

The Basics of Hydrogen



Namibia Green Hydrogen Conference

NAMIBIA NATIONAL CONFERENCE ON
GREEN HYDROGEN (GH2)

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Windhoek Country Club

Jointly
organised by:

economic
association
of namibia



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What is Hydrogen?

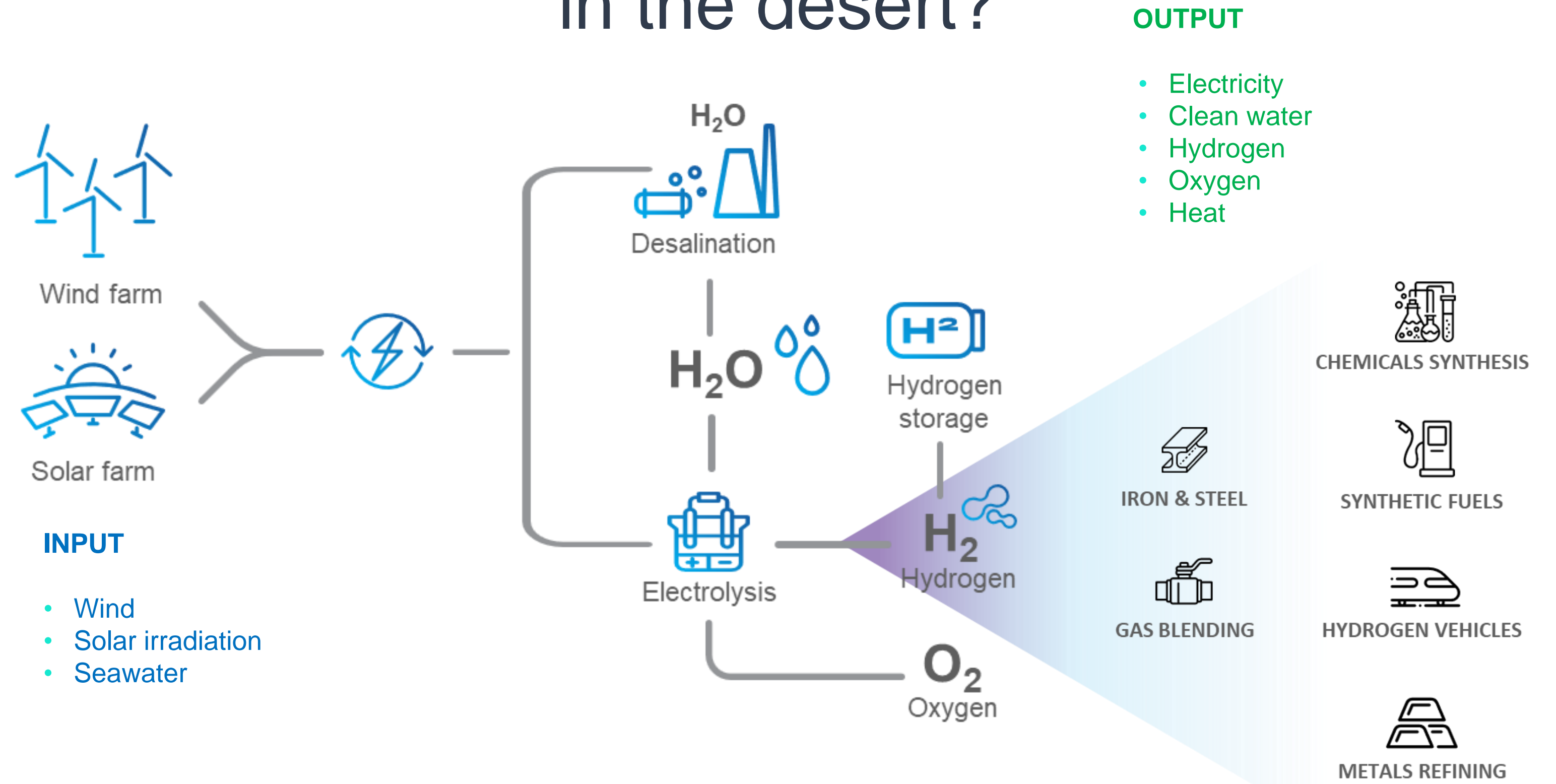


- Density: 89.88 g/m³
 - 1kg at atmospheric pressure ~ 11.125 m³
- Melting point: minus ~ 260 °C
 - Solid to Liquid
- Boiling point: minus ~ 253 °C
 - Liquid to gas

