Hydrogen Council

Hydrogen Council Update: Council Priorities & Hydrogen Cost Report

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DOE Hydrogen and Fuel Cell Technical Advisory Committee

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THE HYDROGEN COUNCIL

THE COALITION

A global CEO-led initiative

Founded at

WORLD ECONOMIC FORUM

Davos 2017

Grown from 13 to

81

Companies

18

Countries

4

Continents

Representing

6

MILLION jobs

€18.7

TRILLION

in revenues

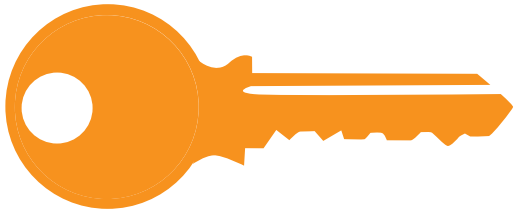
ONE SHARED VISION

Member company data as of January 2020

A STRONG & DIVERSE GROUP

OUR VISION

Hydrogen has a key role to play in the energy transition



Based on **real industry data**, the Council sees hydrogen as an enabler of the future energy system, growing its role over time and delivering tangible benefits:

By 2030

H_2 scales up to achieve competitiveness

- ✓ Cost falls sharply, making hydrogen a competitive low-carbon option across 22 applications – equivalent to 15% of annual global energy demand

By 2050

H_2 reaches full potential

- ✓ 6 GT of CO_2 abatement annually
- ✓ 30 million jobs
- ✓ $2.5 trillion market

Sources:

"Hydrogen, Scaling Up" report, 2017
"Path to Hydrogen Competitiveness" report, 2020

OUR PRIORITIES

1. Bring together key stakeholders to enable investment & large scale projects
-Build a business marketplace
-Stimulate investment

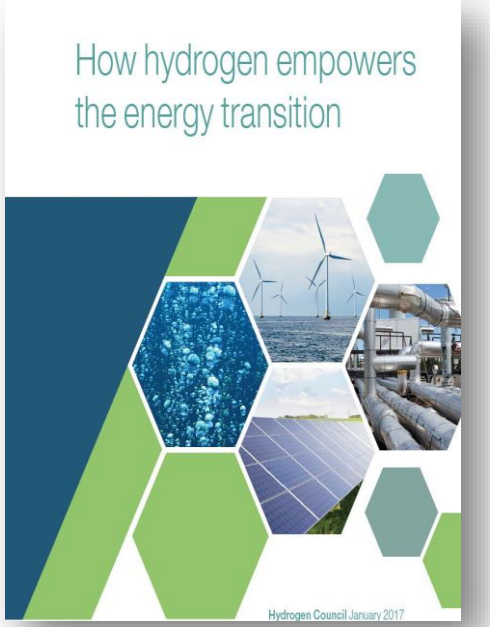
2. Amplify the voice of hydrogen worldwide
-Understand hydrogen perception & challenges
-Address issues & leverage new/broader opportunities

3. Guide policymakers toward appropriate regulations
-Identify key policies & technical recommendations
-Influence through key organizations

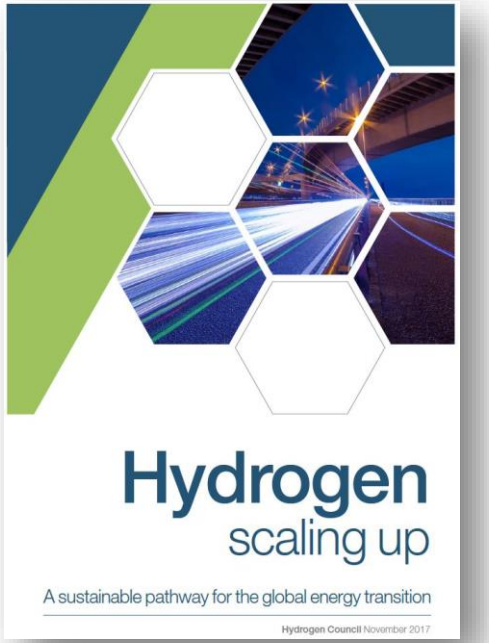
4. Ensure transversal coverage of safety topics globally
-Close safety/standards gaps
-Reputation management and crisis preparedness

