

New Zealand

A key player for the Hydrogen transition.

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AGENDA

01

Why Hydrogen and New Zealand

Introduction about the basics of Hydrogen and New Zealand's engaging.

02

Global Situation

What's the market situation, demand and prices.

03

New Zealand's Actual Situation

How's the countries energy system today.

04

Unlocking New Zealand's Potential

Business model for turning New Zealand into the leader of the hydrogen transition.

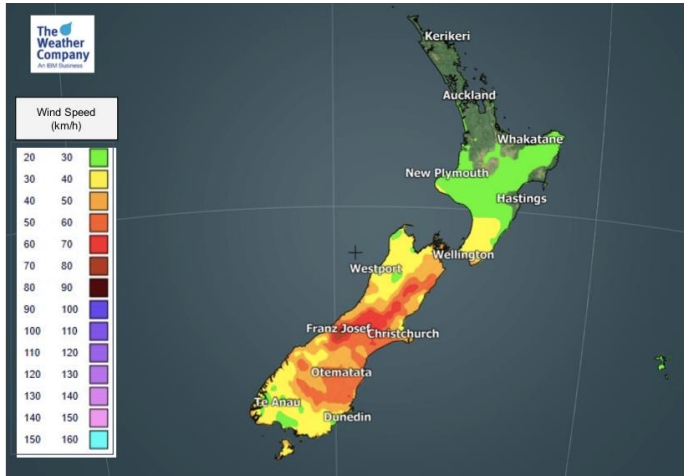
05

Conclusion & Thoughts

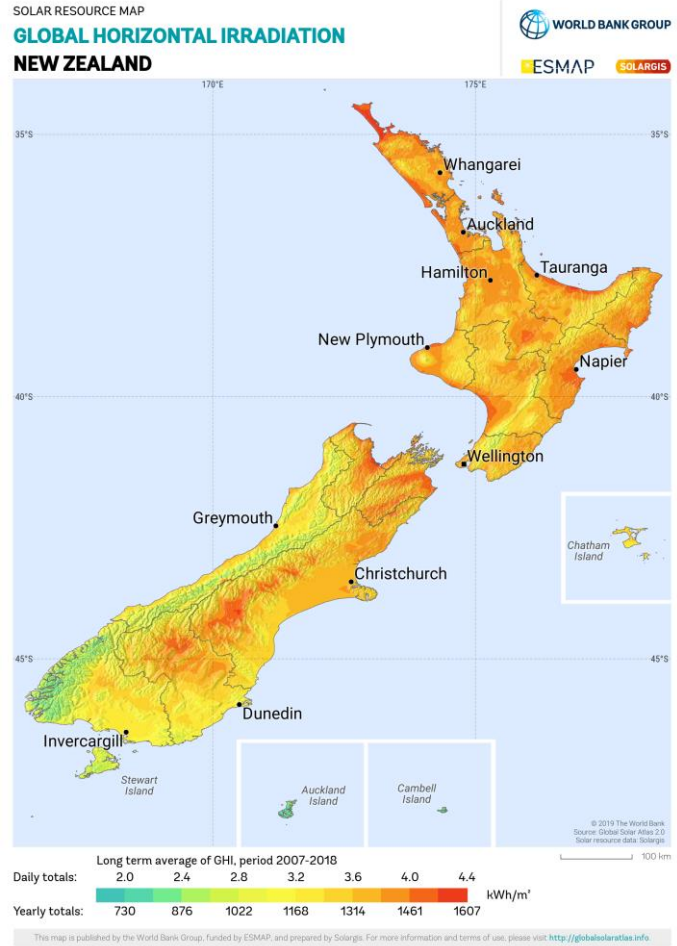
Summary and roadmap.



