



Ministerio de
Energía

Gobierno de Chile

The National Green Hydrogen Strategy of Chile

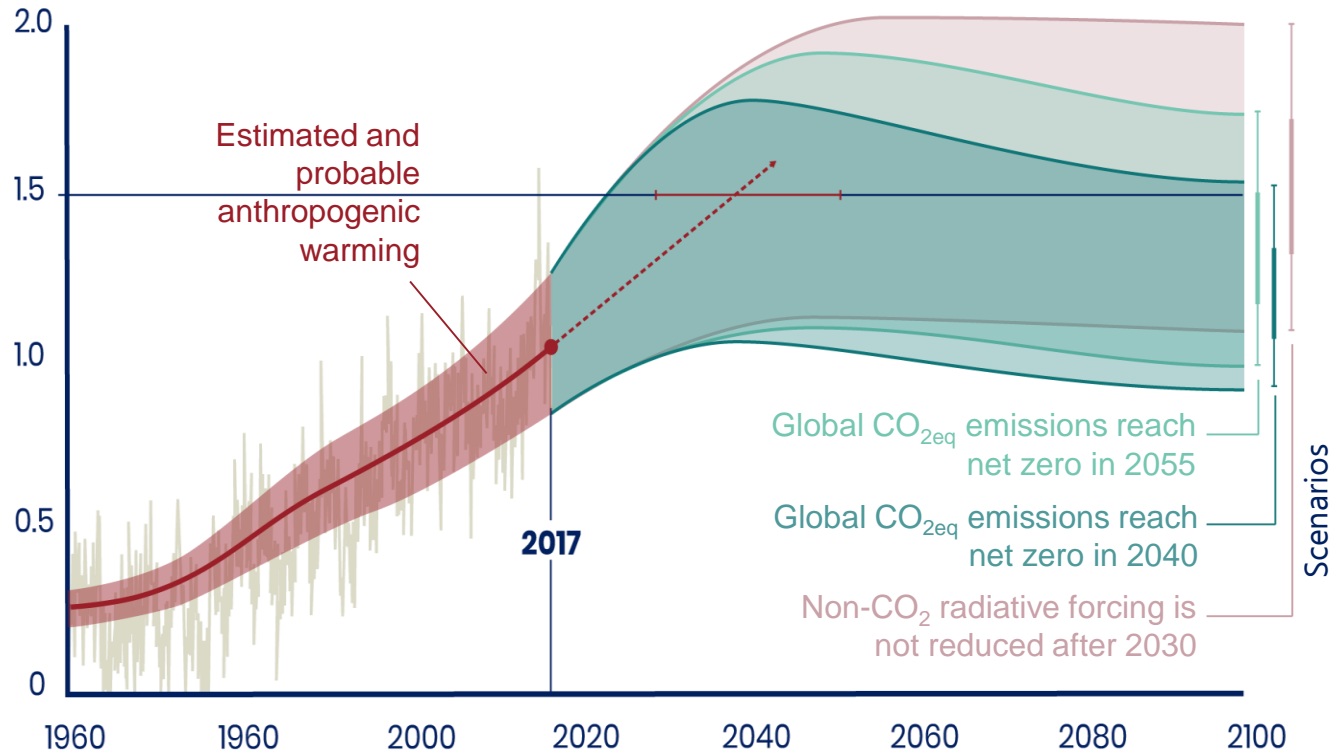
IMO Symposium on alternative
fuels

February 2021

We are facing a climate crisis

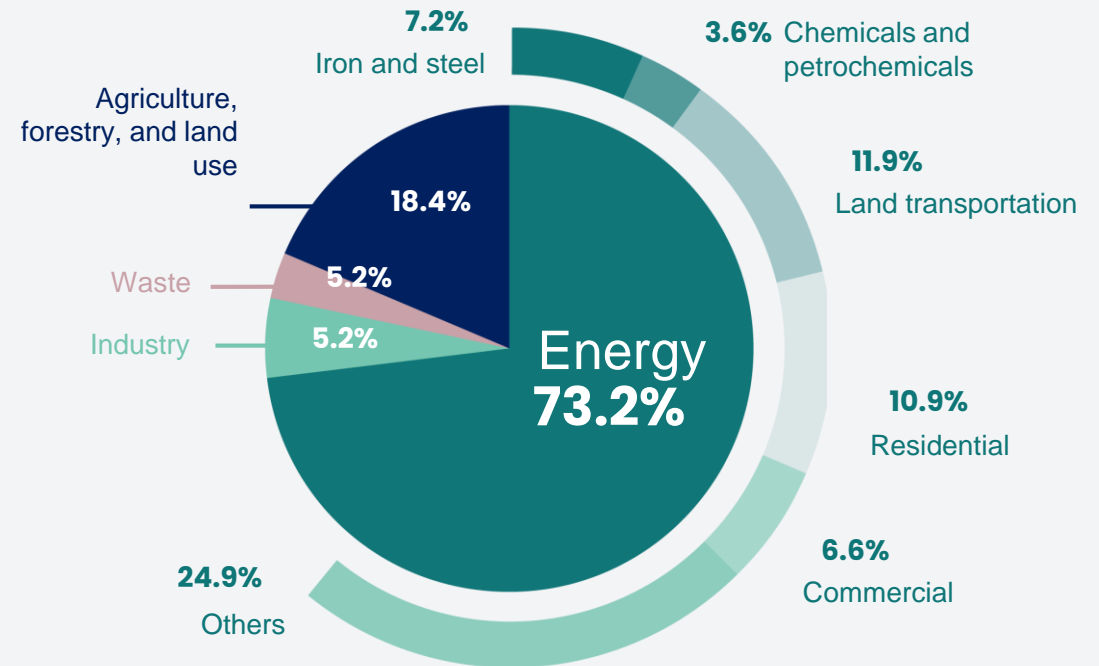
Global warming referenced to 1850–1900 (°C)