Hydrogen combines with other elements, forming several compounds, including common ones such as

- water (H₂O),
- ammonia (NH₃),
- methane (CH₄),
- table sugar (C₁₂H₂₂O₁₁),
- hydrogen peroxide (H₂O₂) and
- hydrochloric acid (HCl)

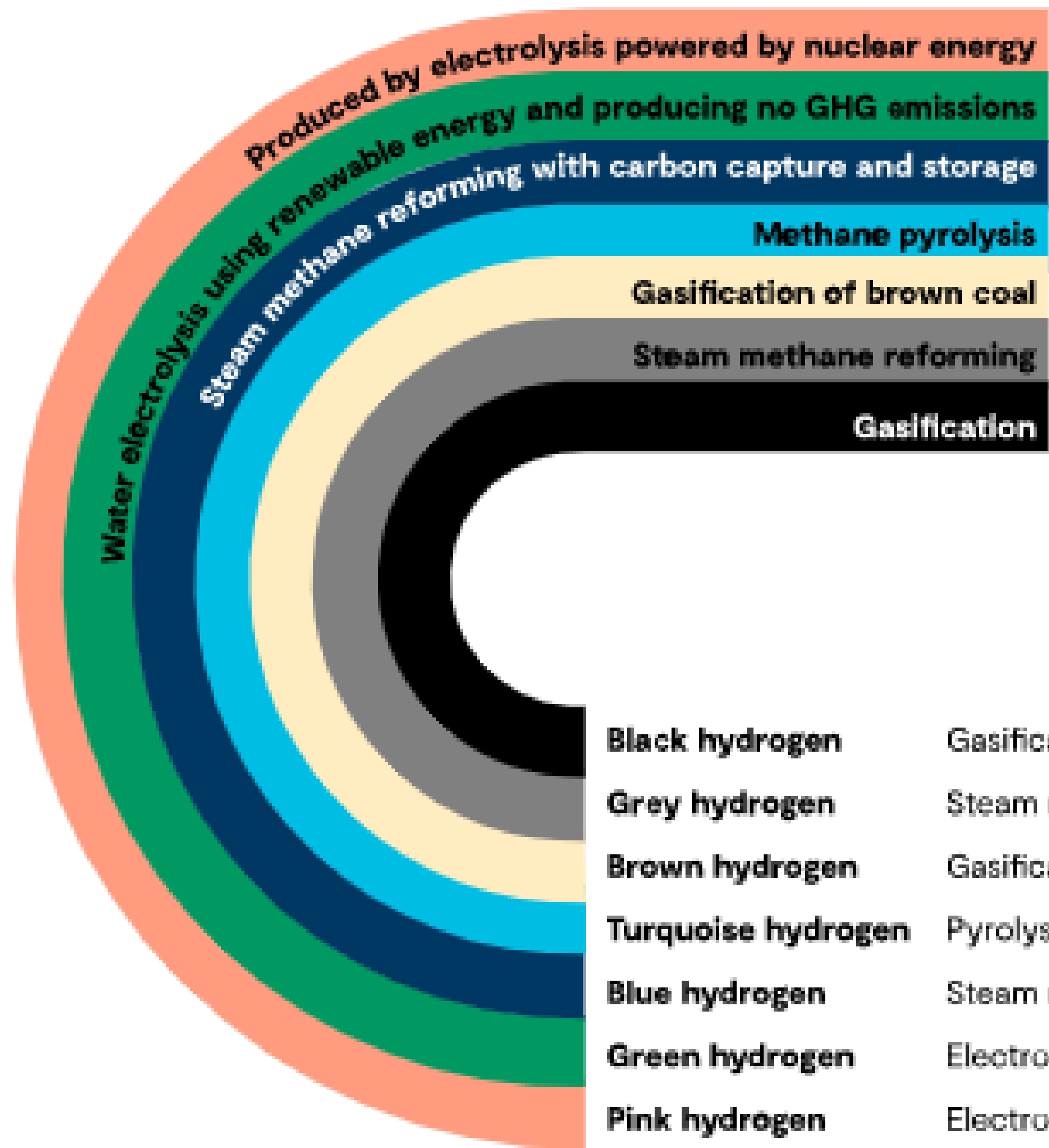
How do we make Green Hydrogen in the desert?



