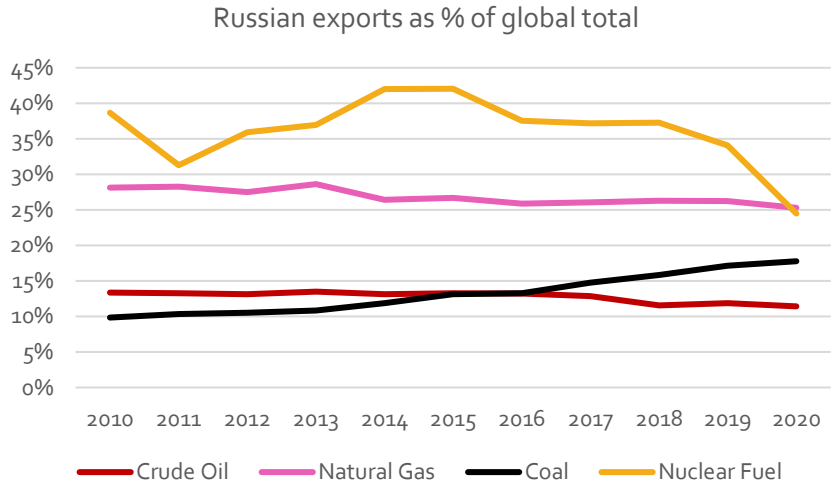
Russia's role in the global energy supply

- Russia is the world's largest energy exporter, but future status uncertain:
  - Several countries already sanctioning energy exports
  - Ural crude selling at massive discount and struggling to find buyers (although demand is increasing again)
  - Decreased Russian crude oil production and reduced refinery throughput already recorded
- Russia's war in Ukraine continues to further fuel the unpredictability and instability of energy supply and prices
  - Possible co-operation and de-escalation of existing sanctions currently not probable in the short-to-mid term.
  - Further sanctions and embargoes on Russian energy exports (especially by the EU) would drastically increase carrier prices.
  - Dependence on Russian energy exports speeding up **EU and global shift to renewable energy**

➢ **Decoupling from Russia as an energy supplier leads to reduced supply availability and more market power of other fossil energy suppliers unless fossil energy consumption is reduced**



Energy source	Reserves: Global share % (rank)	Production: Global share % (rank)	Exports: Global share % (rank)
Coal	15.1% (2nd)	5.2% (4th)	17.8% (3rd)
Natural gas	19.9% (1st)	16.6% (2nd)	19.9 % (1st)
Crude oil	6.2% (7th)	12.1% (3rd)	12.3% (2nd)
Nuclear fuel	-*	-**	23.9% (1st)

Source: BP statistical review of world energy 2021, UN Comtrade
** Russia ranks 7th-10th in global Uranium reserves.*
*** Share of fuel fabrication uncertain. Russia has a fully integrated nuclear fuel cycle and provides many countries with nuclear fuel.*

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4.4 EU accession perspective of Ukraine

- Ukraine already subject to a number of climate-related policy requirements due to EU association and Energy Community membership
- EU candidate status and eventual accession will add further requirements

EU regulation	Content	Implementation status	Upshot	applies to Non-EU	applies to EU-MS
Industrial Emissions Directive	Environmental regulation for industrial installations (e.g. powerplants)	• Law 4167 rejected by Rada • NERP not implemented	Large range of present industrial assets is not compliant and needs retrofit/replacement	✓	✓
Carbon Border Adjustment Mechanism	Carbon price on EU imports	Under discussion in EU council/parliament	Carbon-intensive companies exporting to EU will face carbon pricing in medium term	✓	
EU ETS	Intra-EU carbon pricing for large emitters	• Carbon tax: ~1 EUR/tCO2 • Plan to implement national ETS in 2026	Eventually high carbon prices for all companies	(✓)	✓
Energy efficiency and performance of buildings directives	Minimum energy performance standards for new and existing buildings	Minimal requirements aligned to EU regulation	Buildings might face higher requirements for energy efficiency (insulation, metering etc.)		✓

➢ **Climate-related EU policy requirements hugely favour green reconstruction to avoid high carbon prices or replacement needs in the near future**

