

## **WE CAN GREEN**

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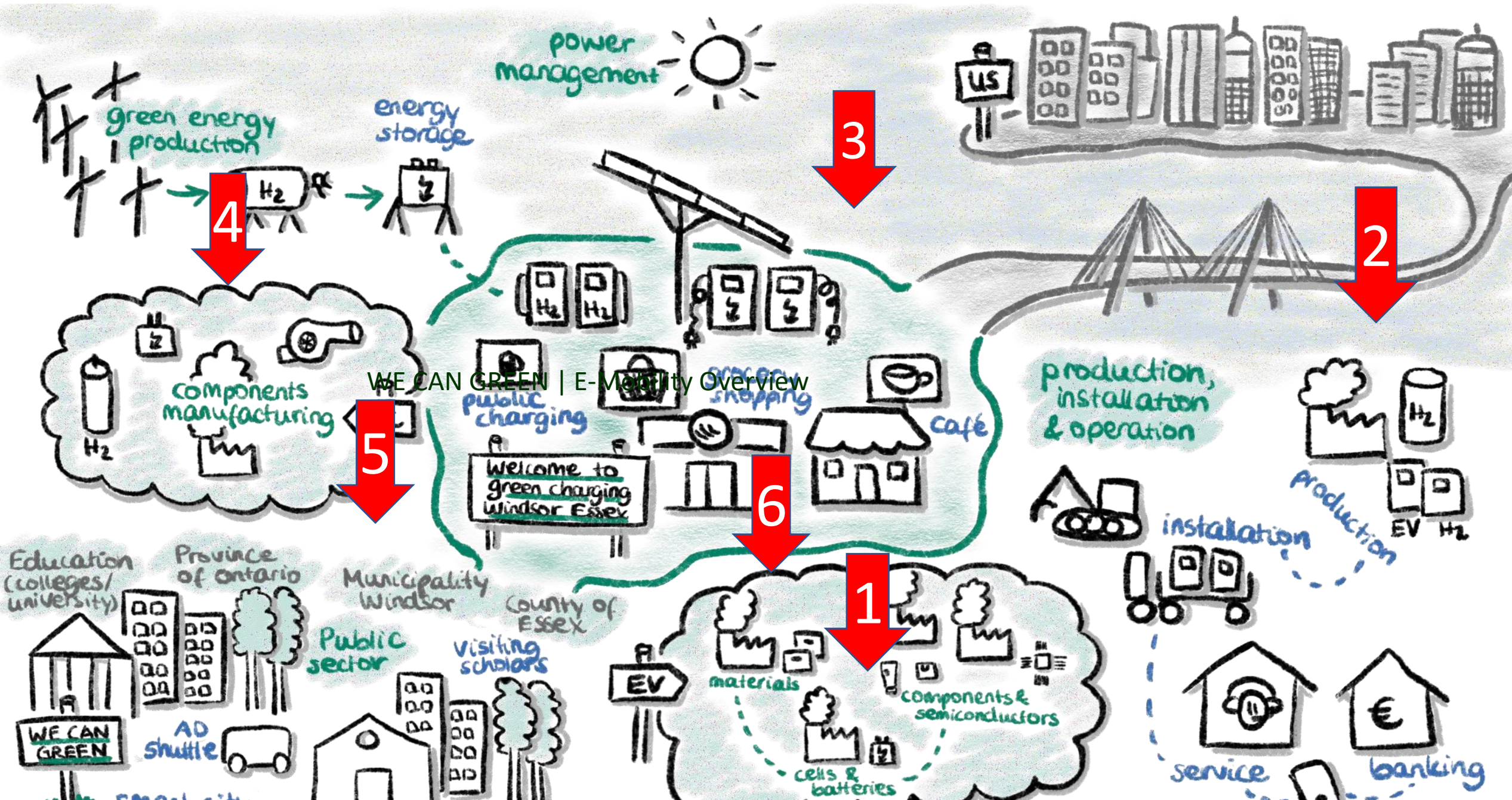


