

BALLARD™



**Sustainable
Power
Now**

From Ambition to a Hydrogen Economy

The global hydrogen economy, fuel cell solutions and the conditions for regional commercial deployment

Andrew Win
Market Development Manager

Proven Technology with Global Deployments

Decades of specialized engineering delivering commercial heavy-duty power across all key markets.



2,400+

Transit Buses

High-frequency public transport in major metros.



2,600+

Heavy Trucks

Long-haul drayage and regional distribution.



10+

Marine Projects

Inland container barges and zero-emission ferries.



>10 MW

Stationary Power

Grid support and off-grid EV charging hubs.



>550

Employees



>7 Million

MEAs Produced



300M+ km

In Revenue Service



1.6 GW

Annual Capacity



1,100+

Patents & IP



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The Global Hydrogen Economy: Where Are We Today?

Industrial scale exists today; new mobility and energy applications represent the scalable opportunity.

Traditional Industrial Markets



>100 Mt

Global annual hydrogen demand today



Petroleum refining



Ammonia synthesis for agricultural fertilizers



Methanol production & chemical feedstocks

Emerging Decarbonization Sectors



Strategic Focus:

Decarbonisation of Heavy-Duty Transport and Power Generation



Heavy-duty transit & commercial logistics



Regional rail corridors and Shipping



Green steel & off-grid clean power generation



New applications remain a small fraction of total volume today but represent the highest growth potential.



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Where Does Hydrogen Fuel Cell Technology Fit?

Focused on applications with demanding range, utilization and operational requirements.



High Utilisation

Continuous 18–24 hour operating shifts.



Long Range

300+ km without payload compromises.



Fast Refuelling

10–15 min parity with diesel operations.



Heavy Energy

Sustained power under steep grades & cold.



Grid Constrained

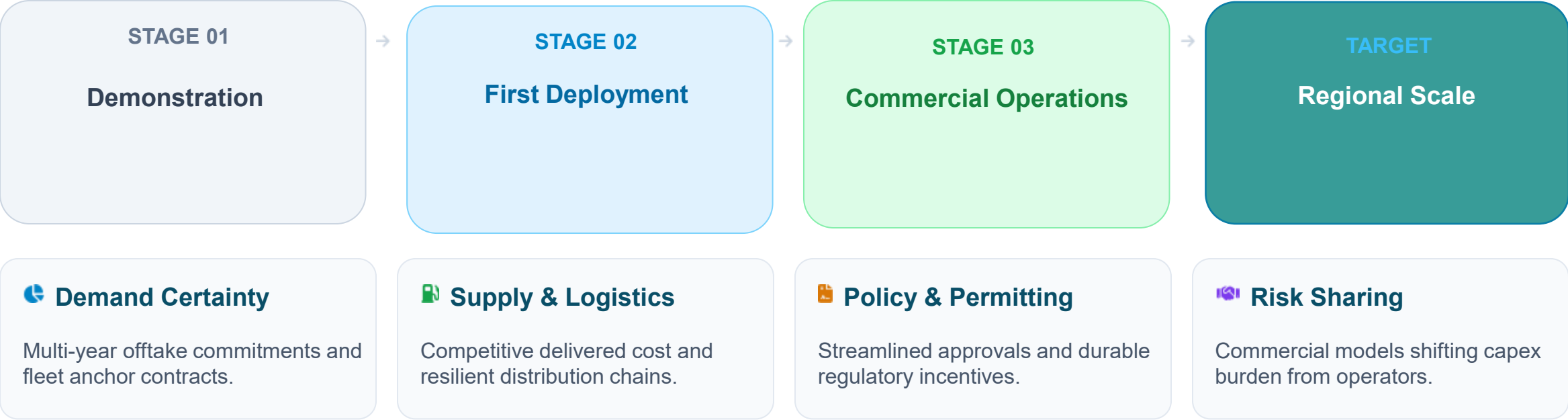
Sites lacking multi-MW substation capacity.