Source: IPCC. (2019). Special Report: Global Warming of 1.5°C.



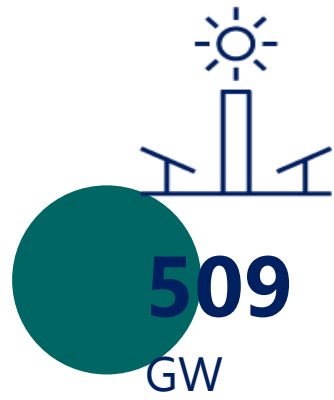
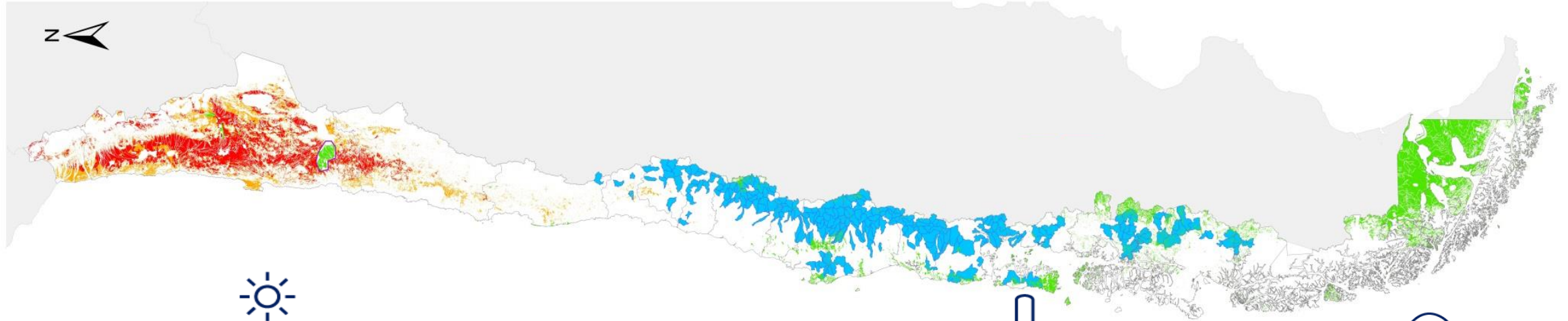
Global greenhouse gas emissions by sector

Source: Ritchie, H. (2020). Published in ourworldindata.org with data from Climate Watch and the World Resources Institute.