MAKING THE CASE FOR HYDROGEN

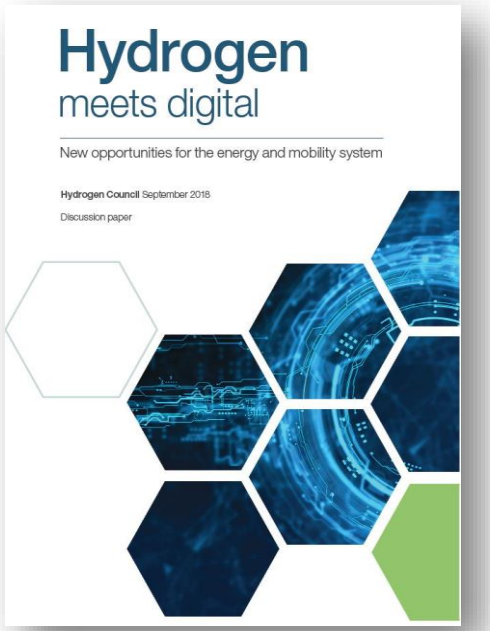
The Council creates studies on the use, development and deployment of hydrogen across sectors and industries. These studies further our understanding of **how to make the hydrogen economy a reality through concrete data provided by Council members** and informed conversations with key stakeholders around the globe. All studies are available **here**.



Explores the role of hydrogen in the energy transition and offers recommendations to help accelerate deployment | LINK



Discusses the feasibility of our 2050 hydrogen vision and proposes tangible steps to get there | LINK



Considers how digitization and hydrogen could complement each other in the energy transition | LINK

Presents a cost trajectory for hydrogen to become cost competitive to other low carbon and conventional alternatives by 2030 | LINK

PATH TO HYDROGEN COMPETITIVENESS: A COST PERSPECTIVE

HYDROGEN COUNCIL'S COST STUDY

A Pathway to Competitiveness

- ✓ Detailed cost trajectory
- ✓ Key cost reduction levers analysis
- ✓ Competitiveness of hydrogen applications versus low carbon conventional alternatives by 2030

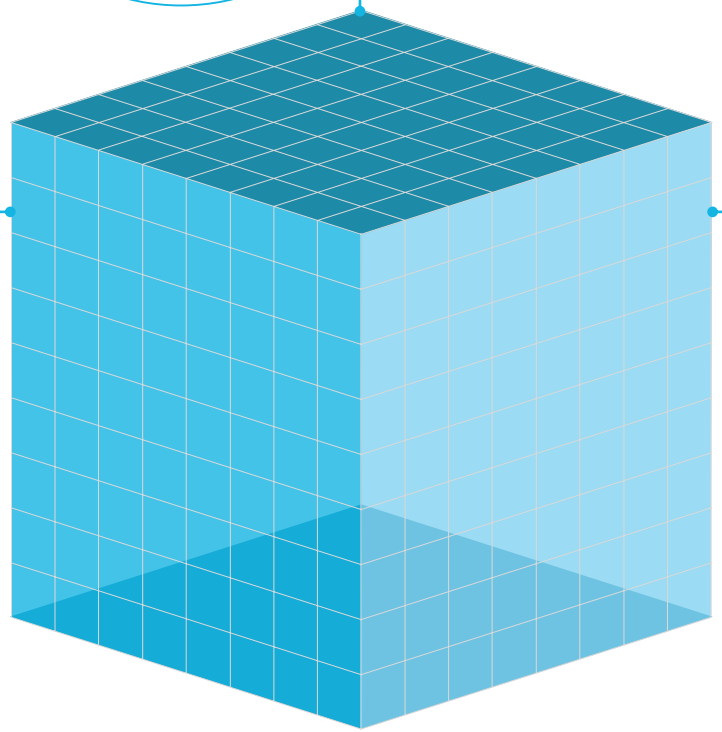
METHODOLOGY

40+
Technologies

Built cost trajectories for hydrogen supply chain from production to end use, compared them with cost targets relative to competing technologies, and identified gaps to close them

35
Applications

Modelled all end uses based on detailed total costs of ownership (TCO) across mobility, heating, power, and industrial feedstock applications



25,000
Data points

Aggregated and analysed clean team data from 30 companies across 4 regions (EU, US, Japan/Korea, China) on the cost/performance trajectory for hydrogen