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The Challenge: Creating the Conditions for Hydrogen Ecosystem

The challenge is no longer only technology. It is commercial integration.



Case Study: The Cologne Region

How a major industrial hub anchored regional hydrogen growth through municipal transit and local supply.

KEY REGIONAL ENABLERS

-  Dense chemical & refining cluster (Rhine corridor)
-  By-product and early dedicated green hydrogen supply
-  Extensive urban + rural operating environment (RVK)
-  Multimodal hub: Inland shipping, rail freight, and drayage

Strategy: Deploy anchor demand where supply already exists.



Fleet Milestone

Europe's Largest Hydrogen Bus Fleet 160 Buses



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The Lesson Is the Connection

The interesting part isn't the bus. It is the connection.



01 INDUSTRIAL BASE

Rhine Industrial Hub

Existing energy density.



02 LOCAL SUPPLY

Refhyne Facility

Green hydrogen generation.



03 ANCHOR DEMAND

Transit Bus Fleets

Predictable daily baseline.



04 EXPANSION

Inland Logistics

Port & river transport.



Key Question: What assets, energy demand, and capabilities already exist — and where can hydrogen connect them?

Building the Full Hydrogen Value Chain

Connecting clean energy generation directly to heavy industry, logistics, and municipal transit.

H₂ Production

Renewable & low-carbon electrolysis.

Scalable Output



Logistics

Compressed trailer distribution.

Safe Transit



Refuelling

High-throughput depot dispensers.

Fast Turnaround



End Users

Buses, rail, trucks, marine.

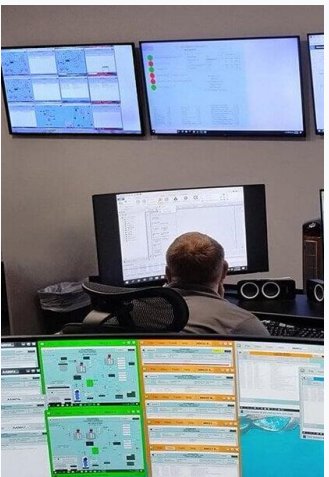
Zero Emissions



Operations

24/7 Service & Maintenance.

