

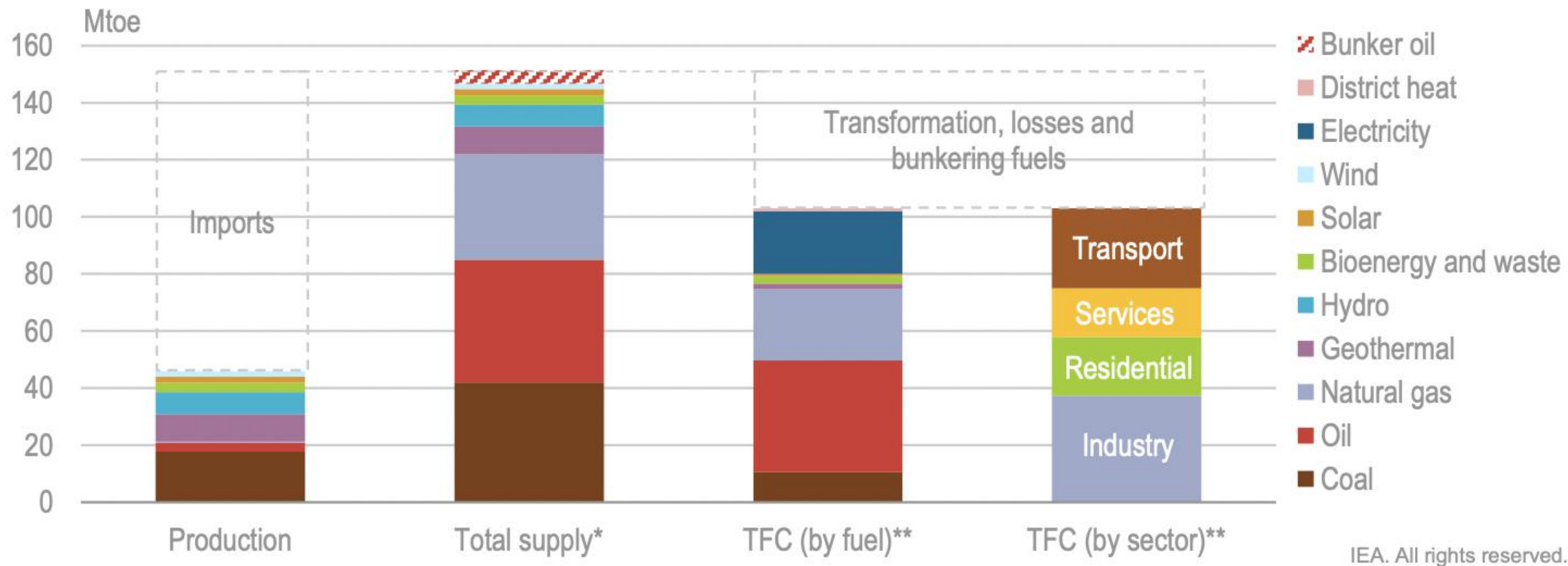
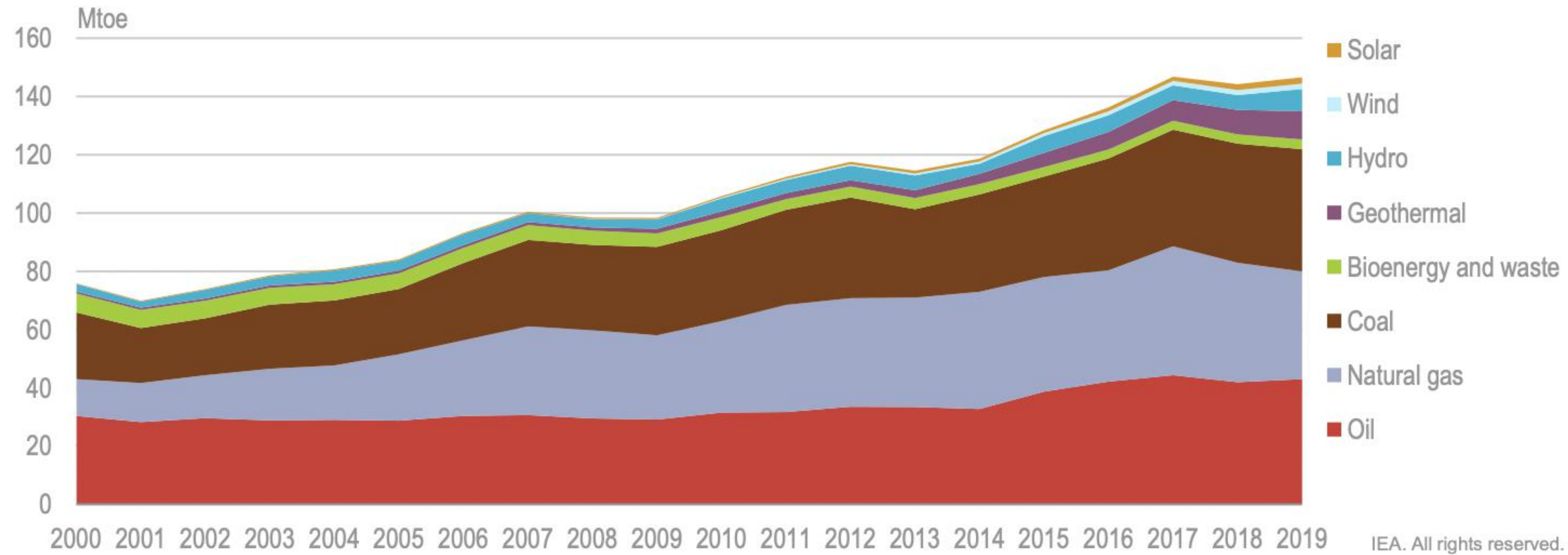
# Hydrogen and Energy Efficiency (Turkey's challenges)

