

H₂

EUROPEAN
UNION
IMPORTS
STUDY

Decarbonised hydrogen imports into the European Union: challenges and opportunities

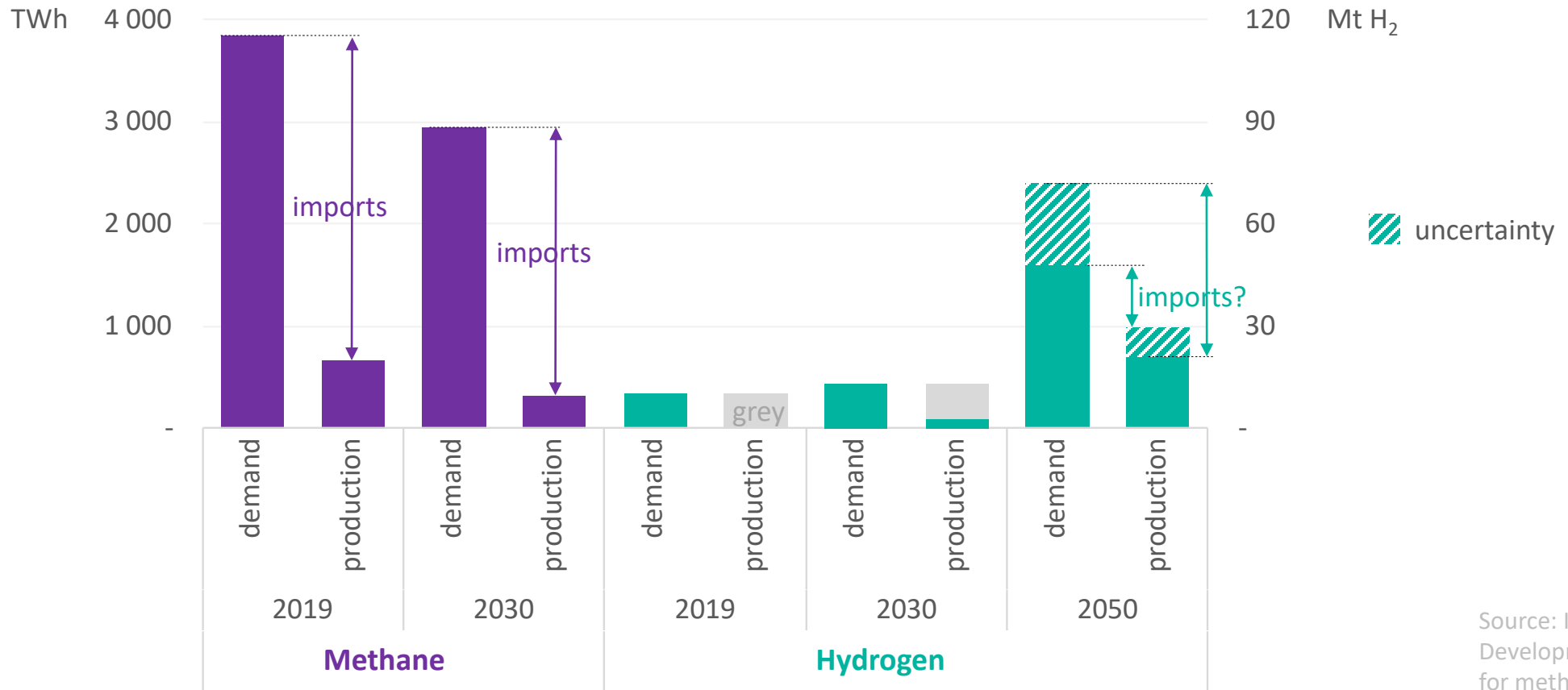
Webinar organised by World Energy Council – Germany, 8 October 2021

The scope and structure of the study

- An opportunity to cross views between potential importers and exporters
 - *Uncertainties on domestic demand and supply of hydrogen in the European Union*
 - *Review of current production and transportation costs, and possible future evolutions*
 - *Implications on energy and technology security and interactions with the power sector*
- Three broad questions:
 - *Why import decarbonised hydrogen to the EU?*
 - *How to make imports possible?*
 - *What would be the conditions for mutual success?*
- Technology neutrality while respecting stringent emission targets
 - *Decarbonised vs emitting hydrogen production*

Redefining Energy Security?

