



# Roadmap towards a hydrogen economy

**Market perspective**

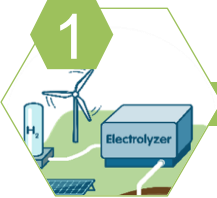
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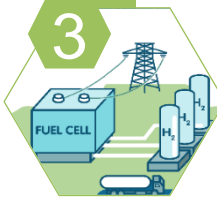
# There are seven roles for hydrogen in the energy transition

Enable the renewable energy system → Decarbonize end uses

Enable **large-scale renewables integration** and **power generation**



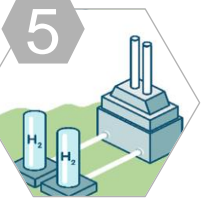
**Distribute** energy across sectors and regions



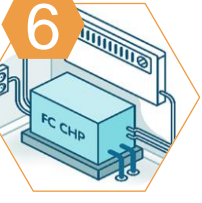
Act as a **buffer** to increase system resilience



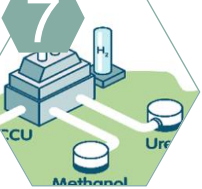
Decarbonize **transportation**



Decarbonize **industry energy use**



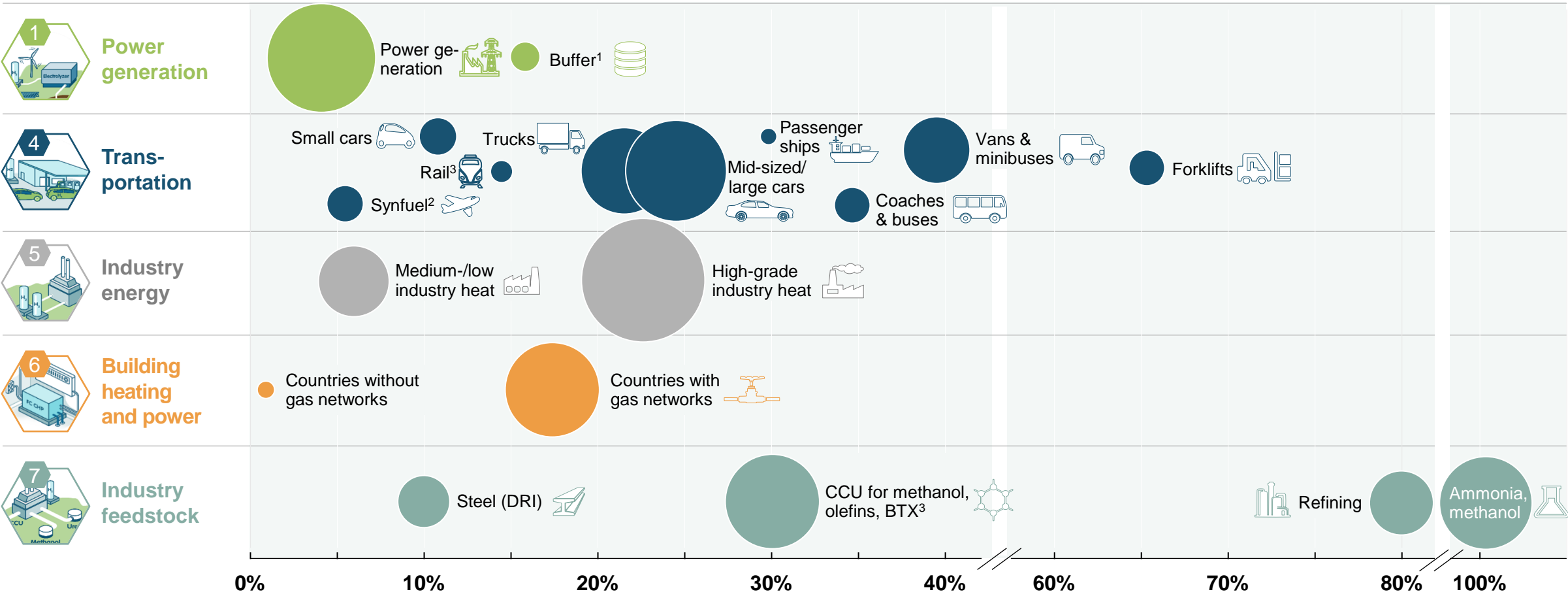
Help decarbonize **building heating and power**



