

# PIONEERING HYDROGEN

BMW  
GROUP



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# SUSTAINABILITY AT THE BMW GROUP.

- > Sustainability is a key element of the BMW Group's corporate strategy.
- > On the path to net zero we have set ourselves ambitious and science-based CO<sub>2</sub> targets for the near-term. The BMW Group intends to reduce its CO<sub>2</sub> emissions by a total of at least 40 million tons of CO<sub>2</sub>e in 2030 compared to 2019.

## » ...this requires BMW's technology openness approach:

The use of all available powertrain technologies:  
BEVs and FCEVs next to PHEVs and ICEs.

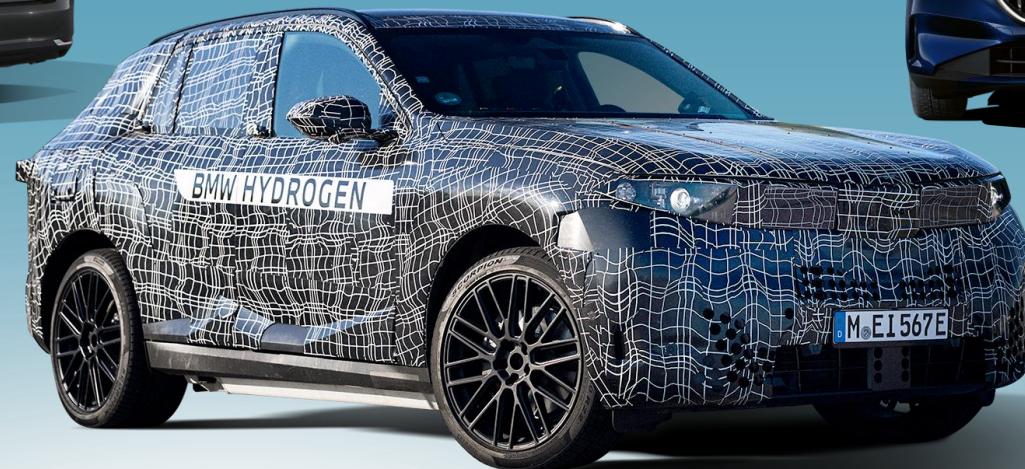
BMW i5  
BEV



BMW 530e  
Plug-In Hybrid



BMW iX5  
Hydrogen



BMW 520i  
ICE



# THE DECARBONIZATION CHALLENGE.



Direct use of electricity  
(grid, batteries)



Industry, machines, tools



Public transport in cities



Urban deliveries



The challenge of  
electrification



Passenger Car, Urban & Commuter



Large passenger cars (long-distance)



# H<sub>2</sub>

Indirect use of electricity  
(H<sub>2</sub>, e-fuels)



Coaches, light commercial vehicles



Heavy-duty trucks



Aviation & maritime



Industry (high heat)

# BATTERY ELECTRIC VEHICLES AND FUEL CELL ELECTRIC VEHICLES COMPLEMENT EACH OTHER.

## » Technology:

Both are electric vehicles – the main difference is: the energy is stored as hydrogen, not as electricity in a battery.



## » Creating options for our customers:

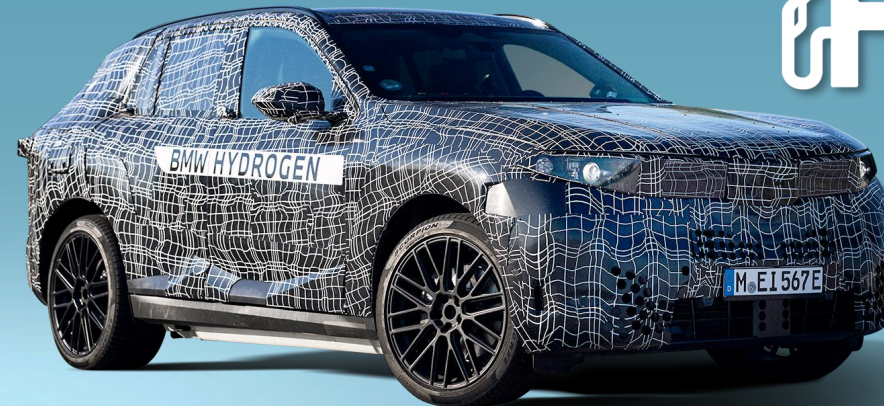
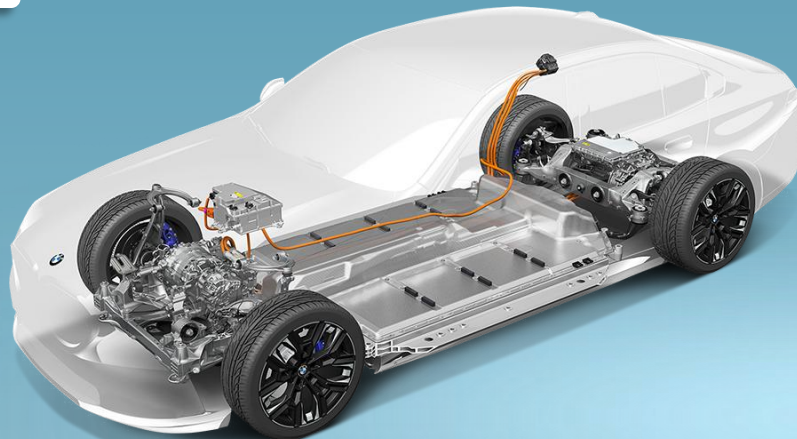
BEVs fulfill most use cases – but not all. FCEV combines best of both worlds: driving like a BEV and fast refueling.