KEY TAKEAWAYS

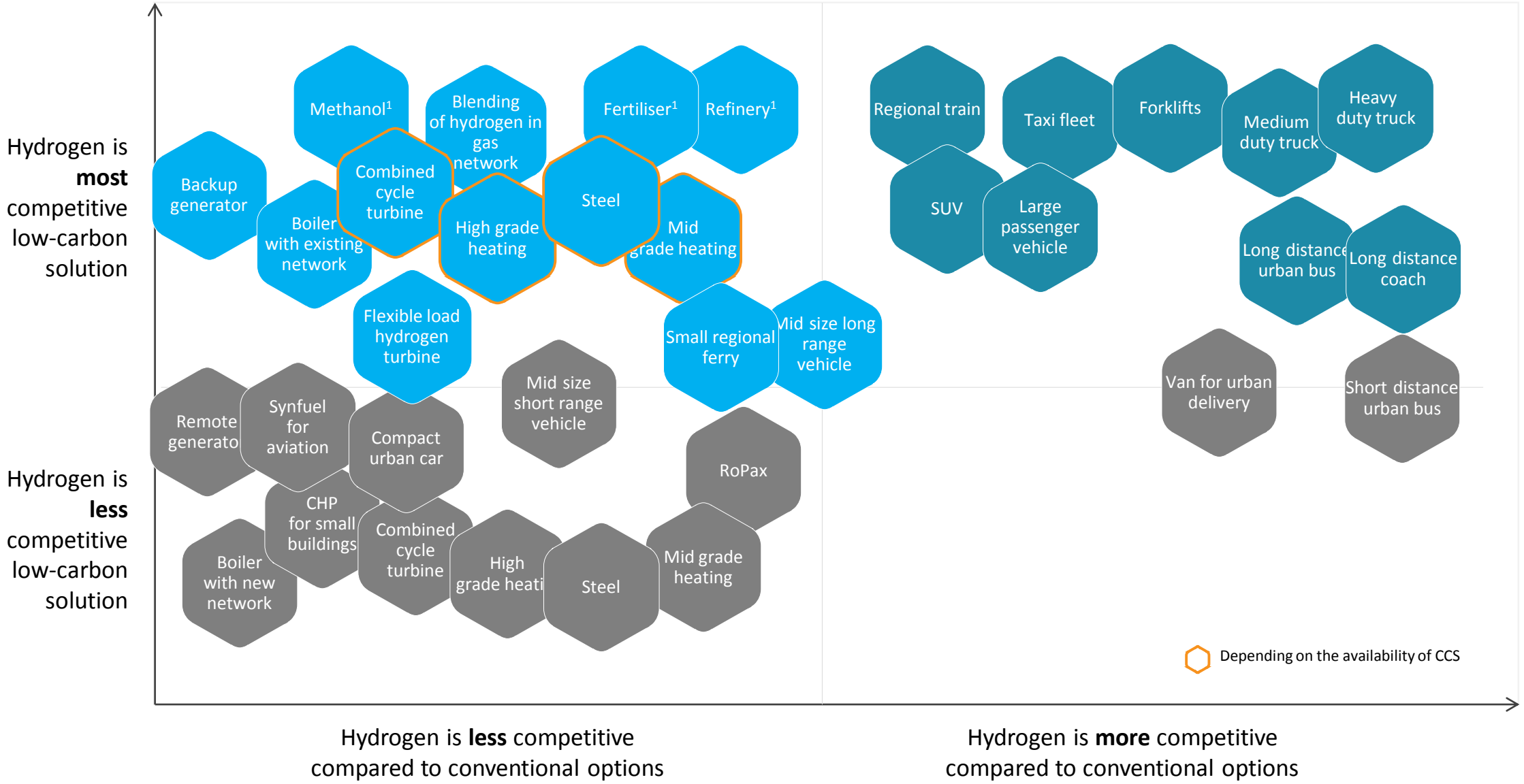
Hydrogen becomes cost competitive…

- Cost of hydrogen production projected to decrease by up to 50% by 2030 for several applications
- For 22 applications, hydrogen can become cost competitive to other low-carbon alternatives, representing 15% of global energy consumption

…Through scale up that impacts three main cost drivers

1. Decreased cost of producing low carbon and renewable hydrogen
2. Lower distribution and refueling costs thanks to higher load utilization and scale effect on infrastructure utilization
3. Decreased cost of components for end-use equipment under scaling up of manufacturing

