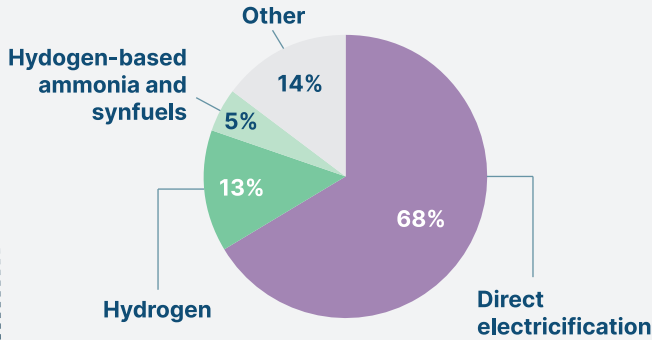


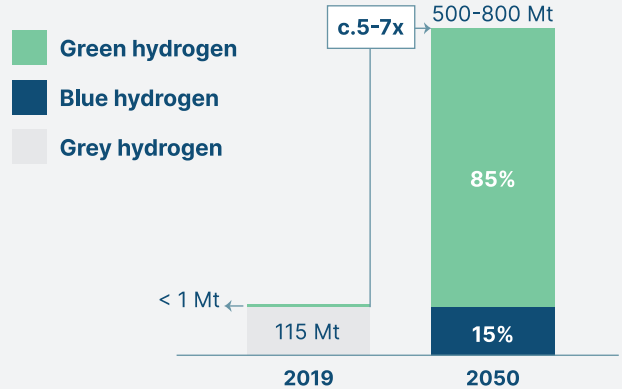
HYDROGEN: THE SECOND DECARBONISATION VECTOR

Final energy demand, ETC 2050 Indicative Scenario



A 5-7 FOLD INCREASE IN HYDROGEN PRODUCTION TOWARDS NET-ZERO

Hydrogen production 2050
Mt Hydrogen / year

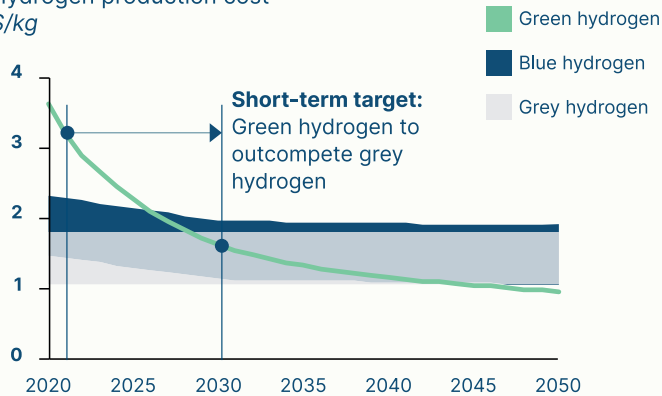


What will it take?

SIMULTANEOUSLY

GROW PRODUCTION VOLUMES TO MAKE GREEN HYDROGEN COMPETITIVE

Hydrogen production cost
\$/kg

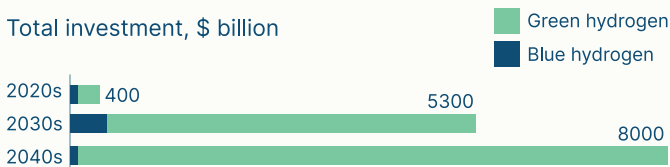


RAPIDLY ACCELERATE DEMAND FOR CLEAN HYDROGEN

- From grey to clean**
 Refining / Ammonia / Methanol
- Development needed but large long-term need**
 Steel / Shipping / Aviation / Chemicals / Power
- Potential transitional**
 Co-firing / Blending
- Possible future uses if electricity doesn't win**
 Trucking / Residential heating / High temperature heating

TO UNLOCK LARGE-SCALE INVESTMENT IN HYDROGEN SUPPLY

Total investment, \$ billion



DEVELOP TRANSPORT AND STORAGE INFRASTRUCTURE WHERE NEEDED

Clusters

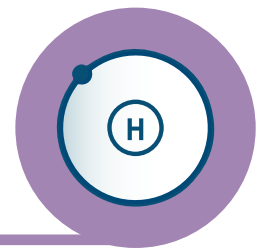
Early use cases will develop around industrial clusters with shared hydrogen production, distribution and storage infrastructure.

Inter-regional

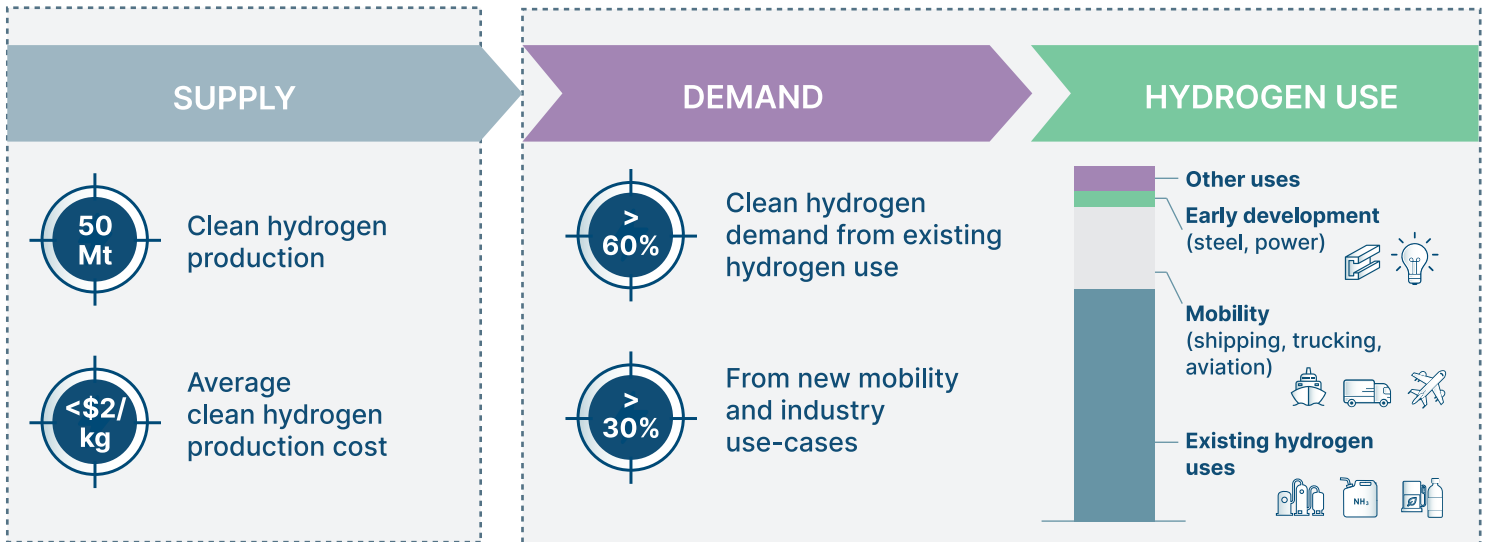
Limited international trade will be mainly supported by interregional pipelines and sometimes ammonia ships where final use is ammonia.



ACCELERATING CLEAN HYDROGEN IN THE 2020S



2030 TARGETS:



TOP 5 ACTIONS ACROSS VALUE CHAIN

