

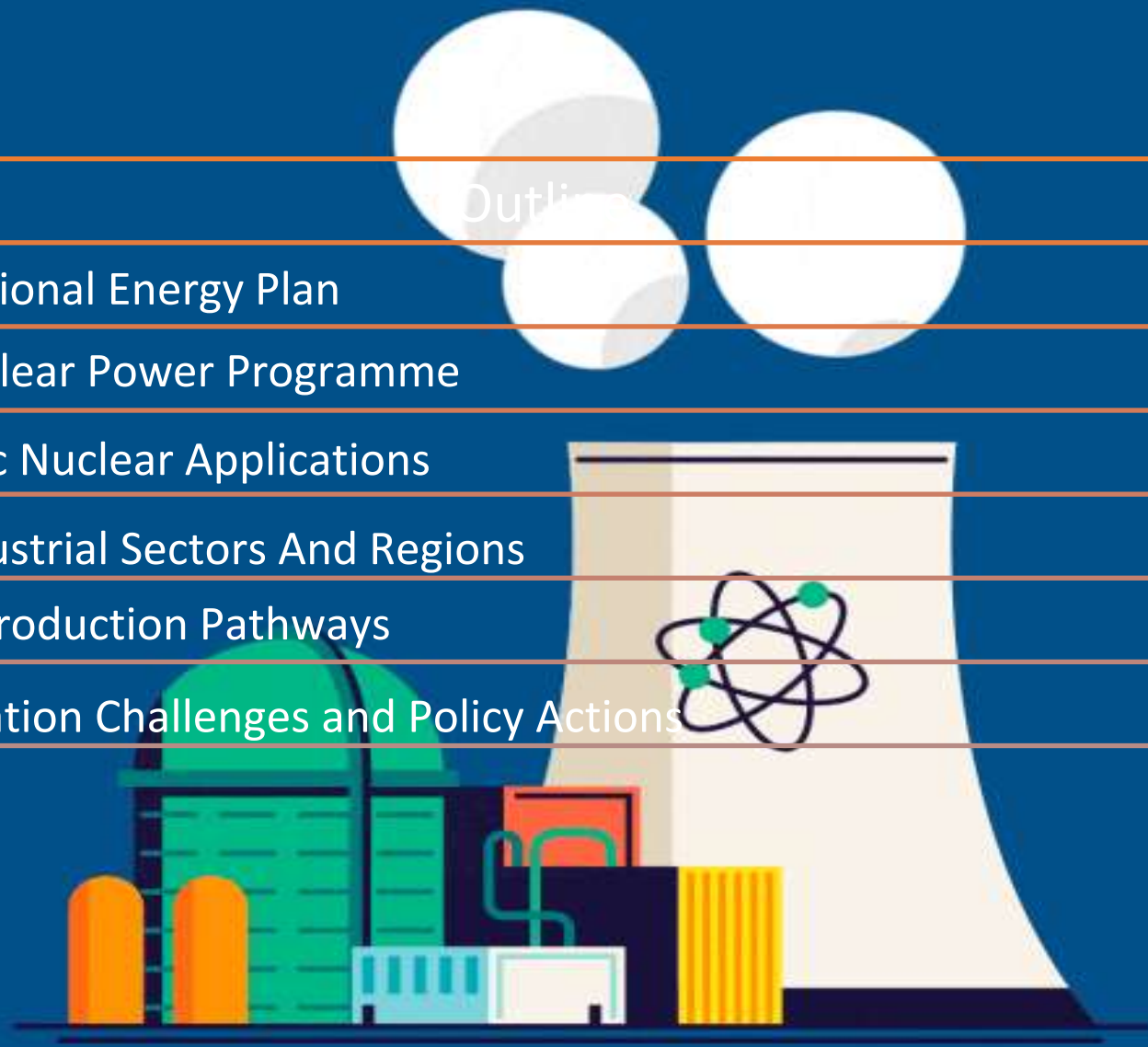


NUCLEAR ENERGY BEYOND ELECTRICITY

Opportunities for Industrial Heat and Hydrogen Production in Türkiye

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26th INPRO Dialogue Forum



Outline

Türkiye National Energy Plan

Türkiye Nuclear Power Programme

Non-electric Nuclear Applications

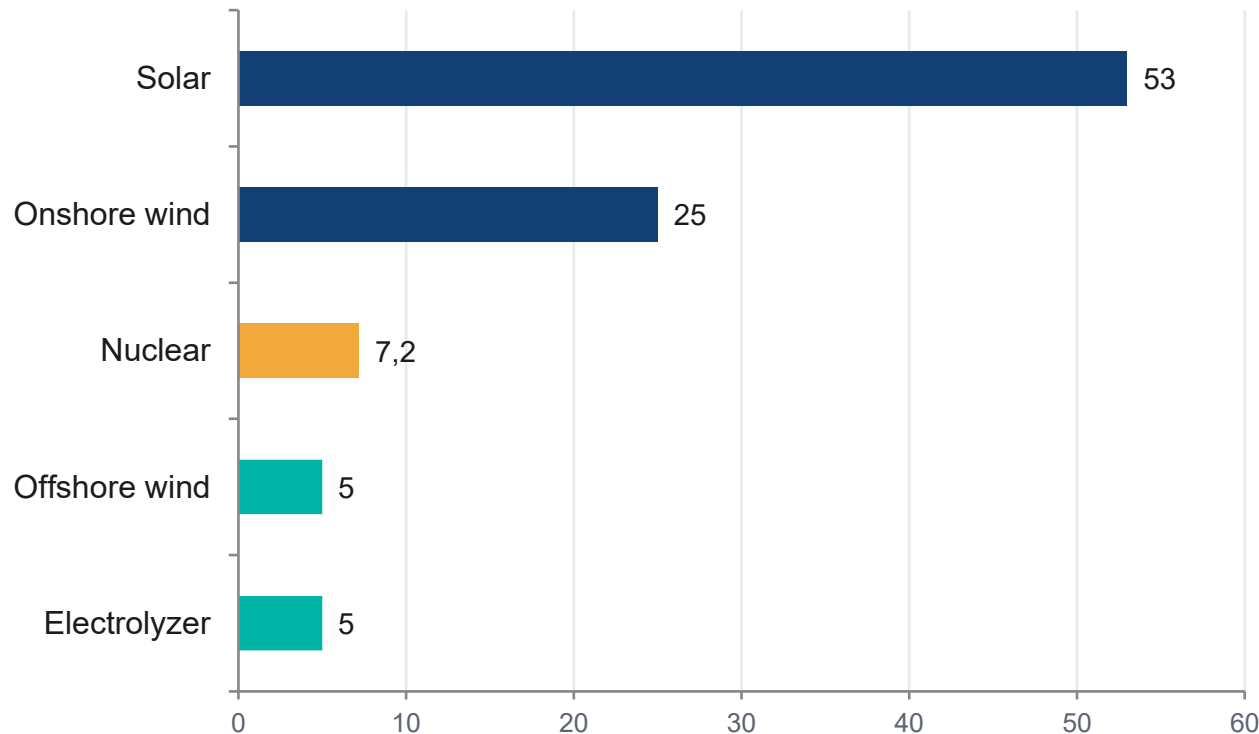
Priority Industrial Sectors And Regions

Hydrogen Production Pathways

Implementation Challenges and Policy Actions

Türkiye's 2035 Capacity Targets

Total installed electricity capacity is planned to reach 189.7 GW by 2035, with renewables providing about 74.3% of the increase. The 2023 National Energy Plan provides the core 2035 projections, while the 2024 renewable roadmap subsequently increased Türkiye's combined wind and solar ambition.



7.2 GW

Nuclear power target for 2035 which will cover about 11% of our national electricity demand.