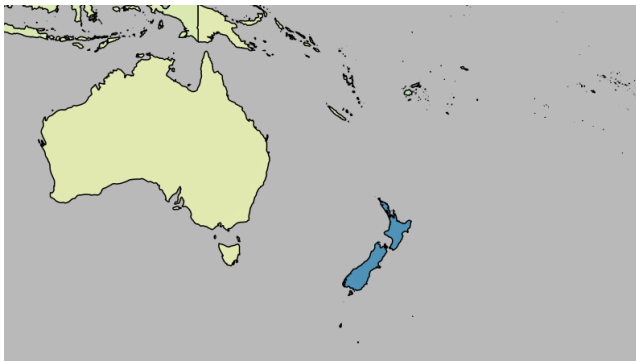
WIND



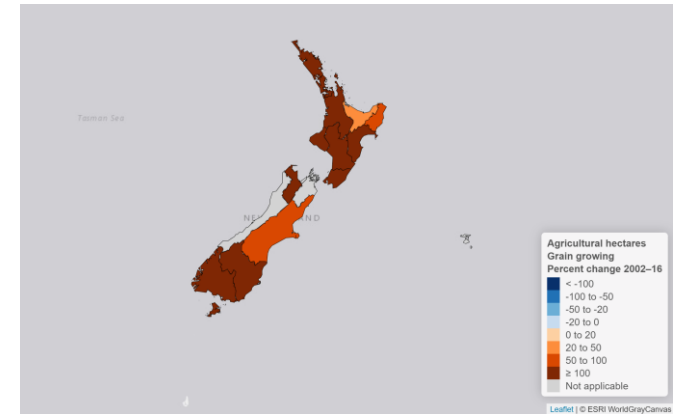
SOLAR



HYDRO



Agricultural



hydrogen

1

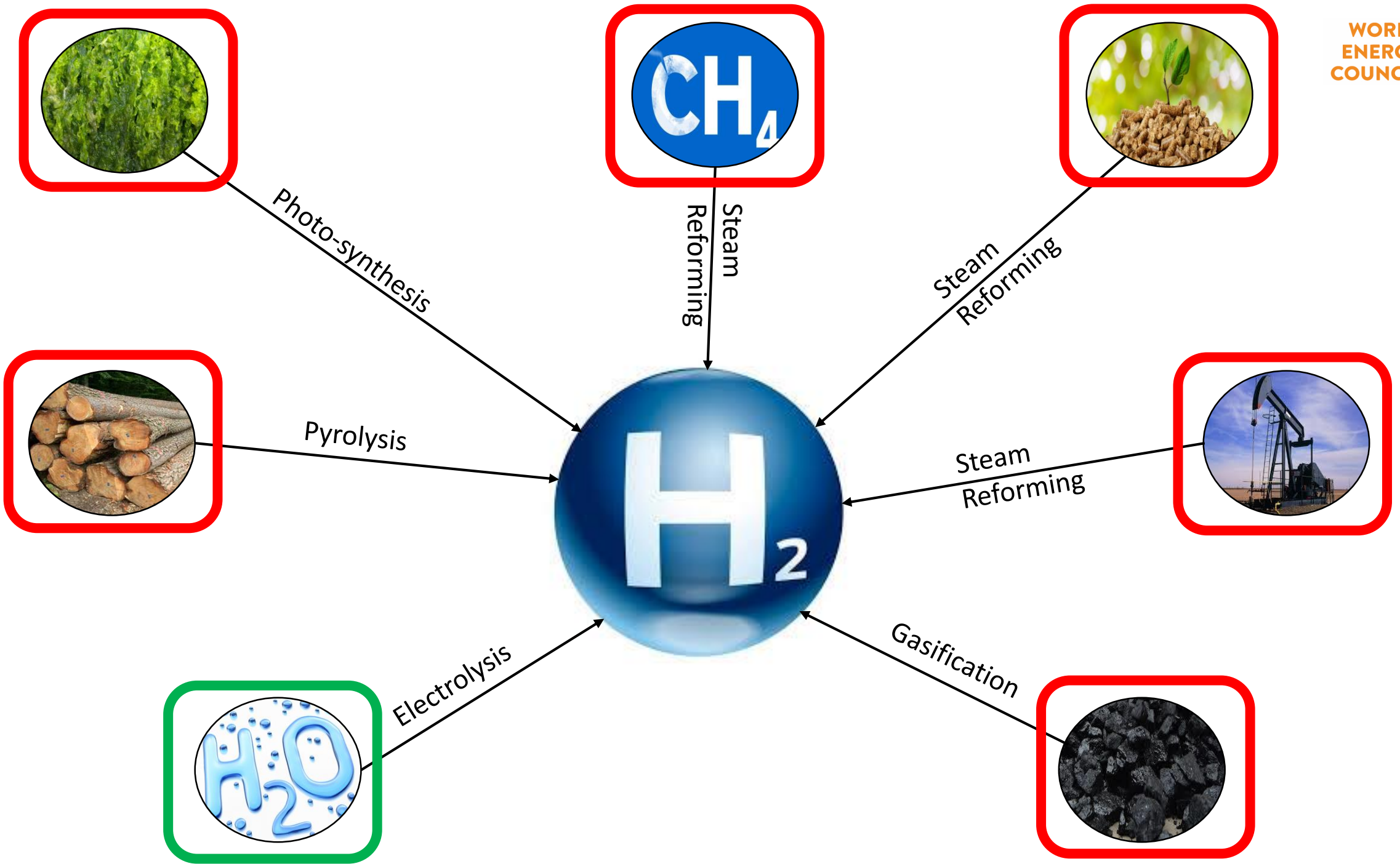
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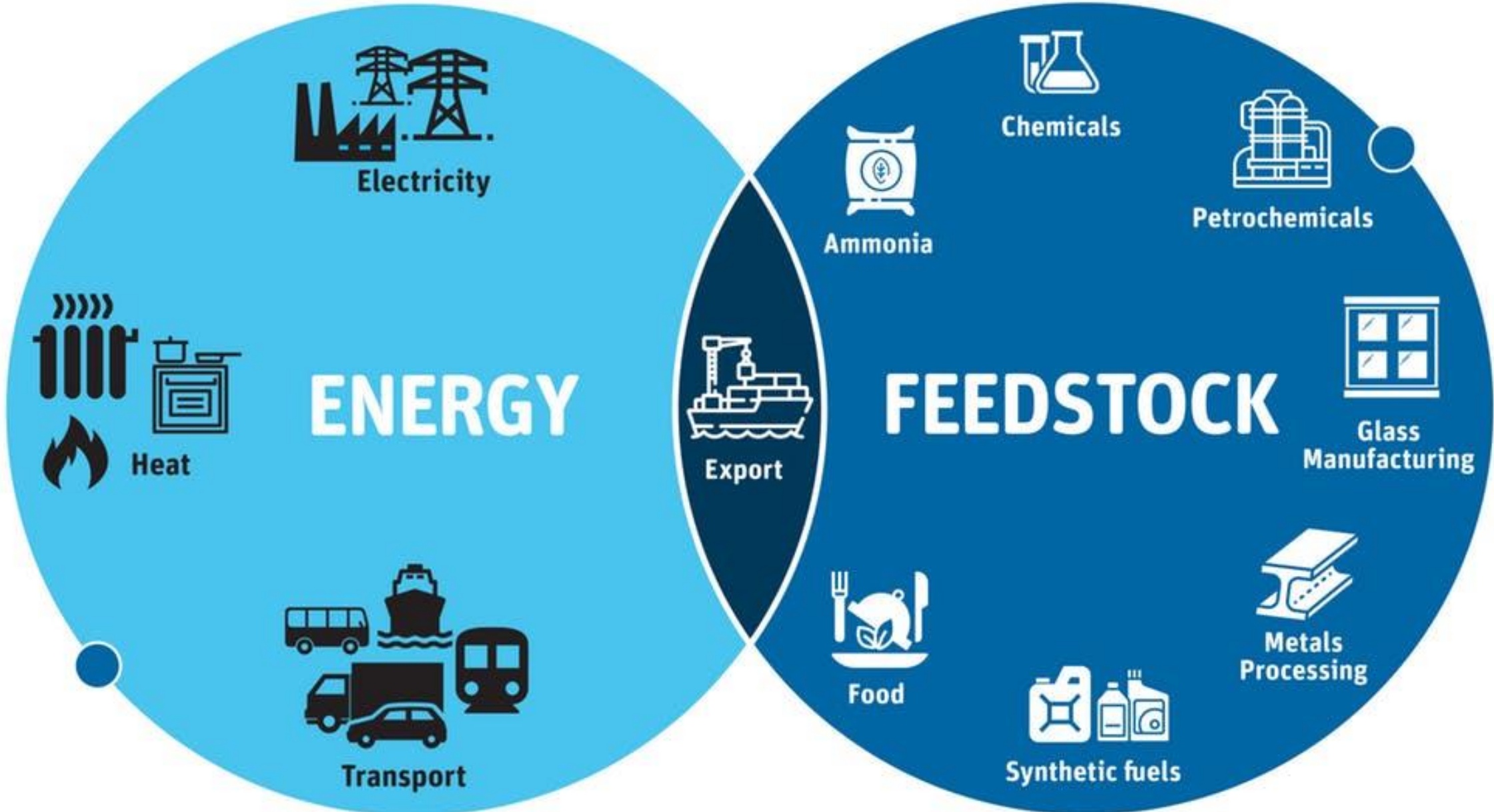
lithium

