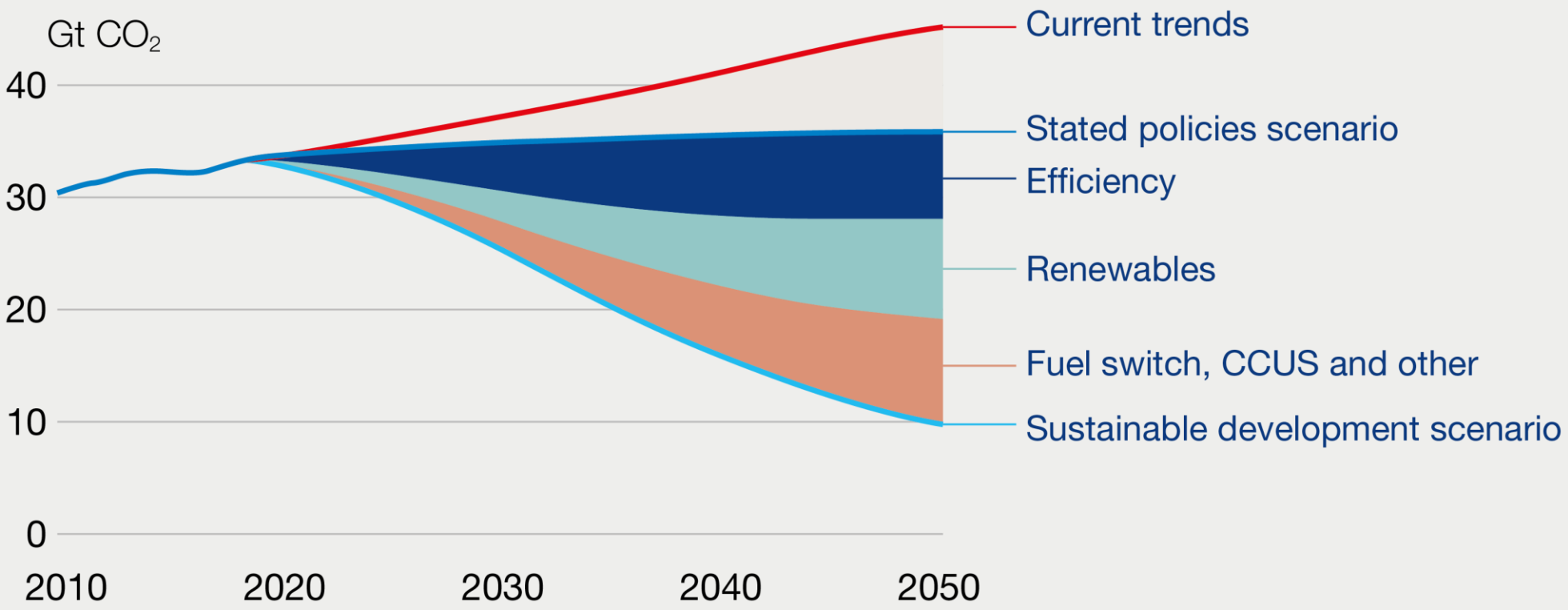
Efficient water purification for offshore wind and power to x

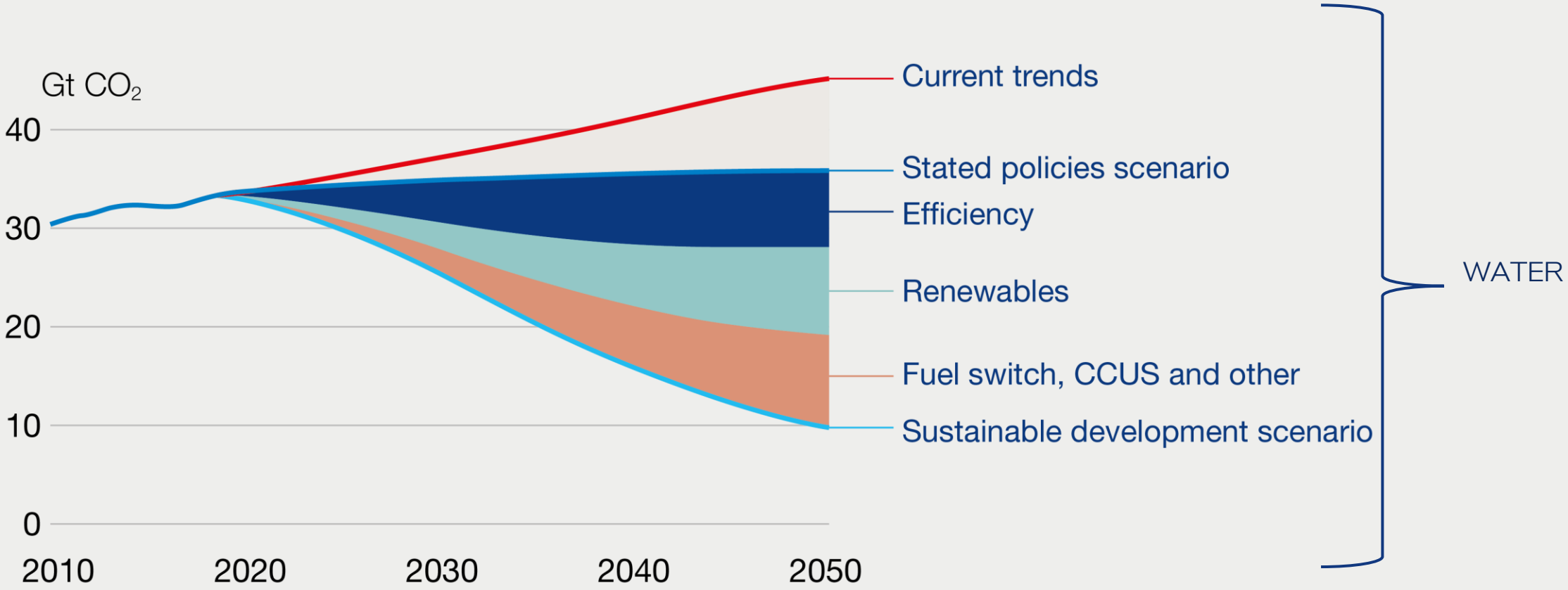
Luciana Mendes
Global Sales Manager for
FWG/Desalination

