SECCA
Sustainable Energy Connectivity in Central Asia

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The European Union – Uzbekistan Sustainable Energy Days

International Conference
Energy Efficiency in Uzbekistan: prospects and challenges
Radisson Blu Hotel, Tashkent, 27 June 2023

Energy Efficiency indicators

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Defining Energy Efficiency Improvements - Indicators

Consume **LESS (-)** energy to provide **SAME (=)** service

Consume **SAME (=)** energy to provide **MORE (+)** service

Consume **LESS (-)** energy because of **CHANGE (≠)** in service

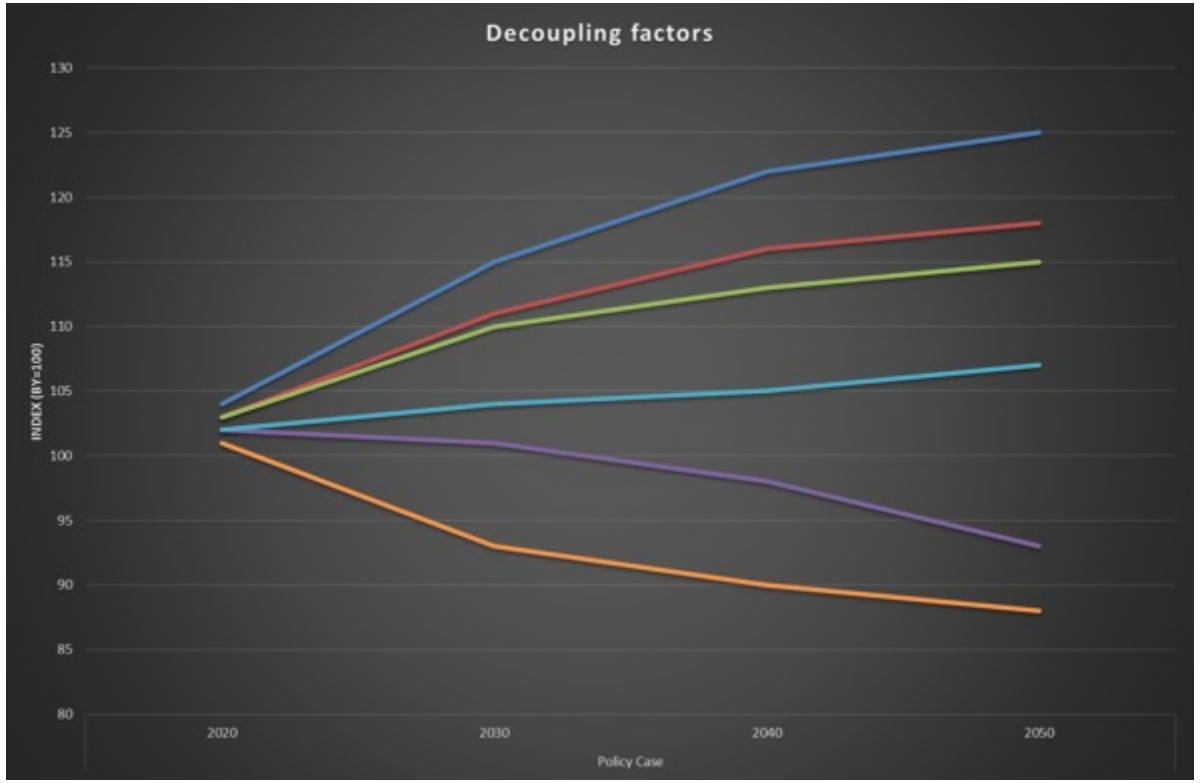
Consume **LESS (-)** energy and provide **LESS (-)** service

Are all the above energy efficiency improvements?

Generic energy efficiency indicator: $\frac{Energy\ Consumption\ (t)}{Activity\ (t)}$

Generic energy efficiency indicator: $Energy\ consumption\ (x,t)\ -\ Energy\ consumption\ (B,t)$

"Decoupling" is when two variables stop moving together:
- the correlation between them remains positive (relative)
- the correlation between them becomes zero, or negative (absolute)