beryllium

LET'S TALK
A LITTLE
CHEMISTRY



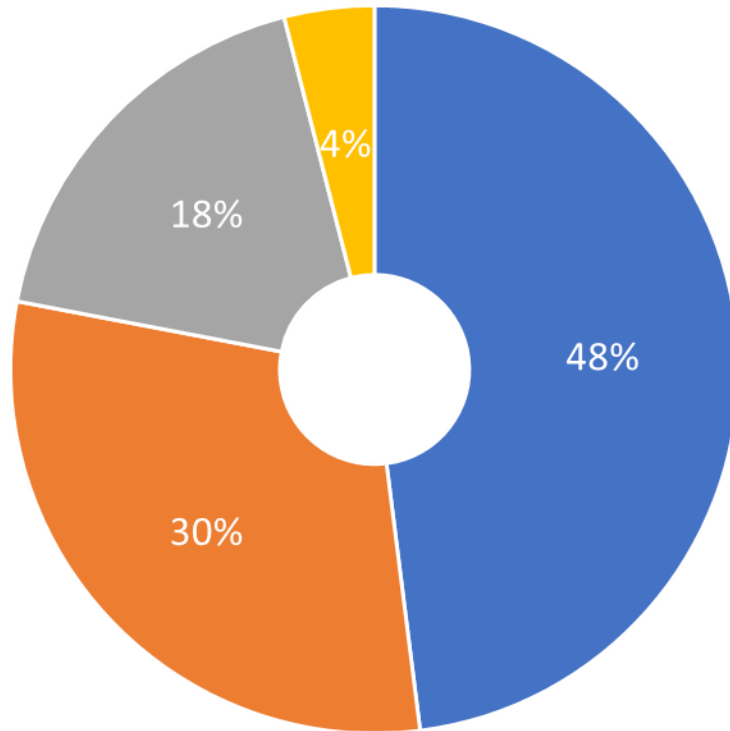
APPLICATIONS FOR HYDROGEN





Global Situation

Global Hydrogen Production 70 MTn/yr

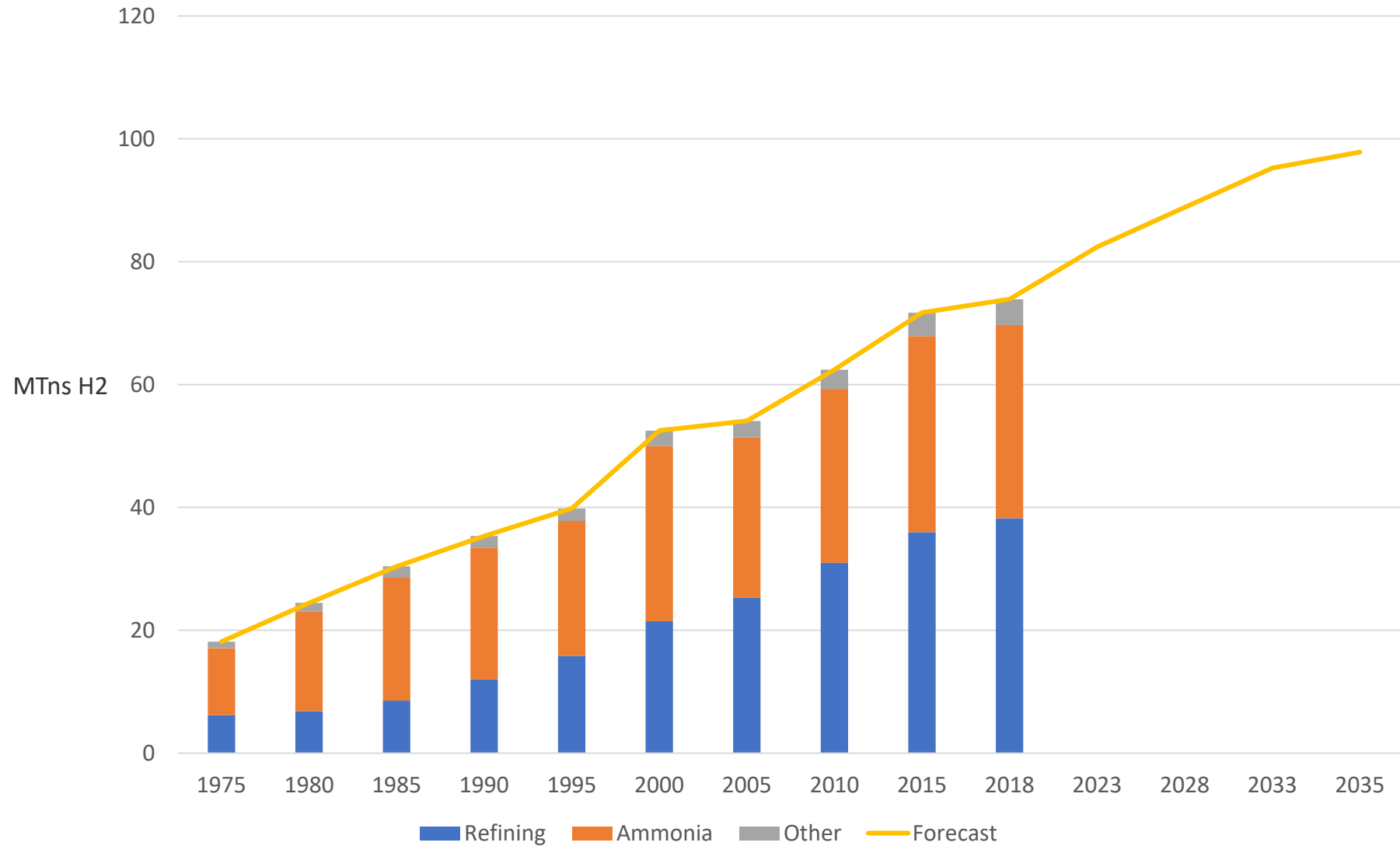


■ Natural Gas ■ Oil ■ Coal ■ Renewable

TOP 5 PRODUCERS OF HYDROGEN GAS:

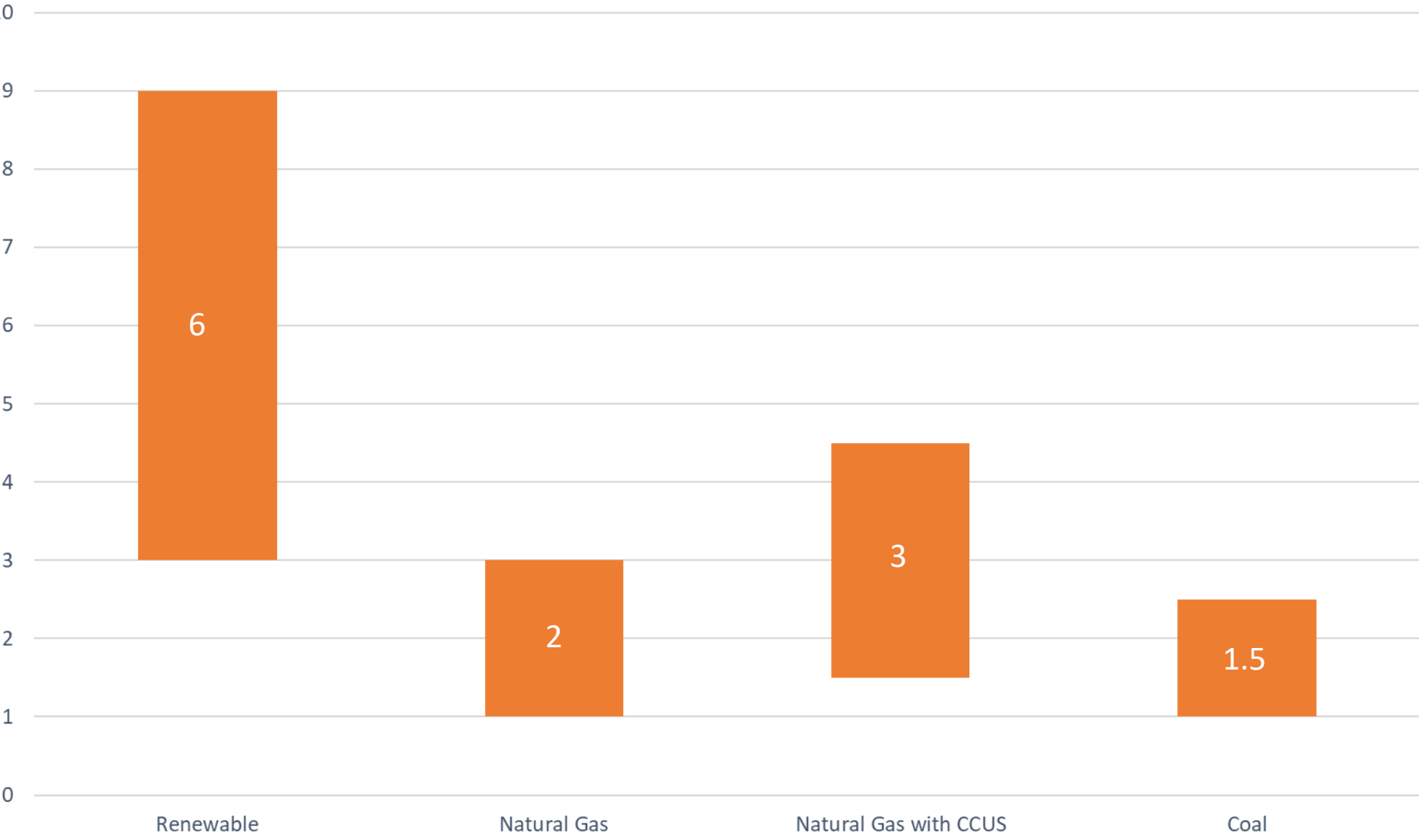
1. United States
2. South Korea
3. Japan
4. Kuwait
5. Germany