Methane and hydrogen demand and production in the European Union, 2019-2030-2050

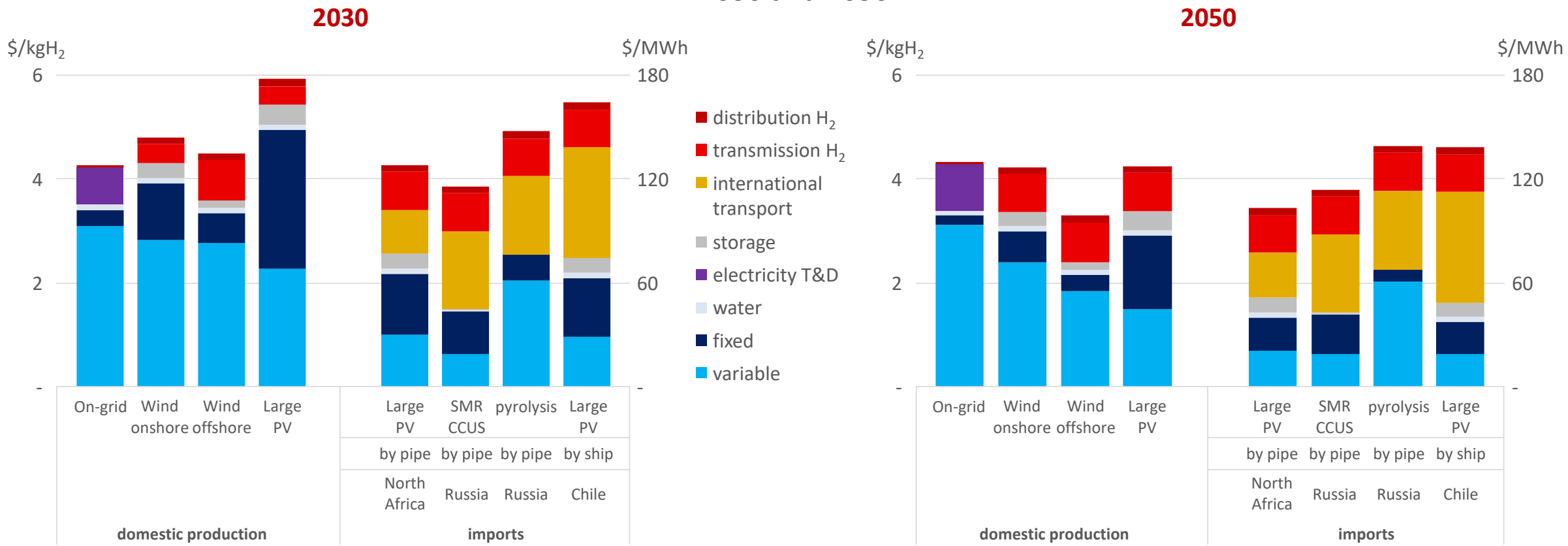


Source: IEA's Sustainable Development Scenario for methane data

Uncertainties on future level of demand and production could hinder new investments. Lower levels of imports with respect to current methane imports can have significant implications on energy security and prices

