

Demand-side assessments in Long-Term Energy Scenarios

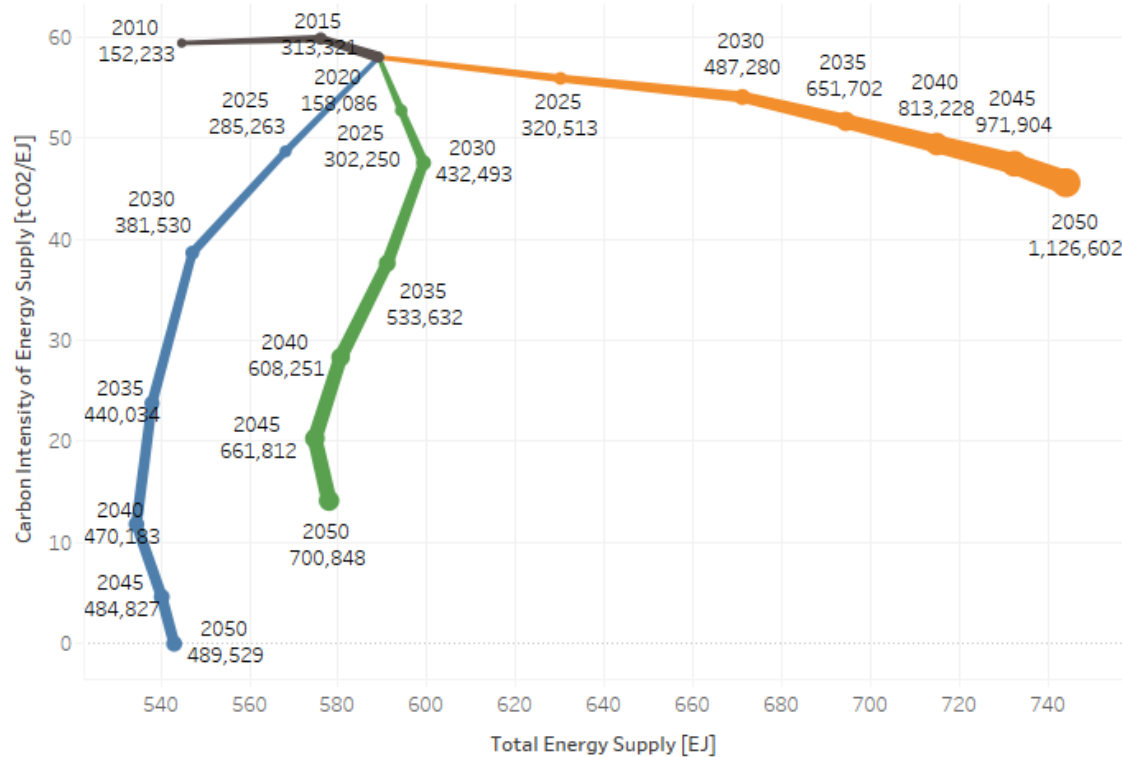
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December 7th 2022

IEA drivers of scenario outcomes

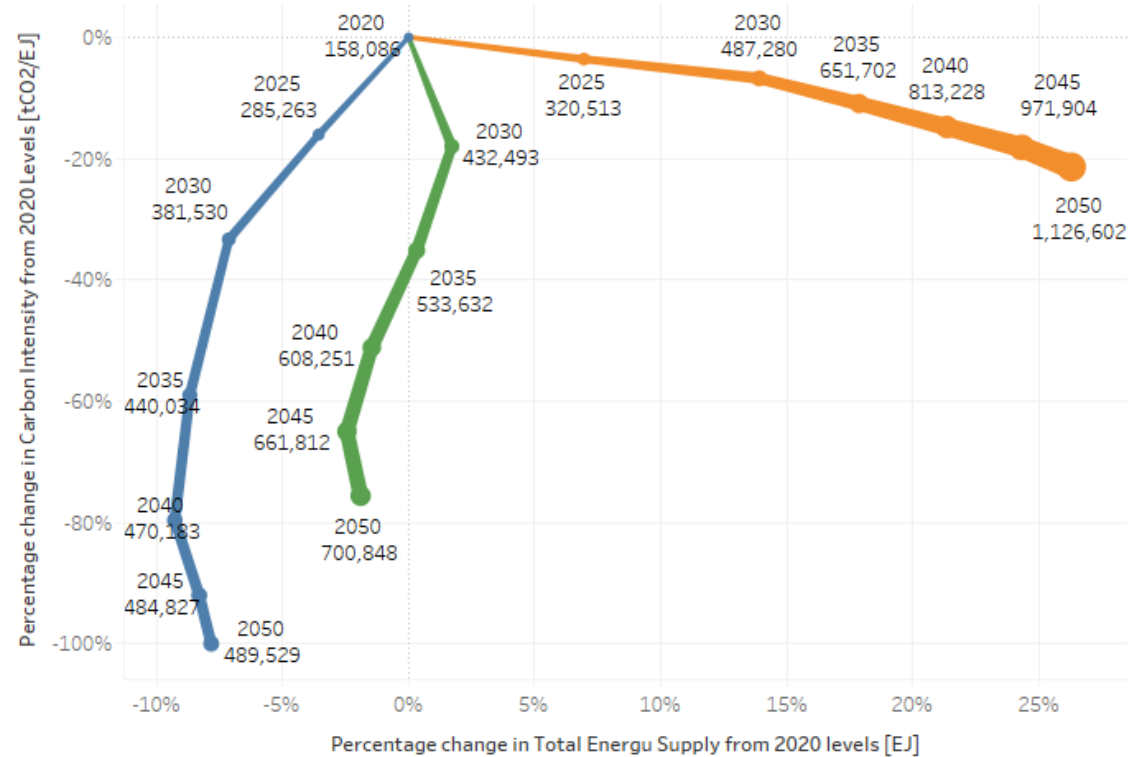
It is important to understand drivers of model outcomes and emergent properties of energy system dynamics e.g.