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**The comments and ideas in this presentation are presenter's only. They can not be attributed to the organizations or institutions.**

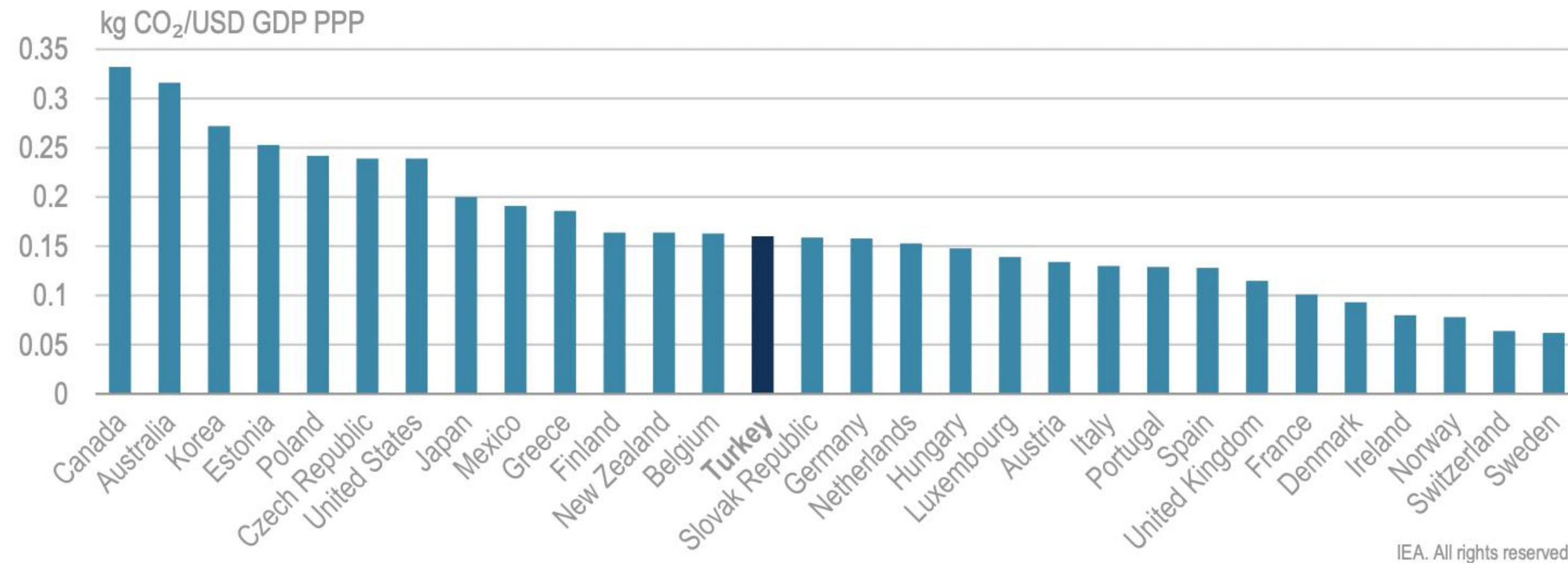
# Turkey at a glance





# Emissions and Intensities

CO<sub>2</sub> emissions per GDP\*



CO<sub>2</sub> emissions per capita

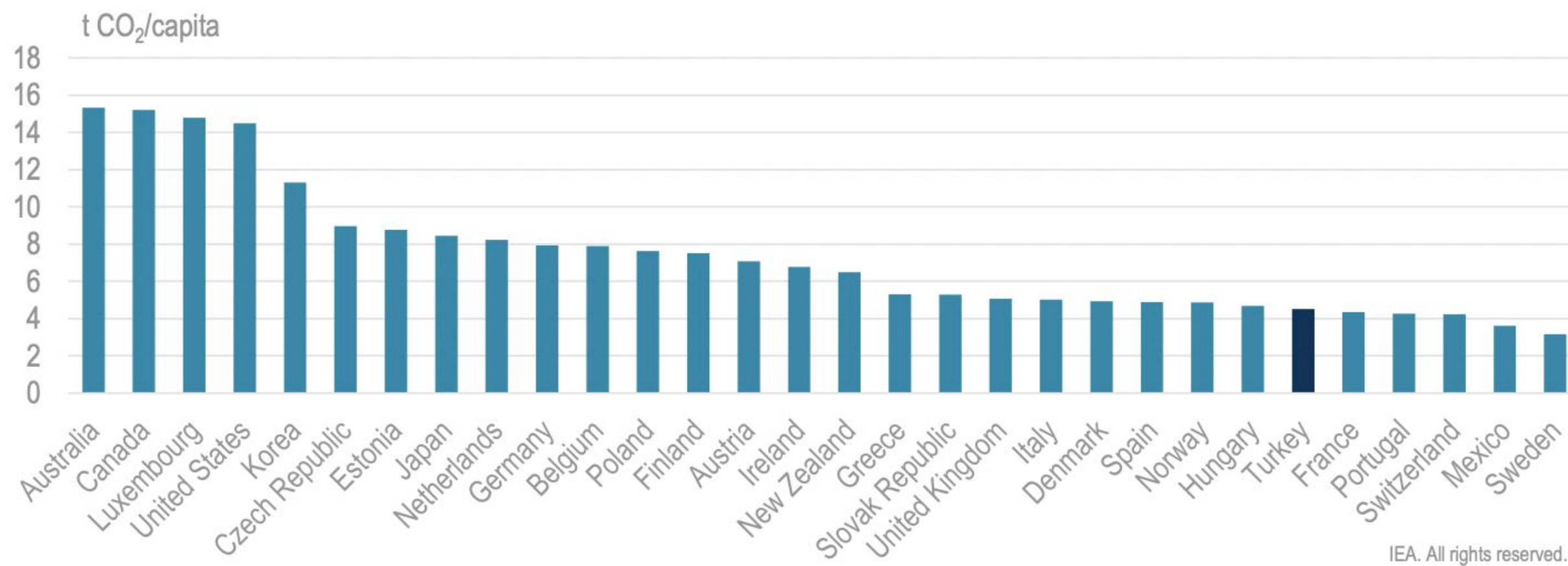


Figure 3.4 Energy-related CO<sub>2</sub> emissions and driving factors, Turkey, 2000-19