Drivers of hydrogen imports – Costs

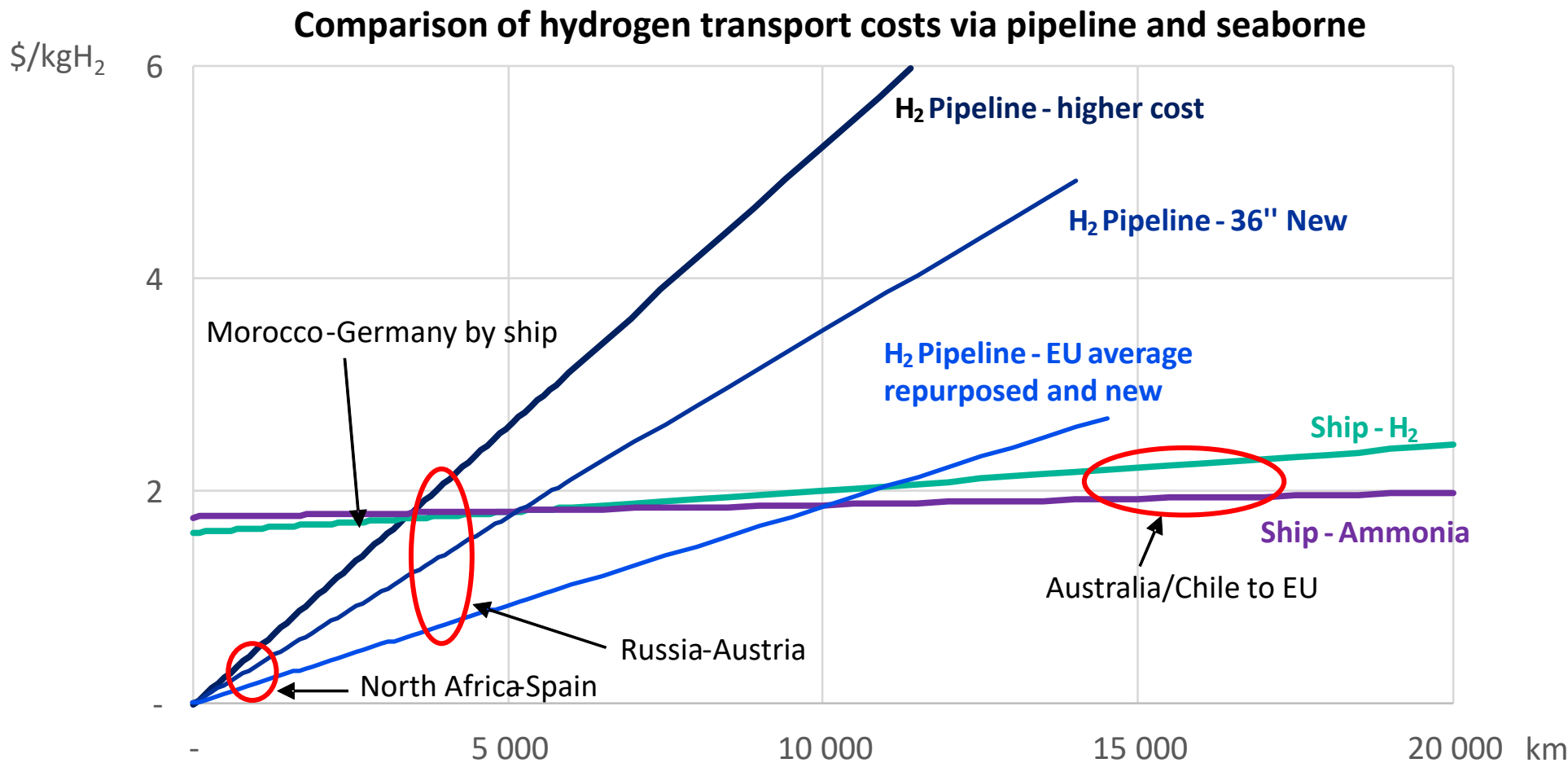
Indicative delivered hydrogen costs to a typical industrial customer in Germany from selected countries and technologies, 2030 and 2050



Transportation costs are set to play a key role in the competitiveness of hydrogen produced in countries outside the European Union, as they often offset their different production costs

