International Symposium on Global Security and Energy Transition

10 November 2023

Energy Transition in Saudi Arabia

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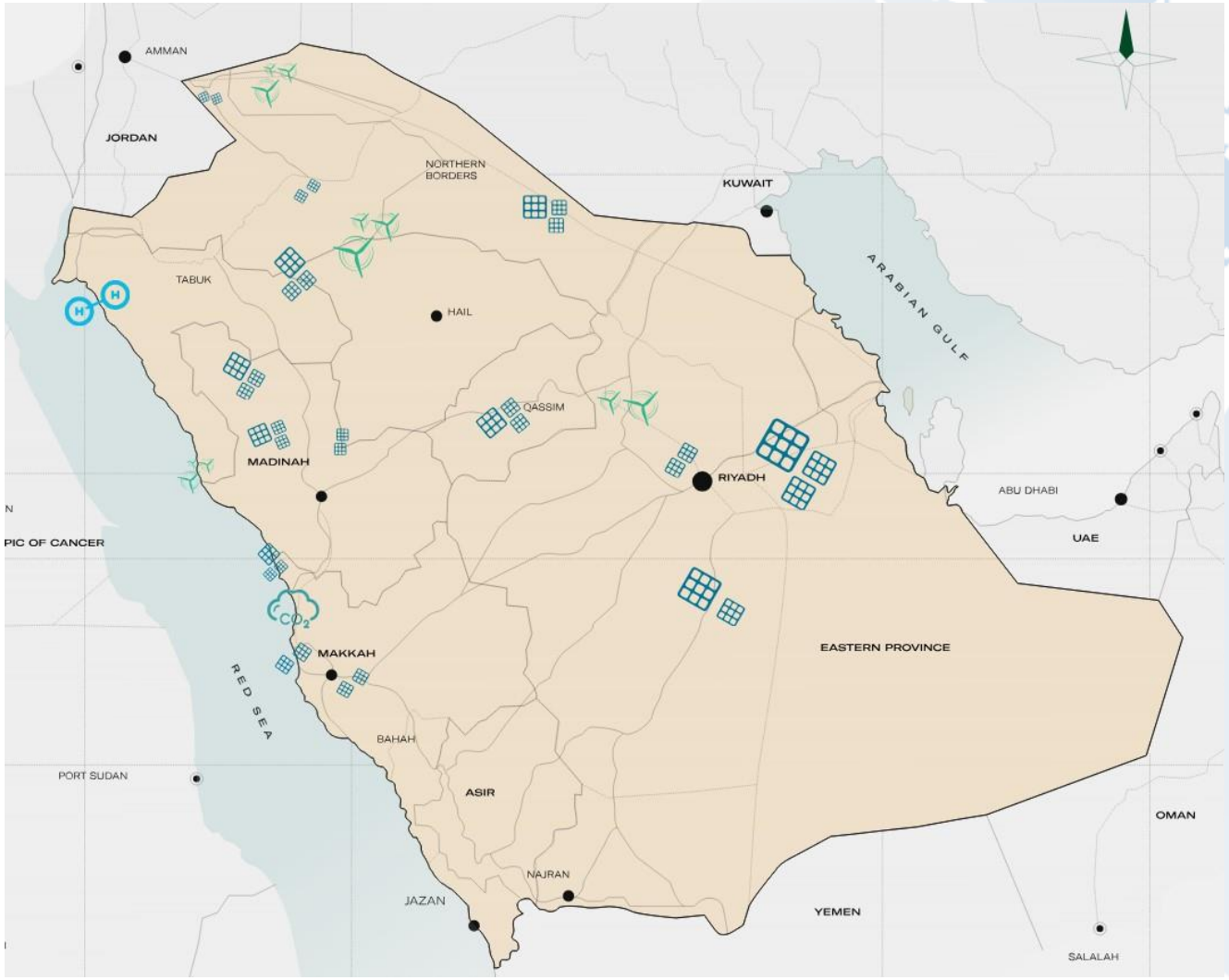
Contents

1. Introduction

- What is the energy transition policy of Saudi Arabia, the largest oil exporter?
- Will the energy transition change the character of Saudi Arabia as a major oil exporter?
- What are Saudi Arabia's advantages in the energy transition?