**E-Mobility must be done with a holistic approach and a common strategy.**





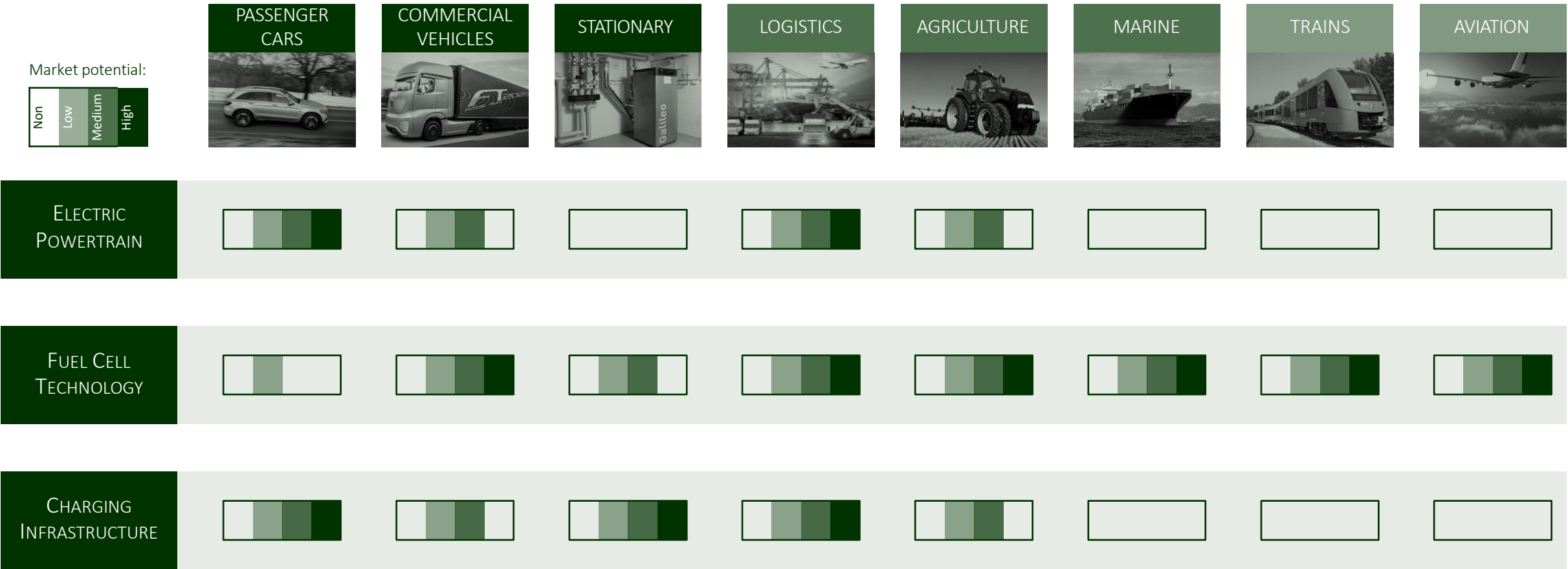
# WE CAN GREEN | E-MOBILITY OVERVIEW





# WE CAN GREEN | E-MOBILITY OVERVIEW

Which technologies will play a major role in WE’s main industries in the future and thus deserve a closer look?



Due to its special geographic location, private as well as commercial road, marine traffic and agriculture are predominantly interesting for Windsor-Essex; furthermore, stationary energy storage recently got a legislative boost.

# WE CAN GREEN | E-MOBILITY OVERVIEW

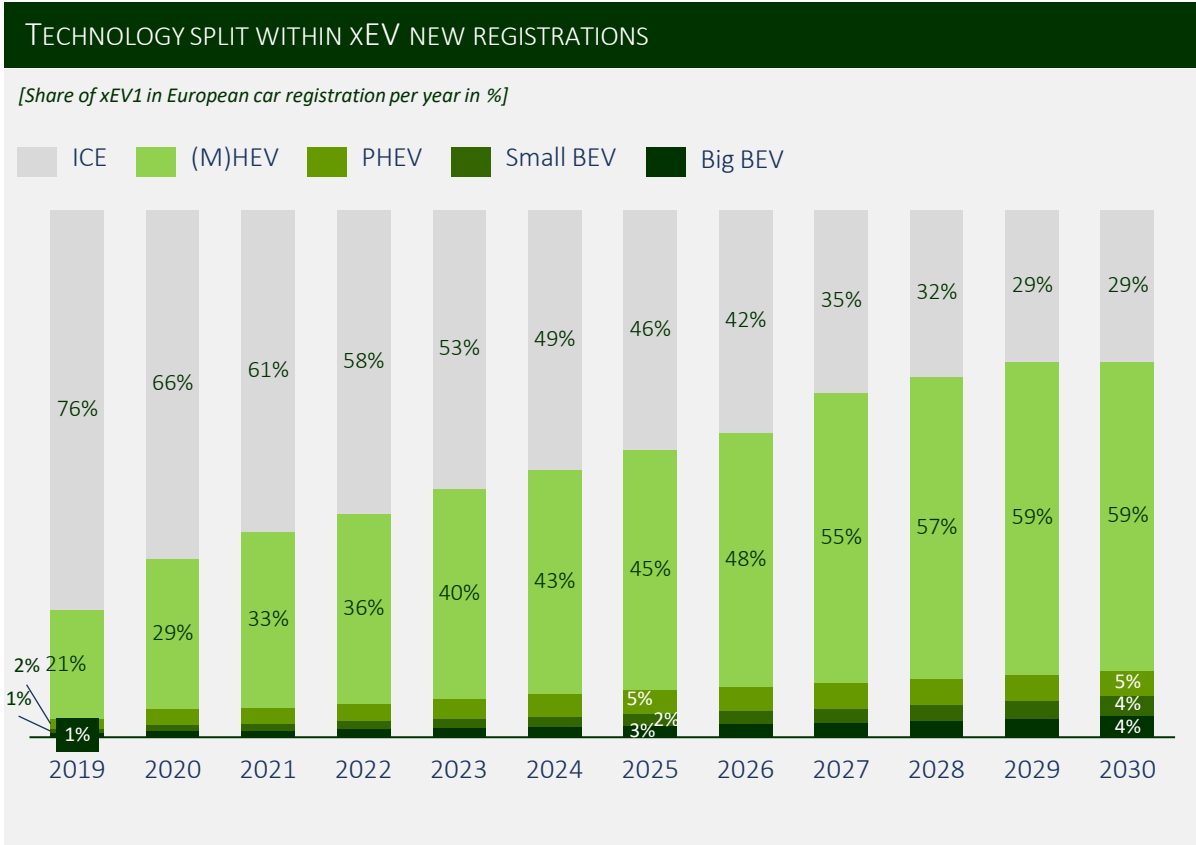
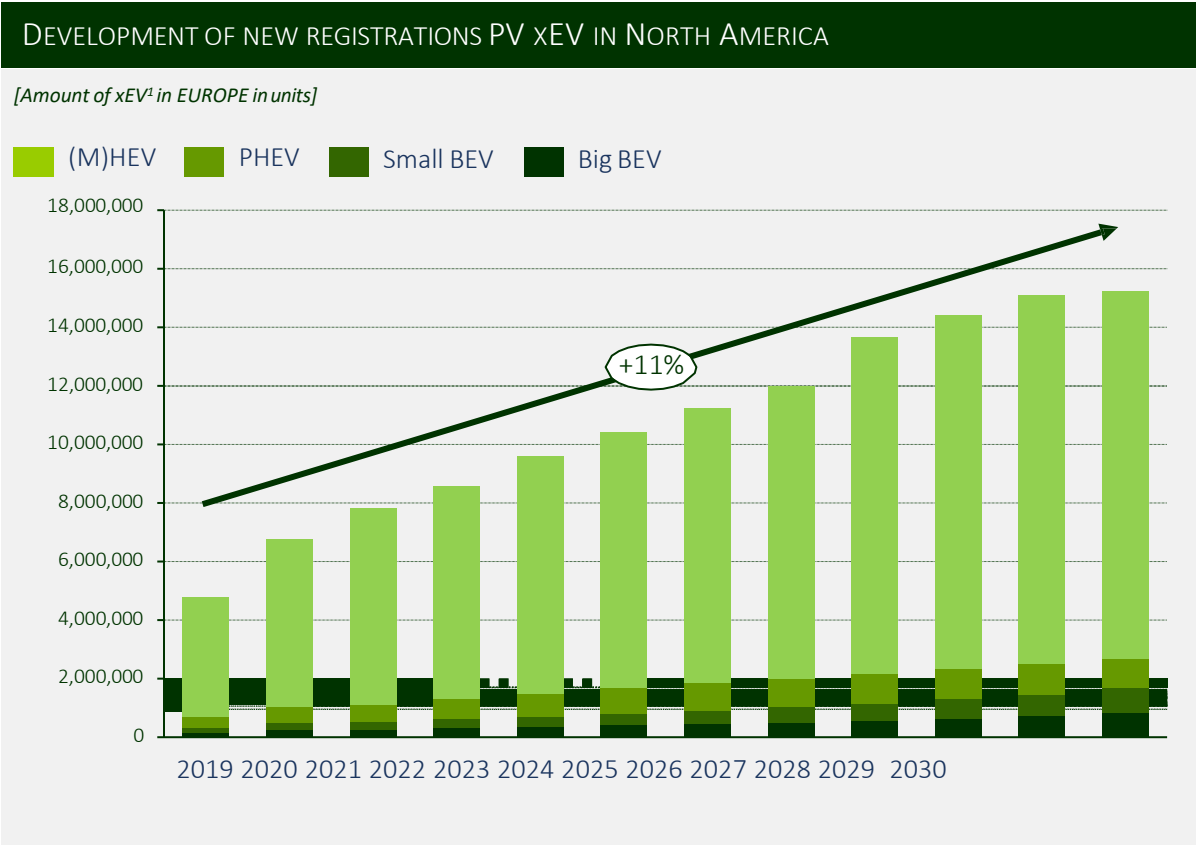
There is a clear division between battery electric vehicles and fuel cell: the heavier and bigger the target vehicle gets; the more feasible hydrogen evolves.