## » Drivetrain diversity increases resilience.

BMW i5 (BEV)

BMW iX5 Hydrogen (FCEV)

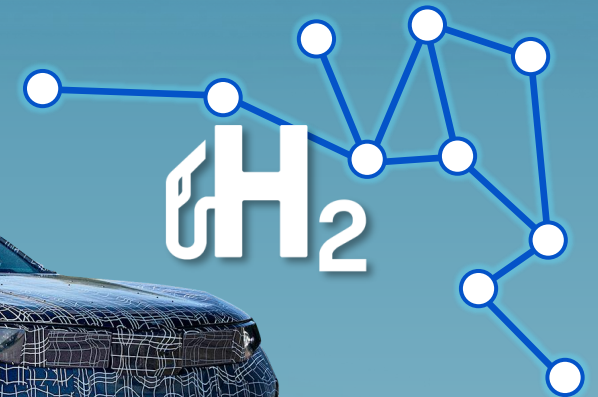


## » Integrated Infrastructure Approach:

The fueling infrastructure must be set up to allow trucks, buses and passenger cars to all refuel at the same stations, maximizing utilization and impact.



Considerable growth in the hydrogen filling station network is essential to achieve breakthroughs in mobility and transport.



# THE EUROPEAN UNION ENSURES A COMPREHENSIVE H<sub>2</sub> REFUELING INFRASTRUCTURE BY 2030, ENABLING THE H<sub>2</sub> BASED MOBILITY.



> **Project AFIR** (Alternative Fuels Infrastructure Regulation):  
The European institutions have agreed to mandate the deployment of electric charging infrastructure and hydrogen refueling infrastructure across all 27 EU member states.

> **European Commission:**  
“[...]AFIR sets **mandatory deployment targets for** electric recharging and **hydrogen refuelling** infrastructure along European roads.”

> < 200 km between H<sub>2</sub> Refueling Station (HRS) on main Transportation Network.

> At least one HRS at every urban nodes.  
(population of 100,000 or more)

> Min Capacity: 1 t/day, 700 bar.

> 100% renewable H<sub>2</sub>.



# HOLISTIC APPROACH OF THE BMW GROUP HYDROGEN STRATEGY IN PRODUCTION, PRODUCT AND LOGISTICS.



» EMBRACING HYDROGEN AT EVERY LEVEL.

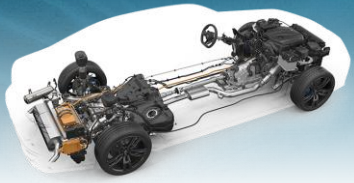
> BMW Group Strategy for Reduced Logistics Emissions.

> Production Plants.

> The new BMW iX5 Hydrogen in 2028.



# TECHNOLOGY OPENNESS APPROACH. FIRST HYDROGEN-POWERED BMW PRODUCTION MODEL IN 2028.



Efficient Combustion Engines



Plug-In Hybrid Electric Vehicle



Battery Electric Vehicle



Fuel Cell Electric Vehicle

> Part of the electrification strategy.

> Follows similar steps as BEV rollout and is based on many years of experience.