16.7% → 23.7%

Share of renewables in primary energy consumption, 2020 vs 2035

2053

Net-zero emissions target

7.2 GW

Nuclear capacity target for 2035

70 GW

Electrolyzer capacity target by 2053

20 GW

Nuclear capacity target for 2050
(~12 large reactors + 5 GW SMR)

\$1.2/kg

Green H₂ cost target by 2053

2026

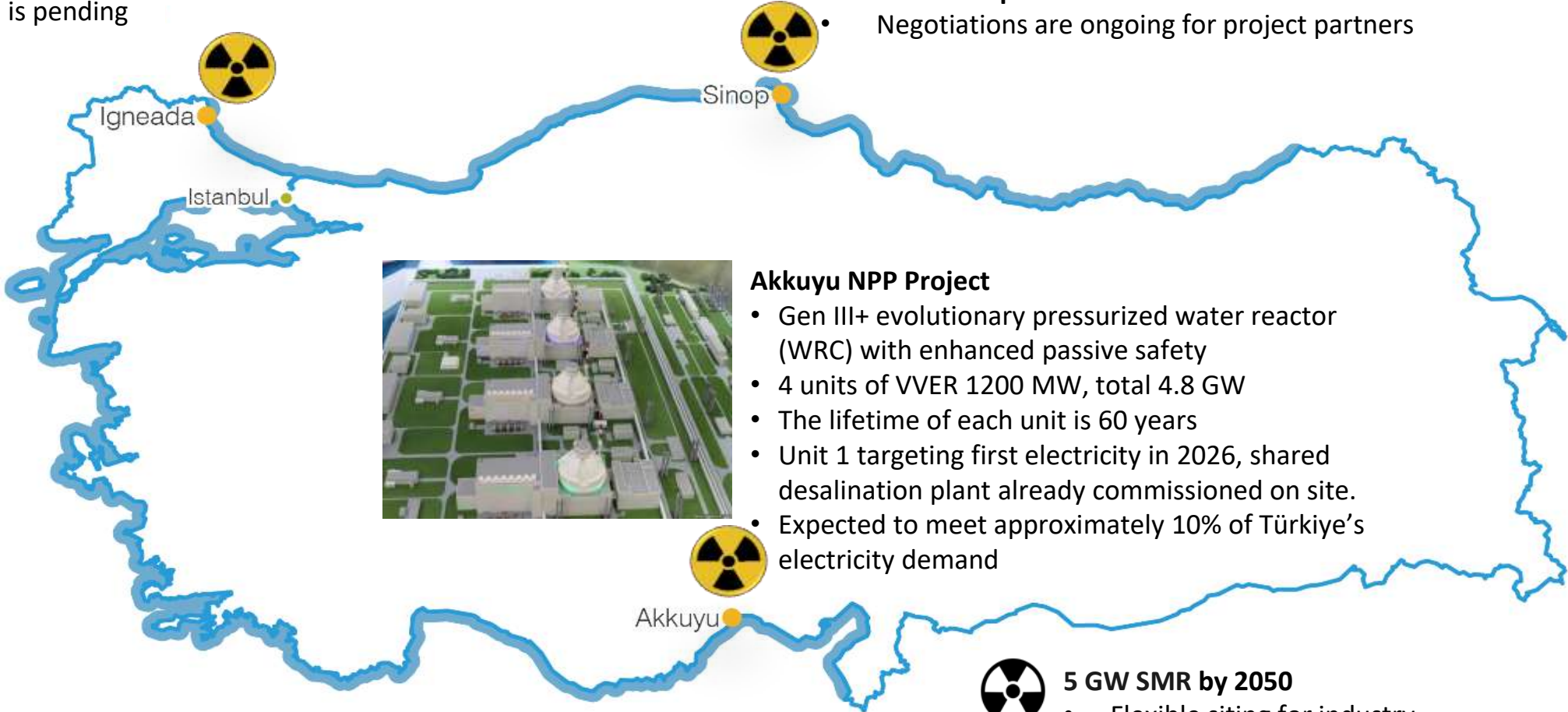
2026 - Target year for first
electricity from Akkuyu Unit 1

İğneada NPP Project (Third Plant- Thrace Region)

- 4400 MW installed power is **planned**
- Site selection concluded, decision and land allocation is pending

Sinop NPP Project (Next Plant)