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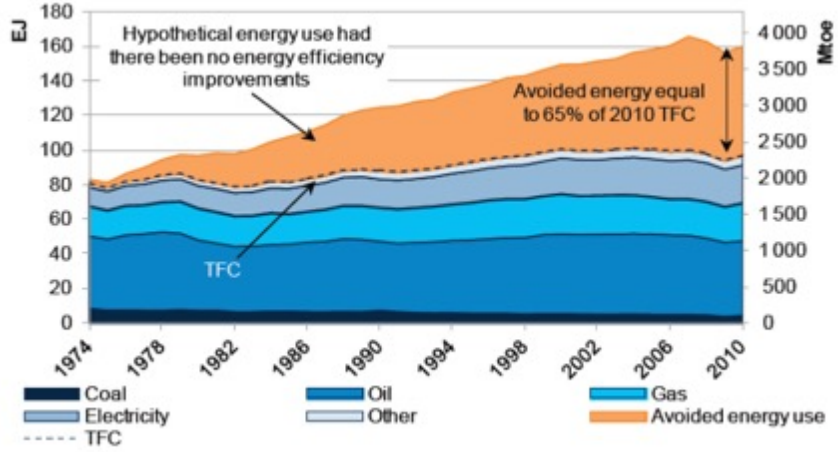
EE1st at the EU level

Article 2(18) of the Regulation on the Governance of the Energy Union and Climate Action

EE1st, as a horizontal "**guiding principle**" of the European climate and energy governance and beyond, should ensure, while taking full consideration of security of supply and market integration, that only the energy **needed** is produced and that investments in stranded assets are avoided in the pathway to achieve the climate goals.

Member States are required to take into account the principle in the integrated National Energy and Climate Plans (NECPs).

The principle aims to treat energy efficiency as the "**first fuel**", that is a source of energy in its own right
"save before you build/produce"



The EE1st principle implies adopting a takes into account the overall efficiency of the "integrated energy system" (holistic) and promotes the most efficient solutions for climate neutrality across the value chain (from energy production, network transport to final energy consumption) so that efficiencies are achieved both in primary and final energy consumption.

This includes giving **priority to demand-side** solutions whenever they are more cost-effective than investments in energy infrastructures.

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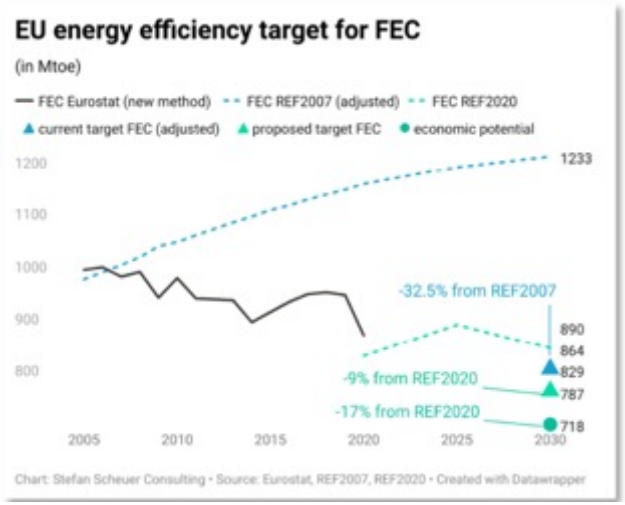
Overall energy efficiency target – Revision of the EED - EC

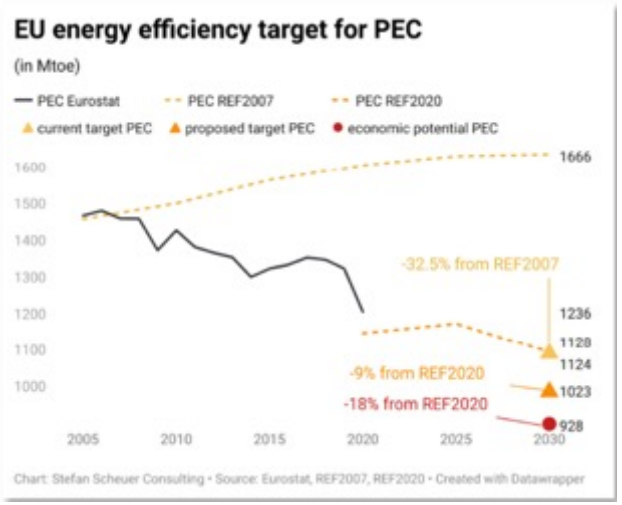
The EU has set ambitious energy efficiency targets for 2020 and 2030 to reduce primary and final energy consumption as part of its 2050 decarbonisation objectives.

Initial (2018): headline EU energy efficiency target for 2030 of at least 32.5% (compared to projections of the expected energy use in 2030). 32.5% target translates into a final energy consumption of 956 Mtoe and/or primary energy consumption of 1273 Mtoe in the EU by 2030.