Transition to clean energy



IEA Energy Outlook 2019

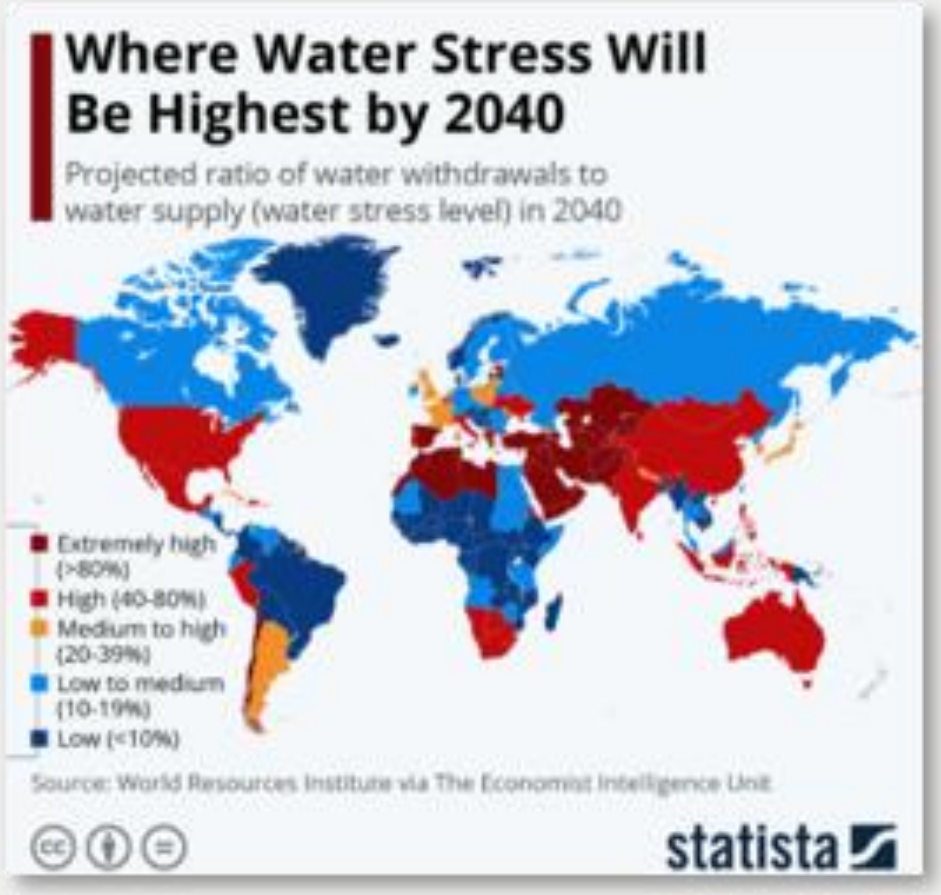
Transition to clean energy



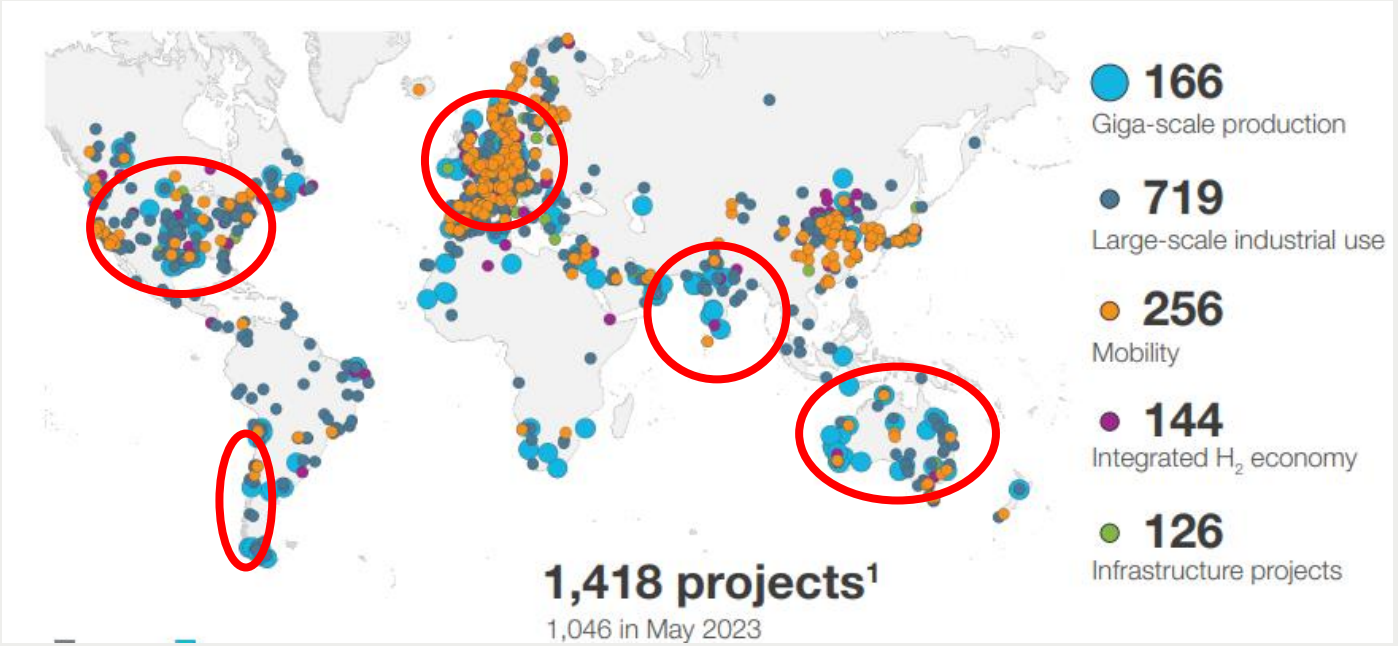
IEA Energy Outlook 2019

Power to X