H₂ Transport costs

EU IMPORTS



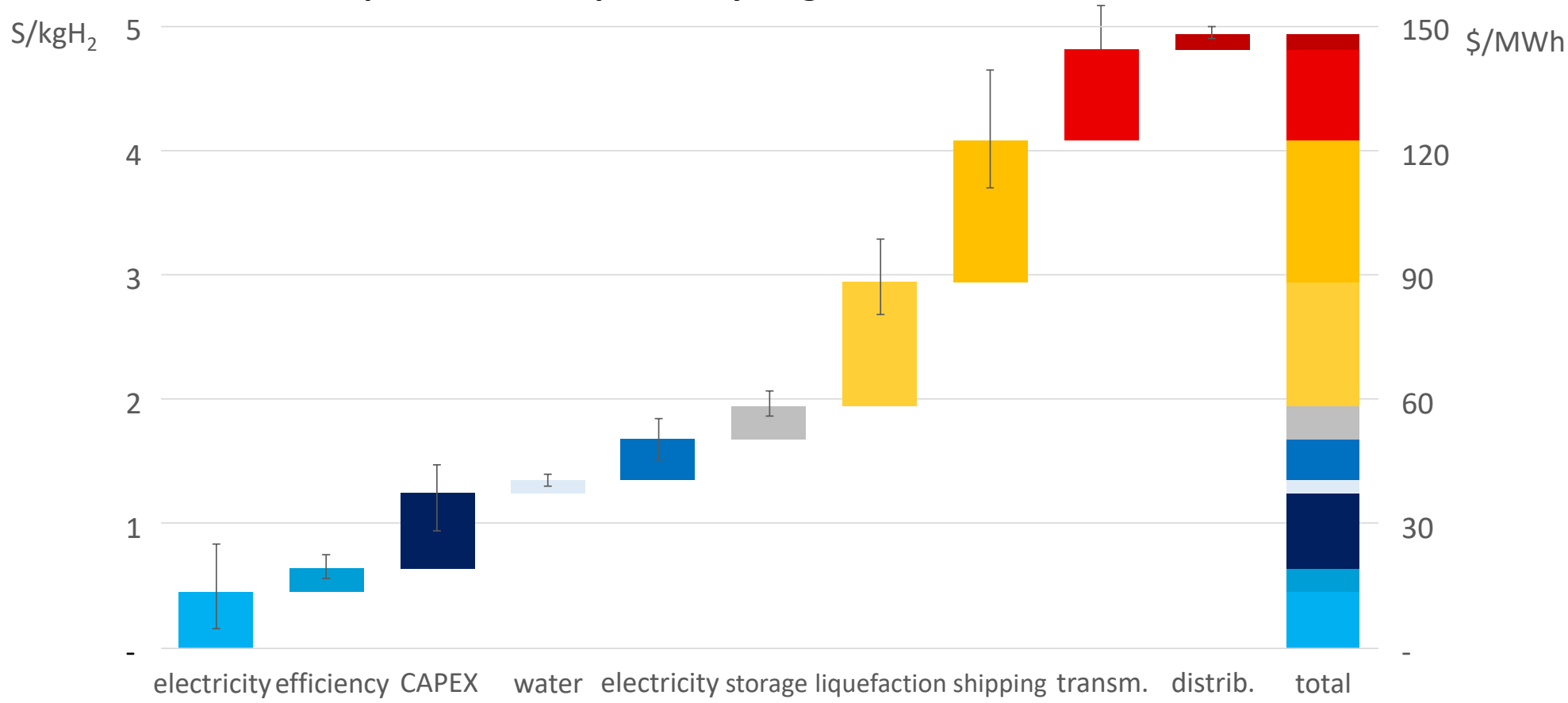
Sources: IEA, 2019; EHB, 2021a; EWI, 2020

Transport costs for pipeline and seaborne trade will be crucial in determining the competitiveness of exporting countries and technologies

H₂ Cost uncertainties

EU IMPORTS

Uncertainties of cost components for imported hydrogen delivered to an industrial customer in 2050