More recent (2022, in the context of the REPowerEU plan)

	Modelling analysis for the EED recast	New modelling analysis	
	Full Package Scenario 9%EE/40%RES	REPowerEU 13%EE/45%RES	REPowerEU 19%EE/45%RES
Energy consumption			
EU FEC target (wrt. REF2020 scenario)	**9%**	**13%**	**19%**
Final energy consumption (Mtoe)	787	751	701
EU PEC target (wrt. REF2020 scenario)	8%	10%	13%
Primary energy consumption (Mtoe)	1,033	1,006	979





Model-based analyses

Target values: "absolute numbers"

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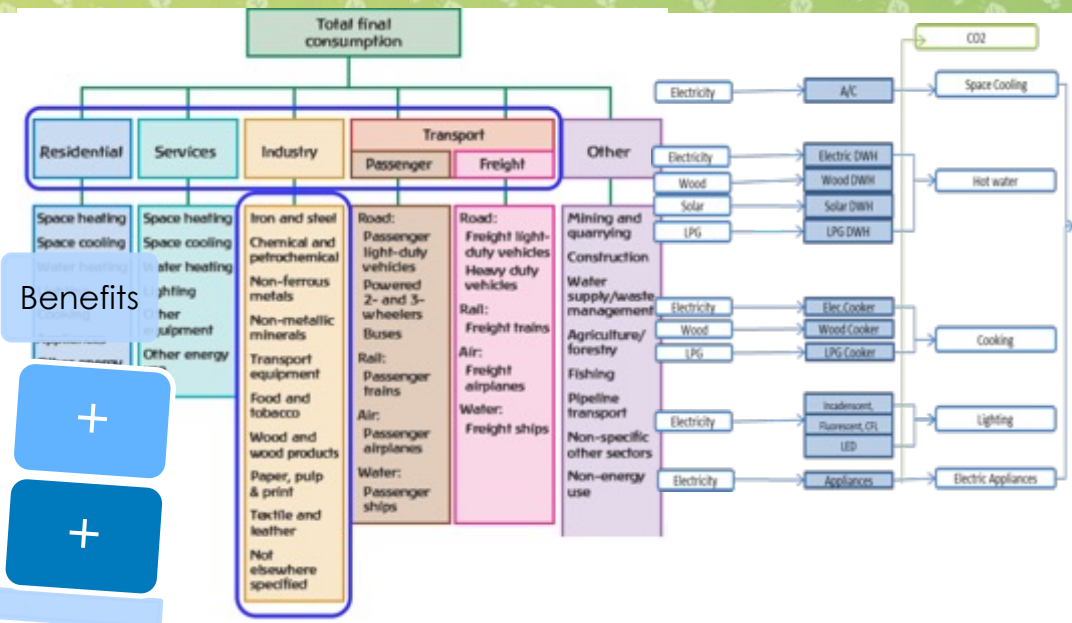
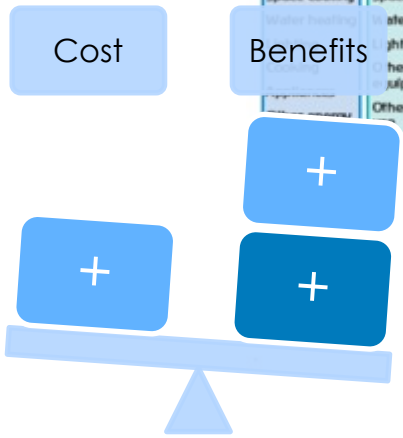
Understanding energy efficiency – Indicative steps

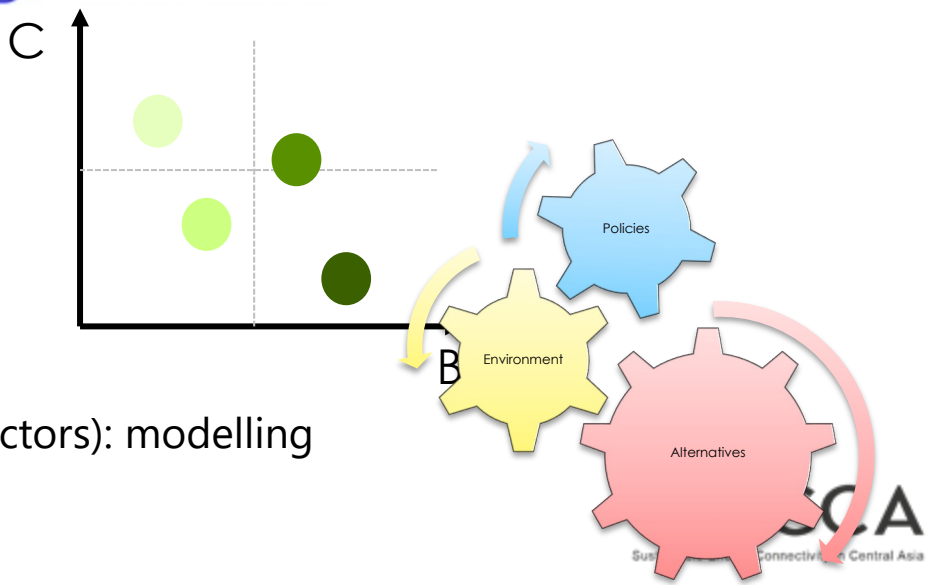
- Understand how energy is used across system/sectors
  Need end-use information beyond the energy balance