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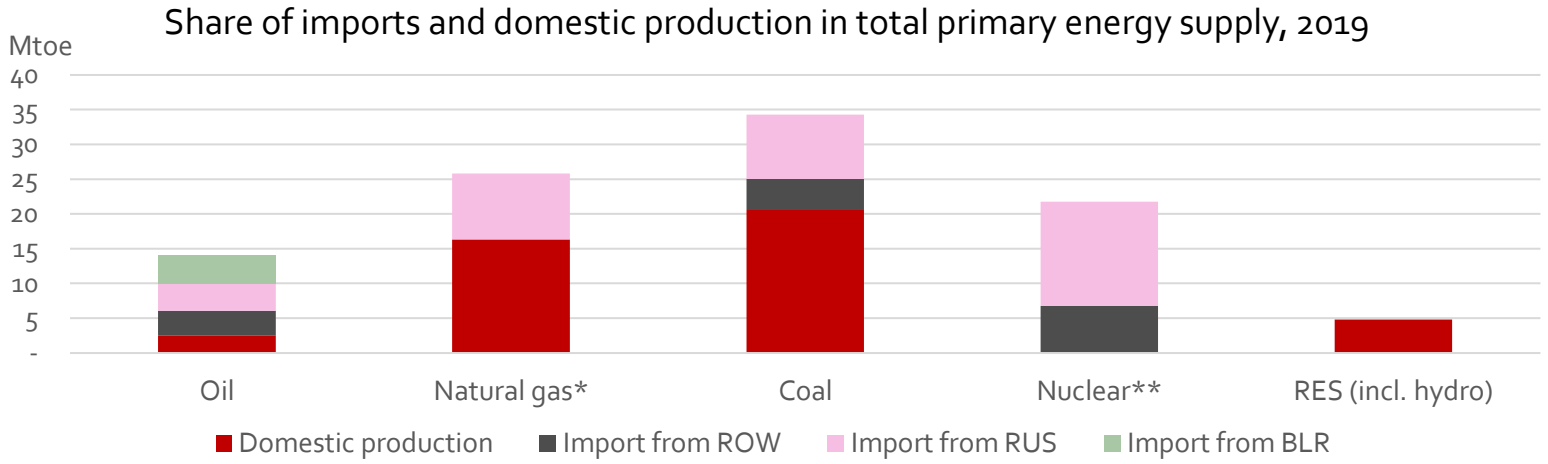
4.5 Energy supply security of Ukraine: fossil imports



**gas from RUS is imported via virtual reverse flows from EU countries **nuclear fuel import shares from 2017*
Source: Energy balance 2019, Eurostat, ua-energy map, World Nuclear Association

EU regulation	Foreign share in energy	Diversification	Sectors affected
Coal	27% from RUS	• Dependent on transport capacities (rail, sea)	Energy, industry
Gas	37% from RUS ("virtual reserve flows": Russian gas, purchased from EU)	• Difficult due to dependency on pipelines • Physical reverse flows technically possible • EU is preparing joint gas procurement	Energy, industry
Oil	82% imported (57% from RUS/BLR)	• Oil trade can be redirected depending on transport capacities	Transport, energy, industry
Nuclear fuel	70% from RUS	• Only recently, no supplies from RUS	Energy