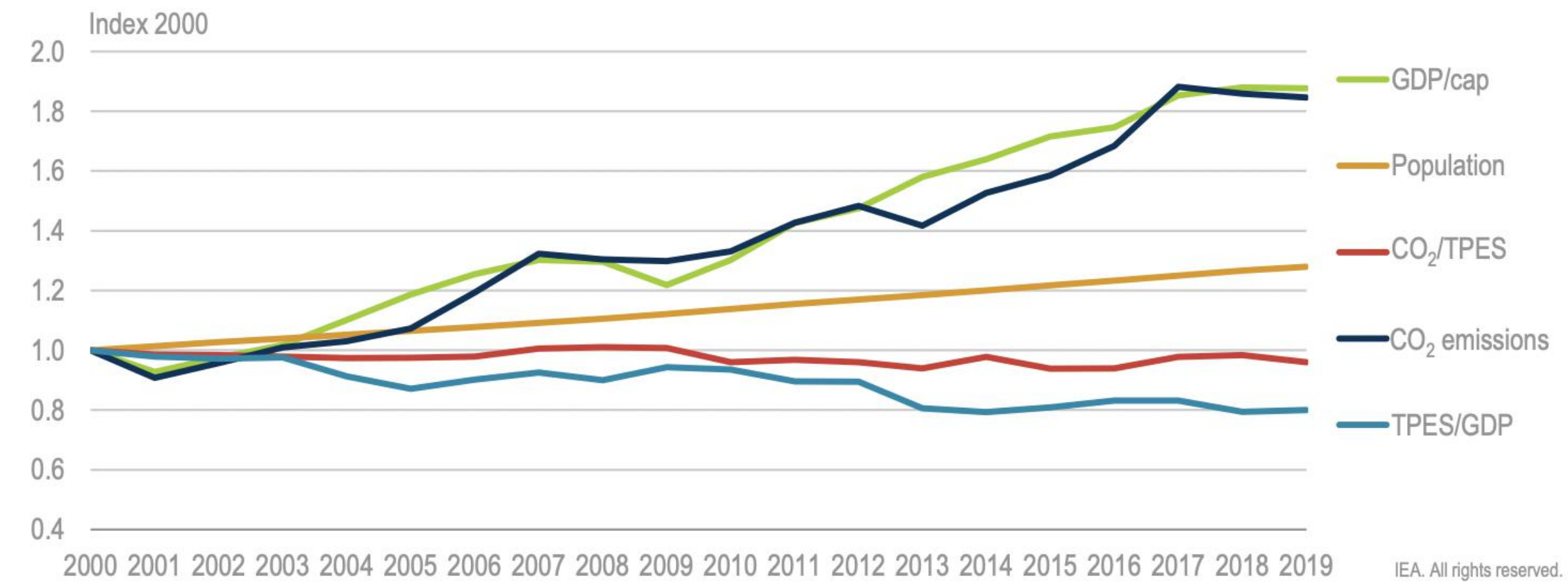
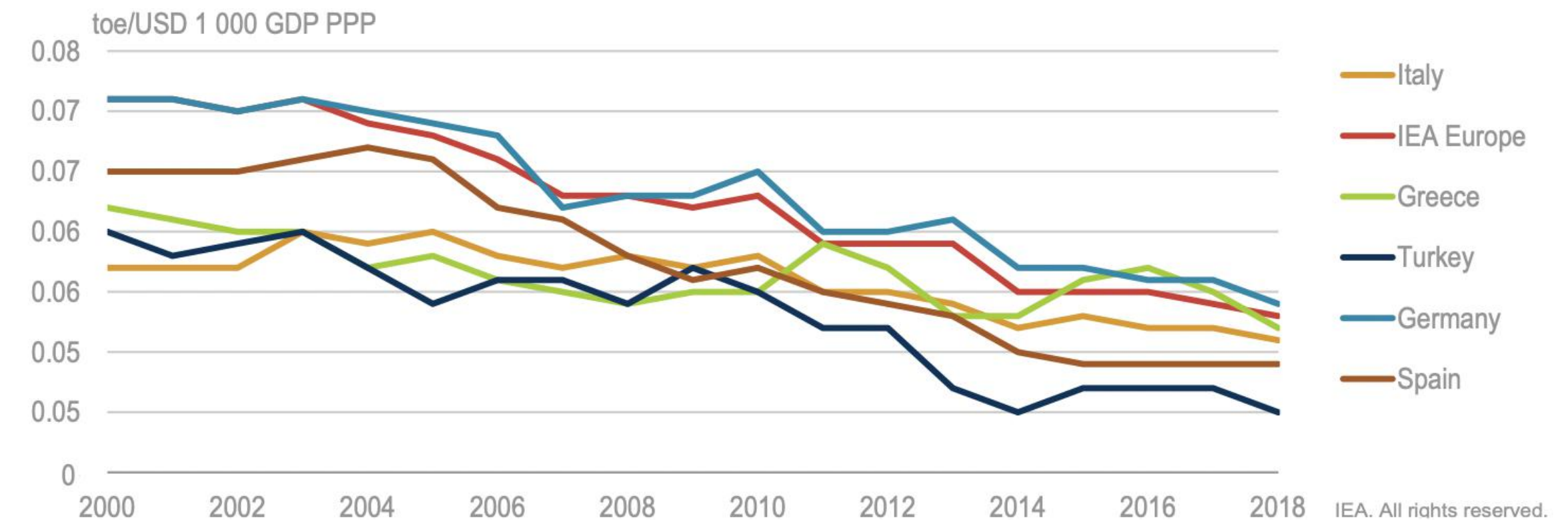