Use cases	Segments	Techn. relevance e-powertrain	Core drivers
	CAR	 Penetration <u>battery electric</u> applications	CO <sub>2</sub> regulation & TCO
	Urban vehicle, segment A-C		
	Long-range vehicle, segment D-S+J		
	Vans/transporters, segment M+N		
	TRUCK		CO <sub>2</sub> regulation & TCO
	Light-duty truck (LDT)		
	Medium-duty truck (MDT)		
	Heavy-duty truck (HDT)		
	BUS		Inner-city driving restrictions & TCO
	City bus (12 / 18 m)		
	Coach		
	MARINE		CO <sub>2</sub> regulation
	Cruise	 Penetration <u>fuel cell</u> applications	
	Ferry		
	Military		
	Commercial		
	Merchant		
	CONSTRUCTION		CO <sub>2</sub> regulation & TCO
	Mining		
	Agriculture		
	Construction/Cranes		
	Forklifts		
	RAILWAY		CO <sub>2</sub> regulation
	Trains		

REGULATORY DRIVERS AND CUSTOMER AWARENESS FOR “GREEN PRODUCT OFFERS” PUSH ELECTRIFICATION IN COMMERCIAL SEGMENTS. STRONG POTENTIAL OF COMBINED POWERTRAIN SOLUTIONS FOR HEAVY DUTY AND LONG-HAUL APPLICATIONS.

# WE CAN GREEN | ANALYSIS: ELECTRIC POWERTRAIN

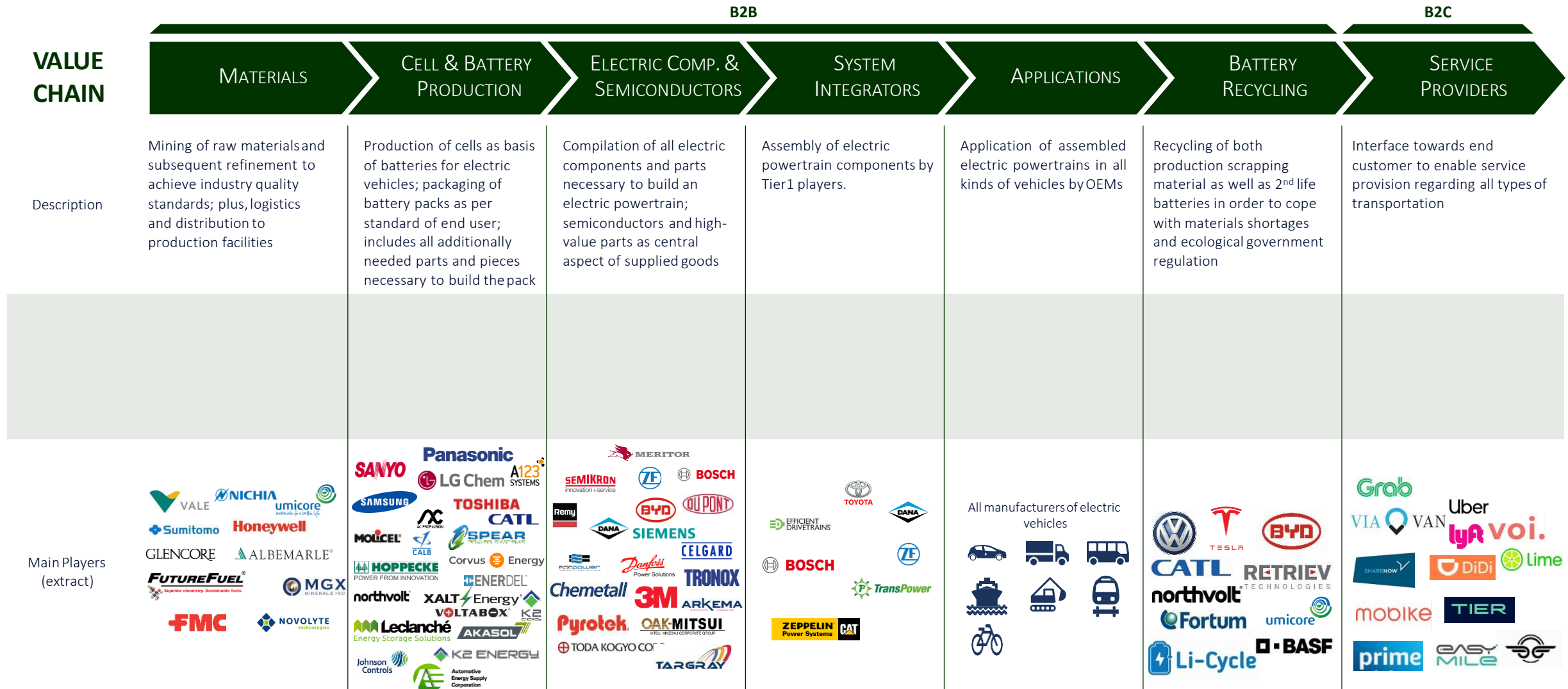
The development of new registrations and market stock of the passenger vehicle market in North America shows a strong increase in demand for batteries towards 2030.