MINI E



BMW ActiveE



BMW i3



BMW iX1



BMW i5



BMW iX2



MINI Aceman



BMW i7



Rolls-Royce Spectre



BMW i5 Touring



BMW iX



MINI Cooper SE



BMW iX3



MINI Countryman SE ALL4



BMW iX3



BMW i4



MINI Cooper SE Conv.



NEUE KLASSE

Pilot fleet

1<sup>st</sup> model

Roll-out



BMW iX5 Hydrogen



2028

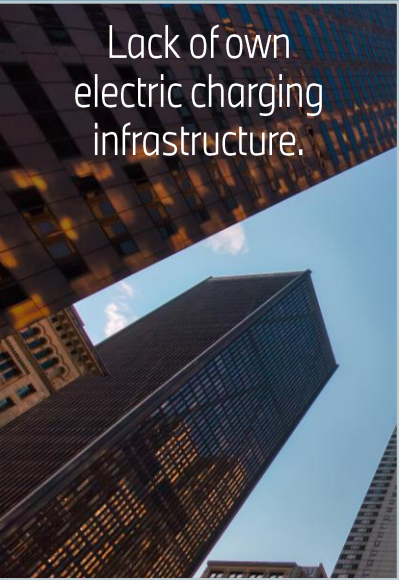
Pilot fleet

1<sup>st</sup> model



# CUSTOMER USE CASES OF HYDROGEN VEHICLES.

Lack of own electric charging infrastructure.



Refuelling in just 3-4 minutes.



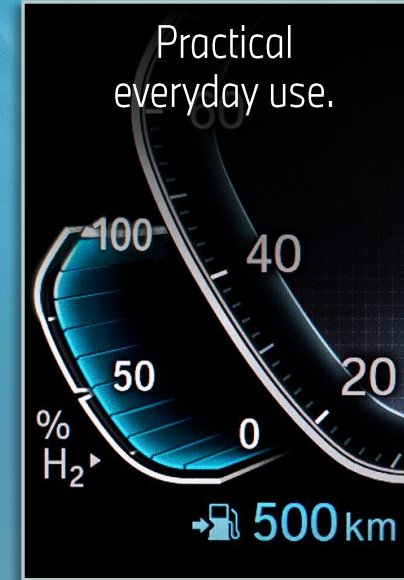
High robustness in cold climates.



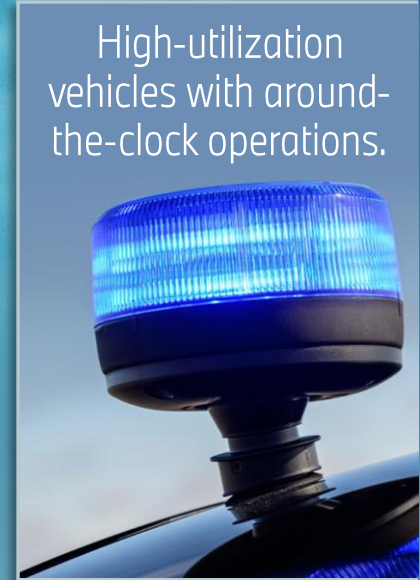
Comfortable trailer usage.



Practical everyday use.



High-utilization vehicles with around-the-clock operations.



» Drives like a BEV, combining the best of both worlds.



# PILOT FLEET PAVES WAY: KEY LEARNINGS. WORLD TOUR SINCE 2023.

- > Global deployment of iX5 Hydrogen vehicles – in more than 20 countries.
- > Nearly 1 million kilometers driven in total.
- > Multi-stakeholder engagement in various formats.



London



New York



Antwerp



United Arab Emirates

- » Key Learnings:
  - > Robust performance.
  - > Infrastructure needs.
  - > Positive public perception.
  - > Technological advancements.



Sweden

# BMW AND TOYOTA JOINTLY DEVELOPING NEXT GENERATION OF FUEL CELL TECHNOLOGY.



## > **Hydrogen Pioneers:**

BMW Group and Toyota Motor Corporation take collaboration to the next level to offer Fuel Cell Electric Vehicle (FCEV) options for passenger cars.