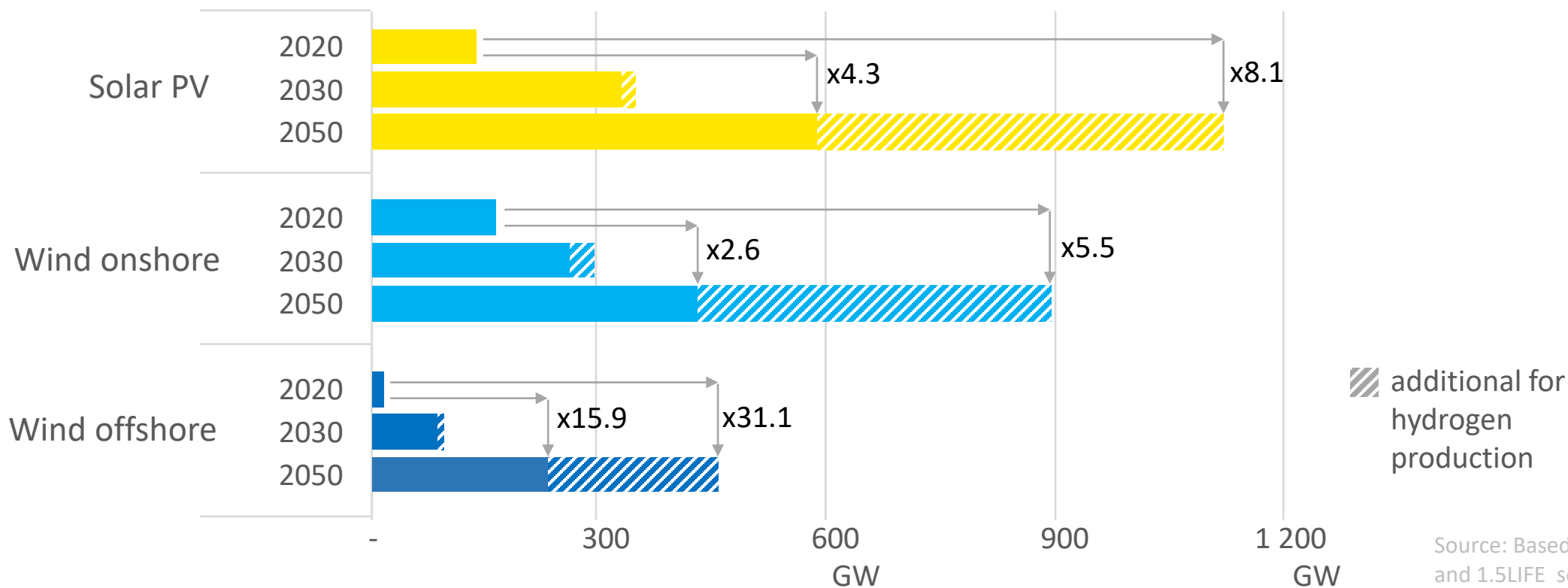


Each of the cost components of delivered hydrogen have significant uncertainties, and are very project-specific. The uncertainty on the overall cost can be as high as 50%.

H₂ Drivers of hydrogen imports – Volumes

EU IMPORTS

Installed capacity for solar PV and wind power in the European Union, including and excluding additional capacity for hydrogen production, 2020-2050