Figure 4.2 Energy intensity in select IEA member countries, 2000-18

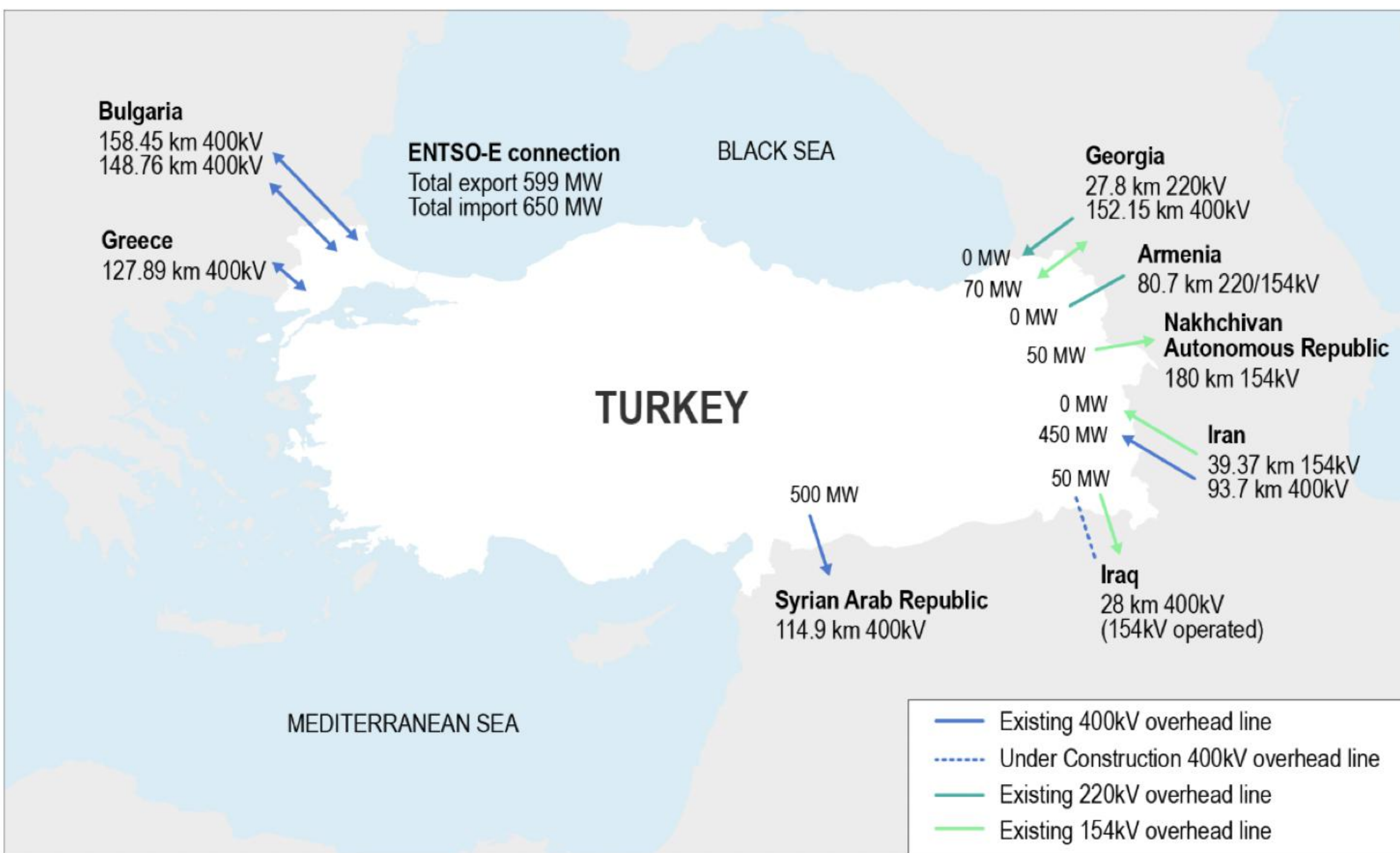




# Turkey's energy interconnections

## Electricity

## Natural Gas



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# Hydrogen Strategy for A Developing Country