- 4480 MW **planned**
- Negotiations are ongoing for project partners



Akkuyu NPP Project

- Gen III+ evolutionary pressurized water reactor (WRC) with enhanced passive safety
- 4 units of VVER 1200 MW, total 4.8 GW
- The lifetime of each unit is 60 years
- Unit 1 targeting first electricity in 2026, shared desalination plant already commissioned on site.
- Expected to meet approximately 10% of Türkiye's electricity demand

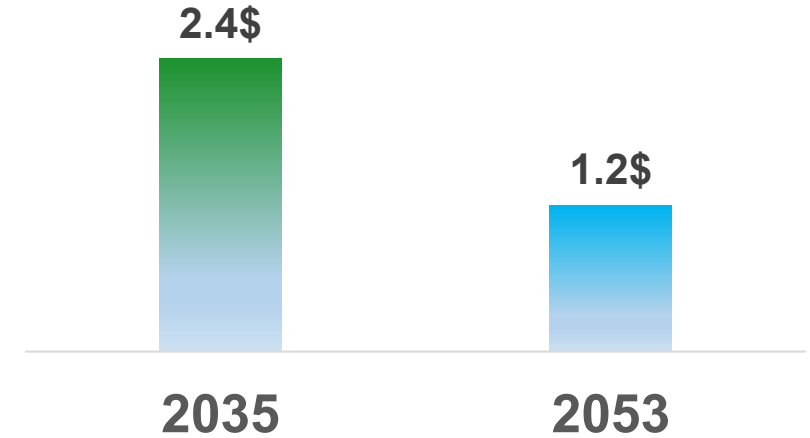


5 GW SMR by 2050

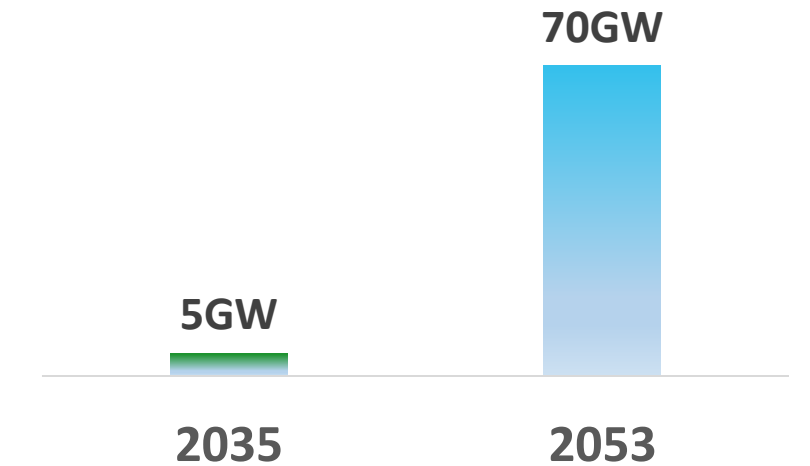
- Flexible siting for industry
- Private-sector model under discussion



To reduce the cost of green hydrogen production below; US\$2.4/kgH₂ by 2035 and US\$1.2/kgH₂ by 2053.



To reach the installed power capacity of the electrolyzer; 2 GW in 2030, 5 GW in 2035 and 70 GW in 2053.





A desalination facility has been developed to meet site water requirements. Although this is not yet a nuclear-powered desalination application, it provides relevant operational experience in integrated water infrastructure at a nuclear site.

Reactor / System	Temperature Range	Practical Türkiye-relevant application
Existing or future large LWRs	280–325 °C	Electricity for electrolysis; potentially district heating, desalination and low-temperature steam through dedicated interfaces
Light-water SMRs	280–325 °C	Cogeneration, district heating, desalination and electricity-based hydrogen
High-temperature advanced reactors	500–800 °C	Higher-temperature industrial heat and heat-assisted hydrogen production



District Heat & Desalination

SMRs could support integrated electricity and desalination systems in suitable coastal regions.



Off-Peak Hydrogen Production

Electrolysis could provide a flexible demand option during periods of lower grid demand or high system electricity supply.