- Define evaluation methodology/rationale

- Information collection (statistics/surveys/metering/databases,..)
  Select and assess alternatives (technology explicitness is "key")



- Explore and project energy variables (EE "triggers" and other factors): modelling

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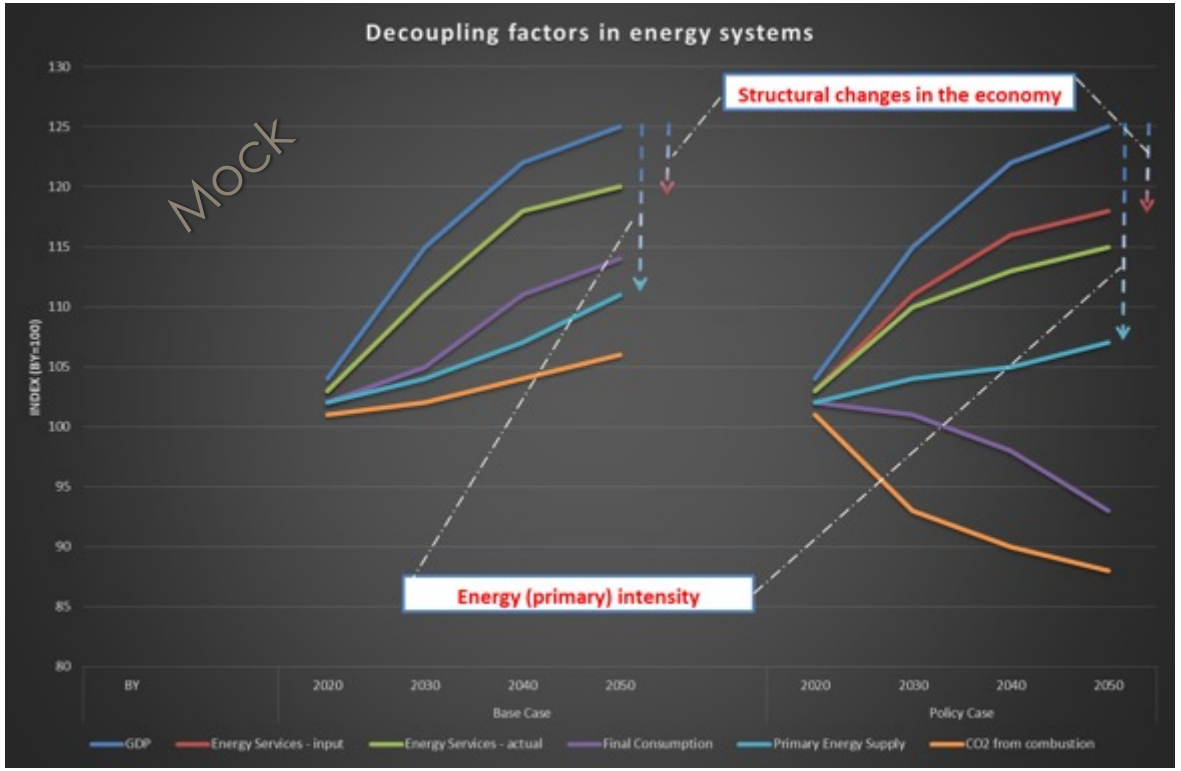
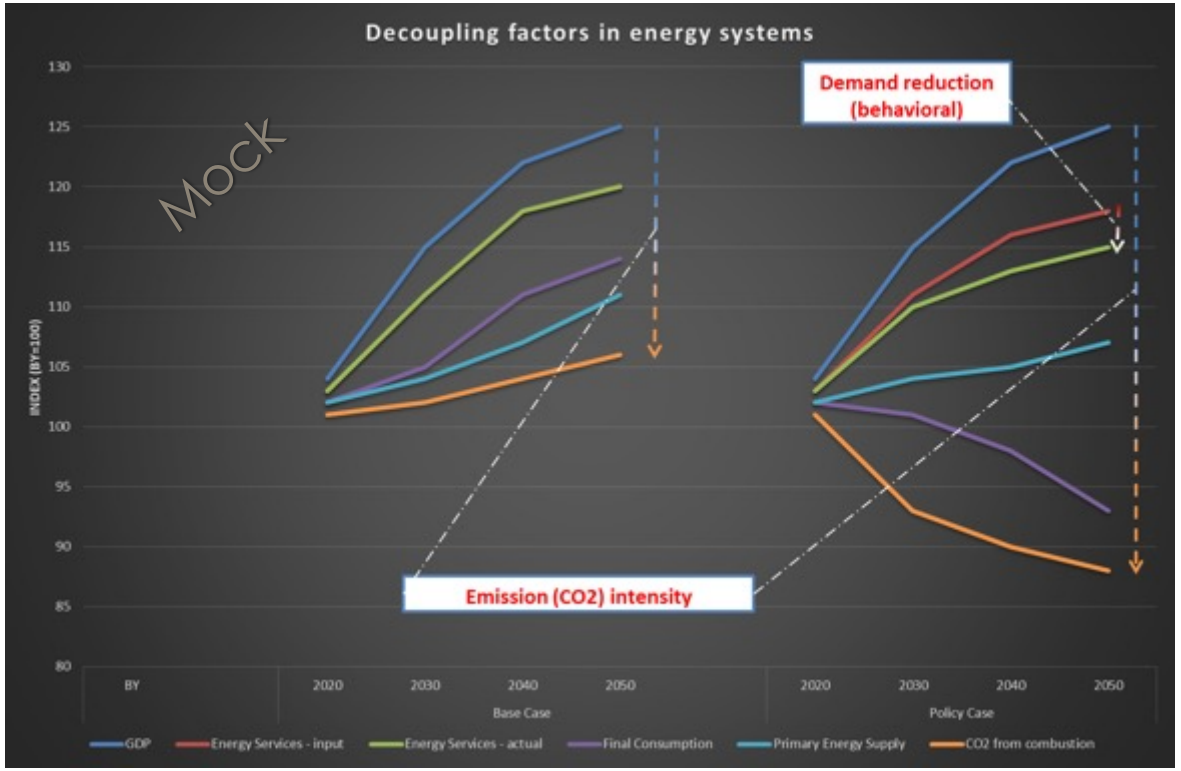
Unveiling and understanding energy efficiency indicators

