



Globalisation, Innovation and Connectivity

Hydrogen, an enabler for a zero-emission society

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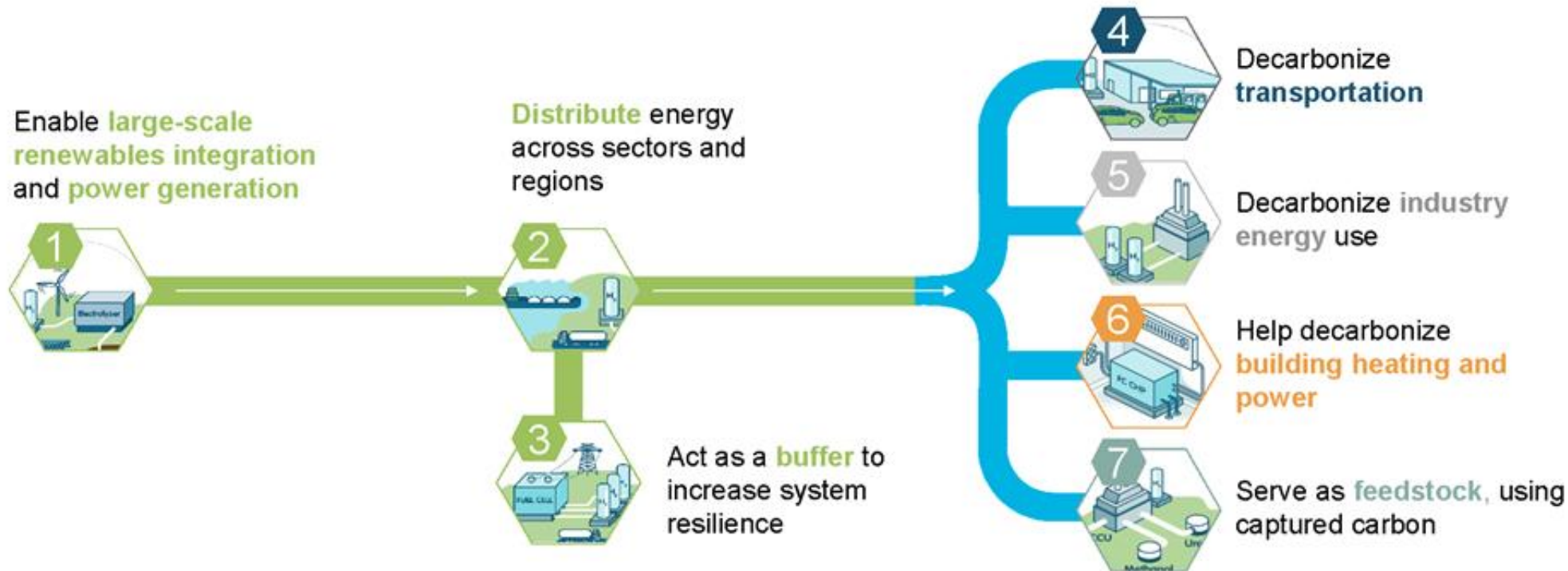
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The energy transition creates multiple challenges the 7 roles of Hydrogen