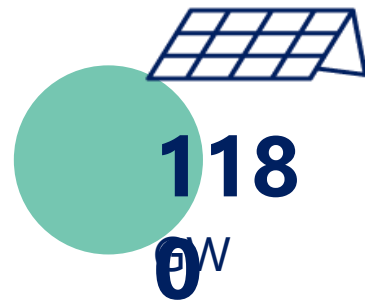
Energy production and use are at the heart of the challenge

Countries such as Chile can tap into local resources to quickly decarbonize



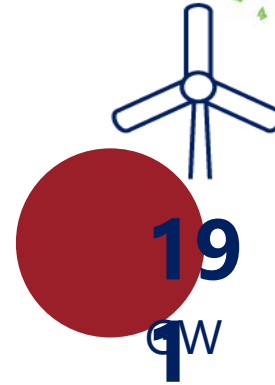
Concentrated solar power

+



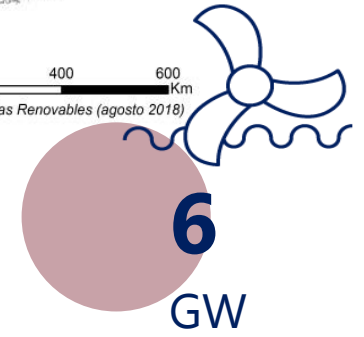
Solar photovoltaic

+



On-shore wind

+



Run-of-river

1800+ GW

The cheapest green hydrogen on the planet

will unlock cost-effective emissions reductions...

Levelized cost of green hydrogen (USD/kg H₂)

Source: McKinsey & Company.

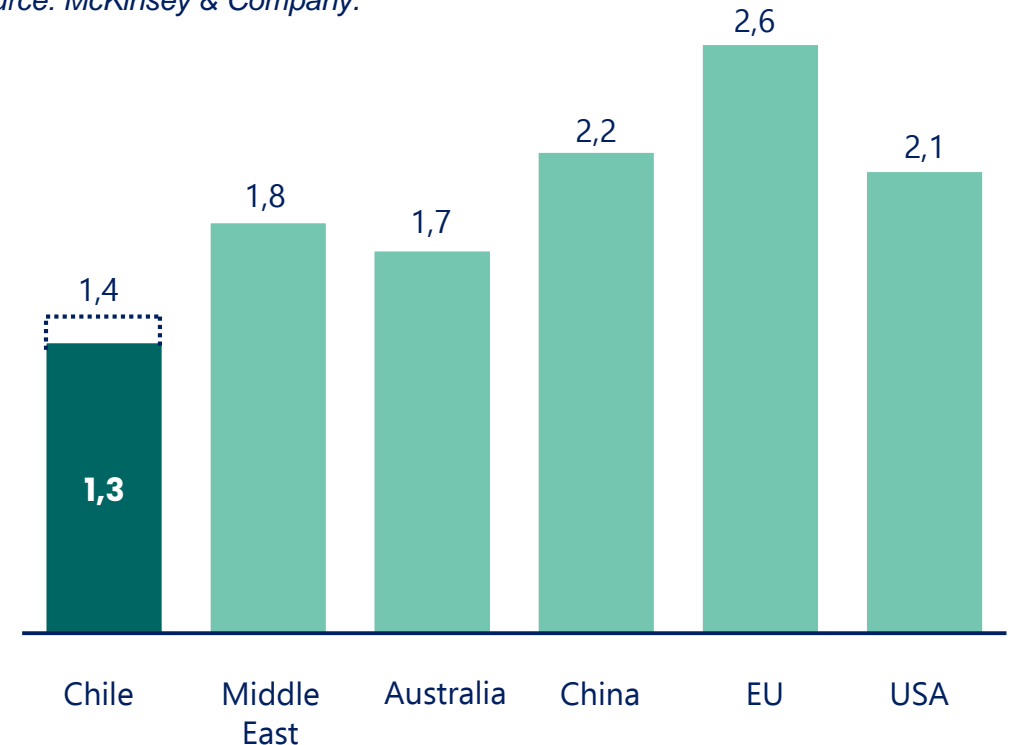


Potential for a **160 Mton** yearly green hydrogen production*

*Source: International Energy Agency.