The importance of disentangling “efficiency improvements” from “structural changes” of the economy and behavioural changes





Uzbekistan’s economy and population is expected to grow at high rates of over 4% and 1.5%, respectively, Unmet demand is an issue!

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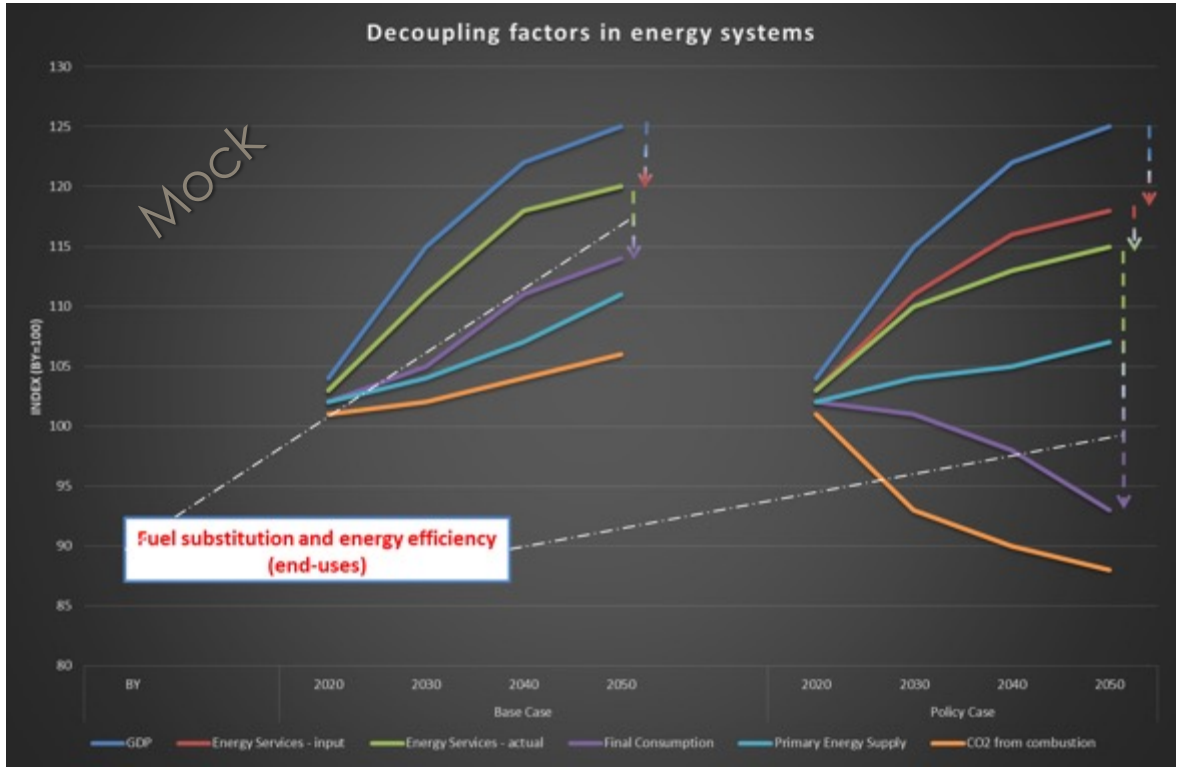
Unveiling and understanding energy efficiency indicators