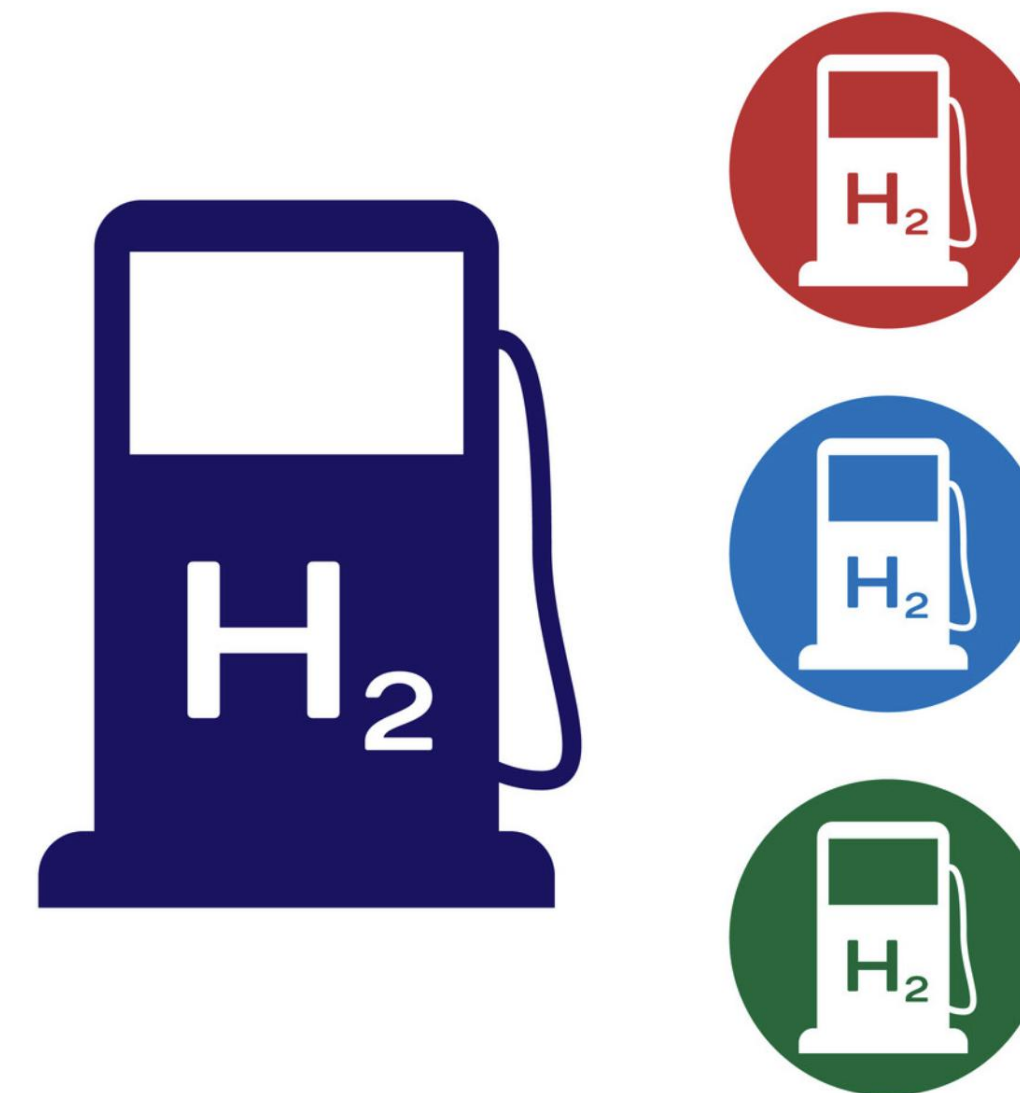
- **What is the aim?**

- Decarbonization?
- A domestic resource
- Integrating infrastructure for efficiency (Electricity & Gas)
- Exporting



