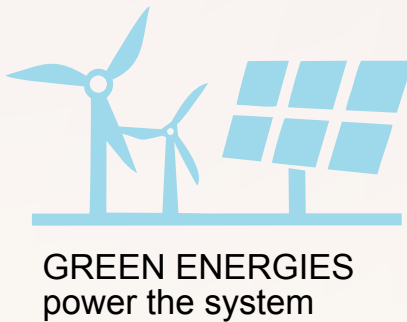


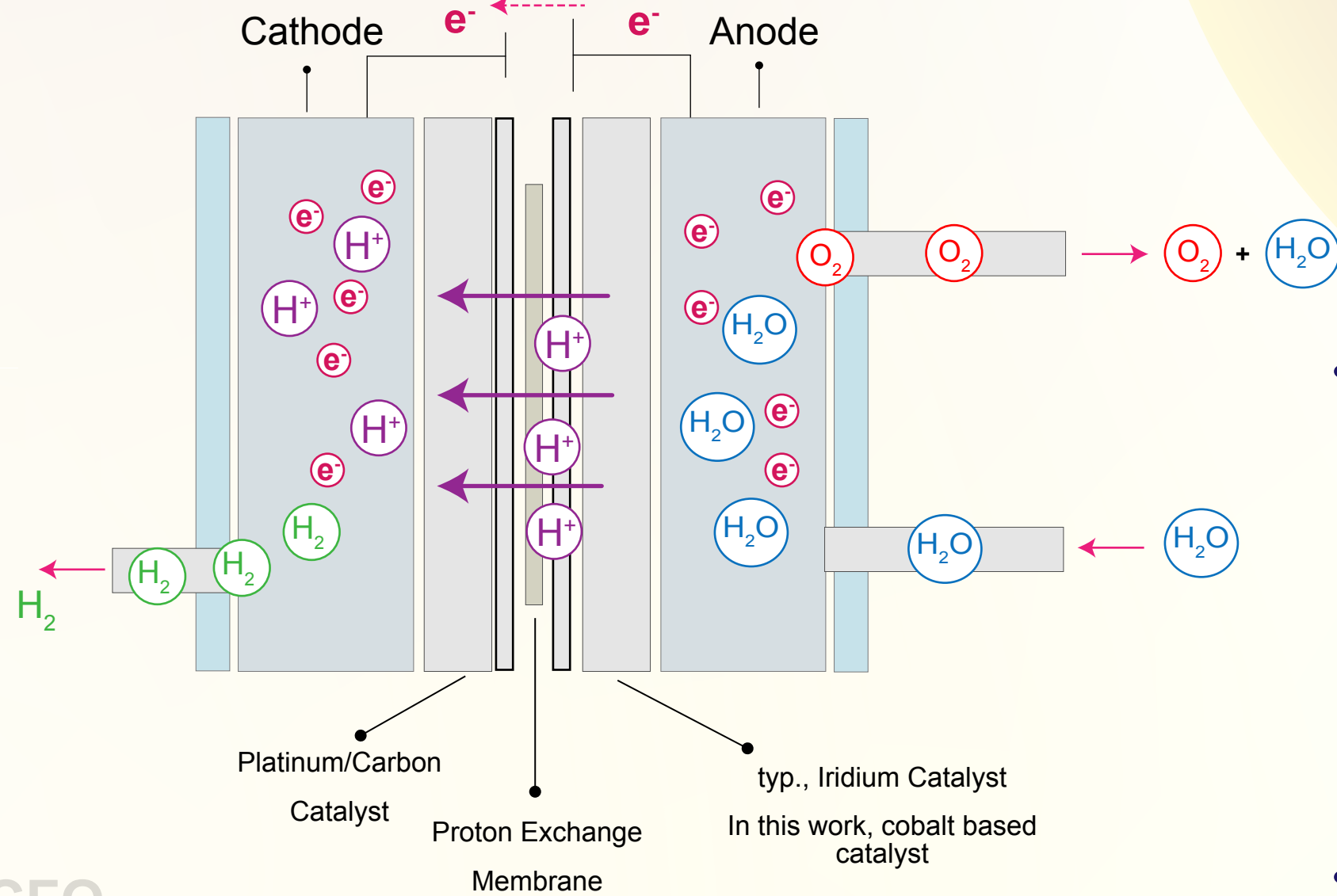
Components of a PEM water electrolyzer

- 1. Cathode current collector
- 2. Anode current collector
- 3. Gasket
- 4. Catalyst coated membrane (CCM): the membrane allows passage of H^+ to the cathode catalyst to make H_2
- 5. Pure water comes into the anodic compartment at $80^\circ C$
- 6. Oxygen and water come out from the outlet of the anodic compartment
- 7. Hydrogen comes out of the cathode
- 8. Heating rod and temperature controller