Serve as **feedstock**, using captured carbon

# Hydrogen has significant potential across all applications

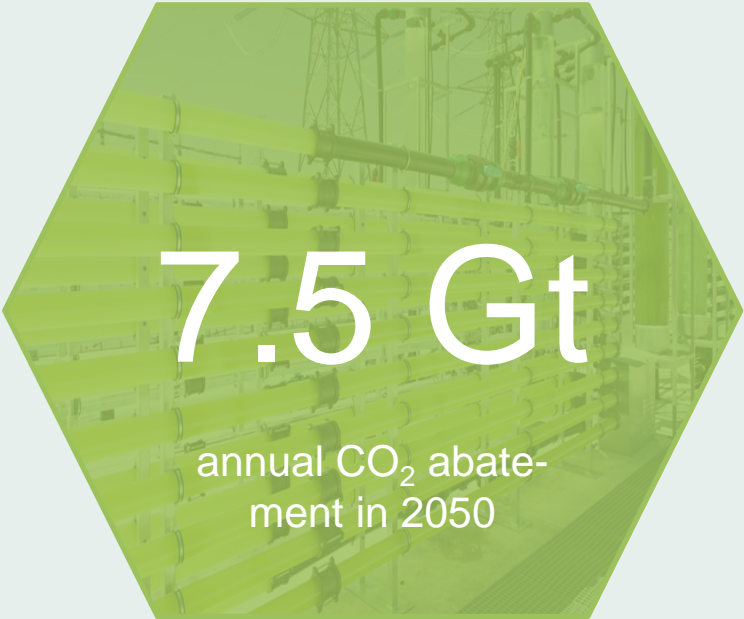
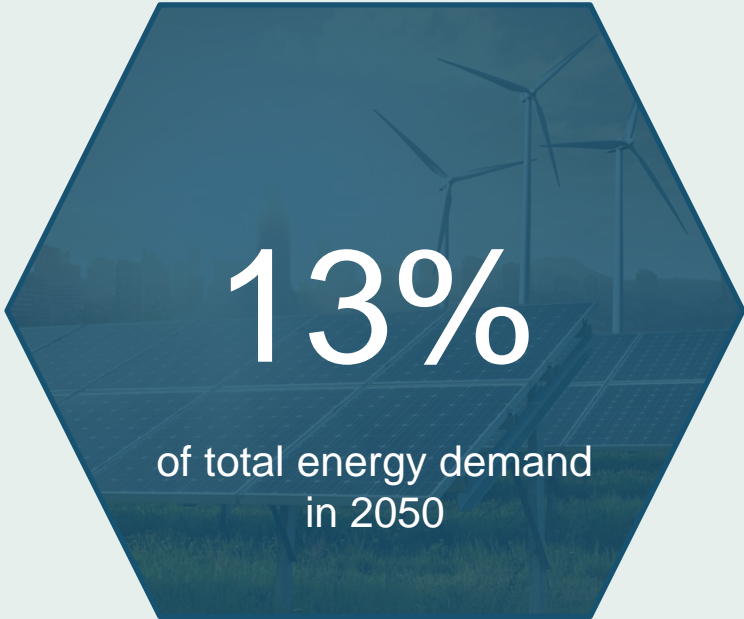
○ Bubble size indicates hydrogen potential in 2050 in EJ (1 EJ)



1 Percent of total annual growth in hydrogen and variable renewable power demand  
 2 For aviation and freight ships  
 3 Trains and tramways  
 3 Percent of total methanol, olefin, BTX production using olefins and captured carbon