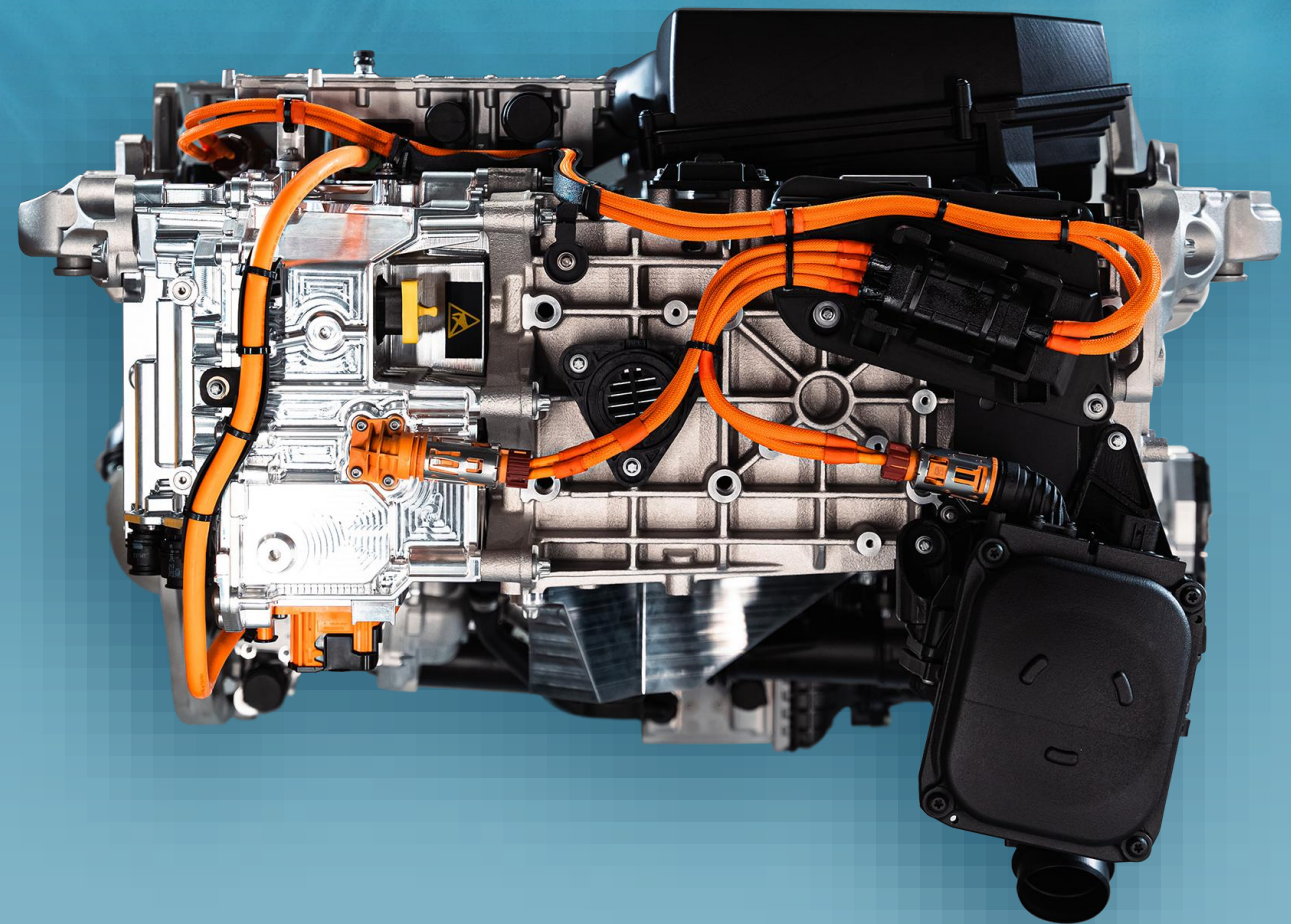
# GEN 3 TECHNOLOGY.

» **Hydrogen high tech at the BMW Group:** our third-generation fuel cell technology. BMW's fuel cell systems will be manufactured in Steyr from 2028, with prototypes already under development at our Munich and Steyr competence centers, and key components supplied by our Landshut technology hub.

» Compact design:  
The space taken up by the fuel cell system has been reduced by around 25%.

» High degree of integration into future vehicle architectures.

» Optimised components and increased efficiency.



# THE NEW BMW iX5 HYDROGEN.

## » BMW's iconic multi-powertrain X5 to debut as the brand's first FCEV in 2028:

The new BMW X5 is the brand's first vehicle that offers customers a choice between five different powertrain options - battery electric, plug-in hybrid, gasoline, diesel, and now also hydrogen fuel cell.



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