

# Unlocking Ukraine's Hydrogen Opportunity:

## A Roadmap



Co-funded by  
the European Union

Explore what actions can be taken in the short term to lay  
the foundations for future hydrogen deployment.

Experience the full roadmap at [iea.org/programmes/eu4energy](https://www.iea.org/programmes/eu4energy)

# The hydrogen opportunity



**18-38 Mtpa**

hydrogen technical potential



**45%**

potential in areas with landmines



**66%**

potential in areas with water stress

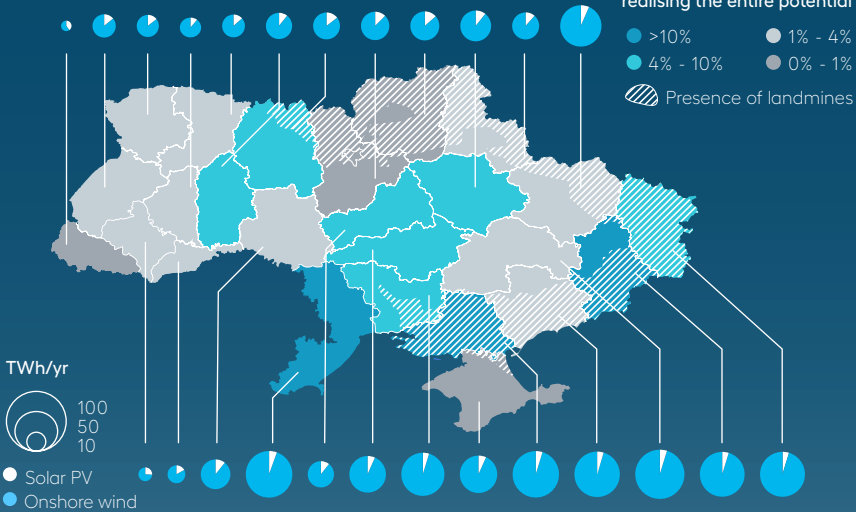


**1/3**

of the potential is in occupied territories

## Renewable technical potential

Share of water resources used for hydrogen when realising the entire potential



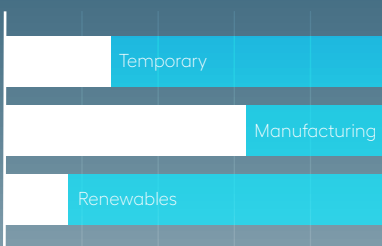
## Macroeconomy

**20 Billion USD**

annual revenues for hydrogen/steel exports

**100 000 jobs at peak, but...**

%     ● Domestic     ● Other



## Finance

**2.5 Mtpa** of H<sub>2</sub> production

**68**

Billion USD

Reconstruction needs for the entire energy sector

**85-90**

CAPEX for electrolysis and RES

**165-175**

Cumulative interest payments with an interest rate of 15%

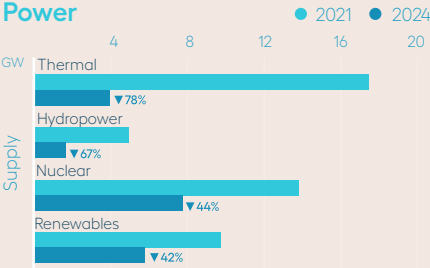
**55-60**

Billion USD

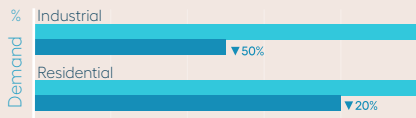
Interest rate of 5%

# Where does Ukraine's energy system stand?

## Power

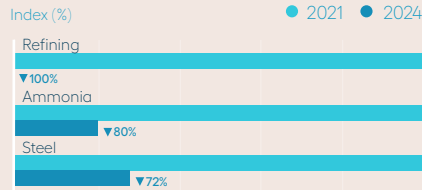


Power deficit of **one third** of peak demand

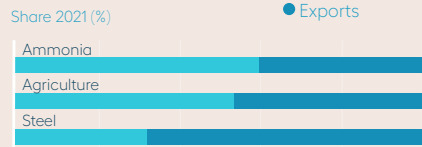


## Hydrogen

Hydrogen demand has **plunged**

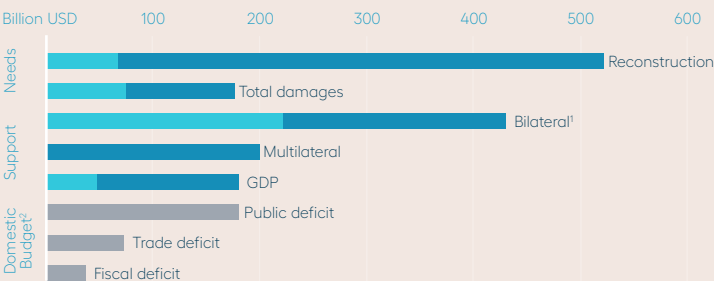


Industry is **export-oriented**



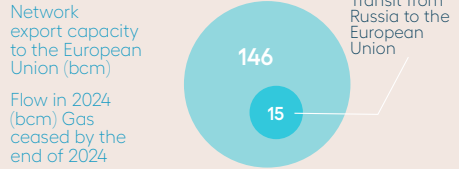
## Finance

**+50 Billion USD** needed to reconstruct the energy system

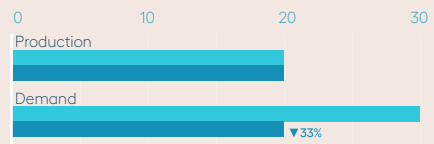


## Gas

Large **existing** export capacity

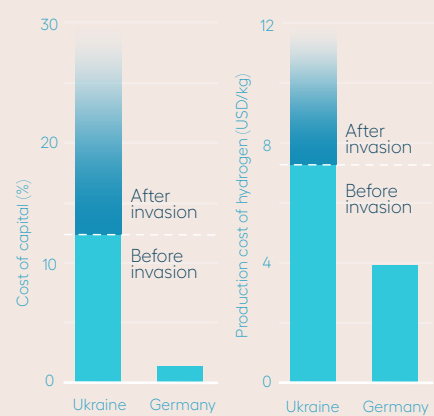


Lack of domestic production



## Cost of capital

**3x cost premium** due to high cost of capital



- Energy
- Non-energy
- Combined

<sup>1</sup> Non-energy funds are part of the government's general budget and could be used for energy.

<sup>2</sup> Numbers from 2024.

# A three-stage process for hydrogen development...

Ukraine can capitalize on the long-term opportunities presented by hydrogen through the near-term actions elaborated in the following stages.



## Stage 1

2-3 years

### Laying the Foundation

- + Make regulatory changes to enable renewables deployment and support decarbonisation.
- + Analyse the techno-economic feasibility and define relevant regulations to provide clarity for investors.



## Stage 2

5 years

### Building the Experience

- + Policy incentives are in place. Pilot projects of increasing size are being undertaken.
- + There is experimentation in configurations and policy implementation to know what works for the next stage.



## Stage 3

10-20 years

### Scaling Up & Market Growth

- + Processes are established and standardised.
- + This stage is about replication, scaling-up, undertaking large-scale projects, achieving economies of scale and driving costs down.

## Physical assets pillar



Priorities include developing “lighthouse” projects and hubs, facilitating offtake for projects, leveraging existing infrastructure and de-risking the supply chain.