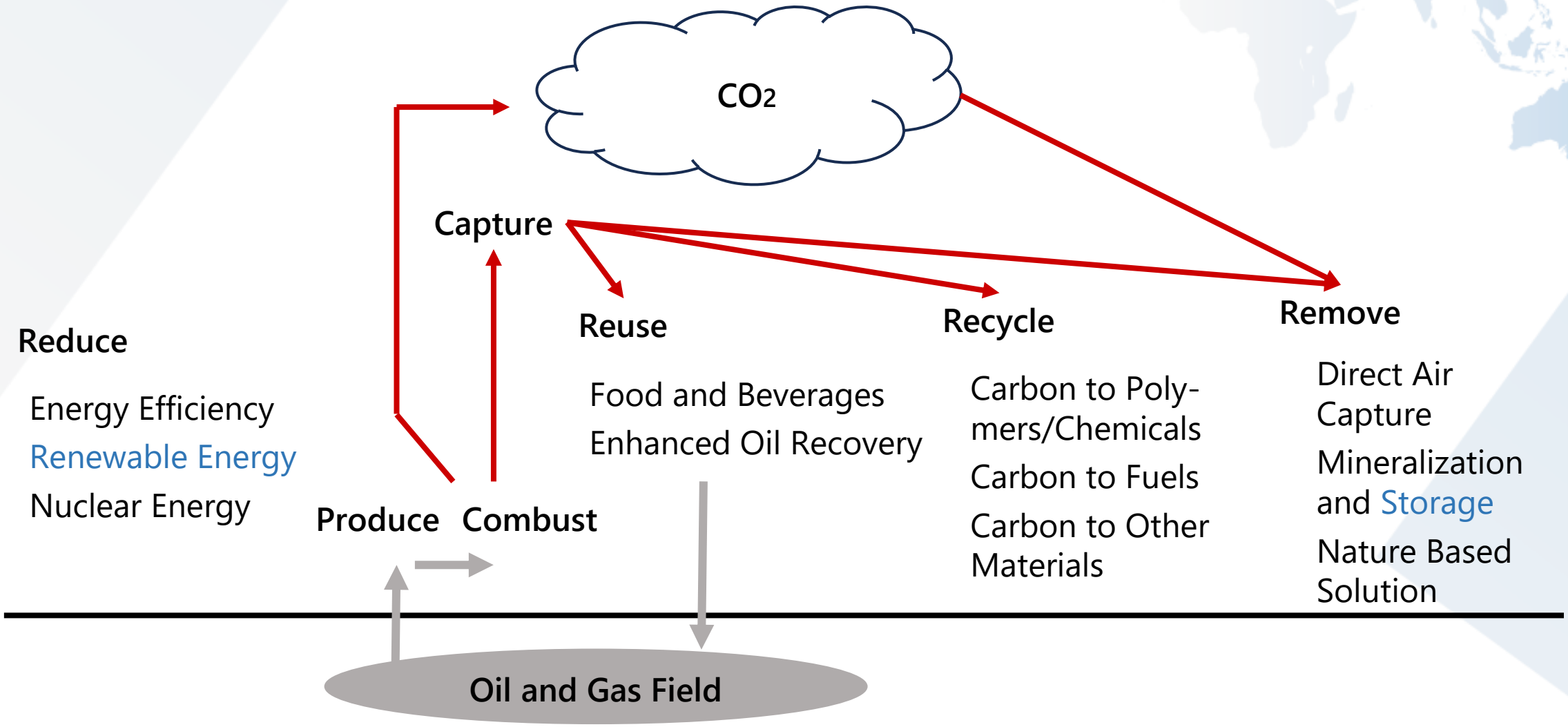


2. Saudi Arabia's Policy on Energy Transition

- Circular Carbon Economy (2020)
  - Supported in G20 summit in Riyadh
- Saudi & Middle East Green Initiative (2021)
  - 50 billion tree planting in Saudi Arabia and the region
  - 50% renewable energy as a percentage of power generation by 2030
- Net zero by 2060 (2021)
  - "Because most of these technologies may not mature before 2040"