Industrial Process Heat For Steel

SMRs sited near industrial zones are framed as enablers of clean hydrogen for steel manufacturing, potentially reducing emissions and dependence on externally supplied low-carbon fuels

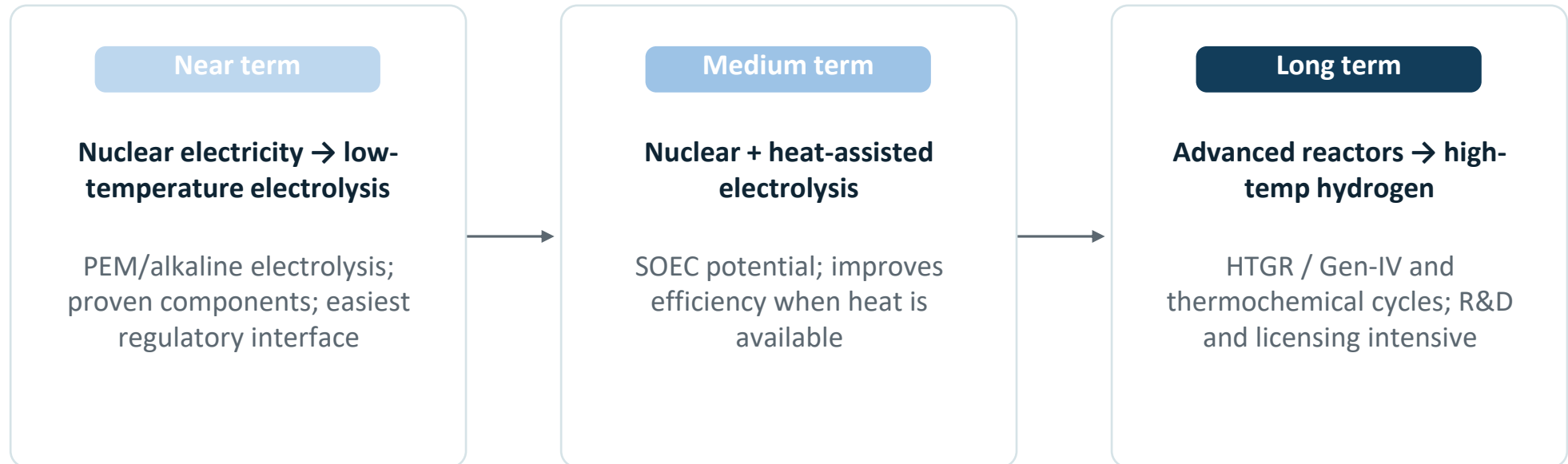


Port and Industrial-Cluster Applications

Hydrogen or derived fuels could serve refineries, fertilizer production, port equipment, shipping and export-oriented industrial facilities.

Sector	Potential Nuclear Contribution	Possible Industrial Regions
Refining and chemicals	Existing hydrogen replacement, steam	Aliğa, İzmit, Mersin
Fertilizers	Low-carbon hydrogen/ammonia	Mediterranean industrial corridor
Iron and steel	Hydrogen-based reduction, electricity	İskenderun, Marmara, western Black Sea
Cement and lime	Heat, hydrogen and CCUS integration	Distributed industrial clusters
Glass and ceramics	Continuous process heat	Marmara, Central Anatolia
Water-intensive coastal industry	Desalinated water, electricity and heat	Mediterranean and Aegean coast

Indicative regions for future screening, not designated project locations.



CHALLENGES

POSSIBLE SOLUTIONS



Regulatory Interface

Develop guidance for coupling nuclear plants with hydrogen, heat and desalination systems



Economic Viability

Begin with existing industrial hydrogen consumers and long-term offtake agreements



Water Scarcity

Assess treated wastewater and desalination options at project-screening stage



Foreign Technology Dependence

Increase localization, workforce development and diversified partnerships



Infrastructure

Map hydrogen demand, ports, pipelines and organized industrial zones



Public Acceptance

Communicate local industrial, environmental and employment benefits



Establishing a national nuclear applications coordination mechanism



Mapping industrial heat and hydrogen demand near candidate nuclear regions



Launching a techno-economic and safety feasibility programme



Developing low-carbon hydrogen certification covering nuclear electricity



Developing a pilot project with an existing industrial hydrogen consumer

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THANK YOU!

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