

Fuel Cells: High Efficiency, Distributed Power

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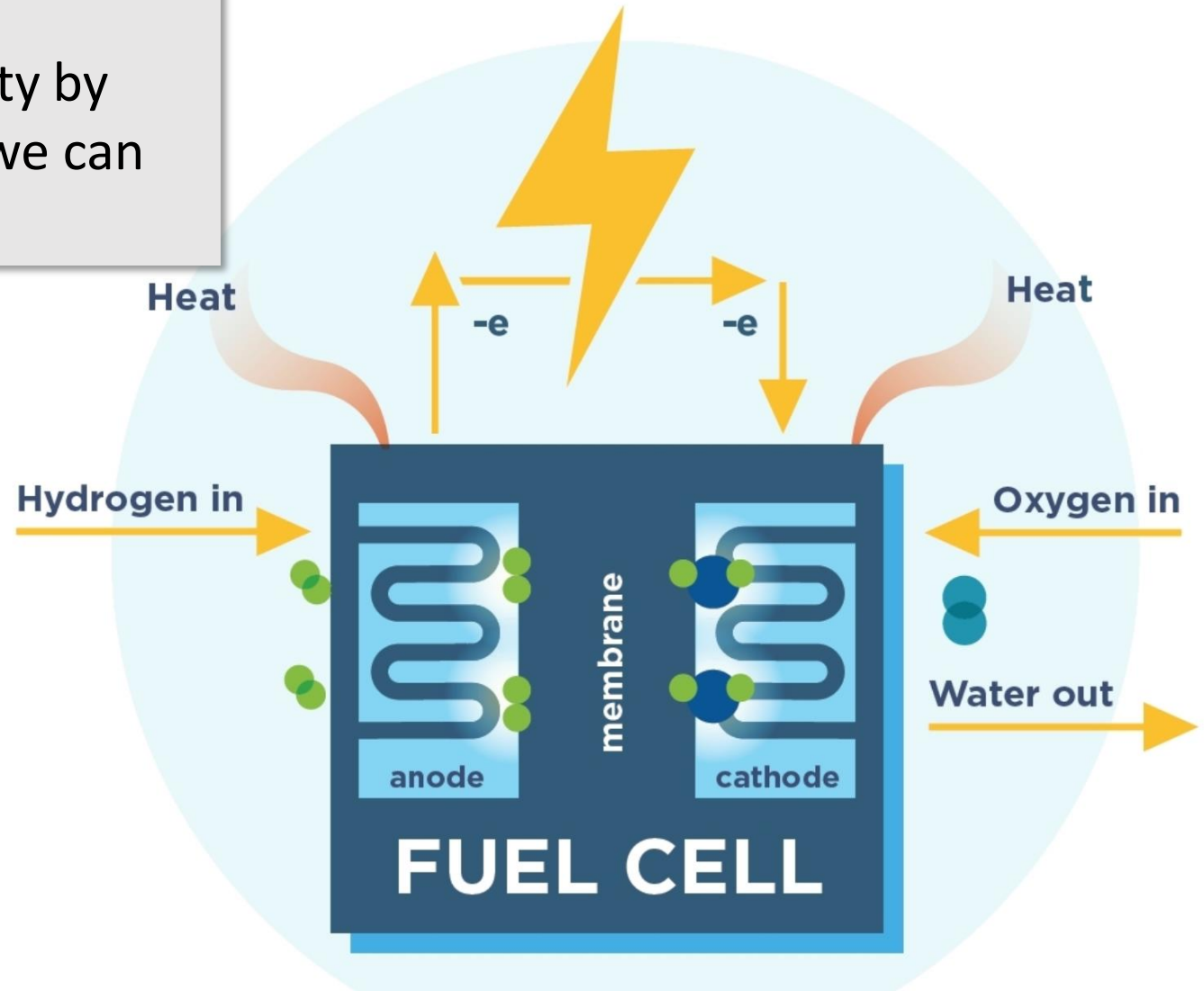


Fuel cells for portable, mobile and grid-level power

What's a fuel cell?

→ Directly convert fuel to electricity by separating the fuel and oxidizer, so we can capture the electrons.