- 9L of clean H₂O per kg of H₂ plus ~51L for cooling, water treatment & wastewater disposal
- 55kWh of electricity is needed per kg of H₂

NASA uses hydrogen as **rocket fuel** to deliver crew to space
 Hydrogen is an **energy carrier** with no carbon in it, so when burnt, **only produce water**
 Hydrogen is used to make **ammonia for fertilizer or explosives, etc**
Or use to reduce Iron-oxide (Ore) to Iron

What is it about all the colours of Hydrogen?



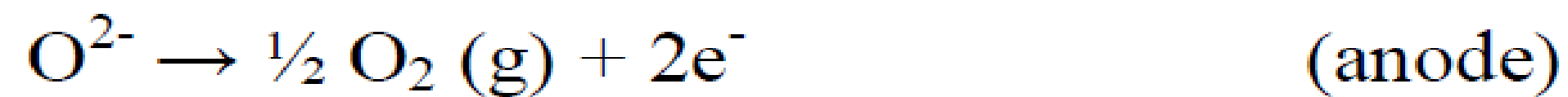
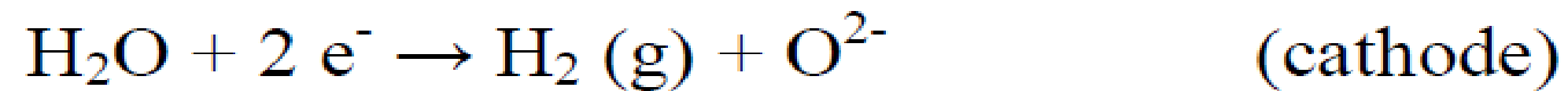
IEA (2019). *The Future of Hydrogen – Seizing today's opportunities. Prepared for the G20, Japan.*

Building our own electrolyser

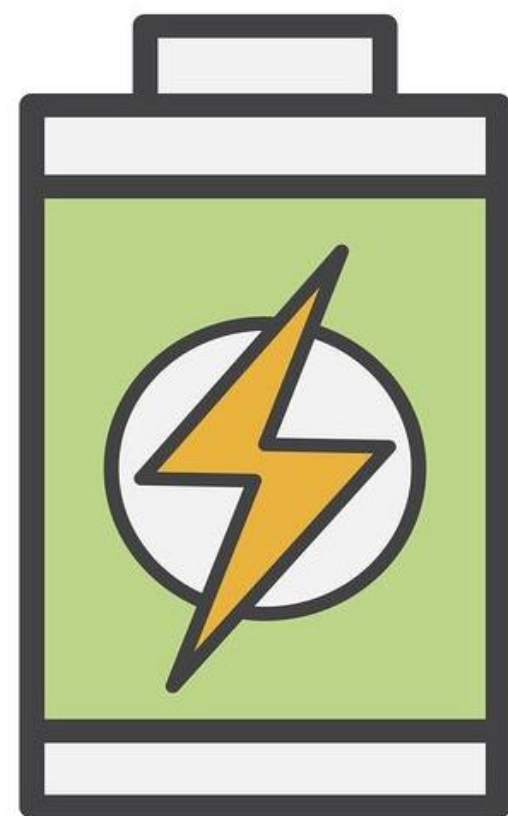
The overall reaction of the water electrolysis is:



The reactions in the cathode and anode sides are:



Warning: Do not do this at home without supervision – hydrogen is **EXPLOSIVE and only need a small spark to make a large and damaging **BANG!****



Thank you for EXPLORING with me!



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