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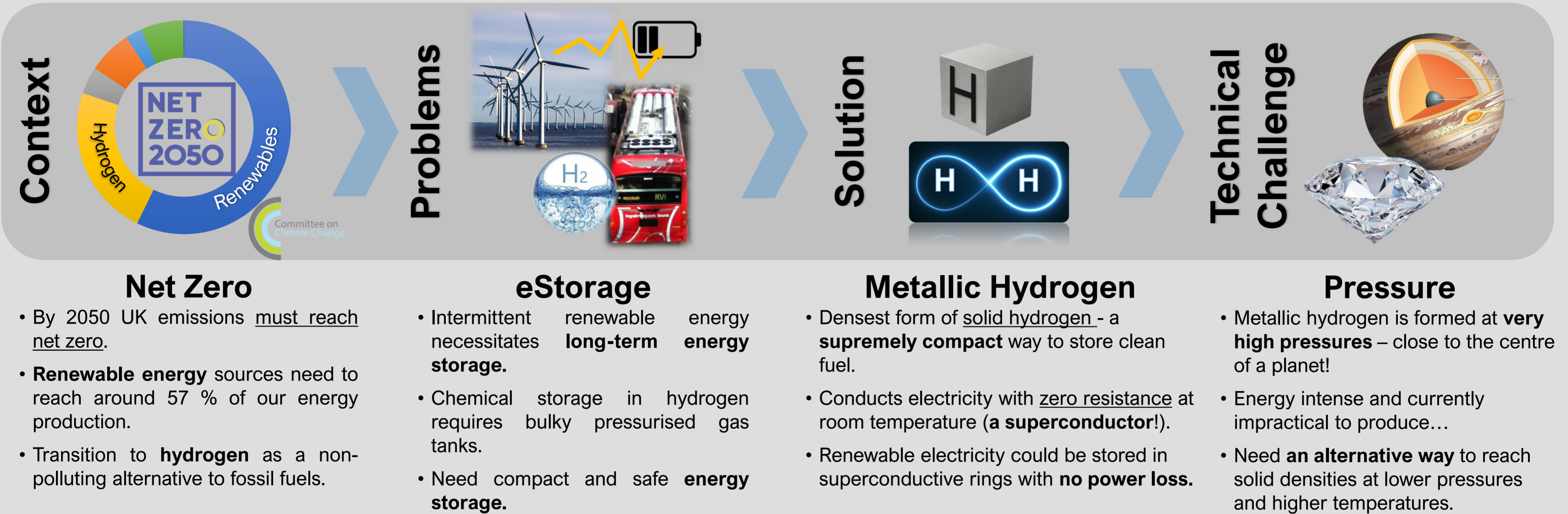
CONFINING HYDROGEN: A Low Energy Route to

Room Temperature Superconductivity



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Solution

DENSE HYDROGEN


Density of hydrogen could be increased by confining in porous carbon sponges

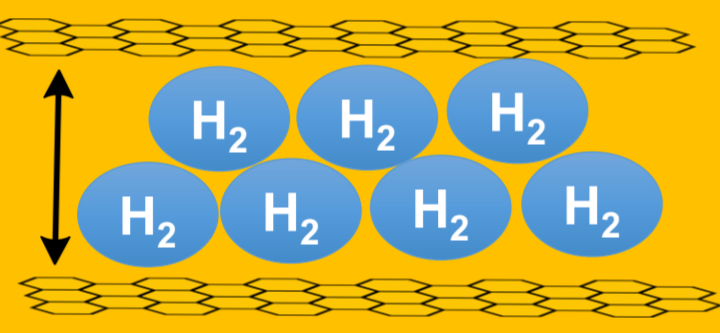
Via **NANOCONFINEMENT**

Previous experimentation indicates that confining hydrogen in very small carbon pores produces solid-like densities at **pressures ~2000 times lower** than classically observed!

“Route to Room Temperature Superconductivity”

Using nanoconfinement as a ‘**pre-densification**’ step and the application of additional pressure, may allow us to **create metallic hydrogen** at significantly lower pressures than the centre of a planet.





1) Proof of Principle – It is Solid!

- Neutron Diffraction** reveals structural information of a material as well as definitive proof of its state.
- Our recent studies show for the first time, the crystal structures of nanoconfined hydrogen - fully **confirming that dense-solid hydrogen** does form in carbon sponges. Furthermore, we observe them at temperatures never seen previously.



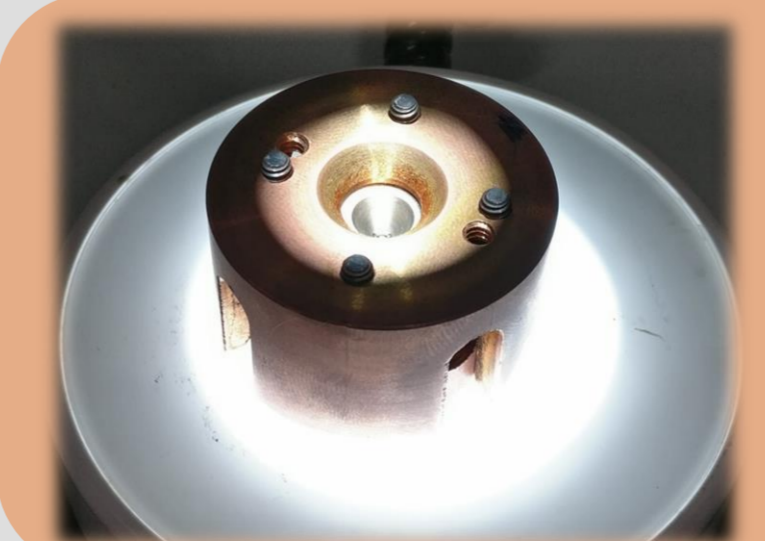
2) Zero Resistance

- Electrical resistivity** measurements can identify a switch to superconductivity but also can identify changes in state.
- Low pressure results observed a **drop in resistivity** upon densification, signifying a switch in the hydrogen’s state.



What does this mean?

- Solid hydrogen = more hydrogen = **compact fuel storage**.
- Lower pressures and higher temperatures = **safer storage**.
- Results so far are promising for the next stage of the project: increasing the pressure to find a **low energy route to room temperature superconductivity...**



Next Steps: Building Pressure Construction of high pressure experimental apparatus