- ♦ Polymer fuel cells
 - low temperature, ~40% efficiency
- ♦ Ceramic fuel cells
 - high temperature, ~60+% efficiency
- ♦ Carbonate fuel cells
 - high temperature, ~60+% efficiency

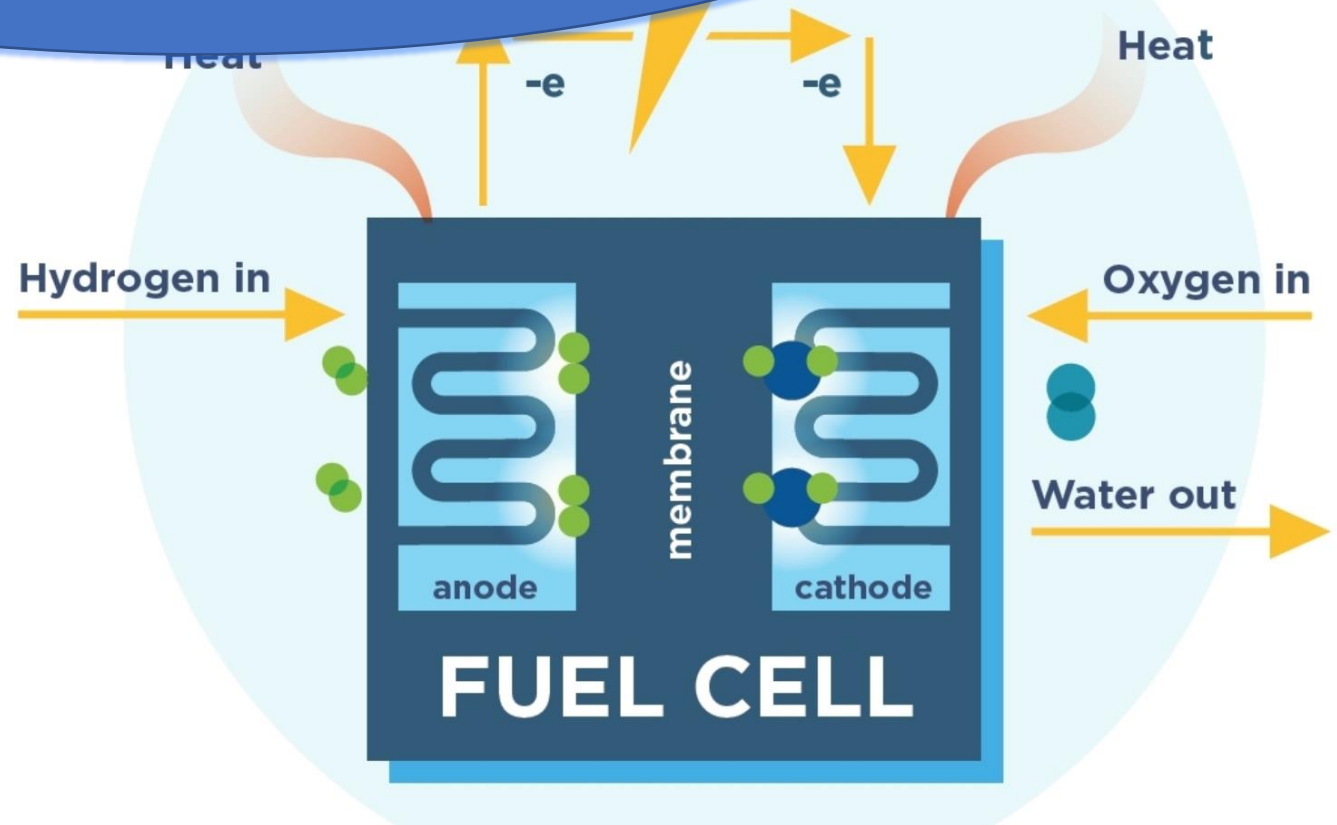


Fuel cells for power

Efficiency is KEY!

→ Directly
separating the
capture the

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Fuel cells on the grid level can provide distributed power → miniature power stations widely distributed = reliability (?)

Grid-scale units are built from discrete, smaller fuel cells



Extend technologies for trucks, trains and ships to grid-level applications



Individual fuel cell
&
350 kW fuel cell stack



Four-Stack Module
1.4 megawatts



Completed module
1.4 megawatts

New generation of scientists & engineers will solve the fuel, fuel storage & transport, and materials challenges



PHOTO: CSIRO researchers Michael Dolan (L) and David Harris are set to make history with these hydrogen-powered cars.
(ABC News: Lexy Hamilton-Smith)

Ammonia as a means to store and transport hydrogen

- NH_3 is used industrially already
- Excellent distribution network
- New materials that enable winning H_2 from the NH_3 molecule

Brilliant!