- **What is the low hanging fruit?**

- Blending ?
- Refineries & Pet. Chem. ?
- Energy intensive industries
- **X** Transport (may be rail)





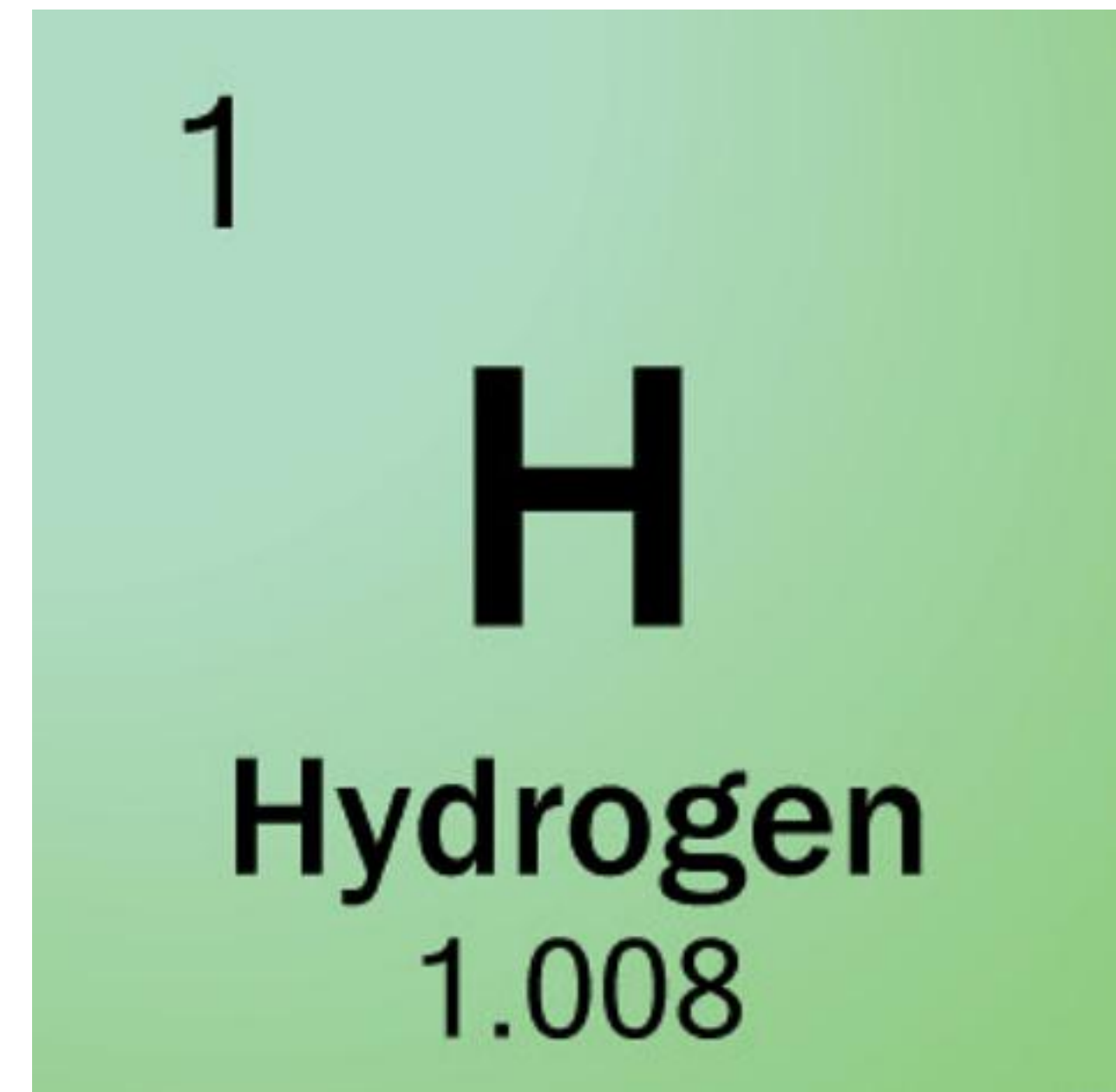
# Why blending is a better path?