Is Energy demand intensity to GDP an input or an output?

CO2 Intensity Vs Energy Demand



Percentage Difference from 2020



Scenario1

History

Stated Policies Scenario

Sustainable Development Scenario

Net Zero Emissions by 2050 Scenario

Carbon Budget (GtCO2)

161,723

400,000

600,000

800,000

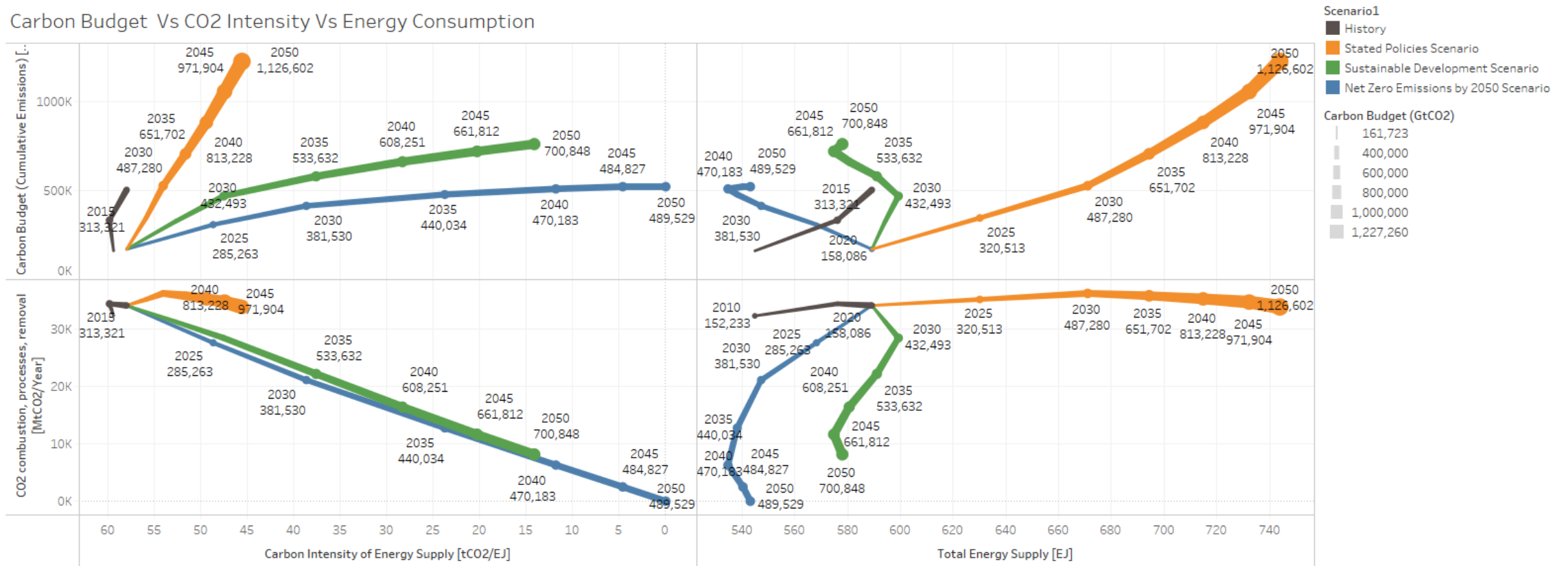
1,000,000

1,227,260

IEA drivers of scenario outcomes

It is important to understand drivers of model outcomes and emergent properties of energy system dynamics e.g. Energy demand intensity?