Examples:

Final Energy per Inhabitant (toe/capita)	Energy use for Residential Space Heating (per sqm)	Energy Intensity Passenger Transport (per pass-km)
Final Energy per household (toe/household)	Energy use for Tertiary Space Heating (per sqm)	Energy Intensity Freights Transport (per t-km)
Final Energy per sectoral value added (toe/M$)	Energy use for Residential Lighting (per dwelling)	Energy use for Cement production (toe/t)
Electric vs bio-fuelled vehicles (over the chain)	Energy use for Public Lighting (per number)	Energy use for Iron&Steel production (toe/t)

Relative indicators need to be carefully interpreted!

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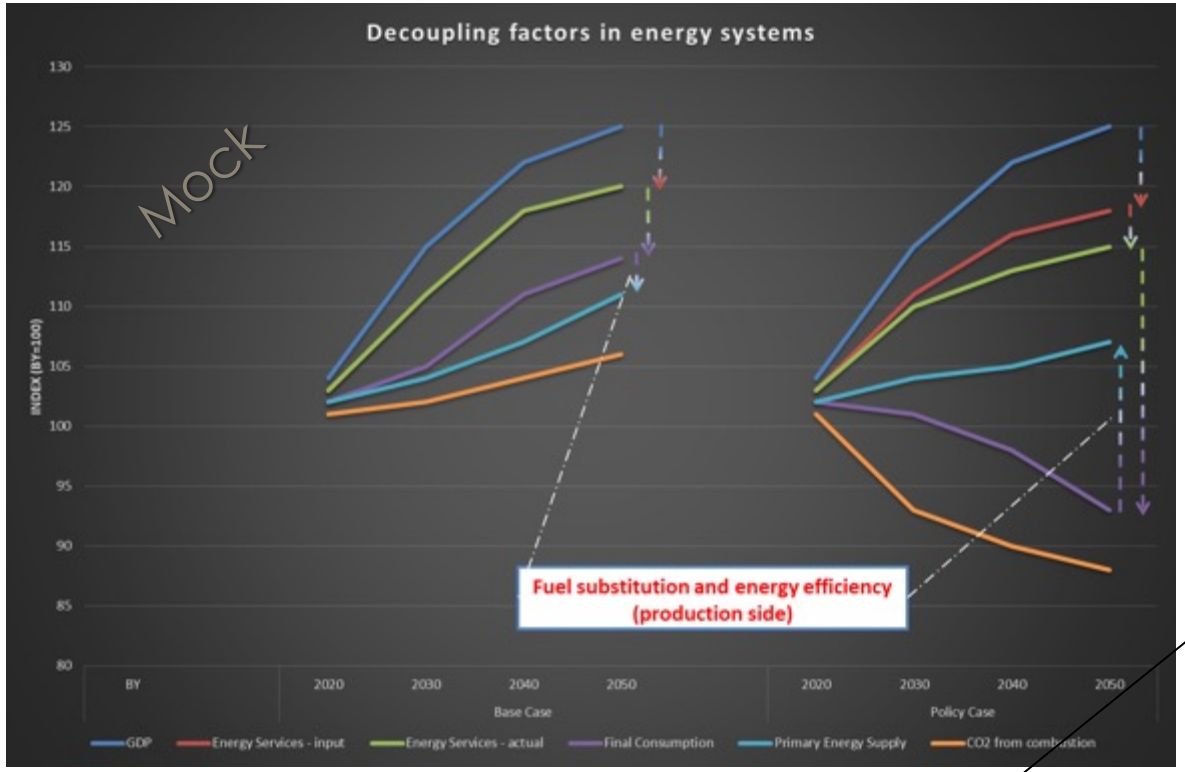