Hydrogen Demand and Forecast 98% Trust



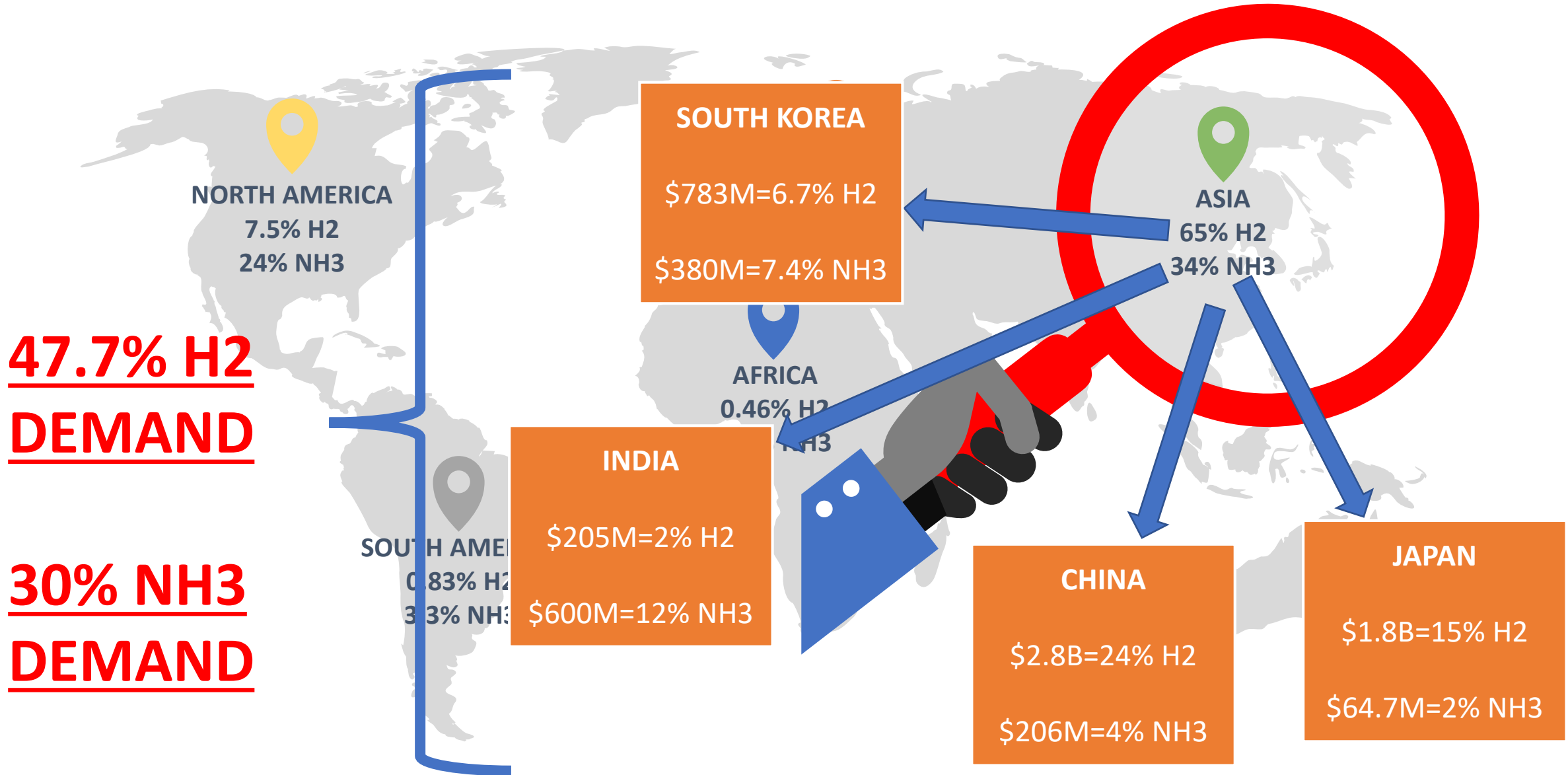
Hydrogen Price by Feedstock

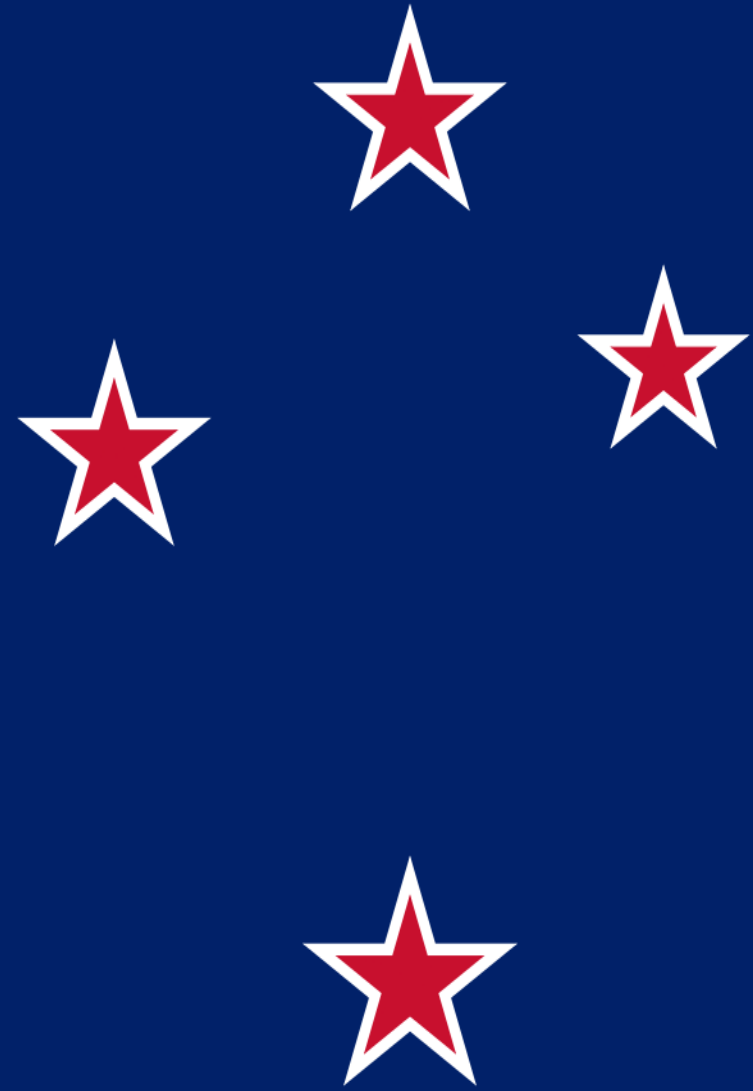
(USD/kg H₂)