▶▶ CAGR of the xEV market towards 2030 is approximately 11%; around 70% of new registrations in 2030 will be (partly) electrified; BEVs will account for approximately one tenth of new registrations.













# WE CAN GREEN | ANALYSIS: ELECTRIC POWERTRAIN

Battery recycling marks an interesting part of the cell production cycle and, due to materials shortages, will play an increasing role in the coming years. PEM ramp up factory.



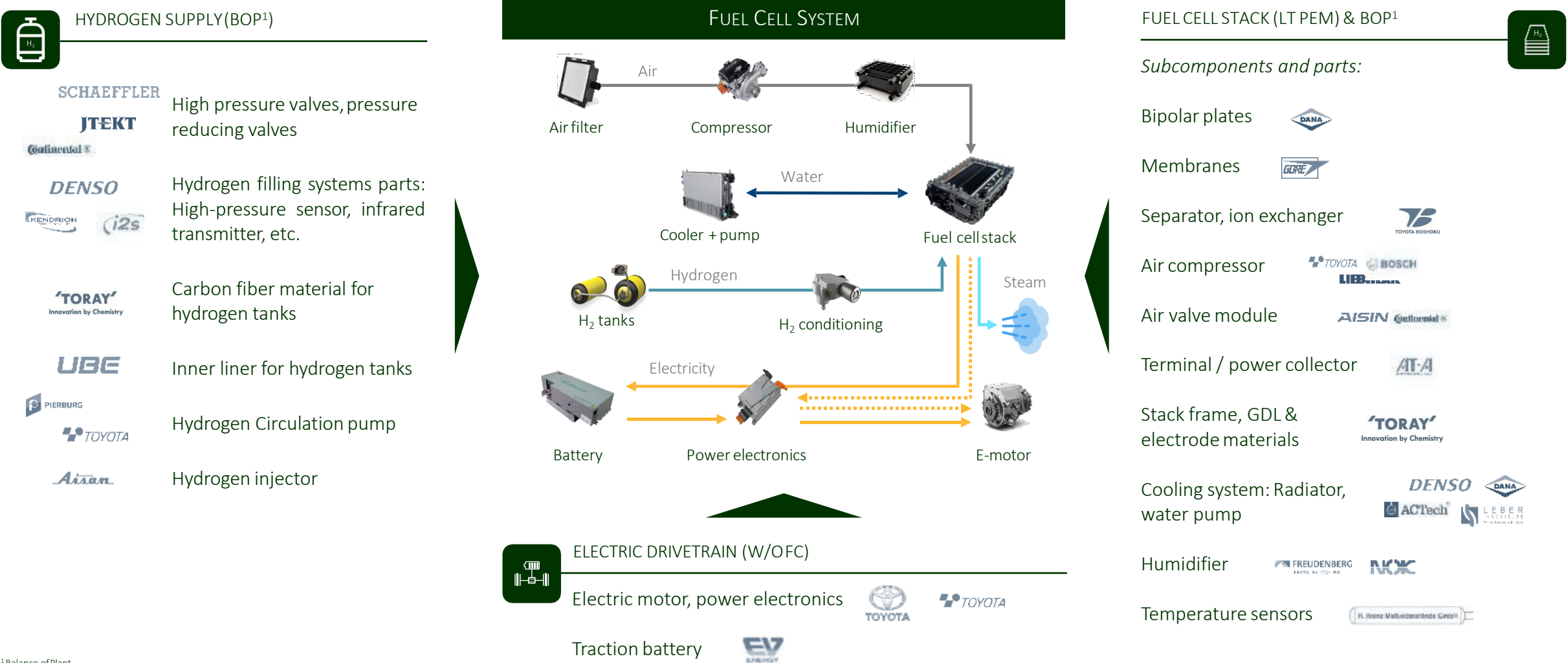
# WE CAN GREEN | ANALYSIS: ELECTRIC POWERTRAIN

Analysis shows that only the first three steps of the ePowertrain value chain are highly relevant for WE, mainly due to focus on generation of localized jobs but also with eyes on already established industry.

VALUE CHAIN	MATERIALS	CELL & BATTERY	ELECTRIC COMPONENTS & SEMICONDUCTORS	
Value-add localized?	✓	✓	✓	<ul style="list-style-type: none"> <li>Strong localization of production as well as R&amp;D expected across all three steps of the value chain</li> <li>Outsourcing of central production steps not expected</li> </ul>
Production localized?	✓	✓	✓	<ul style="list-style-type: none"> <li>Target companies from all three steps of the value chain expected to move overall production site incl. logistics, sales etc. to the new area on Windsor-Essex soil</li> <li>Incentives from WE local government expected to attract mainly medium-sized companies in 2<sup>nd</sup> or 3<sup>rd</sup> range</li> </ul>
Investment Intensity				<ul style="list-style-type: none"> <li>Investment intensity expected to be considerable for all three spheres due to high effort to build up production sites</li> <li>Subsidies from WE government however will thus play an even more decisive role</li> </ul>
Manpower: industry / academic	 	 	 	<ul style="list-style-type: none"> <li>Materials mining and refurbishing as well as cell and battery pack production usually focus rather on blue than white-collar workforce</li> <li>With increasing technological effort included in production of e.g., semiconductors, the number of white-collar workers necessary equals the blue one</li> </ul>
Building Land				<ul style="list-style-type: none"> <li>Build-up of a whole new factory obviously consumes the highest amount of building land</li> <li>Refinement and logistics for materials needs considerably less space, but still relevant demand</li> </ul>

# WE CAN GREEN | ANALYSIS: FUEL CELL TECHNOLOGY

Critical components of fuel cell stack resemble existing manufacturing industry in WE; in addition to new players, established companies need to be incentivized to build up H2-relevant knowledge and abilities.