Relative importance by 2050  
Market share potential in segment

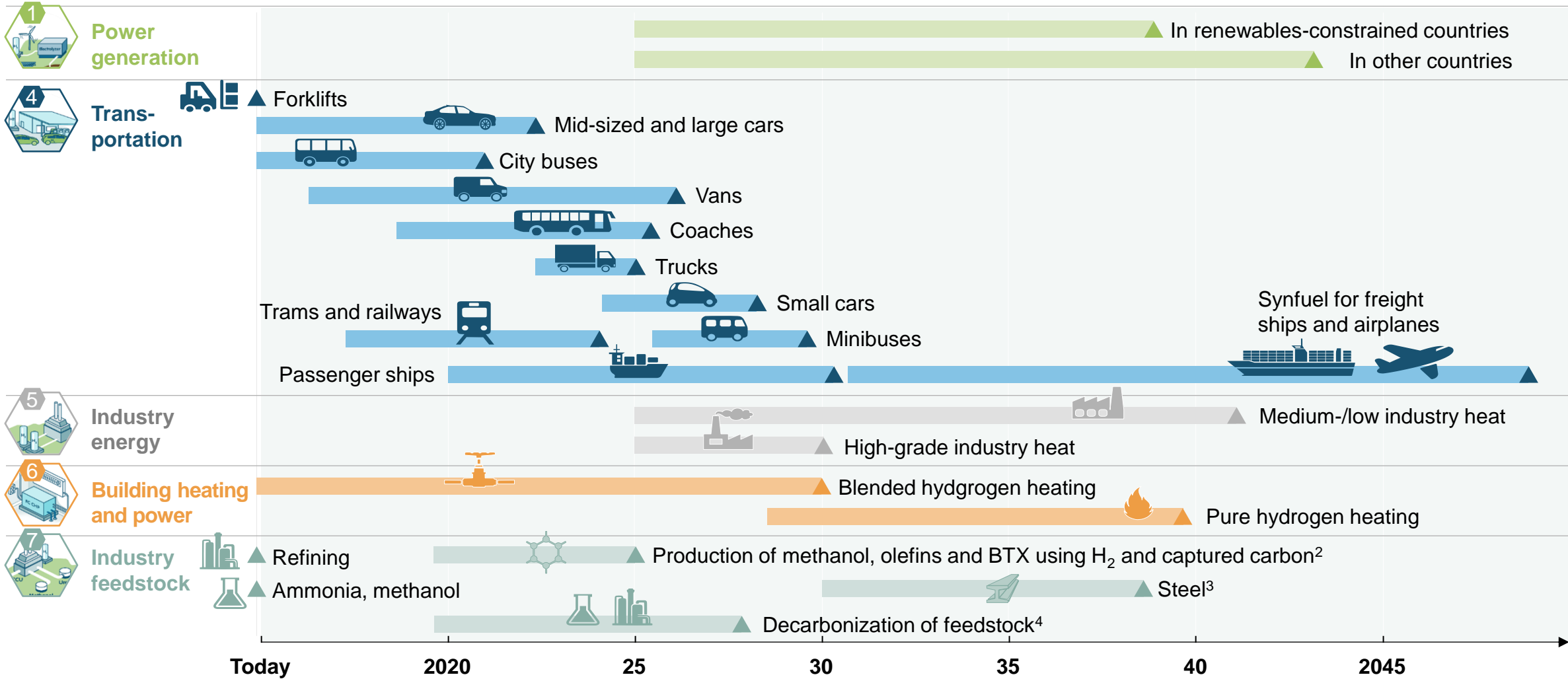
# Hydrogen benefits energy systems, environment and business



SOURCE: Hydrogen Council, IEA ETP Hydrogen and Fuel Cells CBS, National Energy Outlook 2016

# Hydrogen: Ready for scale!

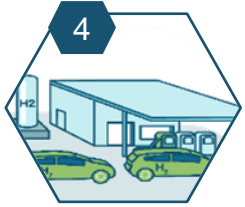
Start of commercialization      Mass market acceptability<sup>1</sup>



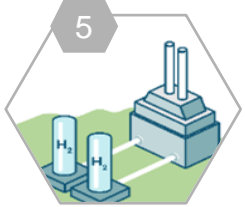
1 Mass market acceptability defined as sales >1% within segment in priority markets  
 3 DRI with green H<sub>2</sub>, iron reduction in blast furnaces and other low-carbon steel making processes using H<sub>2</sub>  
 SOURCE: Hydrogen Council

2 Market share refers to the amount of production that uses hydrogen and captured carbon to replace feedstock  
 4 Market share refers to the amount of feedstock that is produced from low-carbon sources

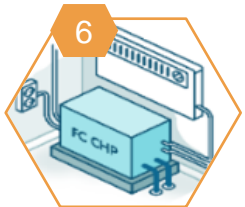
# Important milestones can be reached already in 2030