Levelized cost of production by 2030 (USD/kg H₂)

Source: McKinsey & Company.

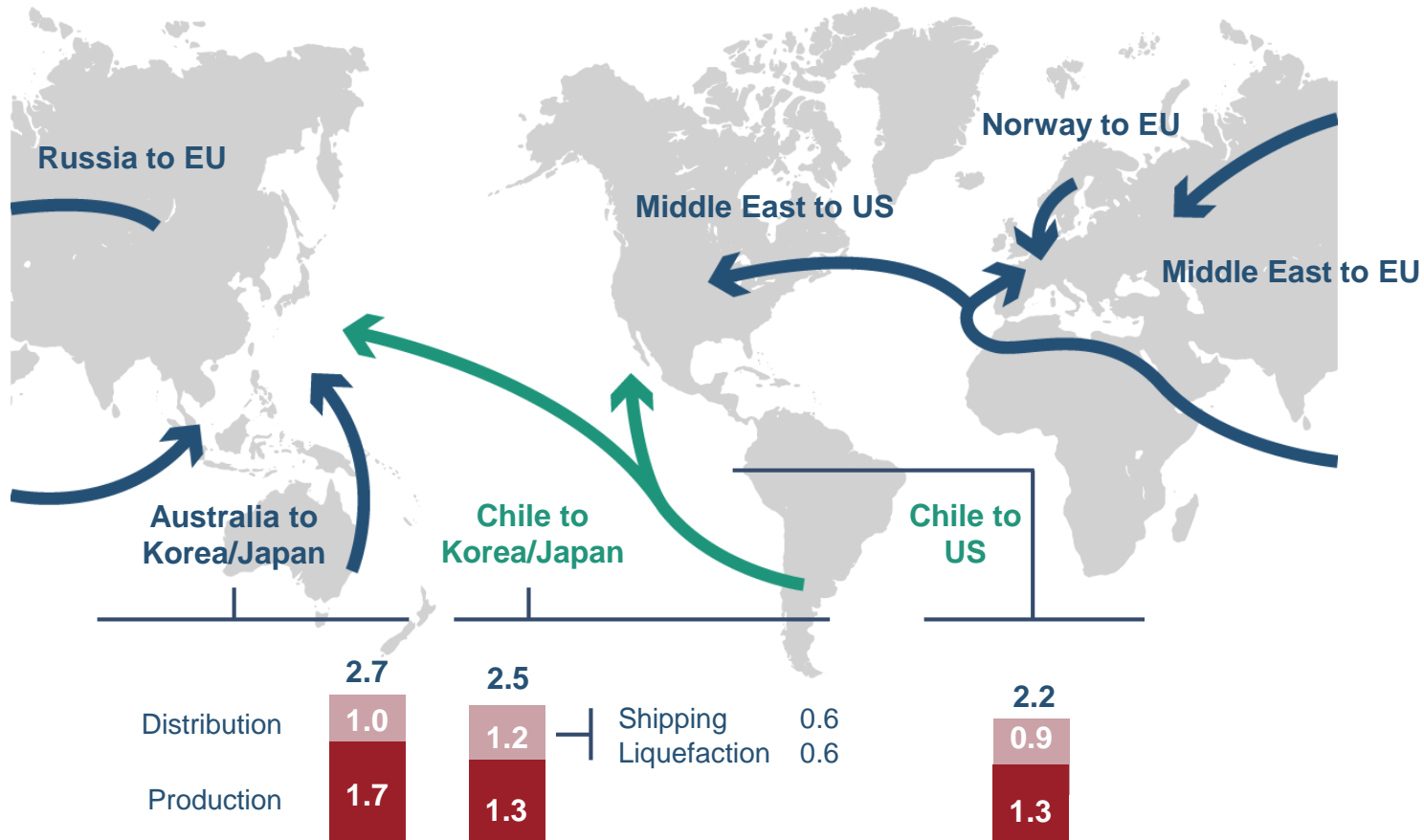


*Does not consider conditioning, transport, storage nor distribution costs.