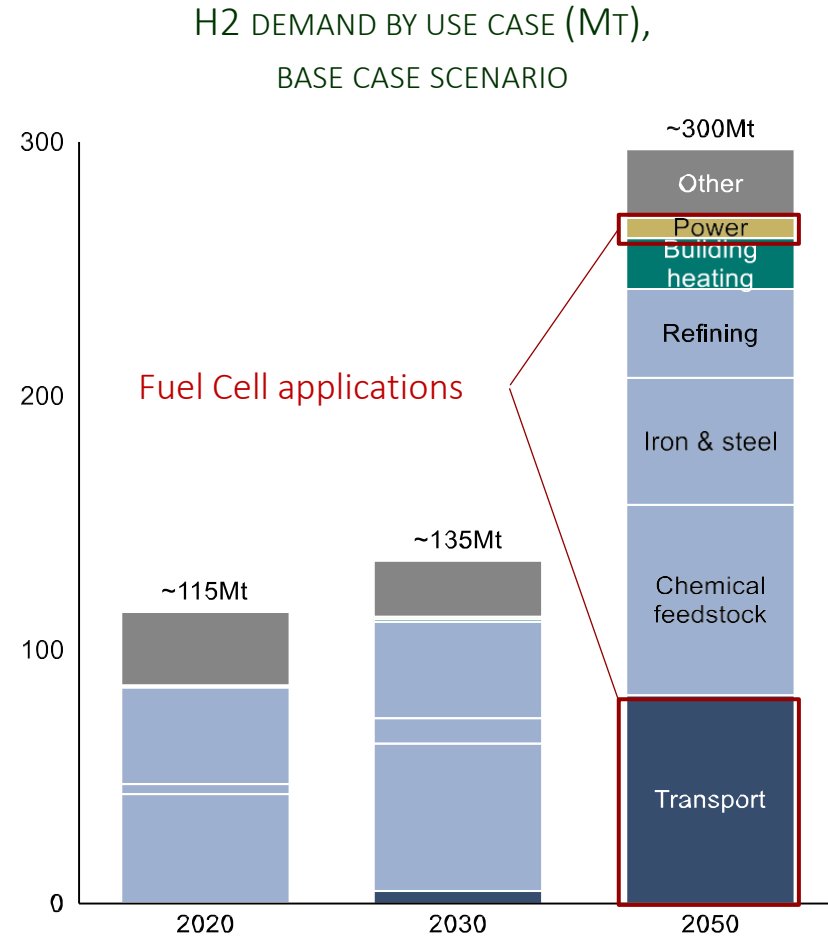


<sup>1</sup> Balance of Plant



# WE CAN GREEN | ANALYSIS: FUEL CELL TECHNOLOGY

Serving already today as an integral supply good for steel or chemical industry, hydrogen will profit strongly from the growing importance of the transport sector, especially in North America.



Regulatory support and investment-stimulating activity in H<sub>2</sub>

- Governmental growth stimulation through policies, subsidies, CO<sub>2</sub> taxes with >\$50B in future commitments to date
- Companies are committing resources to H<sub>2</sub> with >\$20B announced capital to date



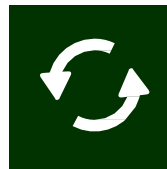
Relative economics of H<sub>2</sub> improve

- Costs of producing 'Green' H<sub>2</sub> has fallen by ~40% since 2005 to ~\$4-4.5/kg
- CAPEX for H<sub>2</sub> production (electrolysis) is forecast to decrease by ~40% by 2030, costs are thus forecast to fall below ~\$2/kg by 2050



Customers adopt H<sub>2</sub> for growing range of use cases

- New use cases are emerging for H<sub>2</sub> (e.g., heating, storage, transit)
- Players are piloting solutions (e.g., Shell, FMG) through partnerships and establishing new business models (e.g., Hyundai Hydrogen Mobility)