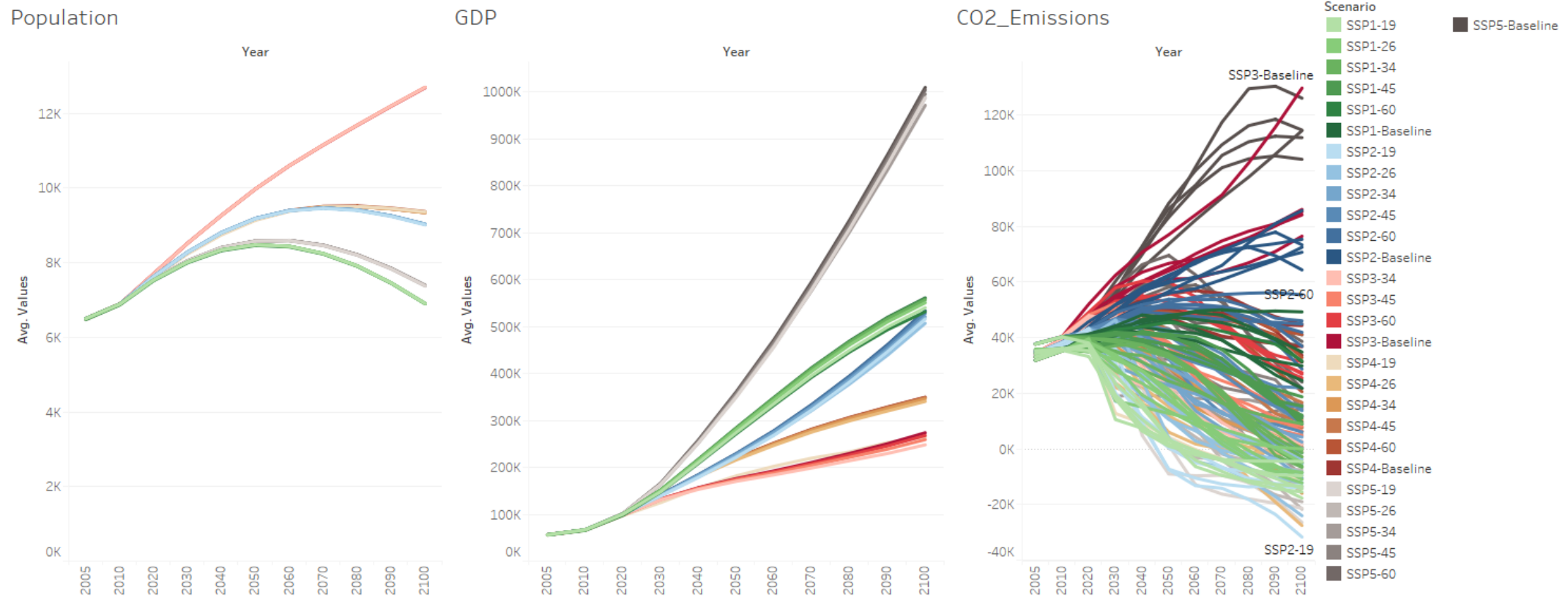
Carbon Budget Vs CO2 Intensity Vs Energy Consumption



Shared-Socioeconomic Pathways

IPCC Working Group 1,2 & 3 coordinate their input assumptions by using the Shared Socio-economic Pathways (SSP) Narratives (SSPx-RCPx)

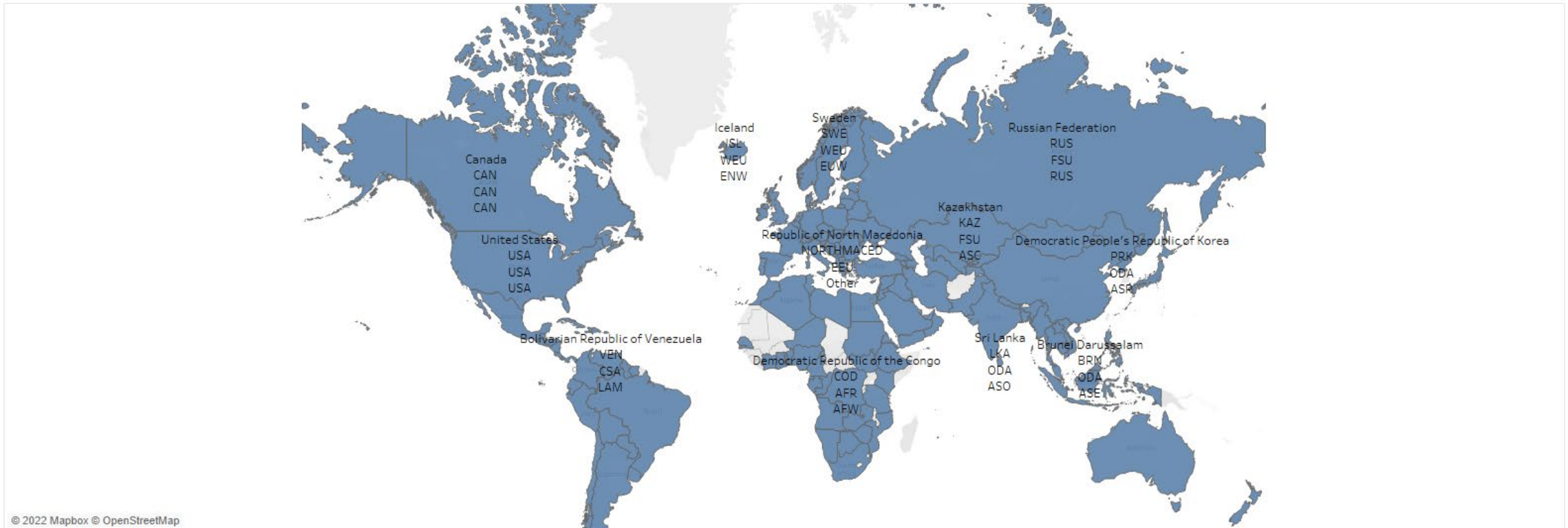
Data Source: <https://tntcat.iiasa.ac.at/SspDb/dsd?Action=htmlpage&page=10>