Hydrogen and Ammonia Imports

\$18 B/Yr

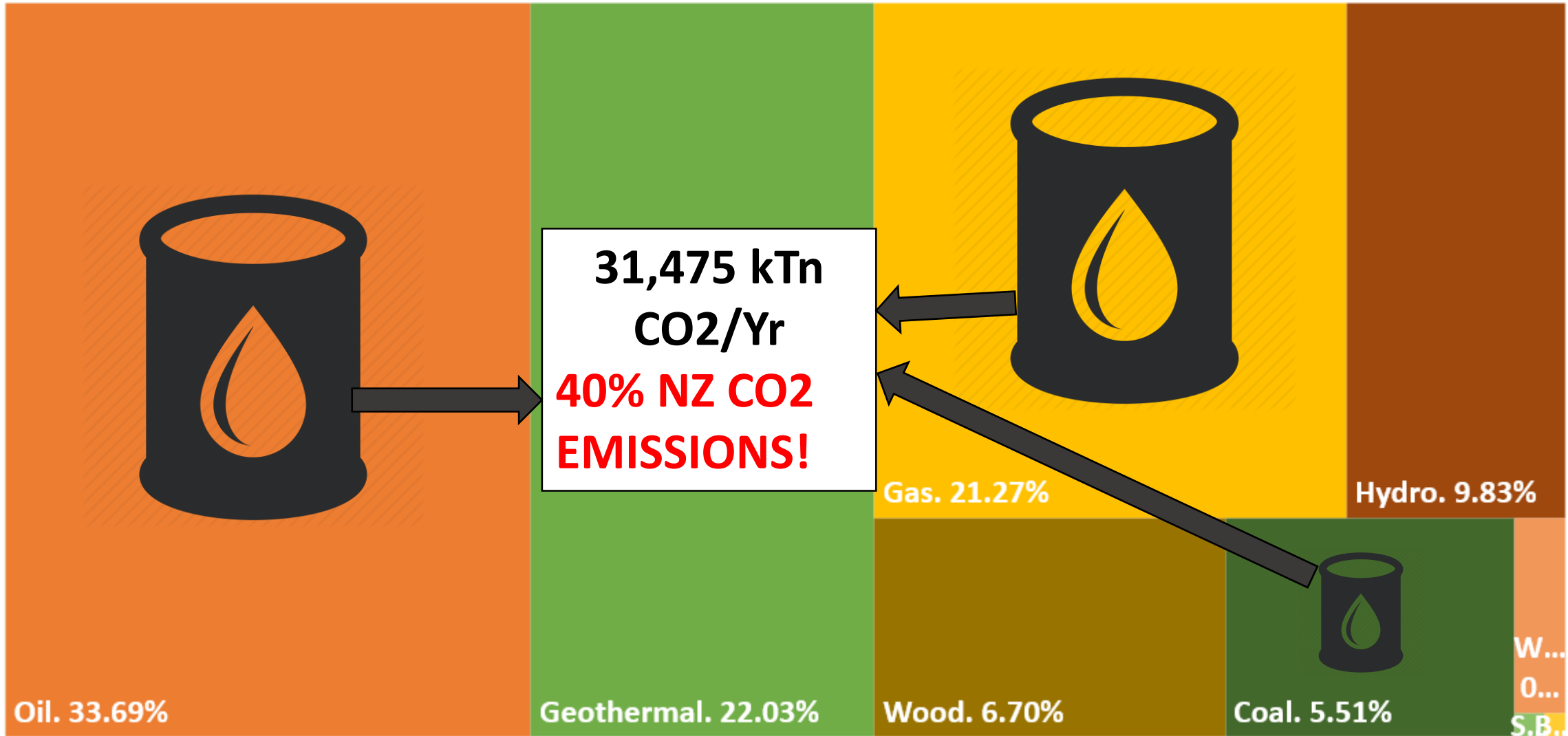




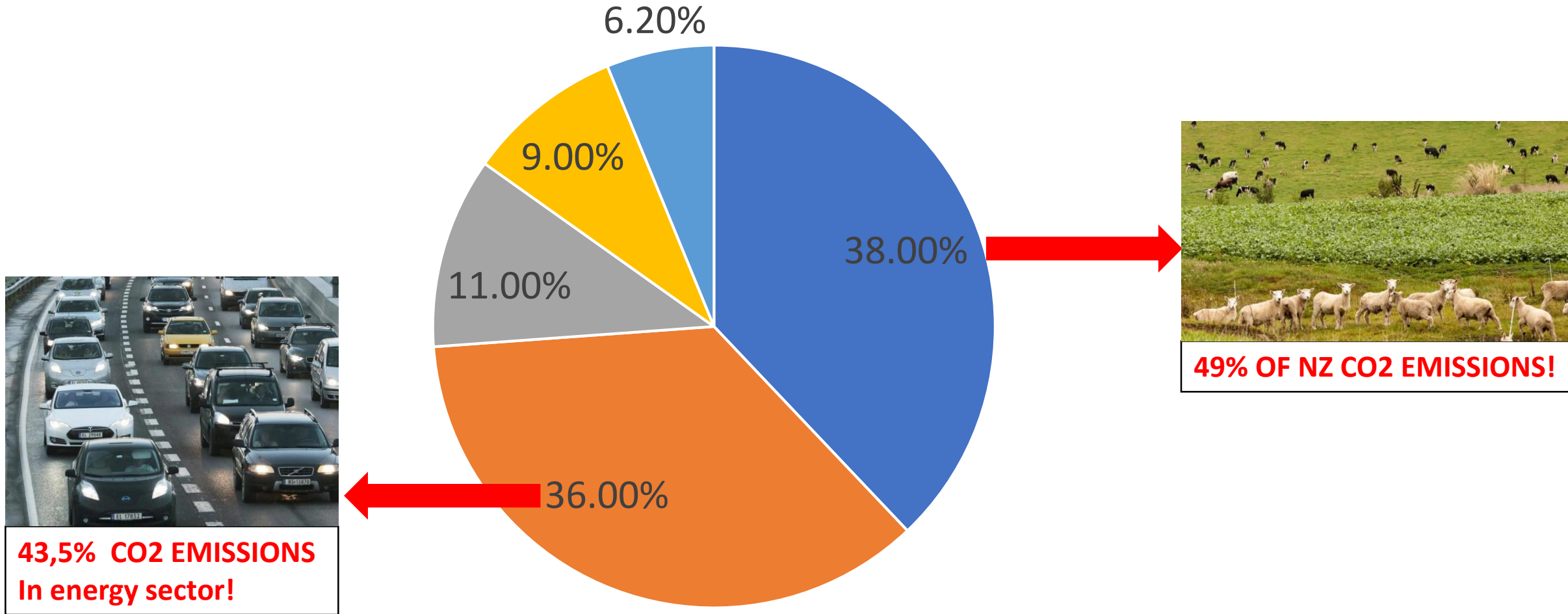
Local Situation

NEW ZEALAND'S ENERGY MIX

Oil Gas Geothermal Hydro Wood Coal Wind Biogas Solar



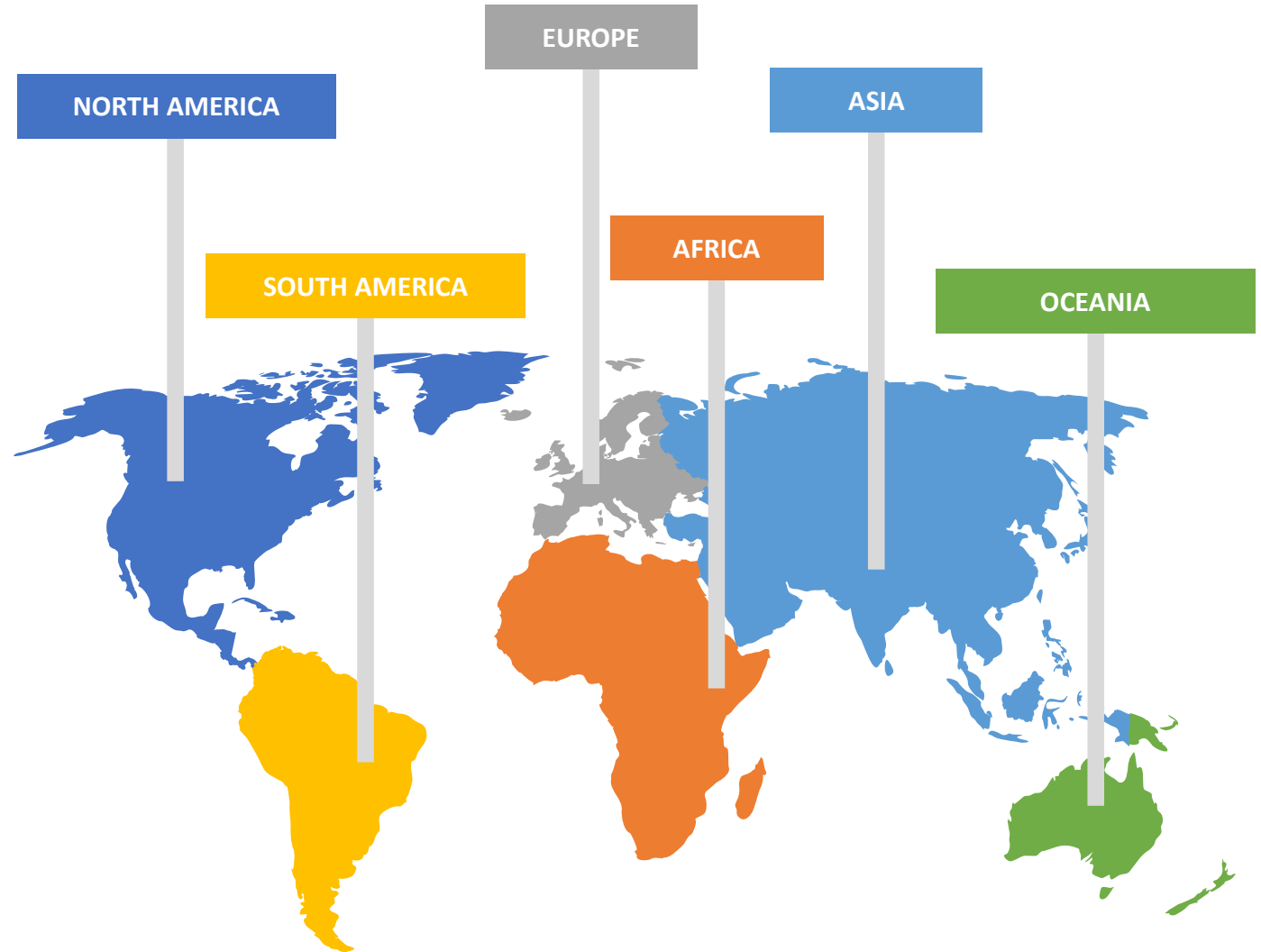
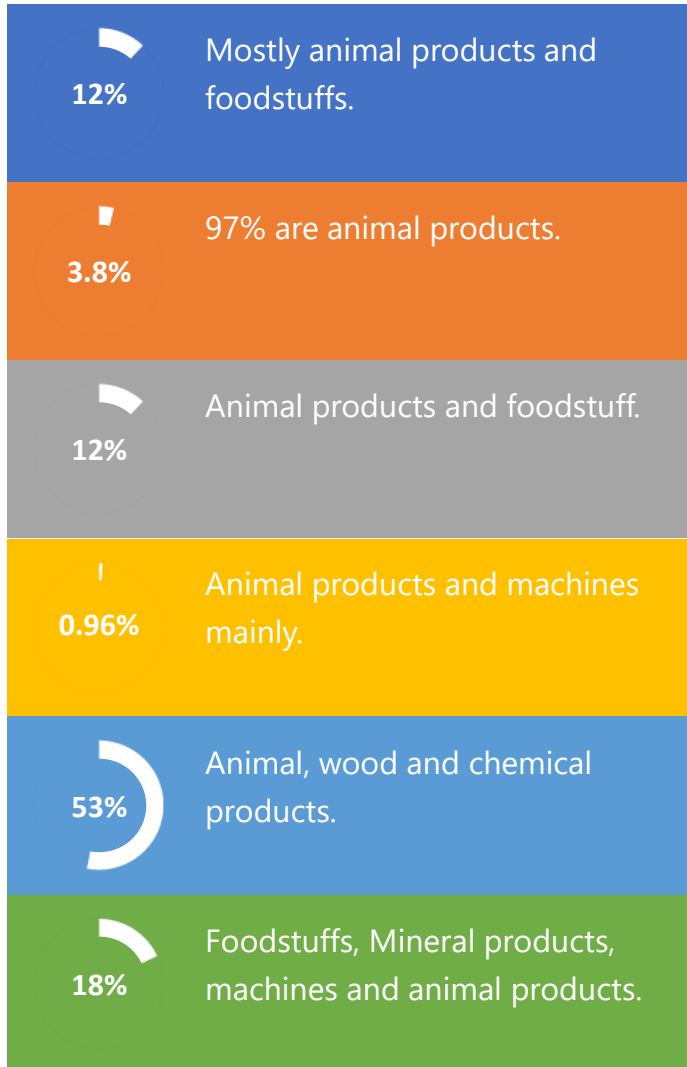
New Zealand's Energy Use by Sector