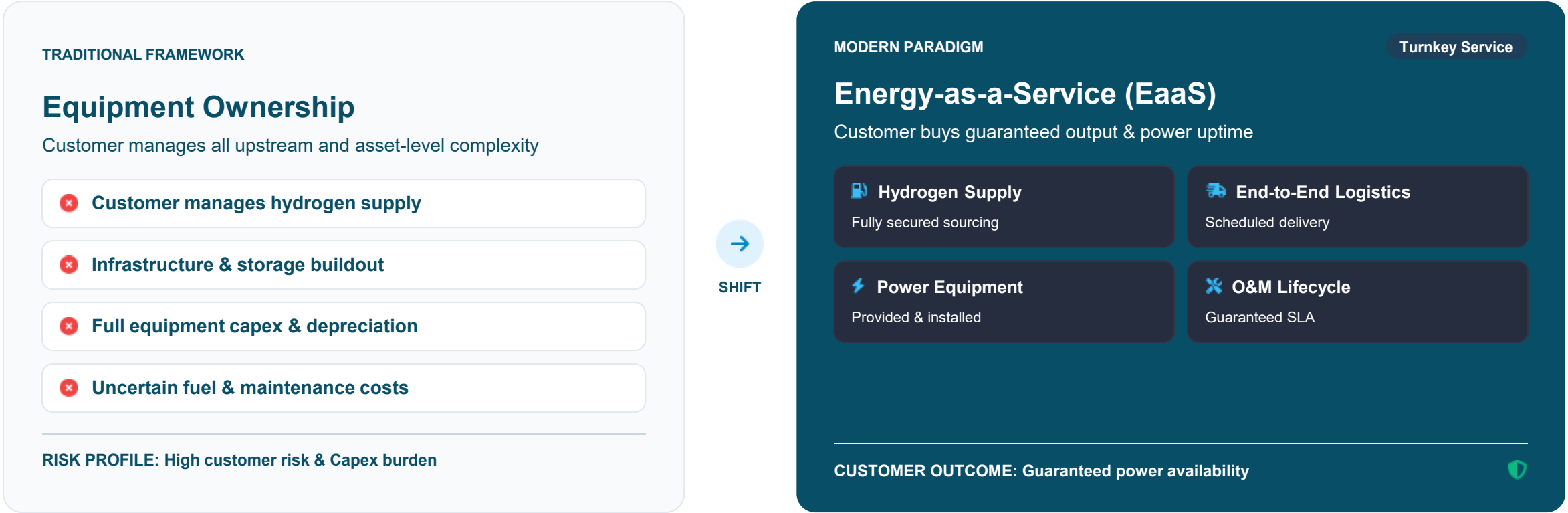
Guaranteed SLA



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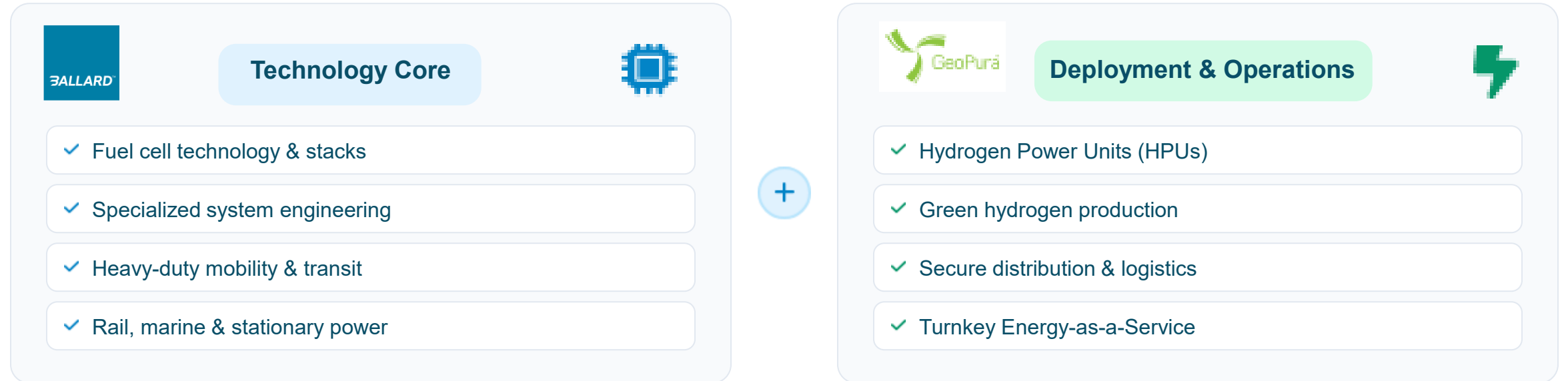
From Equipment to Energy: Energy-as-a-Service

Eliminating customer capex and operational friction through turnkey energy delivery.



Ballard + GeoPura: Enabling the Full Value Chain

Combining technology leadership with turnkey operations to de-risk customer adoption.