SUPPLY

DEMAND

INFRASTRUCTURE

SUPPLY CHAIN

## Regulation pillar



Domestic regulation to enable future market growth including certification and regulation of the network and foreign regulation related to the EU accession process.

LEGISLATIVE FRAMEWORK

HYDROGEN NETWORK

CERTIFICATION

INTEGRATION WITH  
EUROPEAN UNION POLICIES

# ...with actions defined in 14 categories across four pillars

## Financing pillar



Assessment of investment needs, risk identification, risk mitigation instruments and capital sources to finance hydrogen projects.

FINANCIAL NEEDS

RISK MITIGATION

CAPITAL SOURCES

## Cross-cutting pillar



International collaboration, technology transfer capacity building across the workforce, and technical standards.

INTERNATIONAL  
COLLABORATION

CAPACITY BUILDING

TECHNICAL STANDARDS

# Policy recommendations



1

**Prioritise renewables deployment** to boost energy security and create an enabling environment for future hydrogen development.

5

Complete **integration with the EU regulatory framework** as part of the accession process.

2

**Undertake the preparatory analyses** that will form the basis for later deployment.

6

Modernise domestic **regulation and infrastructure**.

3

**Mitigate financial risks** introduced by the war.

7

Follow a progressive approach to deployment and **build the track record** needed to develop **investors' confidence**.

4

**Build the workforce** that will be required to scale up hydrogen deployment.

Scan for more information



# Sample of the actions in the roadmap by stage

		Stage 1	Stage 2	Stage 3
<b>Physical Assets pillar</b>	1. Assess suitability of existing (cross-border) pipelines and underground storage sites for hydrogen	█		
	2. Promote demand creation through a mix of financial incentives, demand hubs and public procurement		█	
	3. Support construction of large-scale hydrogen (derivatives) plants with a clear visibility on timeline for incentives phase-out			█
<b>Regulation pillar</b>	1. Establish a digital hydrogen certification scheme, ensuring consistency with the European Union	█		
	2. Amend existing legislation and put in place new policies to support hydrogen uptake including a simplified and centralised administrative process	█		
	3. Assess the impact of the European Union's 2040 policy package and align hydrogen network development		█	
<b>Financing pillar</b>	1. Assess the investment needs for the hydrogen supply chain, uncertainties and potential funding alternatives	█		
	2. Identify capital sources that could be used for the different stages considering leverage ratios and leveraging development finance		█	
	3. Address offtake risk to unlock final investment decisions for the large-scale projects of the next stage		█	
<b>Cross-cutting pillar</b>	1. Establish bilateral agreements with potential importers and participate in hydrogen-specific platforms	█		
	2. Assess skills gap in the workforce and define a roadmap to close them	█		
	3. Promote joint projects between foreign and domestic actors and establish specific hydrogen teams within government agencies	█		



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