IEA Data Sources - **WBIG**

IEA publishes a comprehensive data base of global extended energy balances, that include all energy commodity flows within all NACE economic categories globally for ~147 countries – “WBIG” is the foundation of all global energy system models

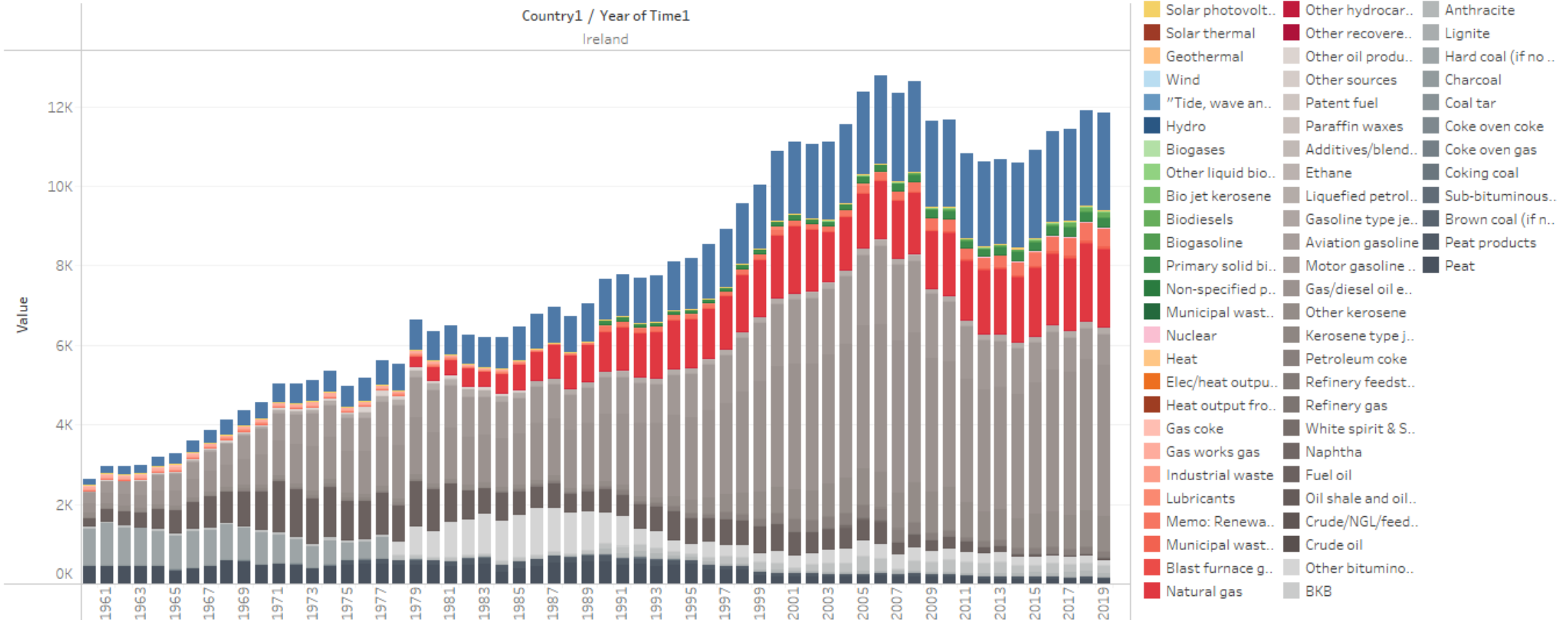
IEA_NATIVE



IEA Data Sources - WBIG

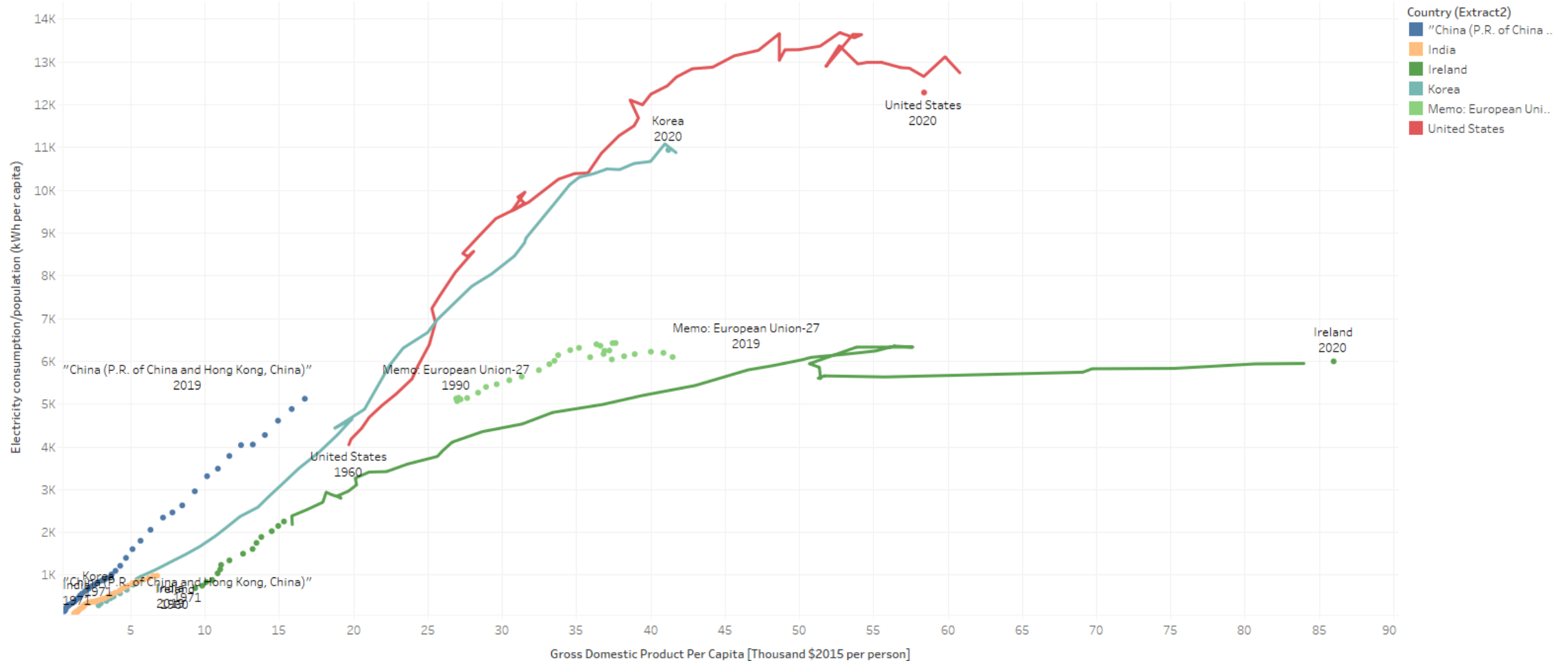