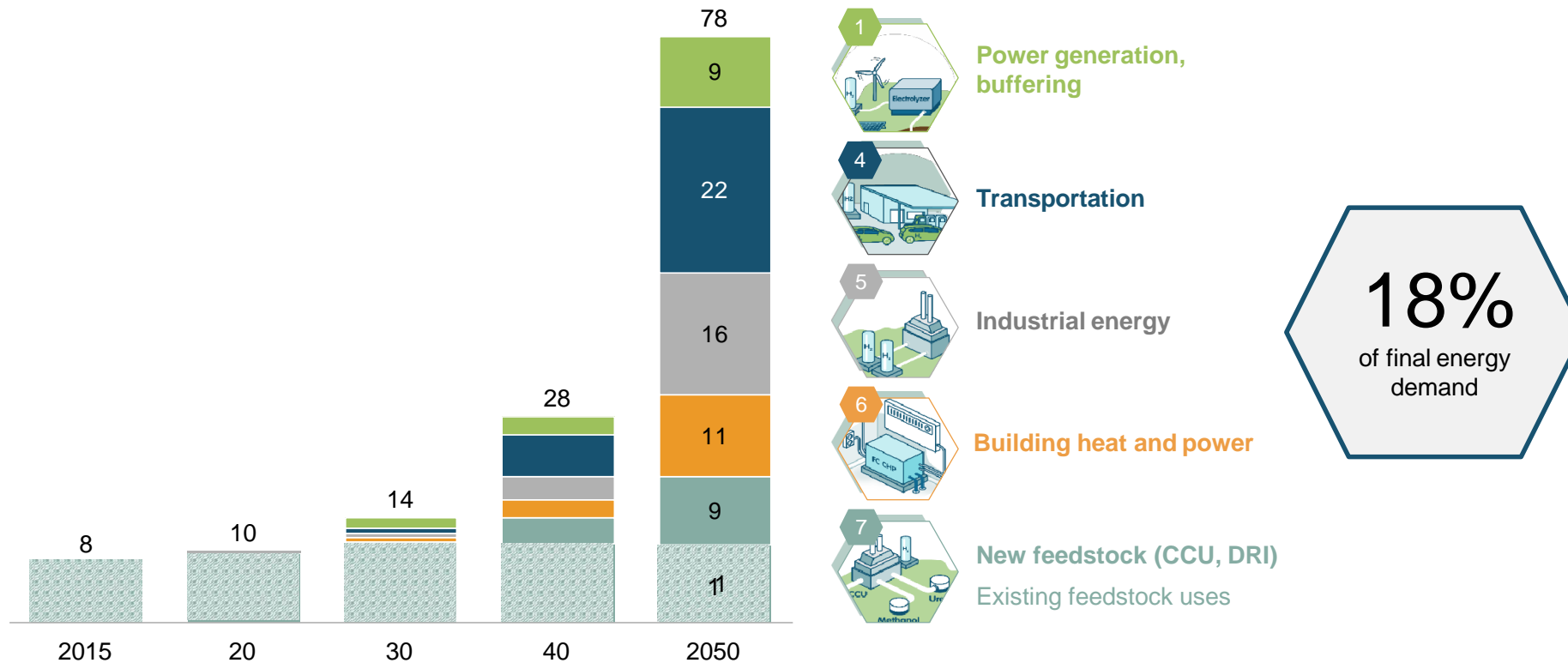
Enable the renewable energy system —————> Decarbonize end uses —————



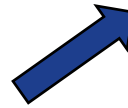
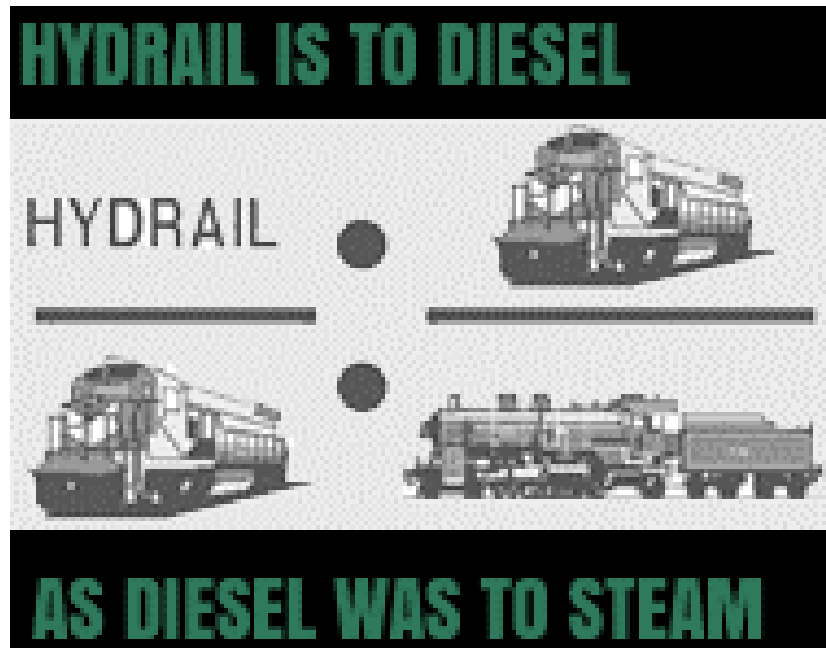
The energy transition creates multiple challenges

In a 2-degree-world, hydrogen could contribute ~18% of demand by 2050

Potential global energy demand supplied with hydrogen, Exajoule (EJ)



Hydrogen trains (Hydrail)



Hydrogen trains (Hydrail)