- Turkish gas infrastructure is relatively young
- Low cost of blending up to 15%
  - can be achieved in steps (5%, 10%, 15%)
- Learning by doing
  - Hydrogen operation is more dangerous
- Domestic resource (Turkish consumption ~50 bcm)
  - 5% = 2.5 billion cubic meter
- Current gas industry can be adapted
  - Dis.co. , Gas



# Challenges

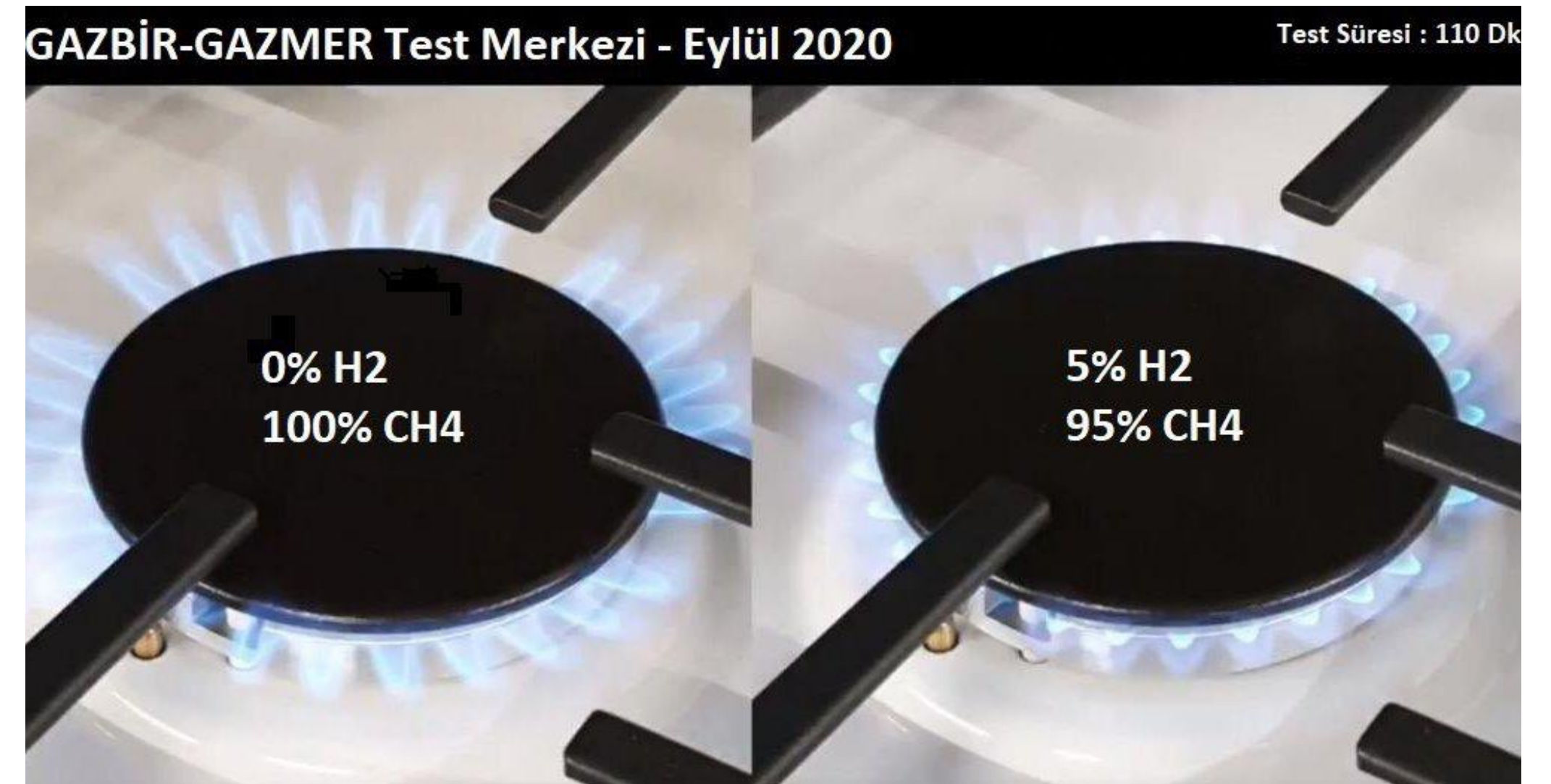
- **Regulation**
  - Under current natural gas reg. or a new hydrogen regulation
- **Safety** of domestic consumers
  - Boilers, indoor tubing
- Hydrogen needs special **standarts**
  - Metering, burners
  - Workforce
  - Consumer understanding
- **Industrial** consumers
  - How their processes are affected





# Steps to be taken

- Currently blending tests are done by Turkish Gas Distribution Companies Organization(**Gazbir/Gazmer**)
- Need pilot projects
  - Refinery/Pet chem
  - Iron&steel, cement
  - Fertilizer
  - Transport?