...and enable the large-scale export of green products

Cost of liquid H₂ at port of destination, 2030 (USD/kg H₂)

(Source: McKinsey & Co)



Renewable energy carriers being considered by developers and investors

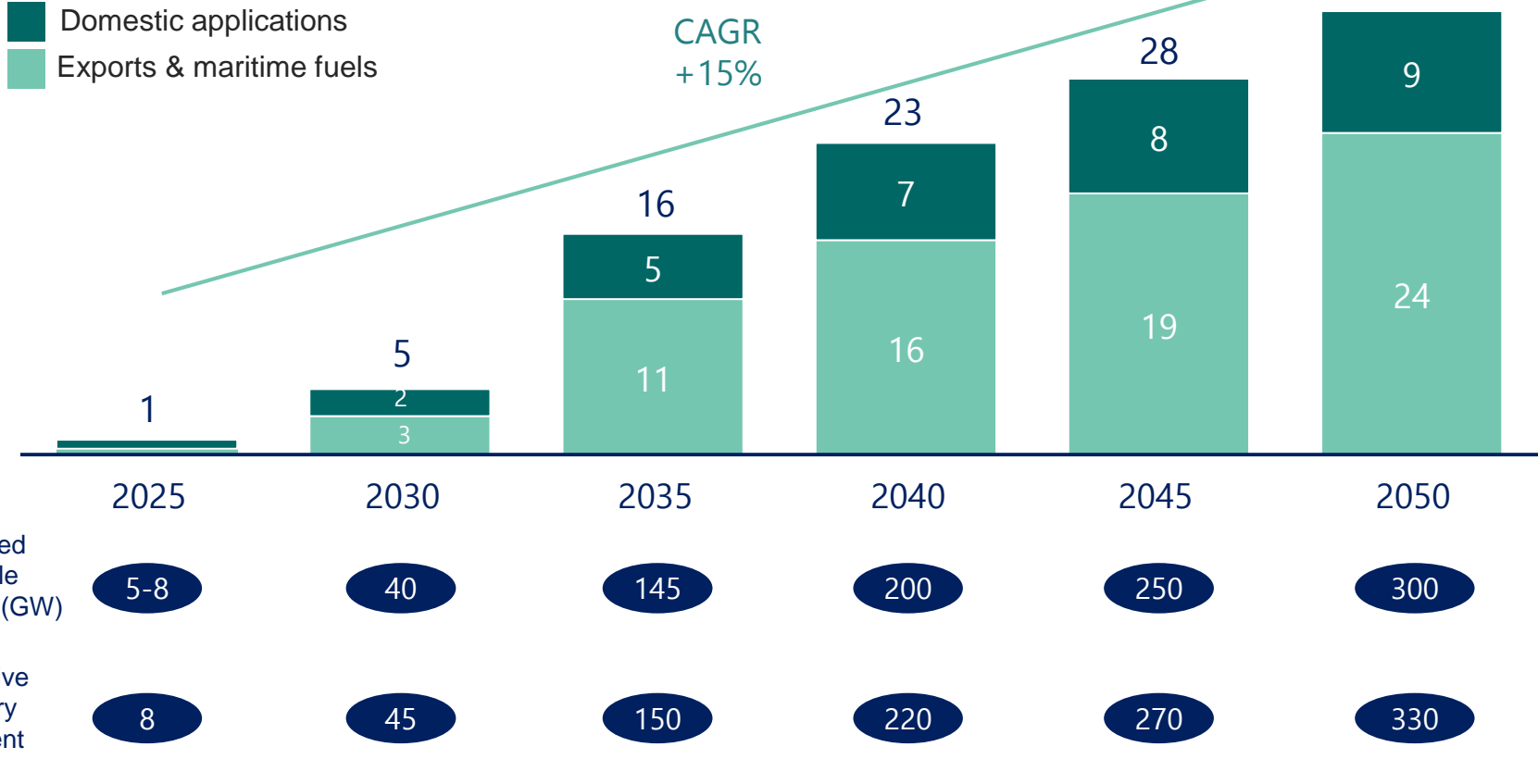
- LH₂** Liquid hydrogen
- NH₃** Green ammonia
- CH₃OH** Green methanol / eFuels
- Cu** Green copper and other green exports

A unique opportunity

Clean industry of the scale of our mining sector

Projection of Chilean markets for green hydrogen and its derivatives (BUSD)

Source: McKinsey & Company.