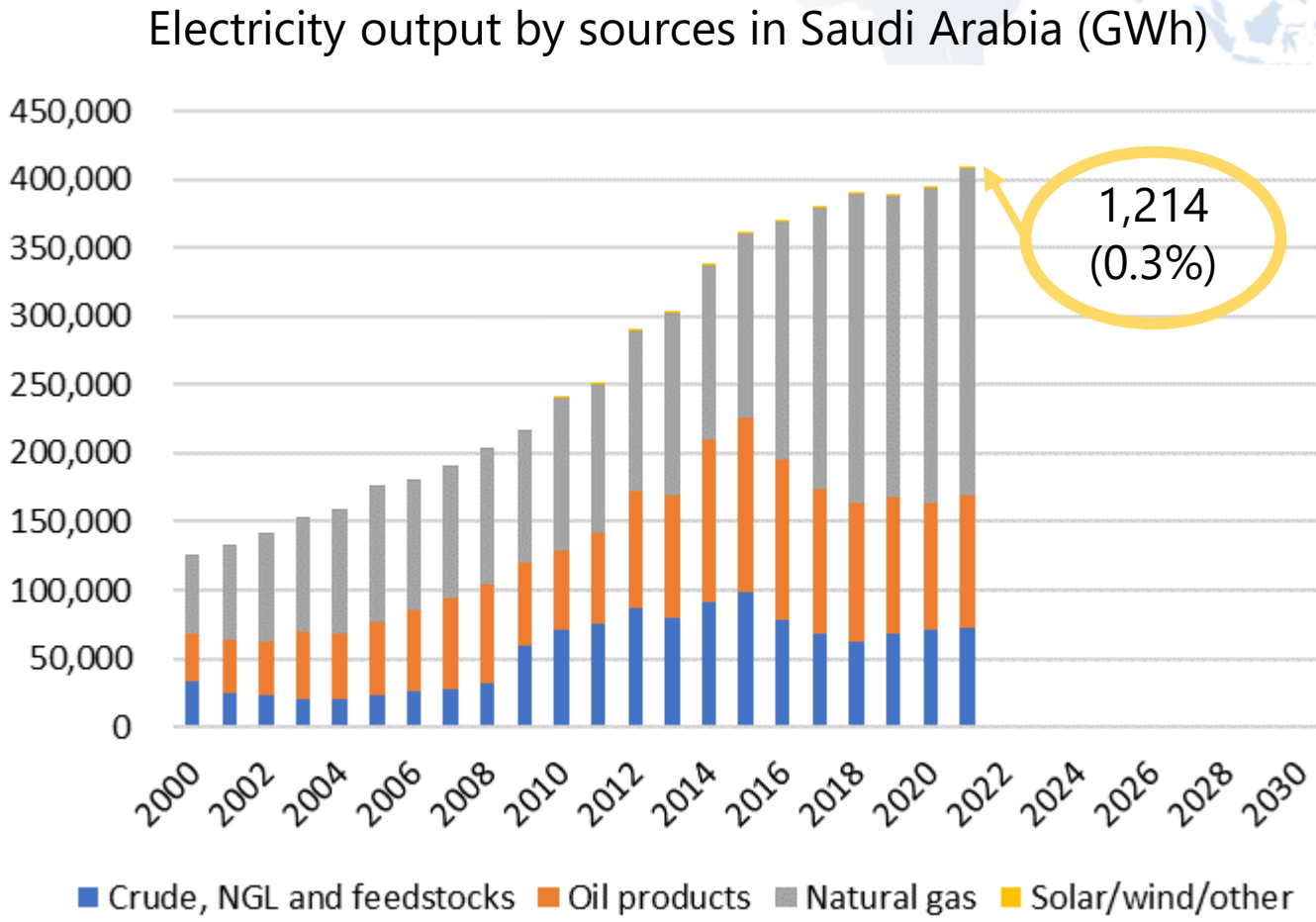
- Analysis
  - Saudi Arabia argues that carbon is not the enemy, but emissions are
  - Strengthening climate change measures to counter the critical voices from the international community against oil-producing countries