1.4<UZ<1.55
KZ>1.65
EU (average): 1.35

Examples:

Primary Energy Supply per Inhabitant (toe/capita)	Efficiency of Thermal Electricity Generation	CO2 emissions from the power sector per unit of electricity produced (kgrCO2/kWh)
Primary Energy Intensity (toe/k$)	Electricity transmission and distribution efficiency	CO2 Emissions Intensity per unit of Primary Energy Supply (kg CO2 from Energy Sources / $ GDP)
Primary Energy over Final Energy (toe/toe) Best = 1	District Heat distribution efficiency	Per value added carbon intensity (kgCO2/$)
Electric vs bio-fuelled vehicles (over the chain)	Average Capacity Factor of Conventional Power Plants	H2 vs electricity in industry (over the chain)

Relative indicators need to be carefully interpreted!

Single indicators can be misleading!

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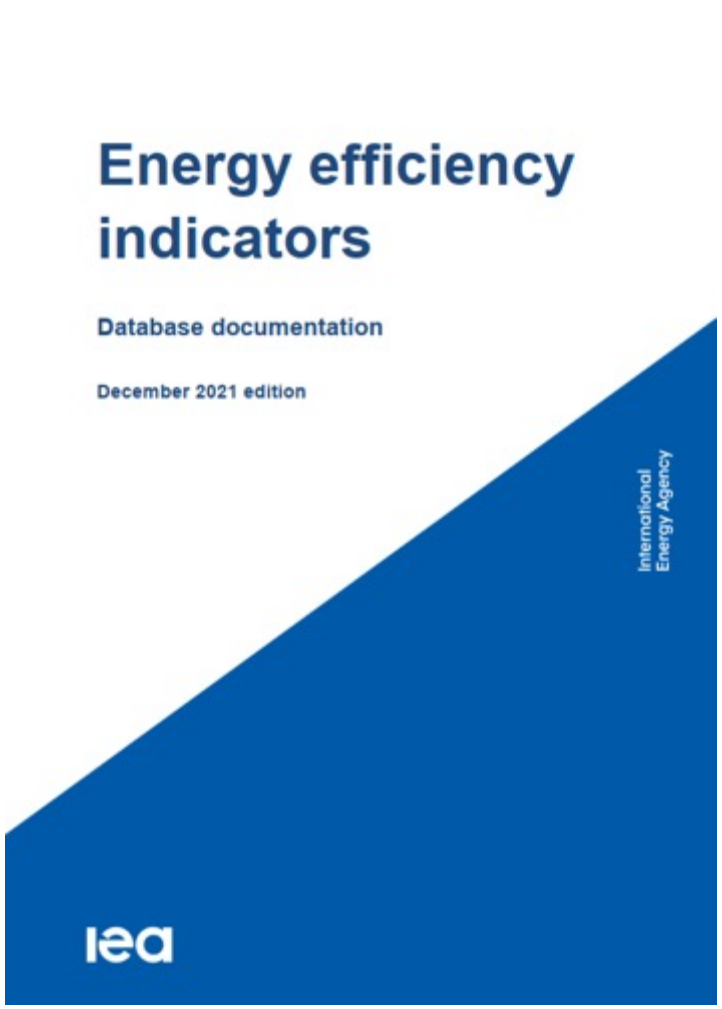
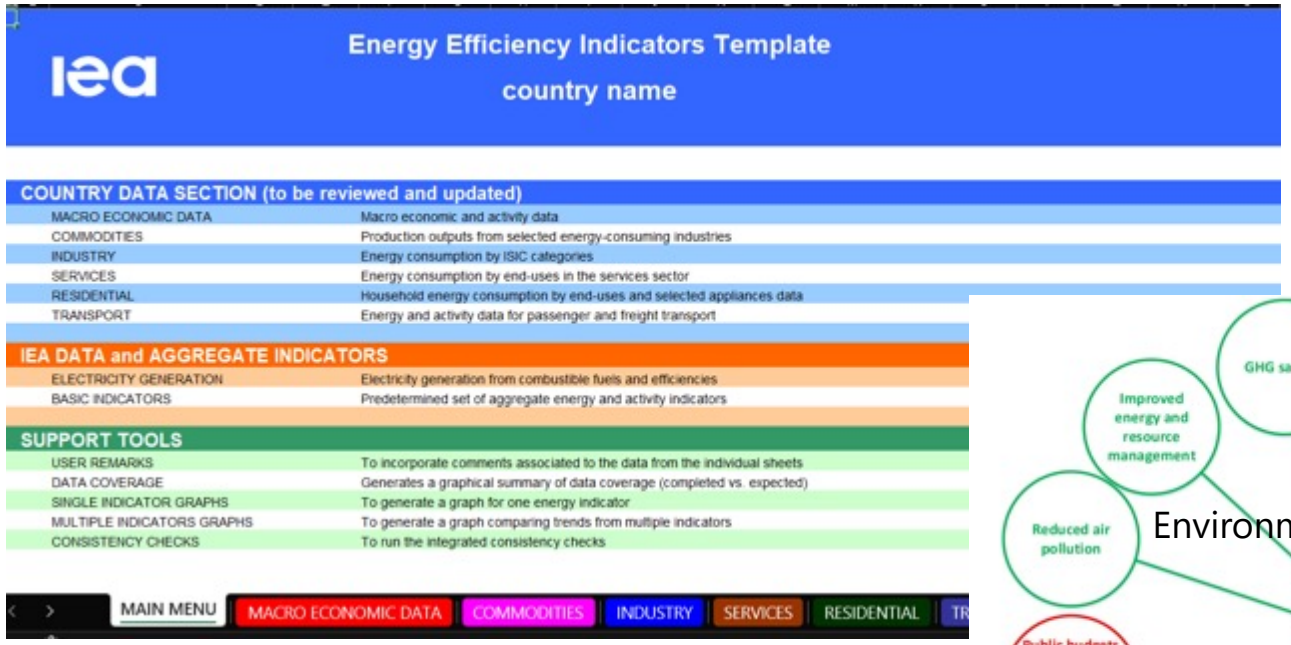
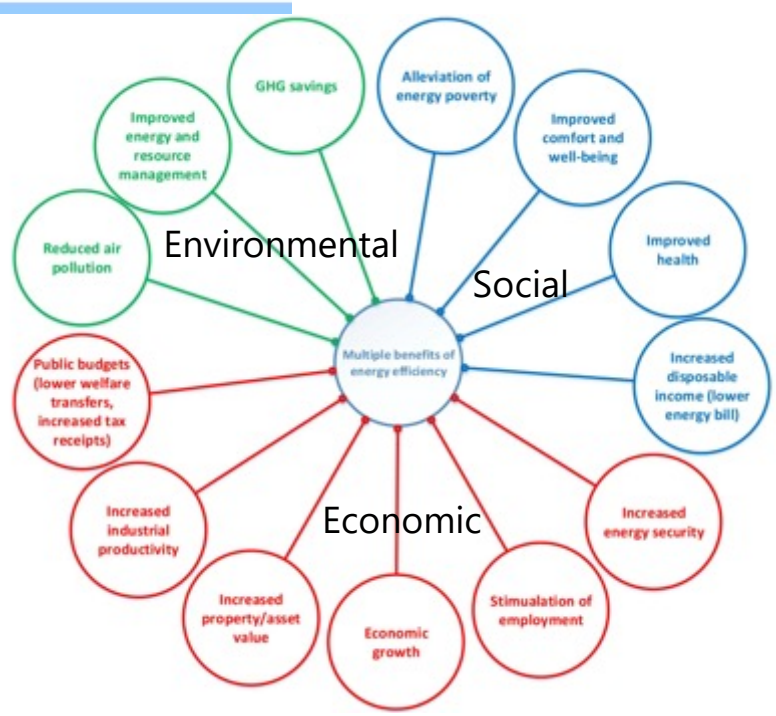
References

https://www.iea.org/data-and-statistics/data-product/energy-efficiency-indicators







https://iea.blob.core.windows.net/assets/6d9daa77-45f0-41c9-978b-c23a3759b073/Efficiencyindicators_Documentation_December2021.pdf

Source: European Commission based on Odyssee-Mure

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Q&A

THANK YOU!

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