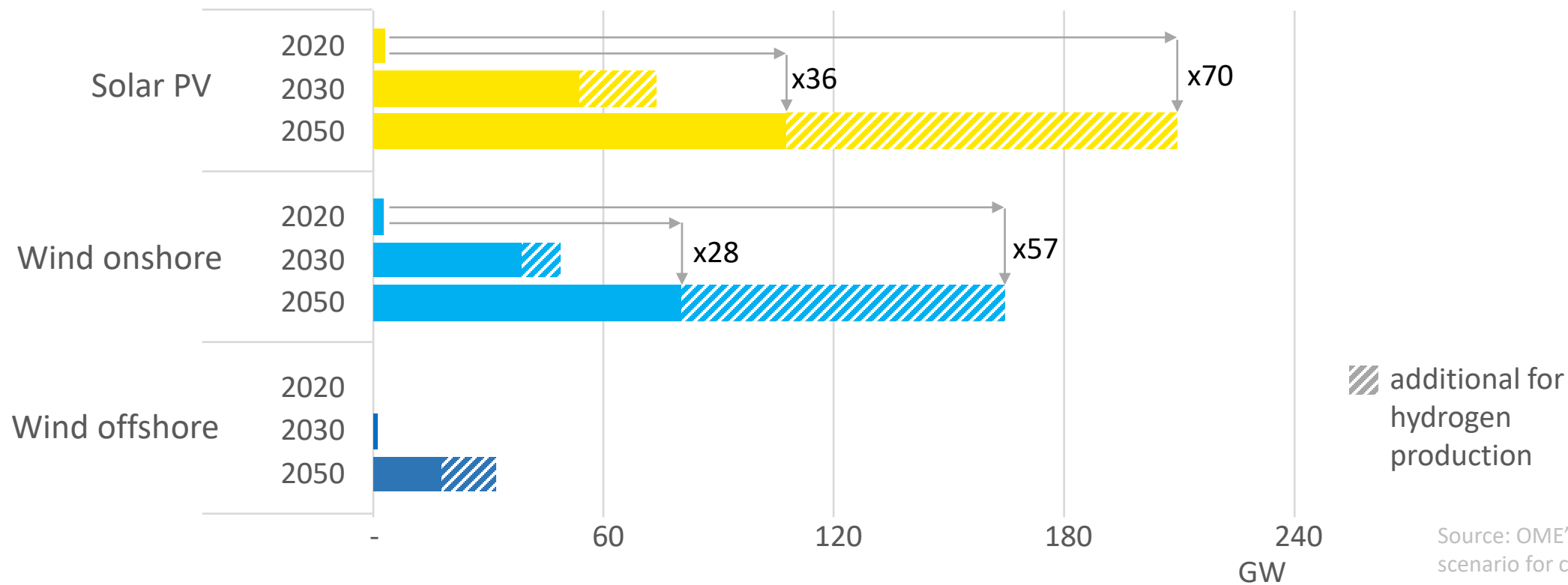


Source: Based on the 1.5TECH and 1.5LIFE scenarios of the European Commission

To support the decarbonisation of the power sector and meet renewables targets, solar PV and wind are set to increase four-fold to 2050. Producing domestically 60 Mth₂ would increase capacity needs almost eight-fold

Growing ambitions in North Africa

Installed capacity for solar PV and wind power in North Africa, including and excluding additional capacity for hydrogen production, 2020-2050