Our ambition

2025



Top destination for green hydrogen investment in LATAM



Electrolysis capacity operating and under development

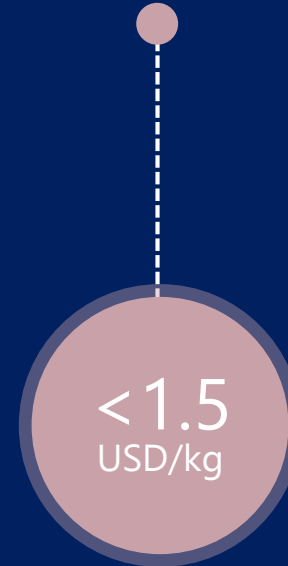


Production in at least 2 *hydrogen valleys* in Chile

Leaders in export of green hydrogen and derivatives



The cheapest green hydrogen on the planet



Leaders in production of green hydrogen via electrolysis



2030

We are currently working on 4 priority areas to execute our Green Hydrogen National Strategy



1 Regulation and permits

Transparent, harmonized standards will enable early projects to supply shipping and others



2 Financing and incentives

The focus on supply-side support will spill over to applications such as shipping



3 Domestic market and international partnerships

Unlocking mining sector and overseas demand will leverage clean maritime fuels demand



4 Local value

Developing infrastructure and capabilities will accelerate the fuel transition in various sectors