■ Industry ■ Transport ■ Domestic ■ Commercial & Public Services ■ Agriculture, Forest, Fish

What about New Zealands Exports.

\$38.9 B in 2018.



Drivers

Hydrogen is important for meeting the world's growing
Need for reliable, affordable and clean energy



Japans Memorandum

Partnership with Japan to develop hydrogen technology. This is the first memorandum of its kind with Japan in the world.



Green Paper

Looks to signal the opportunity that hydrogen can bring to New Zealand and frame discussions for a national strategy.

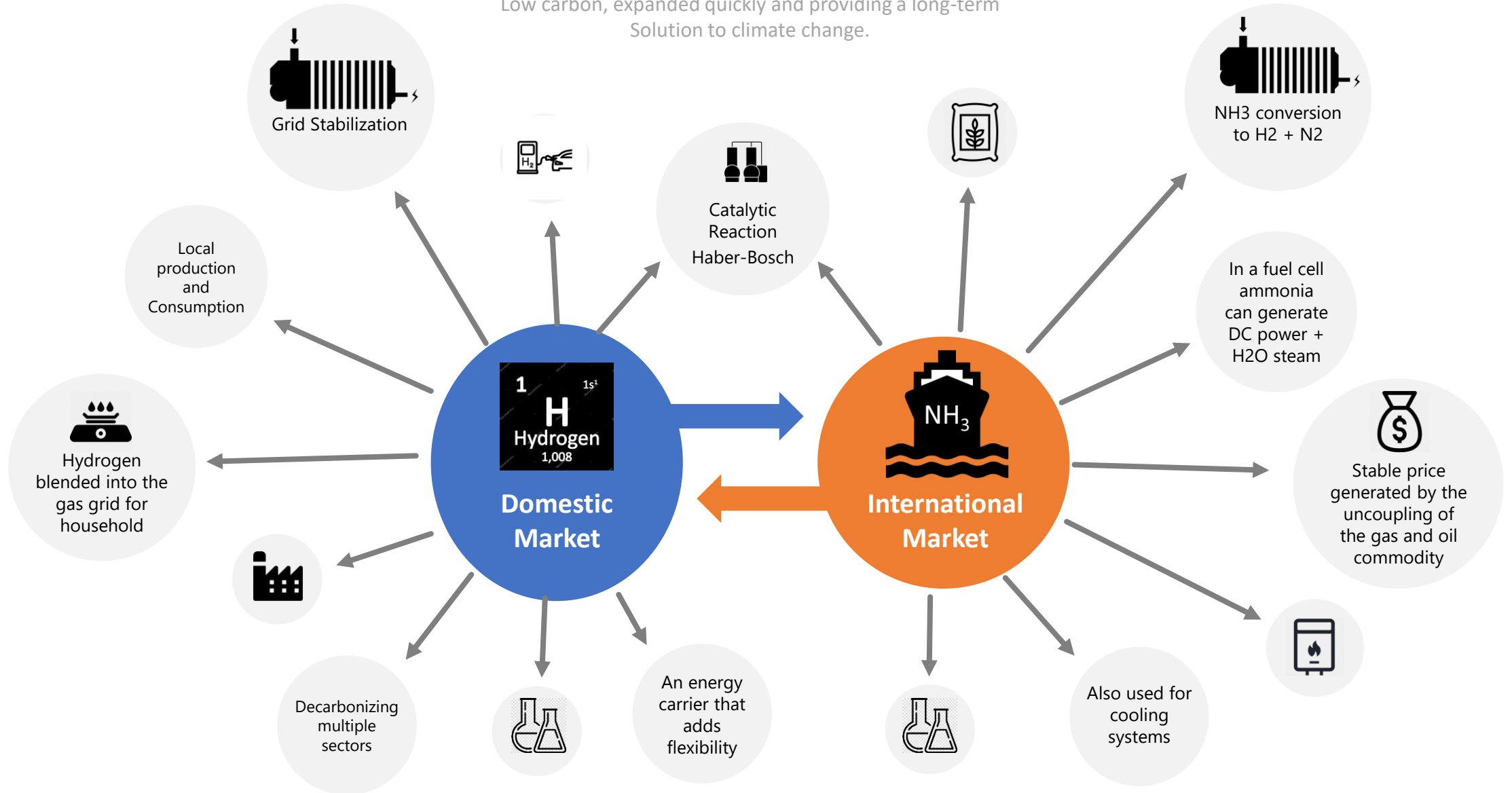



Net Zero

The government's energy strategies set the policy direction and priorities focusing on transitioning to a net zero carbon emissions by 2050.

Hydrogen & Ammonia

Low carbon, expanded quickly and providing a long-term Solution to climate change.