Motivation & technology options for CO₂-free non-electrified rail transport



Significant part of the **rail network not electrified**

Emission-free trains for lines
without catenary



Increasing prices for diesel and traction current
in the medium and long term

Alternative to fossil fuel



Legislation and expectations on **air quality** and
noise reduction

Emission and noise reduction



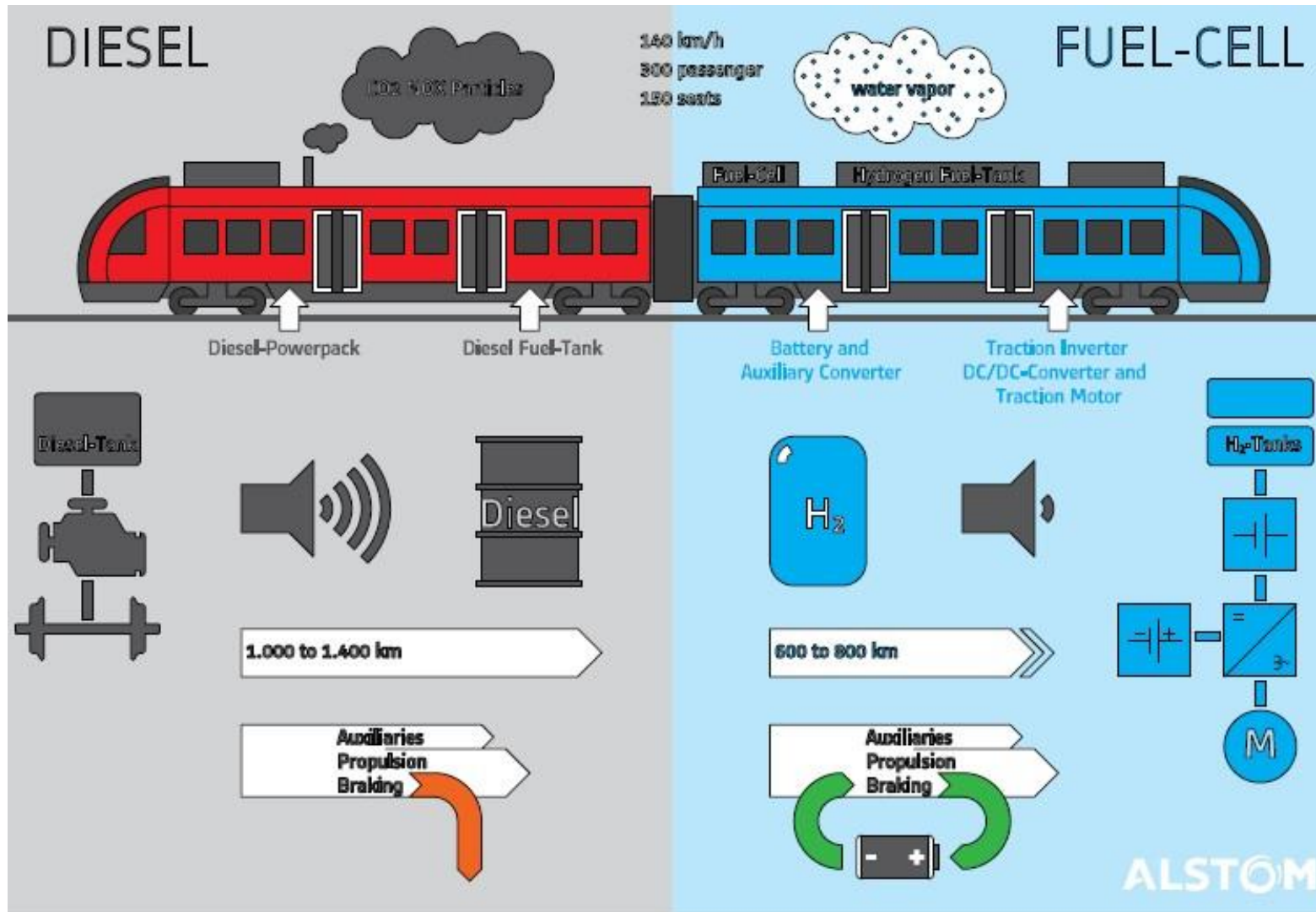
Less acceptance and political discussion
about **ban of diesel** in **urban areas**

Compliant technology



Alstom answers this challenge with the hydrogen powered Coradia iLint

Multiple activities since the early 90s



Parameter	Type	LINT 54	LINT 41 (EVb)
Propulsion		Diesel	Fuel cell
V _{max}		140 km/h	140 km/h
Engine power		2 x 390 kW 3 x 390 kW	2 x 200 kW
Onboard power for propulsion & auxiliary systems		780 kW 2 x 390 kW	850 kW 2 x 200 kW Fuel cell + 2 x 225 kW battery peak: 1.300 kW
alternative option		1.170 kW 3 x 390 kW	
Passenger capacity		327	327
I. Seats		138 - 180	138
I. Standing 4P/m ²		149 - 189	189
Hydrogen tank volume		2 x 800 l	178 kg
Reach		ca. 1,600 km	ca. 600-800 km*



HYDROGEN, AN ENABLER FOR A ZERO-EMISSION SOCIETY

Further information



- **FCH 2 JU** : www.fch.europa.eu



- **HYDROGEN EUROPE** : www.hydrogeneurope.eu



- **HYDROGEN EUROPE RESEARCH** : www.nerghy.eu



- **CEA Litén** : <http://liten.cea.fr>