Circular Carbon Economy



3. Development of Renewable Energy

- 50% of by 2030
- High potential?
- 18 solar and wind projects announced so far
- Progress has been slow, could be facing many challenges
- In 2021, when the first utility-scale renewable energy power plant opens, renewable energy accounts for only 0.3% of total electricity output

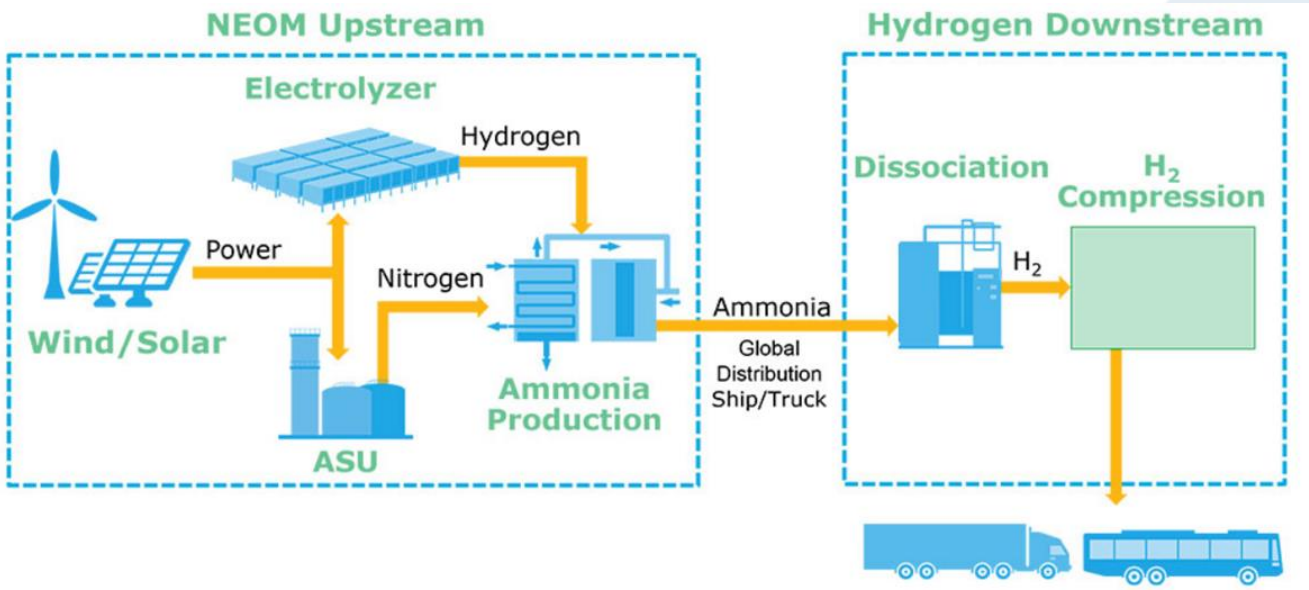


Source: Author made from IEA, *World Energy Statistics and Balances* (July 2023)