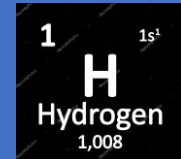

Grid Stabilization

Local production and Consumption


Hydrogen blended into the gas grid for household




Decarbonizing multiple sectors


Domestic Market



An energy carrier that adds flexibility



Catalytic Reaction Haber-Bosch


International Market




Also used for cooling systems



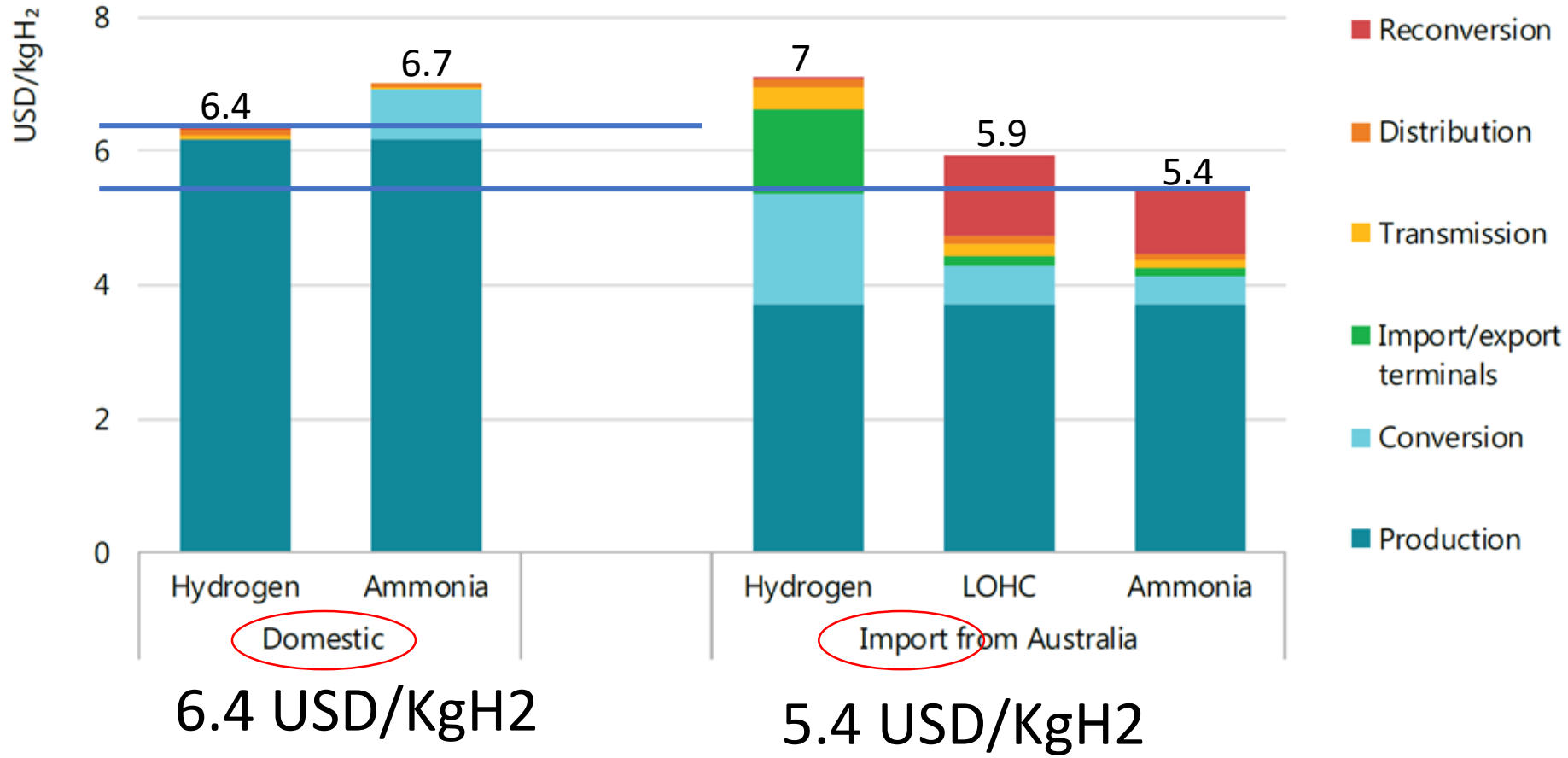

NH3 conversion to H2 + N2

In a fuel cell ammonia can generate DC power + H2O steam

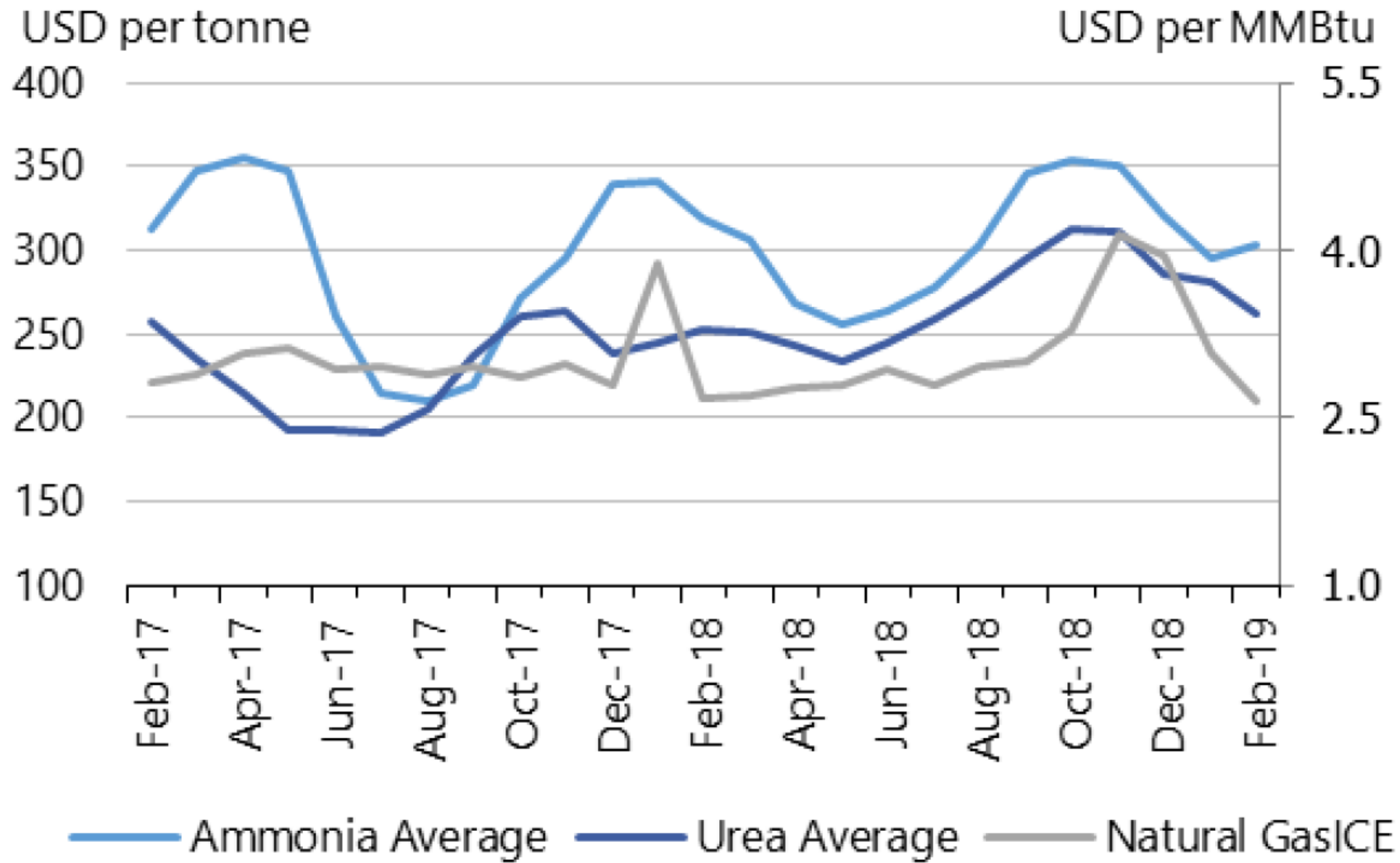

Stable price generated by the uncoupling of the gas and oil commodity



Costs of Hydrogen & Ammonia for domestic demand vs Import

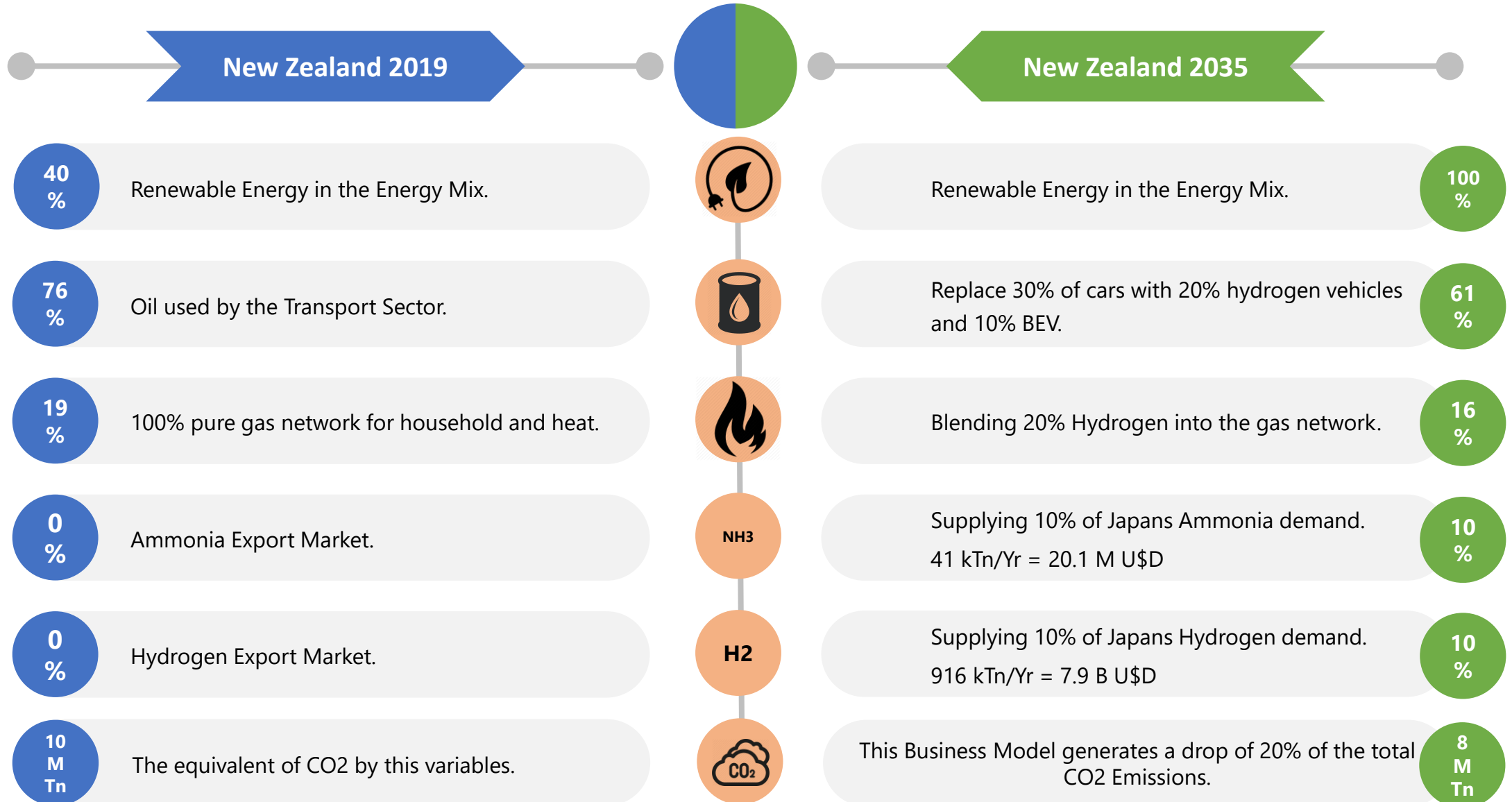


Ammonia Average, Urea Average and Natural Gas (Spot prices)



NEW ZEALAND SCENARIO

Based on Japans Hydrogen Strategy



SUMMARIZING

Why Should New Zealand Apply the H₂/NH₃ Model.



A flexible, zero emission, clean energy carrier. Can be produced with near zero carbon footprint.