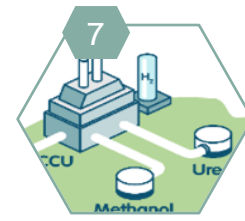
- **10-15 million** fuel-cell **vehicles** on the road, including private cars, taxis, vans and light commercial vehicles



- **3.5 Mt** hydrogen used for **high-grade heat** in first large-scale projects



- **50 million households** connected to a network safely blending hydrogen and natural gas



- **50 Mt CO<sub>2</sub>** converted to chemicals and intermediates such as **methanol** using hydrogen

# Investment opportunities amount to ~475 billion until 2030

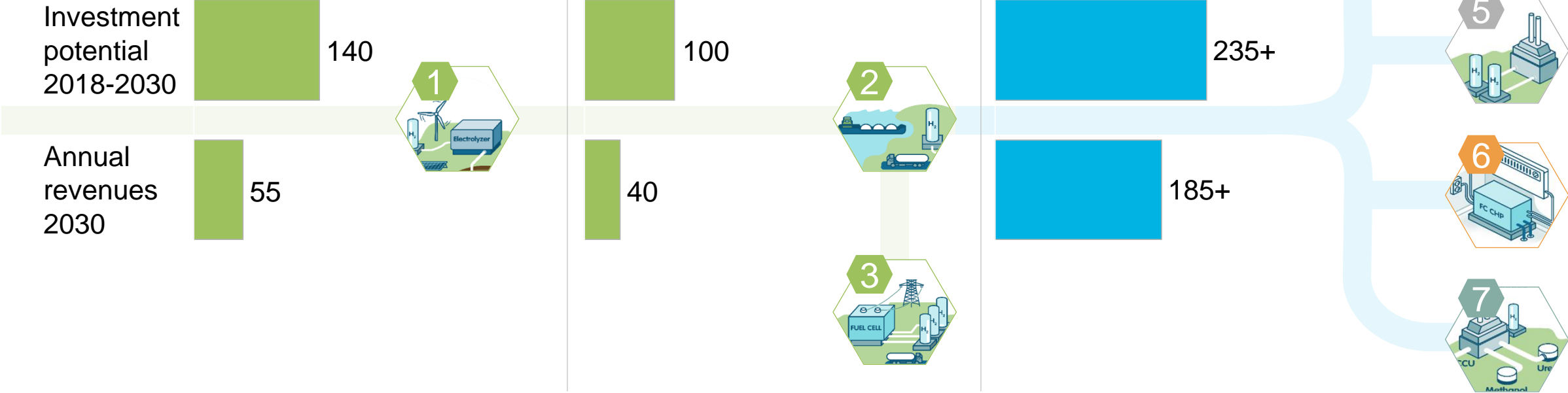
USD billion<sup>1</sup>

Enable the renewable energy system → Decarbonize end uses

Hydrogen production

Storage, transport, and distribution

End-uses in transportation, industry energy, buildings and feedstock



<sup>1</sup> Excluding existing feedstock uses

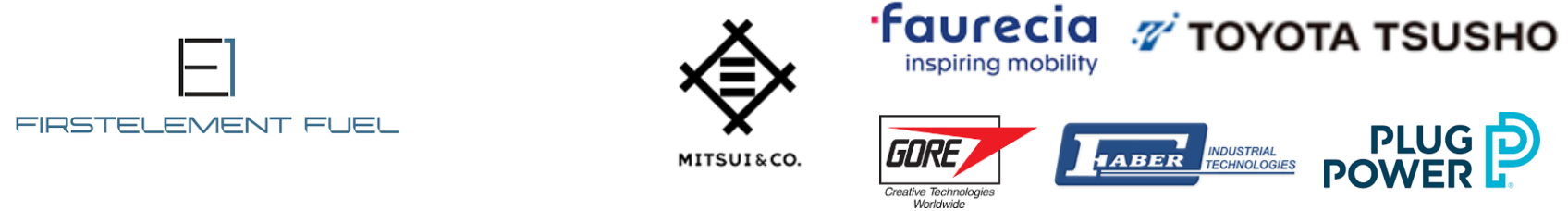
# Hydrogen Council members have started investing and deploying

Enable the renewable energy system → Decarbonize end uses

Hydrogen Council Steering members



Supporting members



Hydrogen Council Details and contacts at [hydrogencouncil.com](https://hydrogencouncil.com)