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Total Final Consumption by Commodity



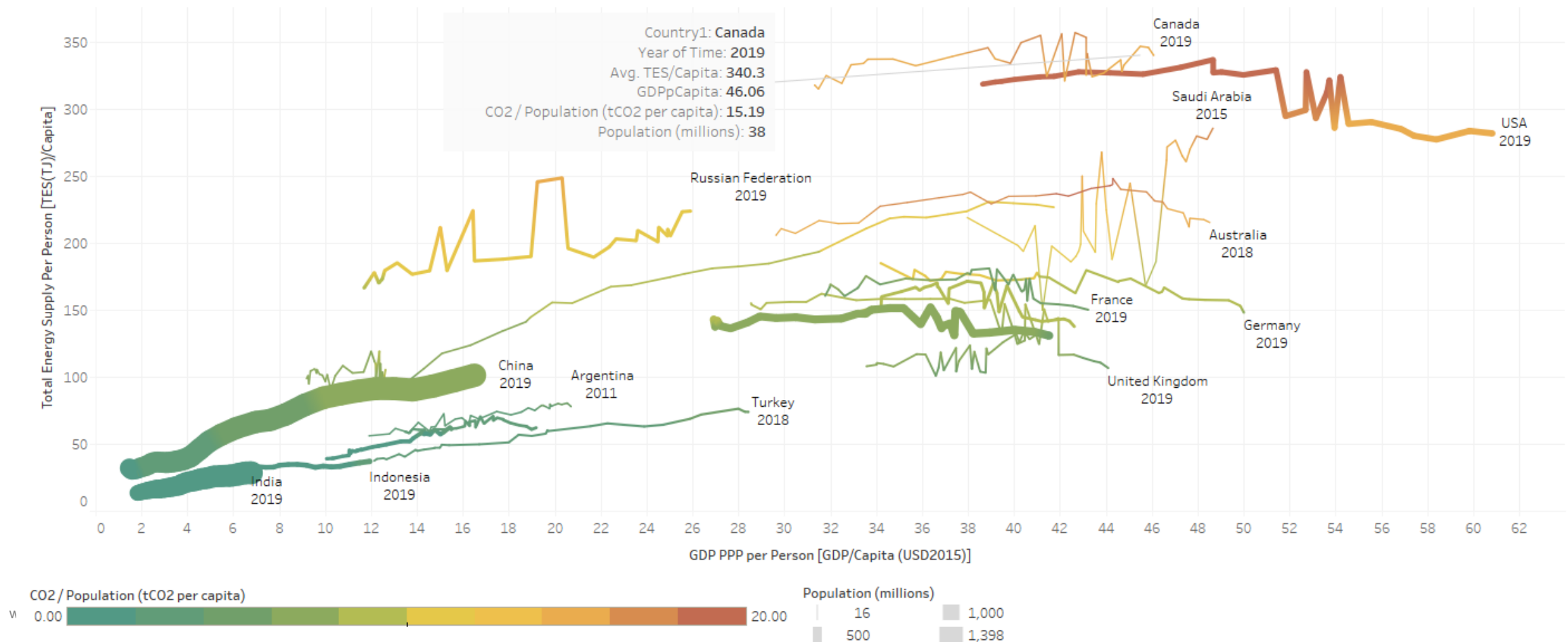
IEA Data Sources WBIG, WIND

More recently in the last 5 years or so IEA has put significant effort in also publishing harmonized macroeconomic, environmental and demographic data indicators for all regions on an annual basis