It can decarbonize multiple industries and has a high energy density, allowing to decarbonize the heavy vehicles (including trains and ships).



Can be stored for large periods of time, solving the clean energy storage problem. It's the basis for achieving sustainability.



A well-known product with an already built infrastructure (Lowering the CAPEX).



It will allow not only to transport green hydrogen but also to develop new business models as the ammonia detaches from the oil commodity price.

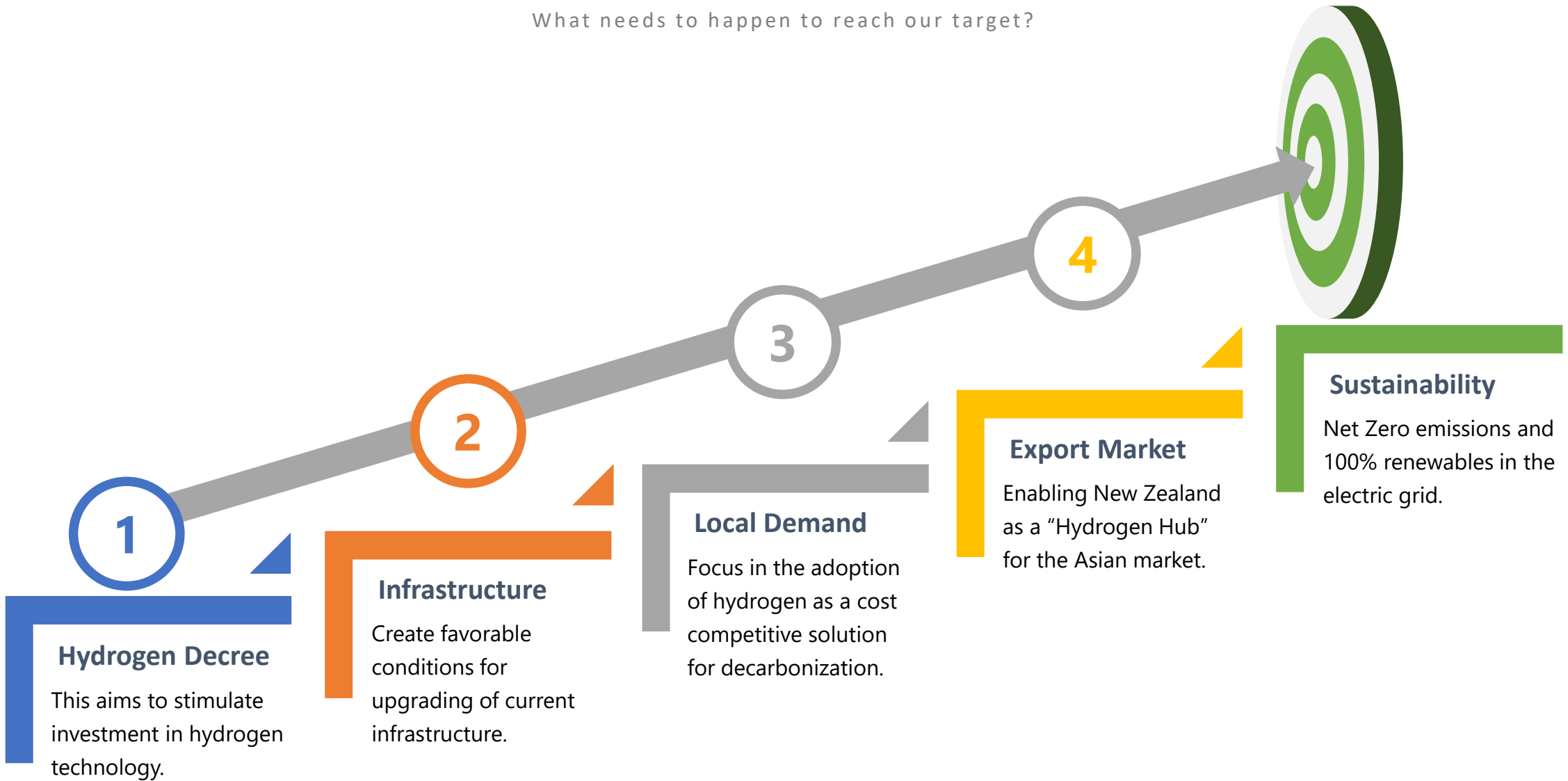


Fuel cells convert the ammonia into water steam and generate electricity. Then we can electrolyze the water steam obtaining H₂.



Strategy

What needs to happen to reach our target?



THANK YOU FOR YOUR TIME.



FEL Argentina

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And remember: Hydrogen will help people live Longer, better lives. Supporting jobs and expanding Applications.