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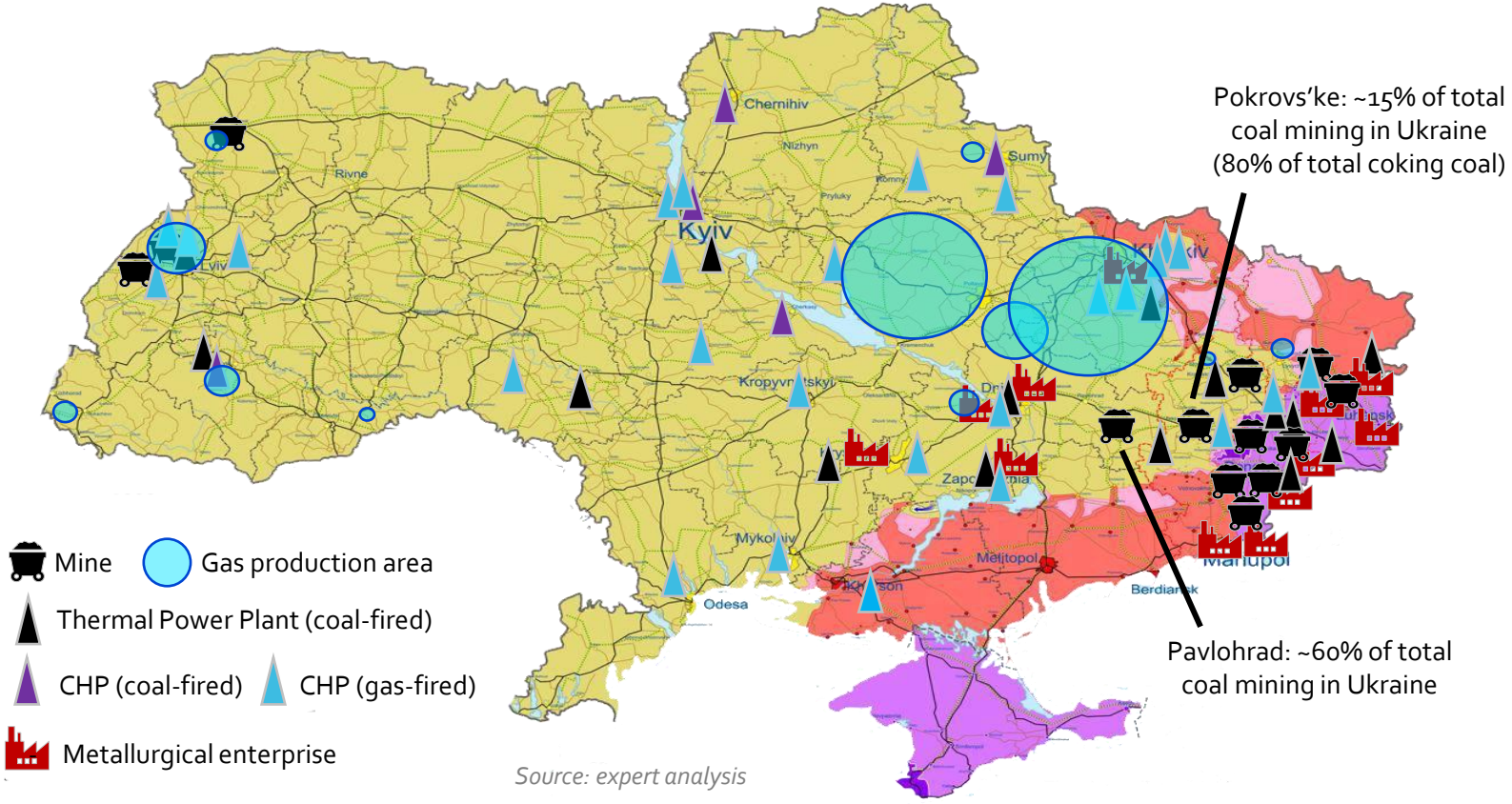
War-related risks to domestic fossil fuel production



Source: expert analysis

- Most danger to assets in or near war zone, **coal mines** heavily affected
- **Gas production** currently less affected, but close to areas targeted by expected Russian offense

➢ **High concentration of mines and plants in the East, heavy war-related damage to be expected**

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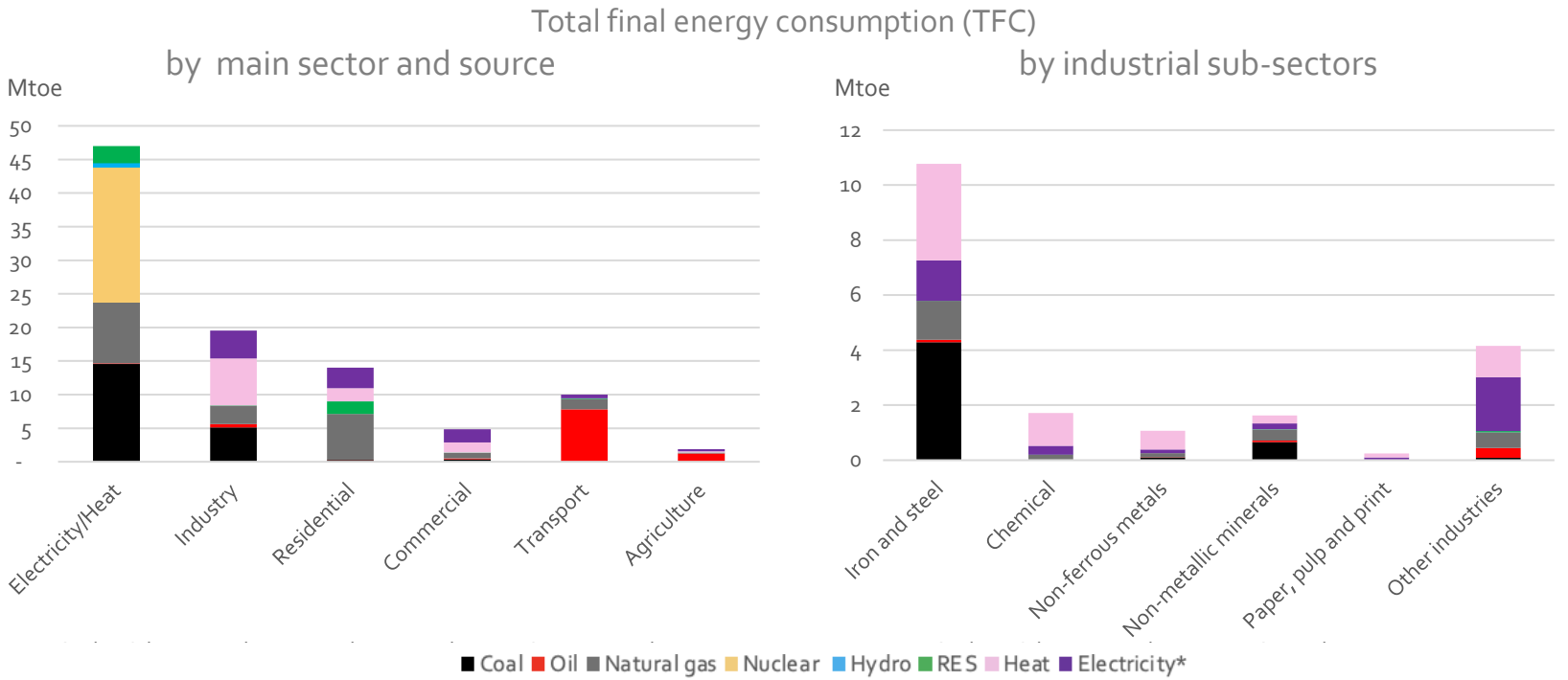
5. Deep dive: Implications for reconstruction of sectors