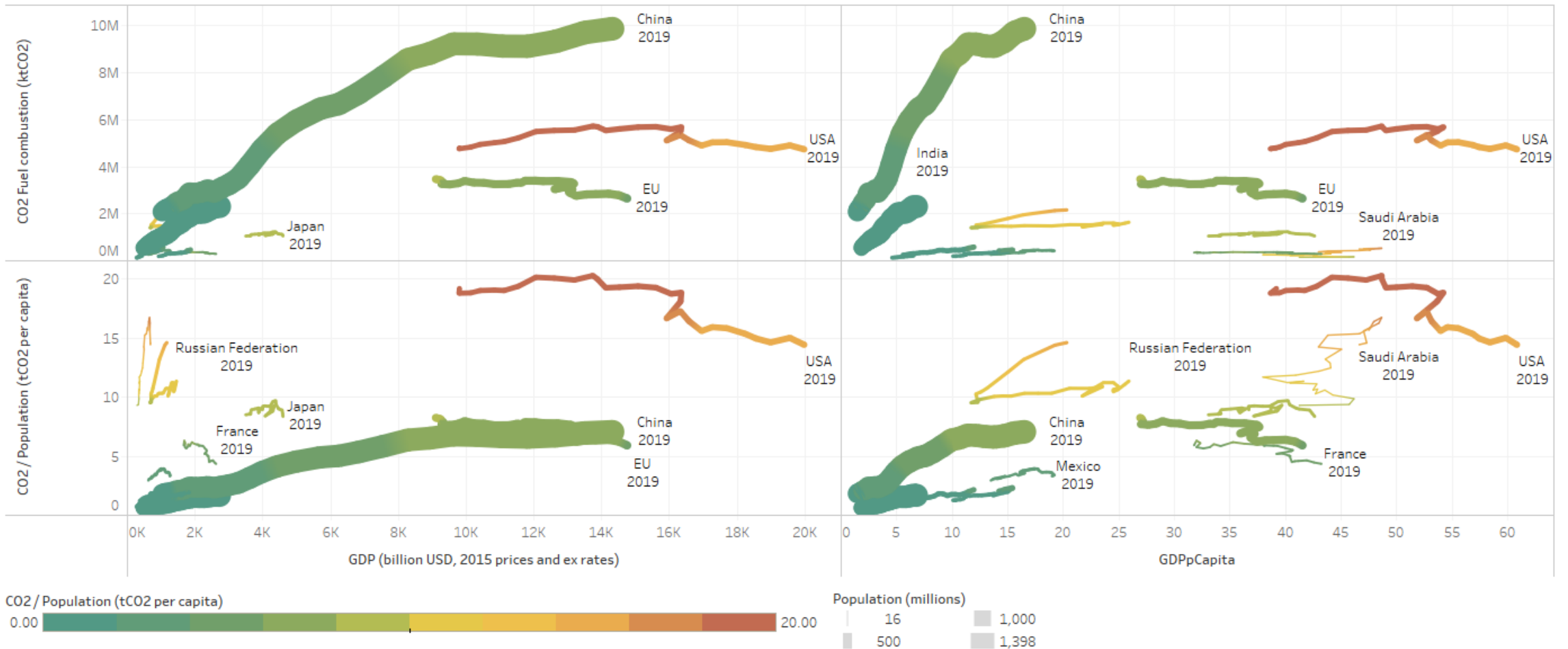
IEA Data Sources **WBIG** + **WIND**

Linking the IEA WBIG and WIND databases by harmonized region names enables quick insights into historical dynamics of the energy system.