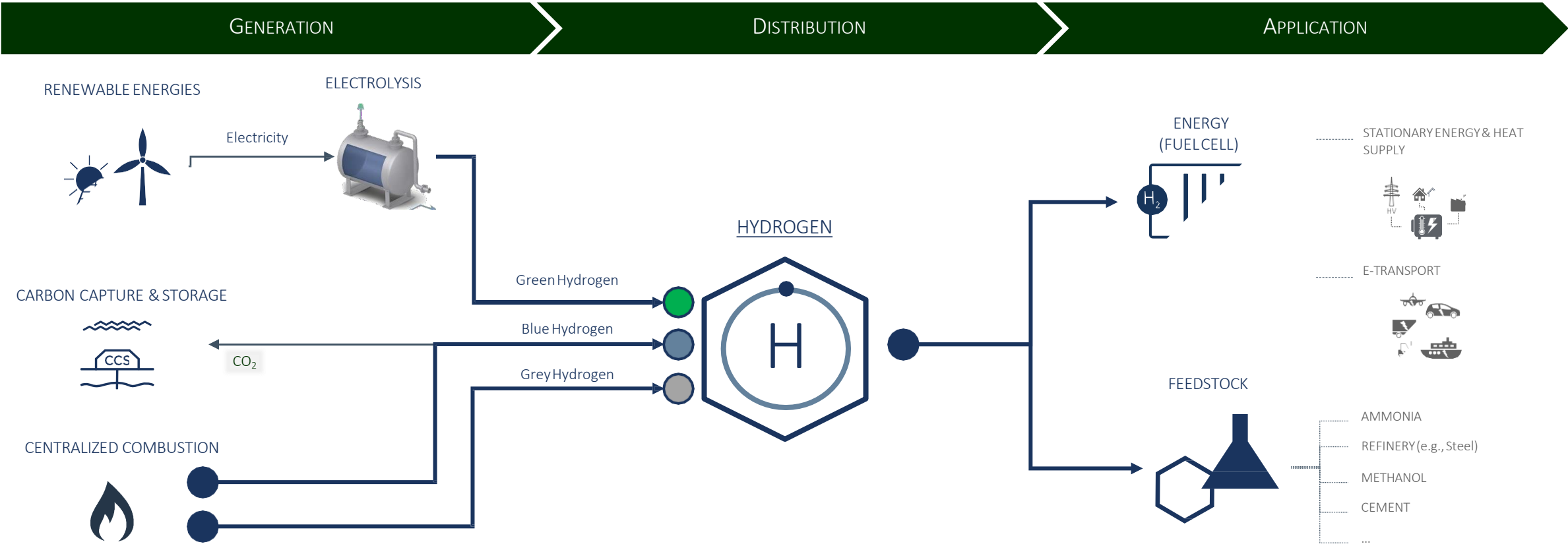


Substitution risk from other technologies is low

- H<sub>2</sub> forecast to become cost-competitive vs. other low-carbon alternatives by 2030, no new viable alternatives exp. to emerge for industrial feedstock use
- FCEV adoption for HDV and long-range transport is forecast to increase, while BEVs expected to remain preferred option for LDVs

# WE CAN GREEN | ANALYSIS: FUEL CELL TECHNOLOGY

The Hydrogen Economy Supply Chain: large scaling potential for hydrogen due to many application fields.



Main Players  
(extract)

nel

thyssenkrupp

McPhy

CUMMINS

SIEMENS

HYDROGENICS

ITM POWER

sunfire

JM

H GREEN HYDROGEN SYSTEMS

SCHAEFFLER

DENSO

TORAY Innovation by Chemistry

PIERBURG

TOYOTA

Continental

SKENDRION

i2s

UBE

JTEKT

Aisin

DENSO

DANA

ATA

GORE

TOYOTA BOSCH

AININ

ACTech

LEBER

TORAY Innovation by Chemistry

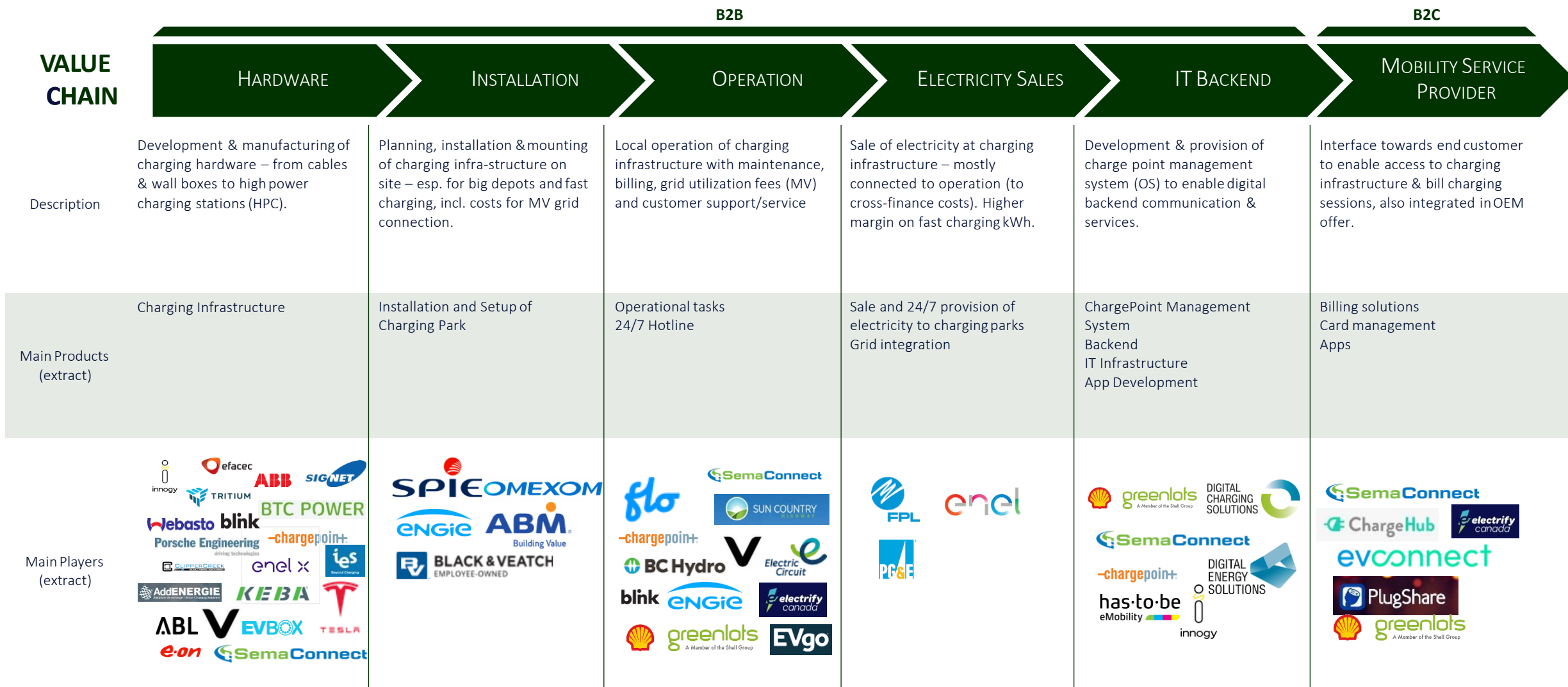
LIEBHERR

TOYOTA

NAK

# WE CAN GREEN | ANALYSIS: CHARGING INFRASTRUCTURE AND TECHNOLOGY

There is a consistent difference between the first and the second half of the charging value chain: whereas the first steps require localization, the following steps tend to be rather remotely operating.





