



SABANCI UNIVERSITY ISTANBUL INTERNATIONAL CENTER FOR ENERGY AND CLIMAT **IICEC** energy outlook series support a more secure and cleaner energy future.





Türkiye Green Hydrogen Future (TGHF) supports realization of high potential with multiple benefits by presenting solid recommendations.

WHY TGHF?

- Energy, climate and industry dynamics, globally and regionally.
- National development, energy and climate targets of Türkiye.
- Türkiye's high potential in renewable energy and electrification and increasing energy demand in hard-to-abate sectors.
- Multi-dimensional opportunities to support a more secure and cleaner energy.
- An independent, participatory and exemplary study.

HOW TGHF?

- Türkiye Energy Outlook developed by IICEC & a holistic energy model.
- Detailed inventory and analyses of the Turkish energy system and final demand sectors.
- Impacts of global and regional developments, related policy priorities in Türkiye, market development, and technological advancements.
- Independent research, qualitative analyses and perspectives.
- Stakeholder engagement built-upon Public-Private Sector-Academia success triangle.







Multi-faceted energy and climate benefits are assessed based on Türkiye's potential and strengths in green hydrogen.

STRENGTHS & POTENTIAL

- Policy targets and strategies
- High renewable energy potential
- Demand increase in hard-to-decarbonize sectors
- Technology-oriented development priorities, emerging initiatives and cooperation areas in the ecosystem
- Proximity to European markets with high demand and import needs

MULTI-DIMENSIONAL OPPORTUNITIES

- Diversification in energy supply & localization
- Greenhouse gas emission reductions
- Reductions in energy import bill
- Technological development & localization





Green hydrogen future perspective is presented

based on the electrolyzer installation targets defined in the Türkiye National Energy Plan.



Türkiye's global share in capacity and generation increases to 2%, supported especially by fast growth after 2035;

Increasing need for electricity input strengthens the relationship among green hydrogen, renewable energy and electrification targets.

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The developments in the economics of production will be critical for

both consumption pathways in various sectors and competitiveness with traditional alternatives.



Electricity input will continue to represent the largest component of the green hydrogen costs,

in addition to power prices, the evolution of fossil fuel and carbon prices will be key determinants in the competitiveness of generation.

* A development pathway that converges to the cost targets in the Türkiye Hydrogen Technologies Strategy and Road Map. With IEA STEPS Scenario fossil fuel and carbon price series.

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Sectoral development of demand is analyzed based on sector-specific dynamics and prioritization of production in domestic consumption avenues.



and will reach a more diversified structure in the future backed by drivers such as energy transition in transportation.





Substituting fossil fuels with green hydrogen in hard-to-abate sectors presents multiple benefits for a more secure and cleaner energy future.



Energy savings equivalent to ~2 times the current energy consumption and emission reductions equivalent to ~3,5 times the current GHG emission inventory can be achieved across these sectors until 2050.





Significant economic benefits can be achieved by reductions in fossil fuel consumption and emissions.



* With the IEA STEPS (Stated Policies) Scenario price series. The analyses reflect the targets to ramp up localization rate in fossil fuel supplies.



Cost and benefit analyses show increasing gains over the medium-to-long term through the development of the holistic benefit-cost dynamics.



3.5 billion 2022USD\$ of import, emissions and export benefits are achieved with 3.0 billion 2022US\$ investment at annual average terms; cost-benefit multiplier exceeds 2.4 annually and 1.2 cumulatively post 2050.

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Türkiye Green Hydrogen Future presents critical development areas and opportunities to realize the high potential and multiple benefits.



Private Sector

Academia

- Policy Targets & Road MapsInfrastructures
- Markets
- Technologies & Localization
- International & Regional Cooperation
- Broad Sustainability
- Human Resources & Entrepreneurship





7 IICEC RECOMMENDATIONS

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Determining road maps regarding the development perspectives within production, demand, and related infrastructures based on priority sectors and regions,

Developing technical and regulatory infrastructure, preparing and implementing long-term master plans that will ensure optimal resource use and maximum safety,

Establishing market and support mechanisms for efficient and predictable growth in the value chain, considering interactions with electricity, natural gas, carbon markets, and electricity-supply security,

Realizing opportunities in critical technologies, especially electrolyzers, storage, and fuel cells, and developing localization and manufacturing capabilities,

- Strengthening international and regional cooperation, utilizing export opportunities to Europe with maximum benefits,
- Implementing a broad sustainability perspective throughout the ecosystem, in areas such as wind and solar resources, water use, critical minerals, and relevant supply chains,

Developing qualified human resources and a talent pool and establishing a strong entrepreneurial ecosystem that will support sustainable growth and competitiveness objectives.







Determining road maps regarding the development perspectives within production, demand, and related infrastructures based on priority sectors and regions.



7 IICEC

RECOMMENDATIONS



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Strengthening international and regional cooperation, utilizing export opportunities to Europe with maximum benefits.





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TÜRKİYE Yeşil Hidrojen Geleceği 2023



THANK YOU



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With Summe

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