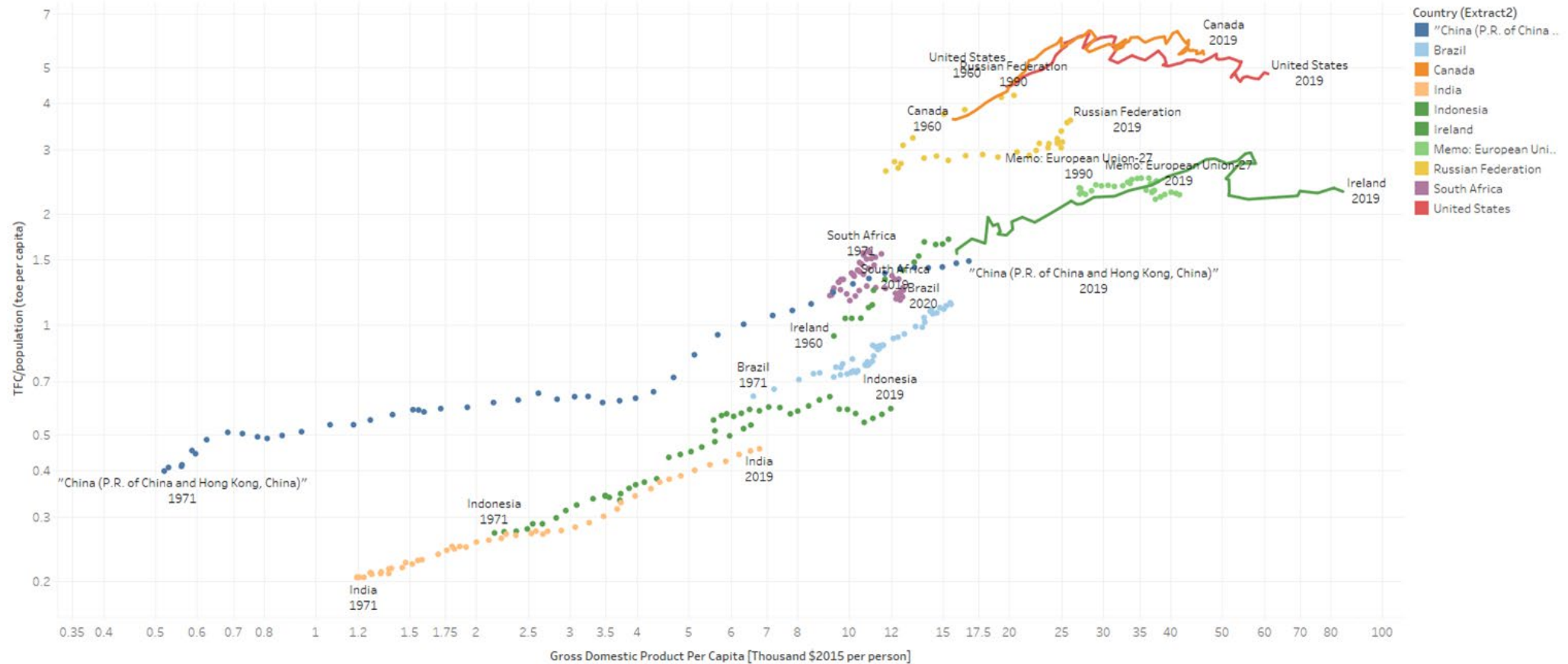
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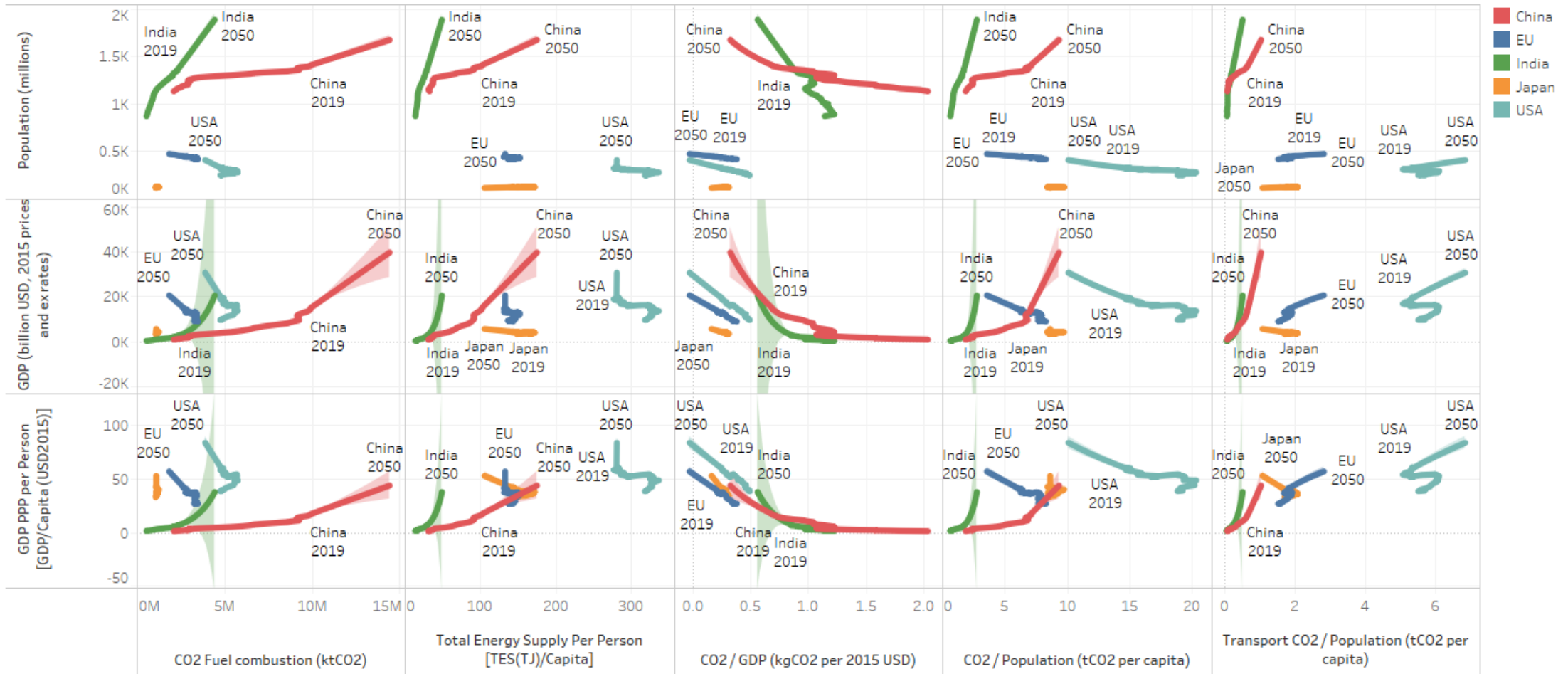
Reminder – Energy access, Income, and Wellbeing go hand in hand

Total final energy consumption per capita (toe/capita) vs GDP per capita, 1960-2000



ML Extrapolation of IEA drivers

It is important to understand drivers of model outcomes and emergent properties of energy system dynamics e.g. Energy demand intensity?