# WE CAN GREEN | ANALYSIS: CHARGING INFRASTRUCTURE AND TECHNOLOGY

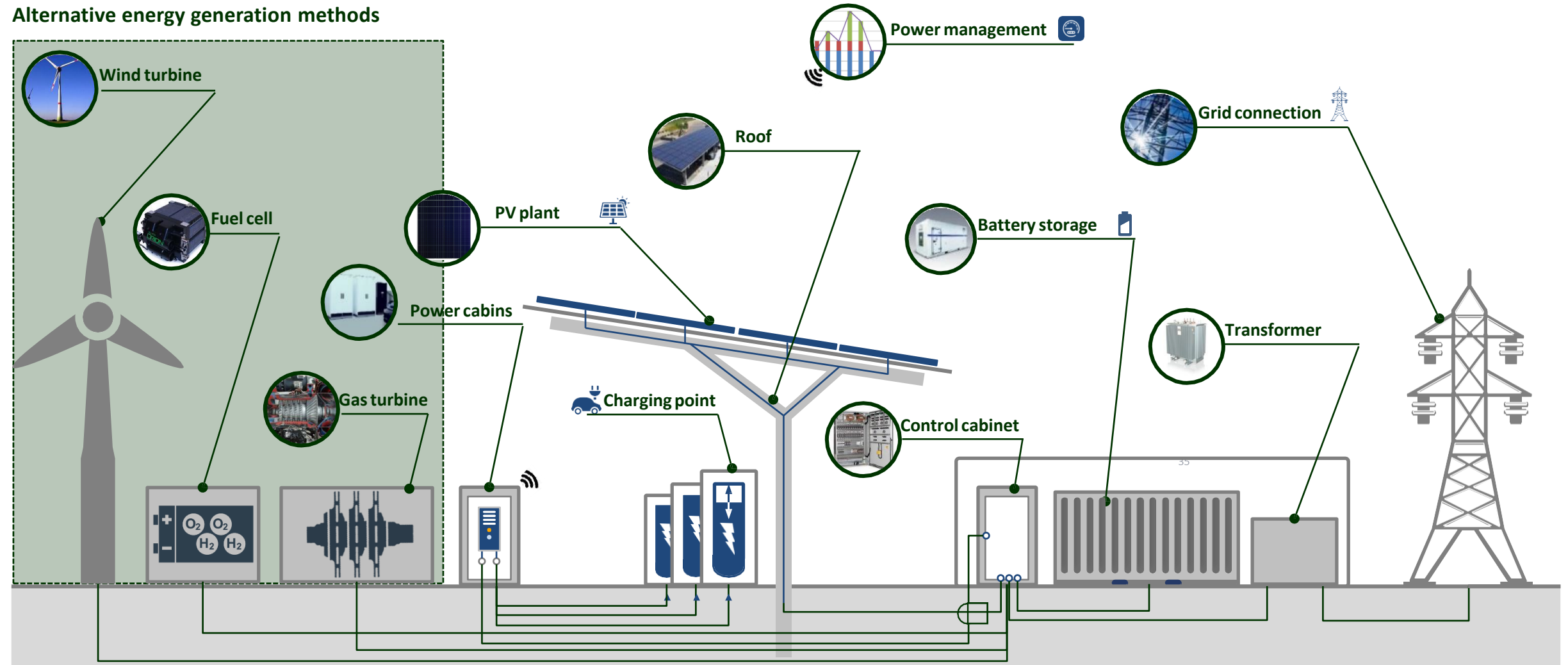
Analysis shows that only the first three steps of the charging infrastructure value chain are highly relevant for WE, mainly due to focus on generation of blue/ white collar local jobs.

VALUE CHAIN	HARDWARE	INSTALLATION	OPERATION	
Value-add localized?	✓	✓	✓	<ul style="list-style-type: none"> <li>Strong localization of production as well as R&amp;D expected across all three steps of the value chain</li> <li>For installation and operation, production is rather not applicable, but daily operations business will be localized generating jobs in a constant manner</li> <li>Outsourcing to other parts of the world not considered practical</li> </ul>
Production localized?	✓	✓	✓	<ul style="list-style-type: none"> <li>Target companies from all three steps of the value chain expected to move overall production or operations site incl. logistics, sales etc. to the new area on Windsor-Essex soil</li> <li>Incentives from WE local government expected to attract mainly medium-sized companies in 2nd or 3rd range</li> </ul>
Investment Intensity	●	◐	◐	<ul style="list-style-type: none"> <li>Investment intensity expected to be considerably high for production build-up of hardware suppliers</li> <li>Less investment intensity for operation business expected</li> <li>Subsidies from WE government however will thus play an even more decisive role</li> </ul>
Manpower: industry / academic	◐ ◐	◐ ◐	◐ ◐	<ul style="list-style-type: none"> <li>Production of charging park hardware and apparel is considered a rather high-tech business and would potentially also involve local R&amp;D business units besides production facilities</li> <li>Installation and operation seem to be rather blue-collar driven due to manufacturing aspect of daily work; share of white-collar workforce to below</li> </ul>
Building Land	◐	◐	◐	<ul style="list-style-type: none"> <li>Build-up of a whole new production facility obviously consumes the highest amount of building land</li> <li>Installation and operation business requires considerably less space, but still relevant demand</li> </ul>