Some projects already coming to the public light

Haru Oni Plant

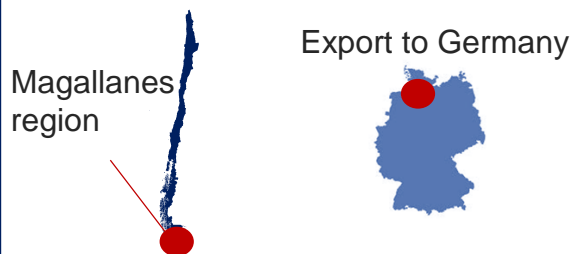
Developer



Key Partners



Location



+ Grant of 8 MEUR from German government



Source: Siemens Energy

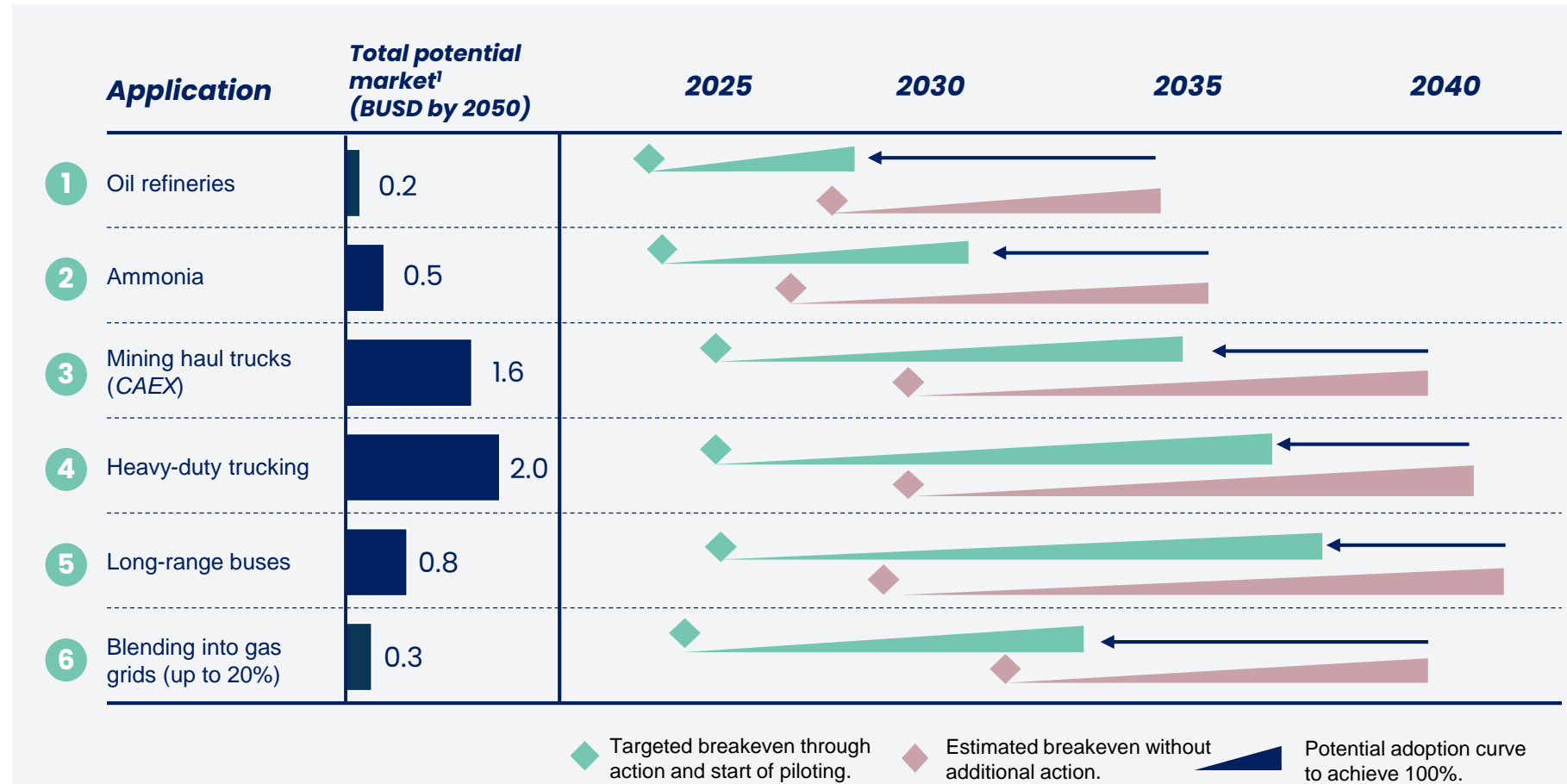


Estrategia Nacional de Hidrógeno Verde

Wave I: 2020–2025

Domestic ramp up and export preparation

We will accelerate the deployment of green hydrogen in 6 prioritized applications to build local supply chains and acquire experience.