THANK YOU!



Wind and Solar Installed Capacity

China far out paces all other countries in cumulative installed capacity and recent rate of new capacity installation

Global Top 10 Countries with Installed Wind Power Capacity

Unit: MW



Source: IRENA



Global Top 10 Countries with Installed Solar PV Capacity

Unit: MW

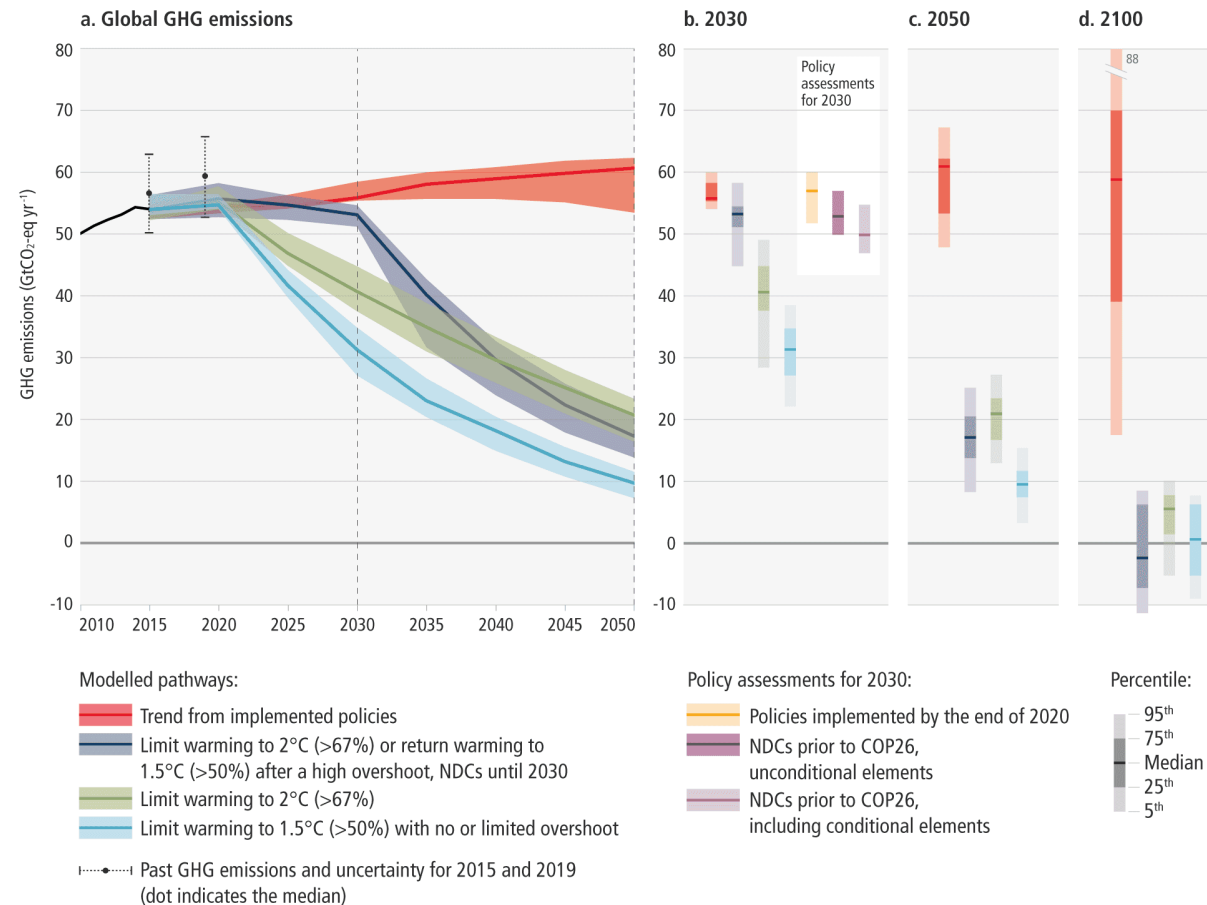


Source: IRENA



IPCC 6th Assessment Report Decarbonisation Pathways

Projected global GHG emissions from NDCs announced prior to COP26 would make it likely that warming will exceed 1.5°C and also make it harder after 2030 to limit warming to below 2°C.



Thank You

The background of the slide features a series of faint, dark blue icons representing various energy sources and infrastructure. From left to right, these include an oil derrick, an offshore oil rig, a nuclear power plant cooling tower with a radiation symbol, a wind turbine, a solar panel array, a high-voltage power transmission tower, a lightning bolt, a factory with smokestacks, and an oil pumpjack.

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