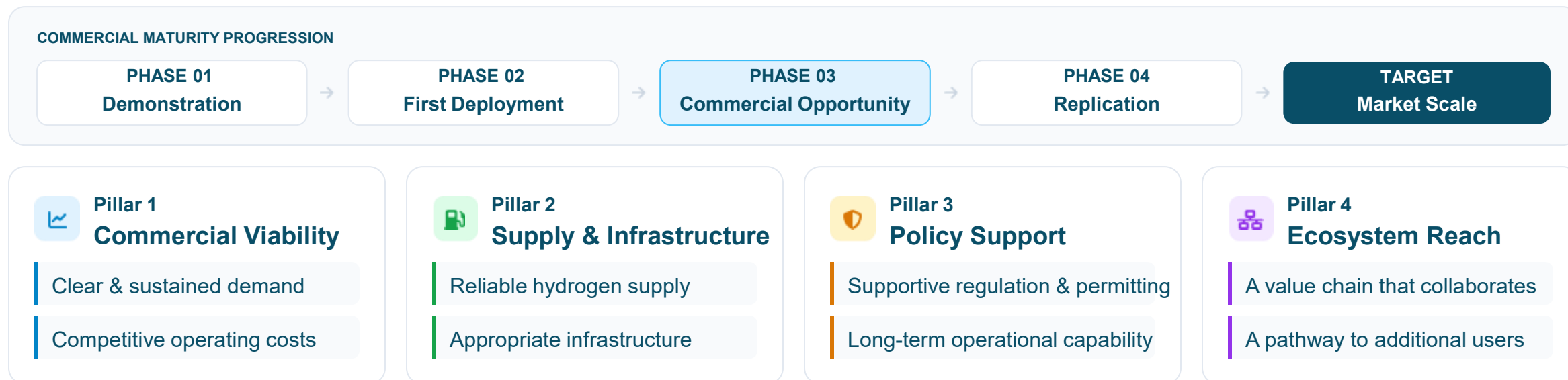


INTEGRATED HYDROGEN ENERGY SOLUTION

Hydrogen Fuel → Clean Power → Guaranteed Service

What Does It Take to Move Beyond the First Project?

Creating the Conditions for Commercial Deployment



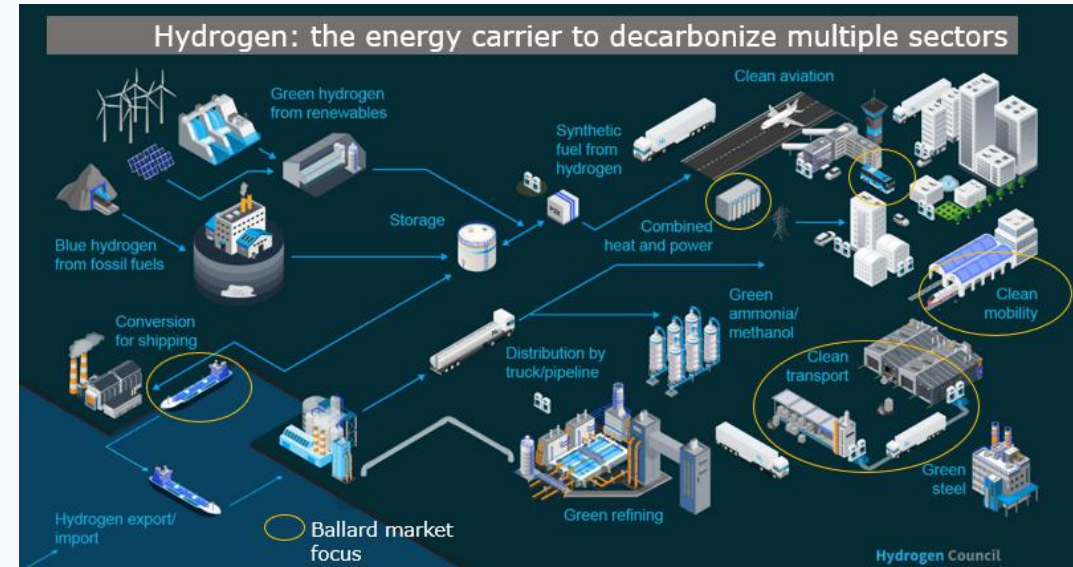
A successful first project requires solving for the entire commercial ecosystem, not just validating the technology.

From Projects to a Regional Hydrogen Ecosystem

Turning Individual Projects Into Something Bigger

The Regional Opportunity

-  Build on existing industrial strengths
-  Connect supply with real energy demand
-  Develop infrastructure around multiple applications
-  Create the conditions for commercial deployment
-  Use early projects to enable further investment & users



Hydrogen does not need to start as an ecosystem. It needs the right conditions to become one.