# WE CAN GREEN | SOLUTION: CHARGING PARK

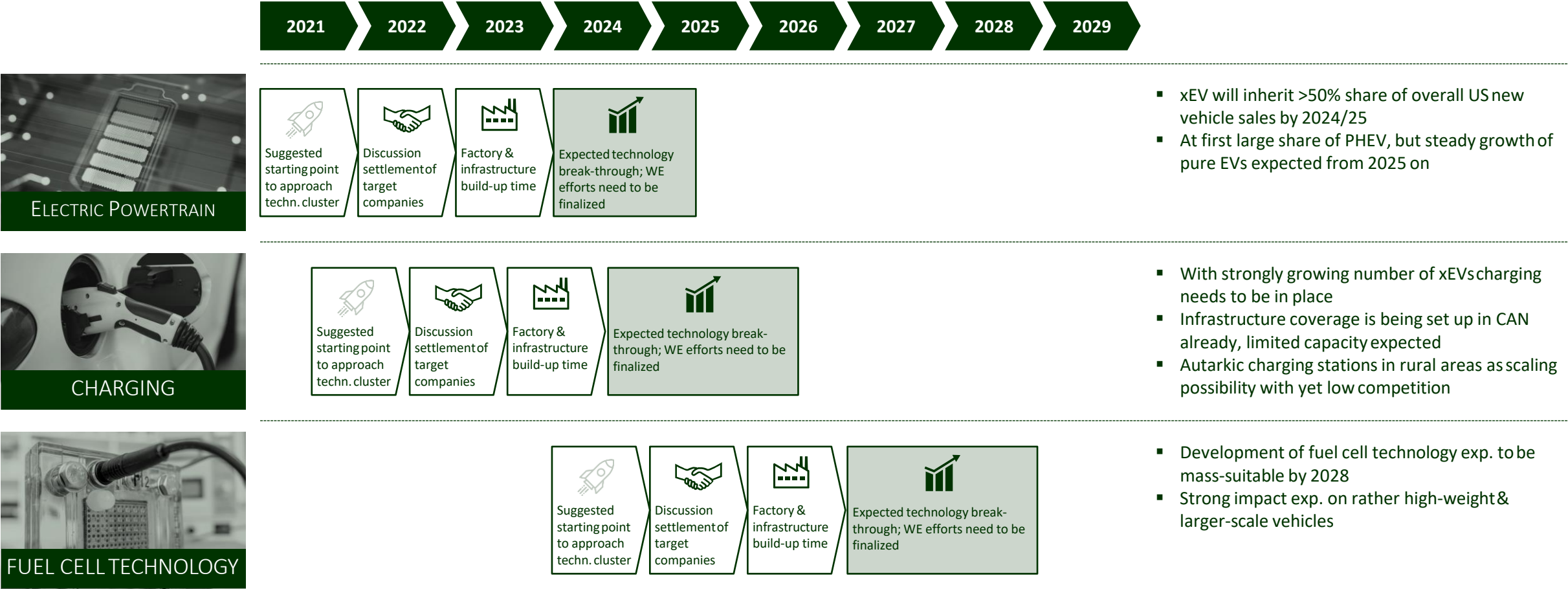
The build-up of a charging park needs to be planned carefully and under a holistic approach incorporating all relevant energy sources, operational devices and safety measures.

## Alternative energy generation methods



# WE CAN GREEN | CONCLUSION

The three industry segments analyzed are in different steps of (global) development and thus need to be viewed separately; entry into ePowertrain industry demands immediate action.





# WE CAN GREEN | NEXT STEPS

The target picture focuses on three main industries and thus requires a series of important tasks to be carried out promptly in order to make WE CAN GREEN a success.

	PROJECT SETUP	INVESTOR ATTRACTION	MARKETING & COMMUNICATION	FUNDING	CHARGING PARK	STRATEGY REFINEMENT
Urgent next steps	<b>I. Development of project plan &amp; timeline for 2021</b> <b>II. Setup of PMO &amp; clear responsibilities</b> <b>III. Definition of KPI set</b>	<b>I. Targeting of ePowertrain companies</b> <b>II. Long &amp; Short Lists of reviewed Companies</b> <b>III. Active approach</b>	<b>I. Communication roadmap for 2021</b> <b>II. Marketing action plan (cross-channel)</b> <b>III. Glossy slide deck</b>	<b>I. Grant action plan in coop. with government &amp; banks</b> <b>II. Promotion fund approach or setup</b>	<b>I. Feasibility study: integrated EV &amp; H2 charging park</b> <b>II. Concept definition</b>	<b>I. Feasibility study: green H2 production plant</b> <b>II. Proof of concept reg. project "BMW stationary energy storage"</b>
Further tasks	<ul style="list-style-type: none"> <li>Assignment of project leads for three main work streams</li> <li>Ongoing (virtual) PMO support over the course of the project</li> </ul>	<ul style="list-style-type: none"> <li>Research reg. hydrogen producers and distributors</li> <li>In-depth research of companies from hardware, installation &amp; operation business</li> </ul>	<ul style="list-style-type: none"> <li>Create clear success stories and insights</li> <li>Establish good press relations in order to boost external picture</li> <li>Organize key marketing events with strong keynote speakers</li> </ul>	<ul style="list-style-type: none"> <li>Establish close cooperation with education sector</li> <li>Enable strong exchange with Detroit bridge council</li> <li>Join efforts with reg. Smart City topics</li> <li>Feasibility study; Windsor-Detroit AD shuttle</li> </ul>	<ul style="list-style-type: none"> <li>In-depth research on regulatory questions</li> <li>Approach of all relevant players</li> <li>Research on planning offices as well as constructors and operators of charging parks</li> </ul>	<ul style="list-style-type: none"> <li>Further considerations reg. focus in terms of factory and academic jobs</li> <li>Consider battery recycling topics in the long term</li> <li>Focus on CATL requirements regarding potential new supplier industry</li> <li>In-depth research on regulatory questions</li> </ul>

## SHOVEL READY SITES:



Shovel ready sites are fully-serviced (electricity, gas, waste, wastewater, telecommunications) and are free of major development constraints\*

Complete a certain level of due diligence including:

- ✓ Environmental site assessments
- ✓ Archaeological assessment
- ✓ Ownership and Title details
- ✓ Property Survey (along with the Plan of Subdivision if applicable)
- ✓ Detailed Zoning and Permitted Uses information
- ✓ Road and rail access
- ✓ Utilities and Servicing letters and maps
- ✓ Maps including topography, developable area and surrounding uses
- ✓ Community Profile

\* Community Incentive Programs - CIP