4. Hydrogen, Ammonia, CCUS, and E-Fuel

- Green Hydrogen and Ammonia
  - NEOM Green hydrogen project, up to 600 tonnes of carbon-free hydrogen, up to 1.20M tonnes of ammonia exported per annum from 2026
- Blue Hydrogen and Ammonia
  - Shipment to Japan, South Korea, and China
  - Challenges: offtake agreement
- Carbon Capture Utilization and Storage (CCUS)
  - 44 million tons of CO_2 per year by 2035 for CCUS
- E-Fuel
  - Developing demonstration plant

NEOM Green Hydrogen Complex

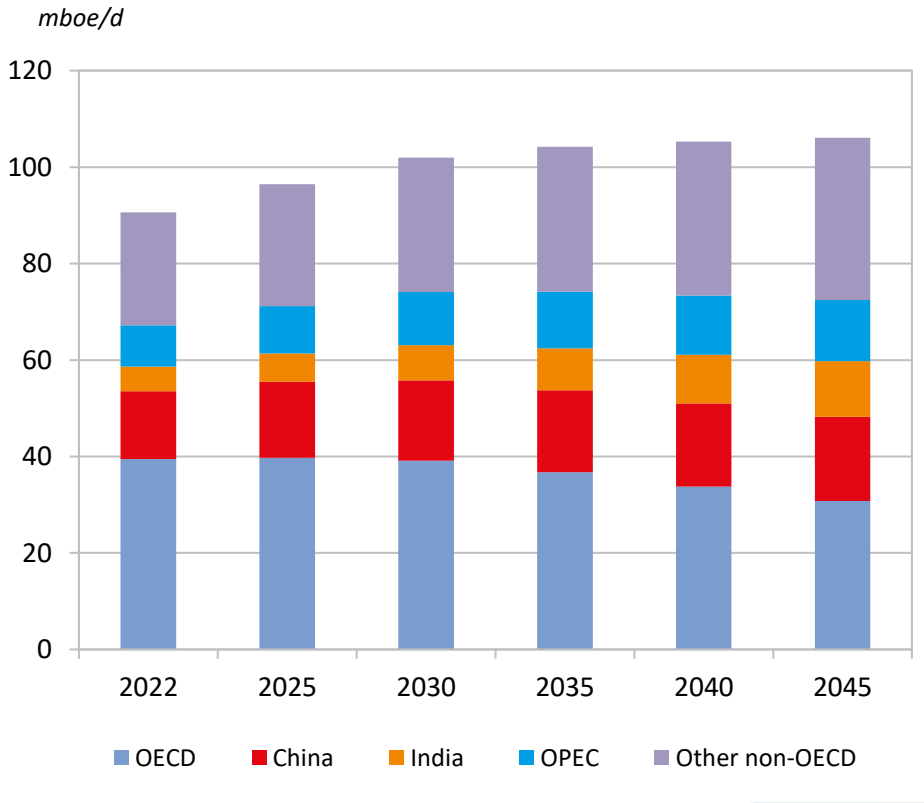


Source: "NEOM Green Hydrogen Complex" Air Products, https://www.airproducts.com/campaigns/neom-green-hydrogen-complex

5. The Role of Conventional Energy

- Oil
  - Main source of government revenue
  - Production level affected by many elements including most notably OPEC plus decision
  - Production capacity would be increased to 13 million b/d by 2027
- Gas
  - Associated gas is wholly used for power generation
  - Unconventional (shale) gas development is underway but still not clear how to use it: power generation, blue ammonia, and export as LNG?

Oil Demand by region, 2022-2045



Source: OPEC, *2023 World Oil Outlook 2045.*

6. Conclusion

- Saudi Arabia's current energy transition policy is well theorized to refute criticism from external critics.
- Saudi Arabia is not only focusing on expanding the adoption of renewable energy, but also on capturing CO_2 and reusing, recycling, or storing it.
- Renewable energy development in Saudi Arabia is designed to save oil used to generate electricity and to export it.
- Oil will certainly remain an important source of revenue for decades to come.

Thank you for listening