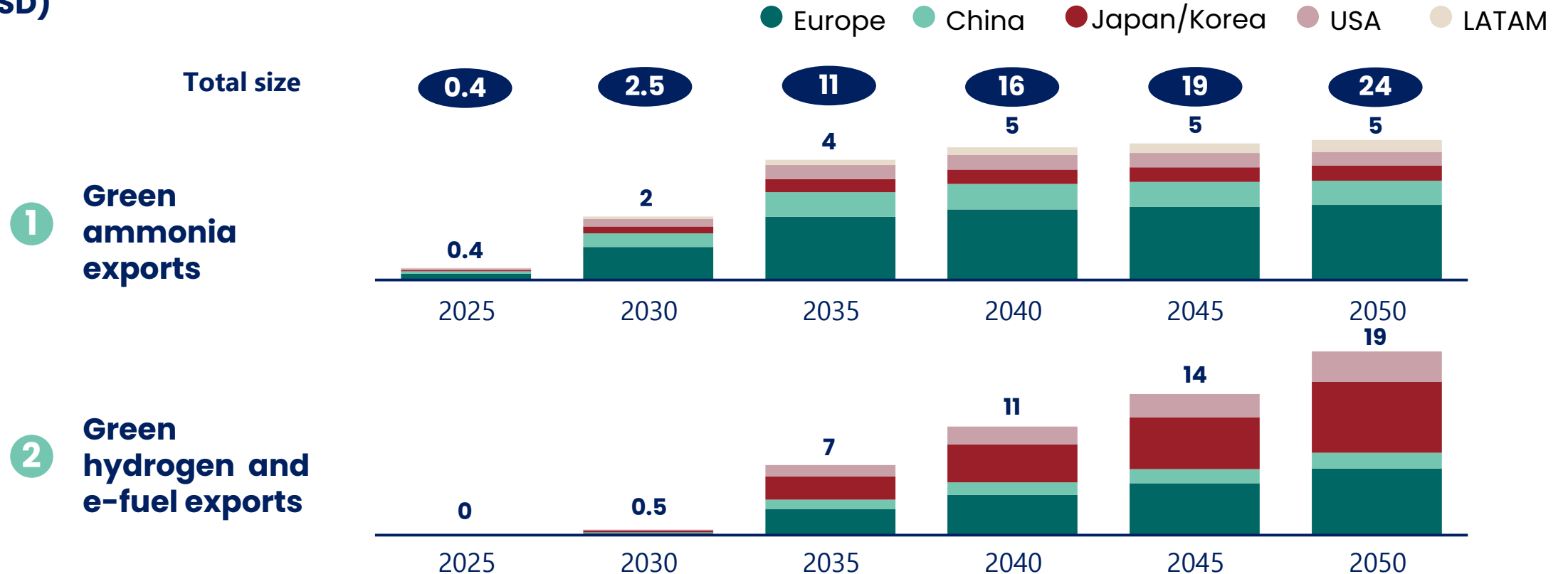


1. Annual sales. Considers the full transition to hydrogen of the energy demand in each application.
 Source: Based in analyses from McKinsey & Company.

Waves II & III: 2025-2030 & 2030+

Scaling up to capture global markets

Estimated market size for Chilean exports (BUSD)



1 Regulation and permits

Transparent, harmonized standards will enable early projects to supply shipping and others



Objectives

- **Reduce uncertainty** in the market to accelerate and facilitate the execution of green hydrogen projects
- **Reduce the complexity** associated with new project development



3 key initiatives in progress

- **Define economic and taxation instruments** to accelerate an energy transition, aiming to carbon neutrality
- **Develop a green hydrogen by-law for key applications**, to enable quick and effective development of projects
- Define a **Green Hydrogen Legislation** to promote demand



Next steps

- Evaluate other relevant **existing gaps in regulation and permits inhibiting quick and effective project execution**, assessing existing best practices

2 Financing and incentives

The focus on supply-side support will spill over to applications such as shipping



Objectives

- **Close cost gaps** , fostering scalability locally
- **Develop incentives** to promote development of early stage projects



3 key initiatives in progress

- **Attract bilateral financing and development banking**, with major focus on grants and concessional debt that will enable boosting of green hydrogen projects
- **Launch a 50 MUSD funding round** to support developers of scalable green hydrogen projects
- **Establish *certification of origin*** in order to validate internationally quality of Chilean hydrogen exports



Next steps

- Establish **additional initiatives to reduce financing cost for green hydrogen projects**

3 Domestic market and international partnerships

Unlocking mining sector and overseas demand will leverage clean maritime fuels demand



Objectives

- **Accelerate internal demand** to achieve decarbonization and start the development of a green hydrogen market
- **Capture external demand** fast to position Chile as a competitive supplier



3 key initiatives in progress

- **Generate a public-private agreement** for hydrogen usage in the mining industry, defining concrete green hydrogen applications
- **Develop a transition plan with ENAP** to enable green hydrogen utilization in refineries, leveraging existing capacity and infrastructure
- **Sign offtake agreements with key markets:** European Union, Asia and North America



Next steps

- Define additional support mechanisms to foster exports and **aim to become a top 3 exporter of green hydrogen by 2040**
- **Attract Consortiums bringing international demand**, that will foster vertical integration across green hydrogen production in Chile

4 Local value

Developing infrastructure and capabilities will accelerate the fuel transition in various sectors



Objectives

- **Prepare local territories with productive potential in order to enhance value capture**, focusing on capturing value throughout the entire value chain of green hydrogen production



3 key initiatives in progress

- **Define infrastructure needs to establish key green hydrogen hubs** (e.g. export terminals, desalination plants, electric transmission sites)
- Define gaps **for large-scale development of manufacturing capacity**
- **Foster green hydrogen applications** in remote geographies and isolated areas



Next steps

- **Define value capture initiatives** for local suppliers alongside the productive value chain