COMPETITIVE APPLICATIONS

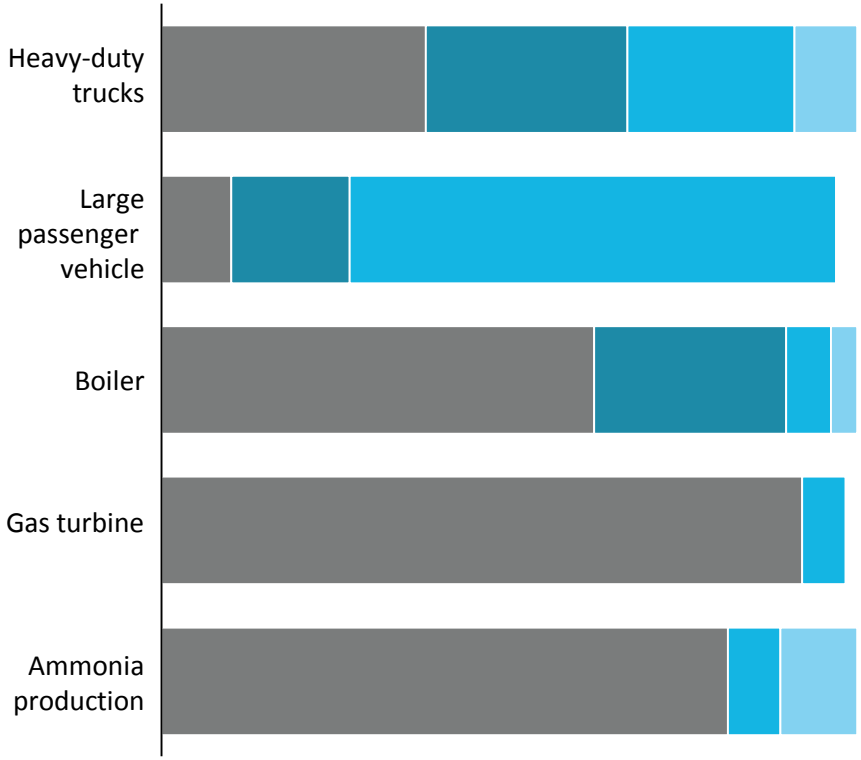


1. Hydrogen is the only alternative and low-carbon/renewable hydrogen competing with grey (optimal renewable or low-carbon shown)

COST REDUCTION LEVERS

Cost breakdown of hydrogen applications

Percentage of total cost 2020



Cost drop 2020-30,

Percent

Cost reduction levers to reach target

-50%	Scale-up of full supply chain Industrialisation of fuel cell and hydrogen tank manufacturing
-45%	Industrialisation of fuel cell and hydrogen tank manufacturing Scale-up and utilisation of HRS
-45%	Lower-cost hydrogen from renewables Higher pipeline network utilisation due to scale-up of demand
-35%	Scale-up of system size and manufacturing of electrolysers for green hydrogen production
-45%	

Hydrogen production[1] Hydrogen distribution Equipment capex Other opex

1. Assumes 50/50 blend of low-carbon and average renewable hydrogen

SCALING UP REQUIREMENTS

	Segment	What needs to be achieved		Required premium to 2030, USD bn
HYDROGEN SUPPLY	**Renewable hydrogen**	**Renewable production scale up** to cost parity with grey in countries with favourable renewables	**70 GW**	20
	Low-carbon hydrogen	**Low-carbon production at scale** until cost parity with grey	**~10 Mtpa** in 2030	6
	Transportation	**Distribution and refuelling station** network scale up	**20,000** HRS	10
		Manufacturing scale-up	**3 m** FCEVs	20
HYDROGEN APPLICATIONS	**Heat and power for buildings**	**Network and gas boilers** upgrades, fuel cost gap bridged	**6m** households	10
	Heat and power for industry	**Fuel cost gap** bridged	**115 Twh** in 2030	7

Supporting regulation to embed USD 50/t CO_2 by 2030

THE TIME TO ACT IS NOW

5 Principles to act now to create a market and accelerate a path to competitiveness

Reduce demand uncertainty

Reduce uncertainty, e.g. with long-term offtake agreements, feed-in tariffs, ZEV targets, captive demand

Scale

Focus on solutions with biggest 'improvement-for-investment', e.g. fuel cells and tanks

Complementarity

Deploy applications that start 'virtuous cycles' and positive spillover effects, e.g. hydrogen infrastructure on airports for refuelling, heating and power

Utilisation

Focus on increasing utilisation of assets, e.g. through aggregation of demand and synchronisation of deployment

Low-cost production

Push scale-up of hydrogen production, e.g. with ~40 GW of electrolysers, renewable hydrogen can out-compete grey in select areas

Hydrogen Council

Thank you for your time!

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