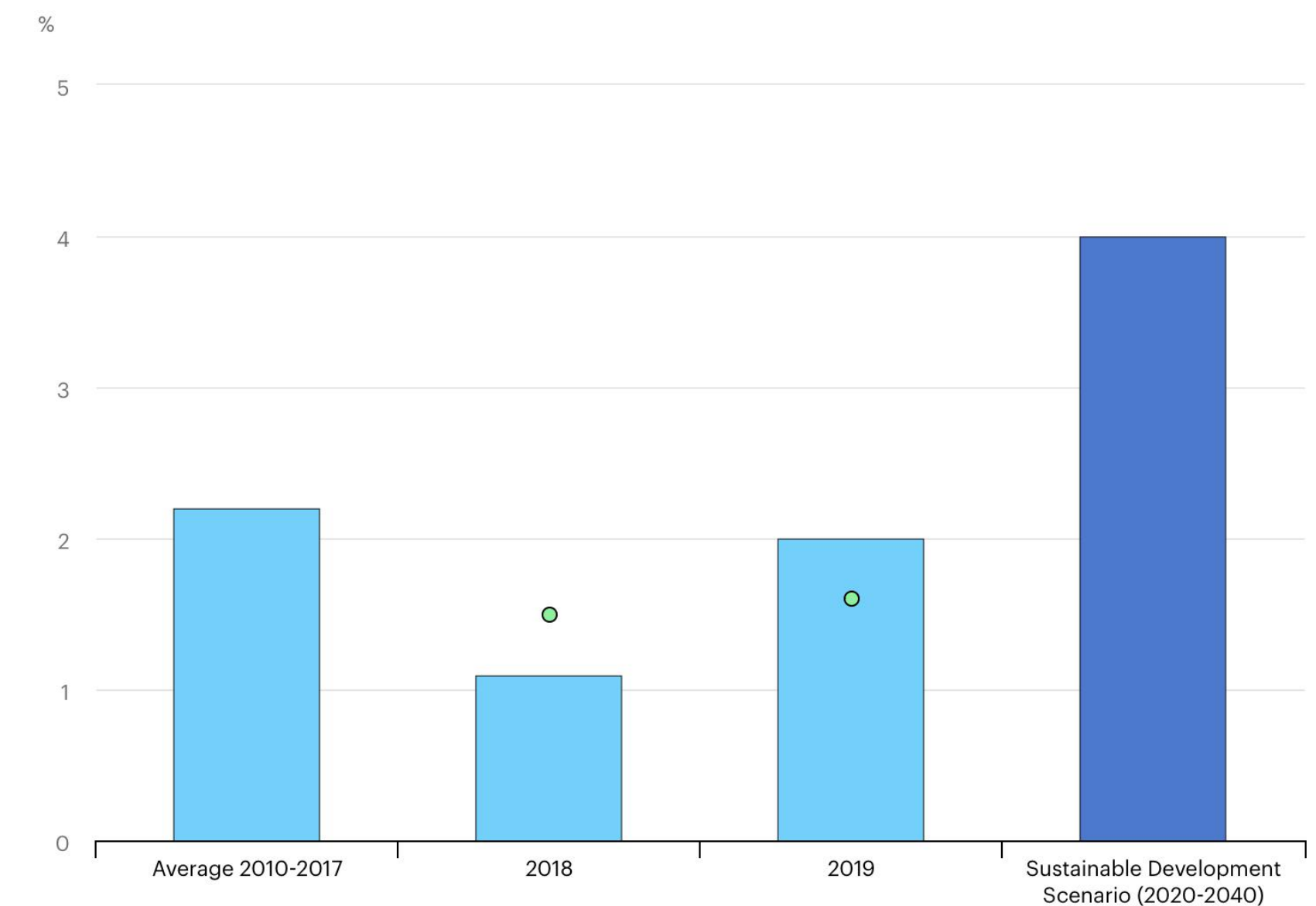
# Near term issues

- Hydrogen market “creation process” (from zero)
- R&D, pilot projects are very important
  - Industrial adaptation
  - Estimating Costs and Impacts
- Closely interlinked with electricity market and costs
  - Effect on price formation
  - Infrastructure utilization (some investments become redundant?)



# Energy Efficiency

- What is the realistic efficiency improvement ?
- Why efficiency is not happening despite green growth?
- Interest rates & building renovation
- Oil taxes can not stop consumption
- Industrial inertia to invest in eff.
- Dis.co.s are not in the game



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● Energy intensity improvement ● Weather normalised energy intensity improvement



thank you

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