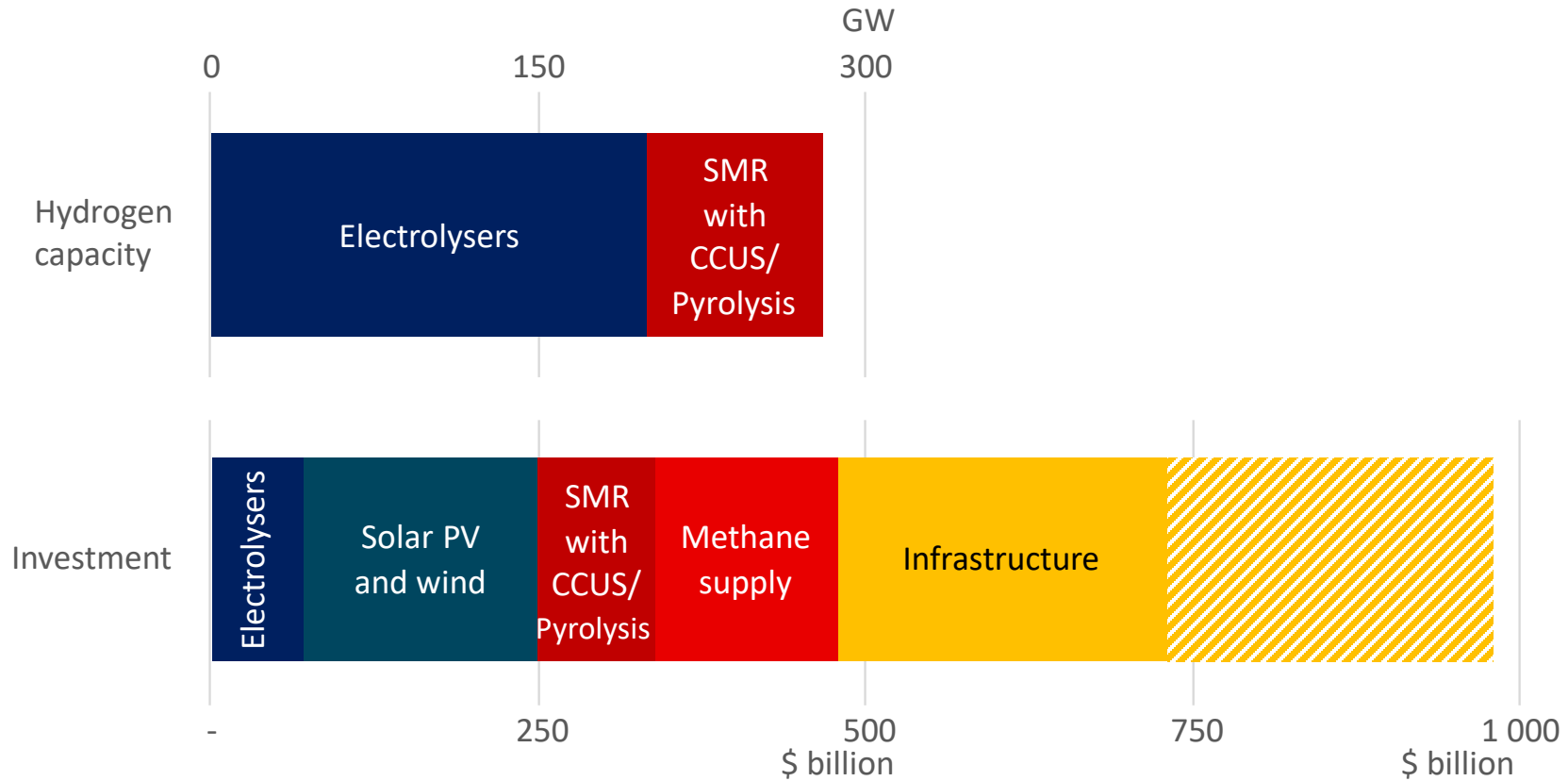


Source: OME's ProMed scenario for capacity used to meet power demand

North African countries are expected to see continuing soaring electricity demand. The ambition of exporting decarbonised hydrogen must be well integrated with the strategies to decarbonise the power sector

How to make imports possible?

Capacity and investment needs outside the European Union for export purposes, 2021-2050



Meeting exports of around 30 million tonnes of hydrogen requires around 300 GW of hydrogen production capacity and \$750-1 000 billion of investment. Access to low-cost financing is set to play a key role

Conditions for mutual success

- Coordination of all infrastructure (hydrogen, electricity, gas, heat) both within and outside the EU
- Implementation of a clear regulatory framework to ensure that investment will be forthcoming in a timely manner
 - *International hydrogen and derivatives quality, technical and safety standards*
 - *Well-designed certification of the decarbonised nature of hydrogen*
 - *Stable and coherent set of support measures for both importing and exporting countries*
- Create stable relationships with key trading partners
 - *Ensure acceptability and respect of the principle of additionality for new hydrogen projects*
 - *Foster industrial development*
 - *Establish a high-level roundtable between exporters and importers for the development of a joint hydrogen roadmap*

H₂ Conclusions

EU IMPORTS

- Hydrogen production within the European Union is set to be insufficient to meet the 60 Mt of projected demand by 2050, with about half that will need to be imported
- Hydrogen deployment can have significant implications on energy security and prices, while traditional energy concerns move towards technology security
- Hydrogen strategies should be included in the overall energy strategy and vision, providing fair economic support and avoiding cross-subsidisation among sectors
- Renewable sources will be crucial for hydrogen, but limiting the long-term choice of low-carbon technologies could prevent reaching the decarbonisation target
- Some \$900 billion will be needed for hydrogen projects outside the EU over 2021-2050. Access to capital and coordination of infrastructure will be of paramount importance
- Ensuring cooperation and stable relationships with key trading partners will be essential. Clear and transparent rules will be needed to ensure long-term visibility to investors