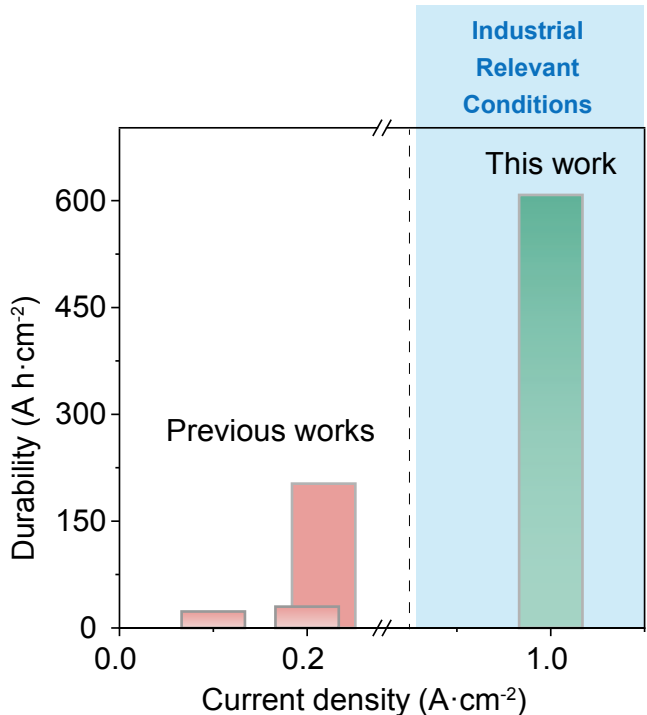
GREEN ENERGIES power the system

H₂ generation

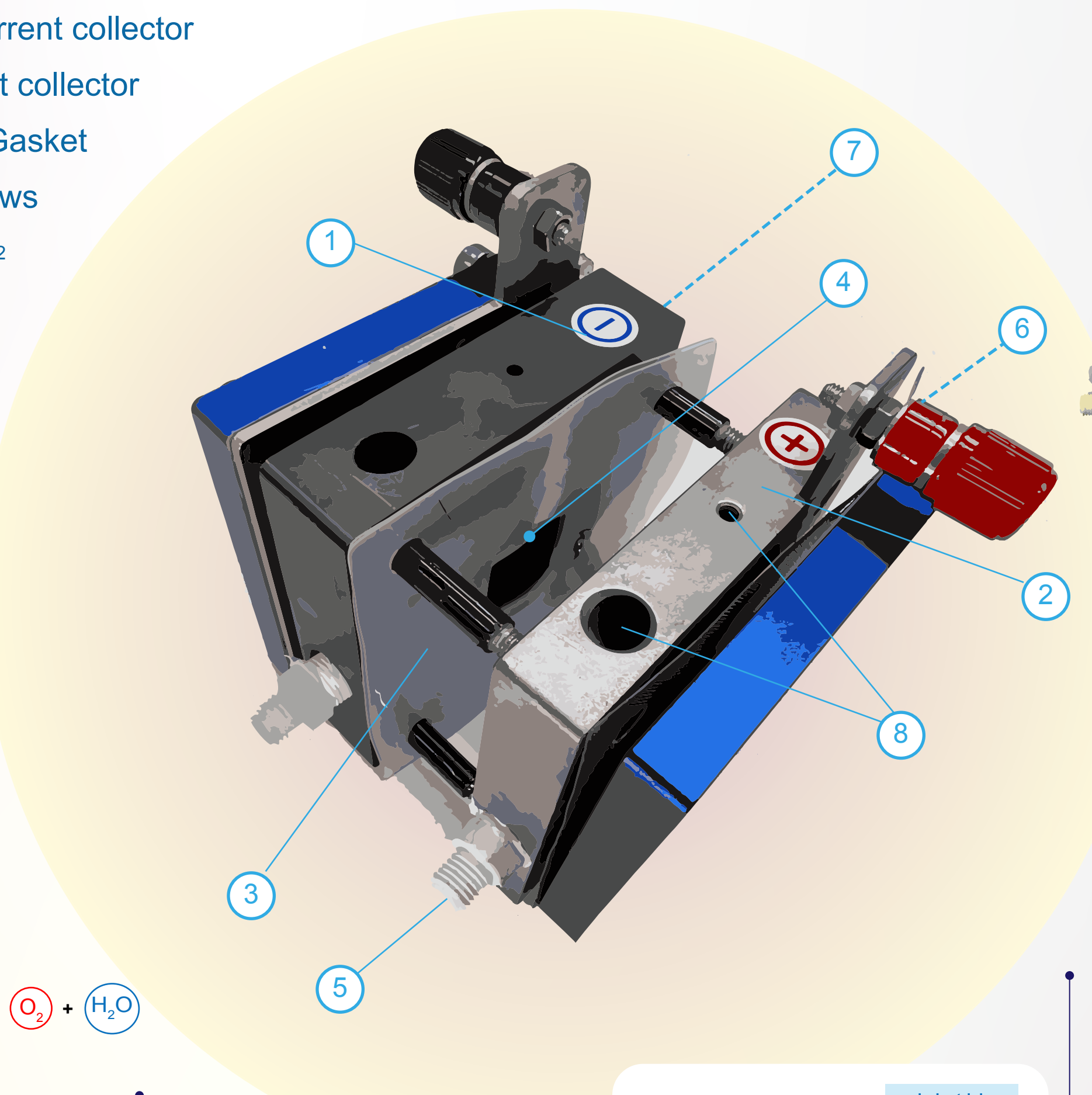


Performance

The device has proven to obtain a current density of $1A/cm^2$ at $1.77V$. It has proven to be stable under these conditions for more than 600 hours - a new landmark towards sustainable green H_2



The PEM water electrolyzer

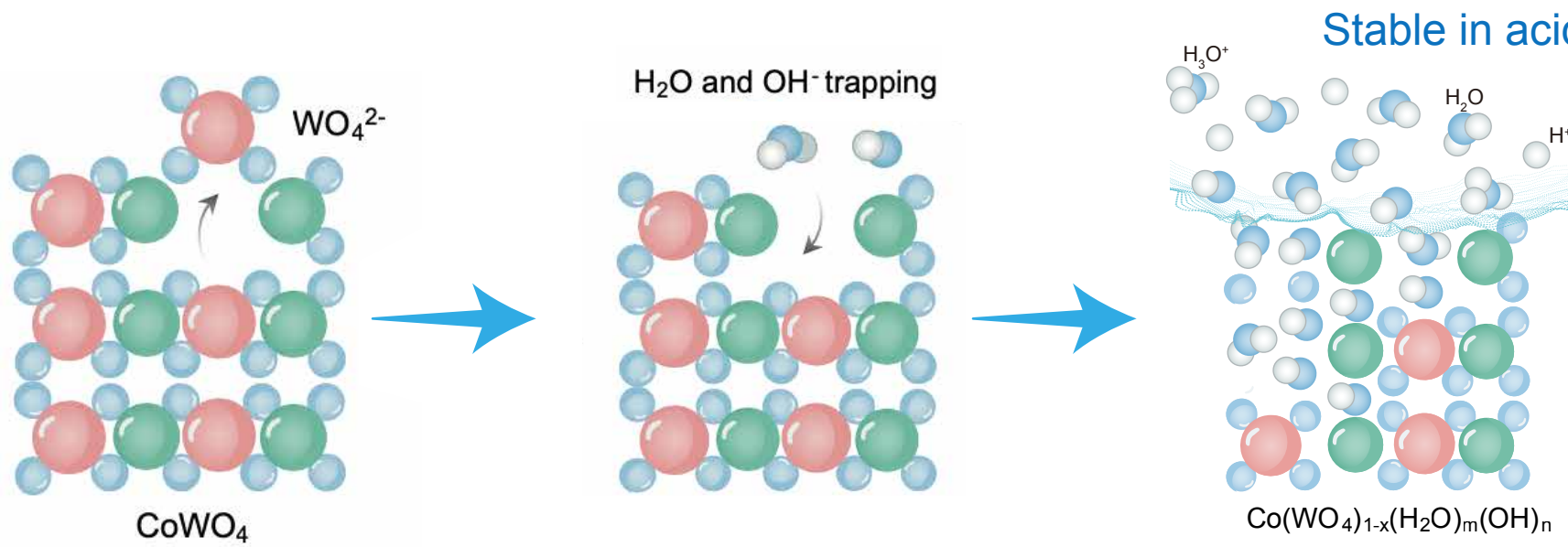


Catalyst coated membrane (CCM)

Catalysts, typ. platinum (cathode) and iridium (anode) based, are pressed onto the proton exchange membrane.

The new device replaces the scarce and costly iridium.

The new catalyst: material delamination to trap water



Highly acidic environments degrade anode catalysts. Iridium is the only material that combines activity and stability at these conditions. **This work presents a sustainable and cost-effective alternative to iridium.**

The **new catalyst**, based on cobalt, **achieves stability and activity by incorporating water and hydroxide into its structure.**

This promotes a **new reaction mechanism based on confined water and hydroxide that increases activity**, and creates a **shield against corrosion using the trapped water**. Together, this allows **unprecedented performance for non-iridium catalysts**