*Source: Energy balance of Ukraine, *electricity usage in sectors other than electricity and heat*

- Sectoral reconstruction should aim at minimising fossil dependency
- Nuclear energy in electricity/heat sector still reliant on fuels from Russia

➢ **Most need for green reconstruction in electricity/heat, industry (esp. iron and steel), residential and transport sectors**

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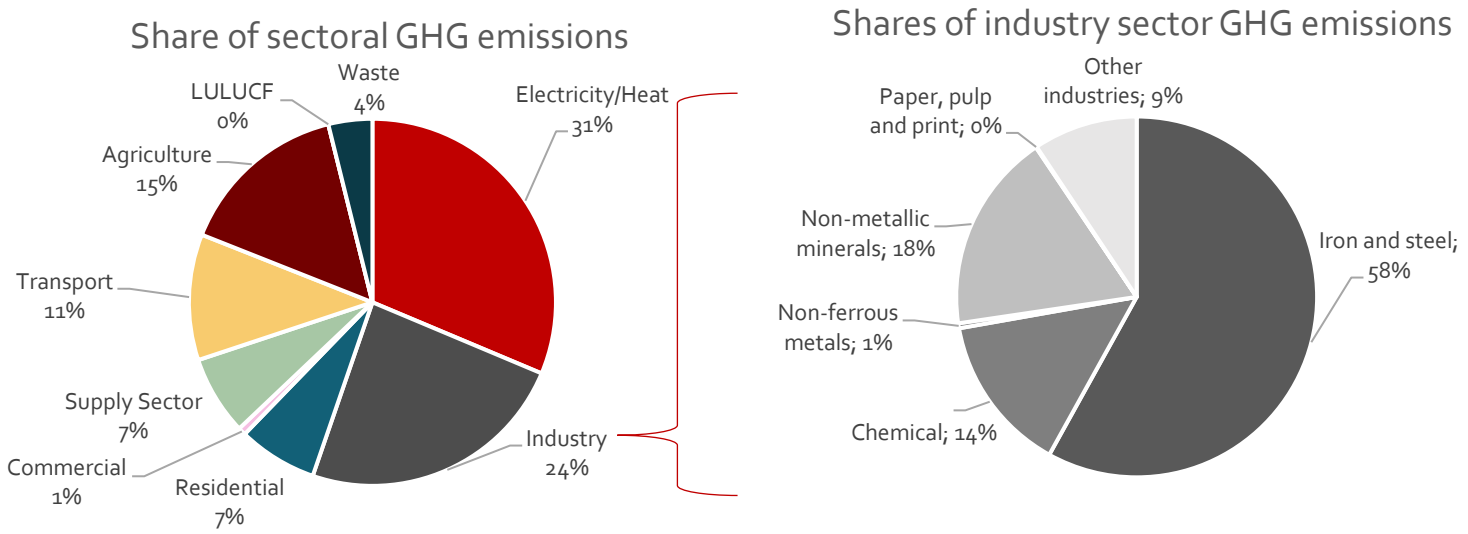
Greenhouse gas emissions of sectors



*Source: Energy balance of Ukraine, *electricity usage in sectors other than electricity and heat*

- Unsurprising: Sectors most dependent on fossil fuels are also the heaviest polluters

➢ **Economic and security imperative to reduce fossil fuel dependency implies a greening of Ukraine's economy**

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