Renewable Hydrogen

Water in Green Hydrogen



Hydrogen Project – By Hydrogen Council



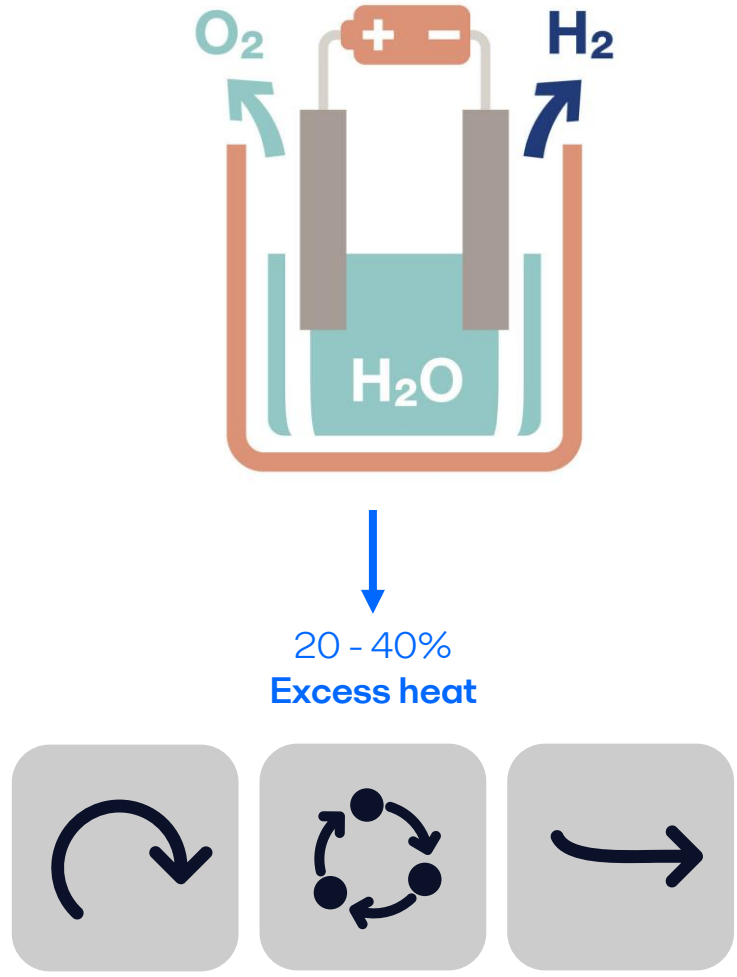
Green hydrogen production insights

Electrolysis generates 20-40% excess heat

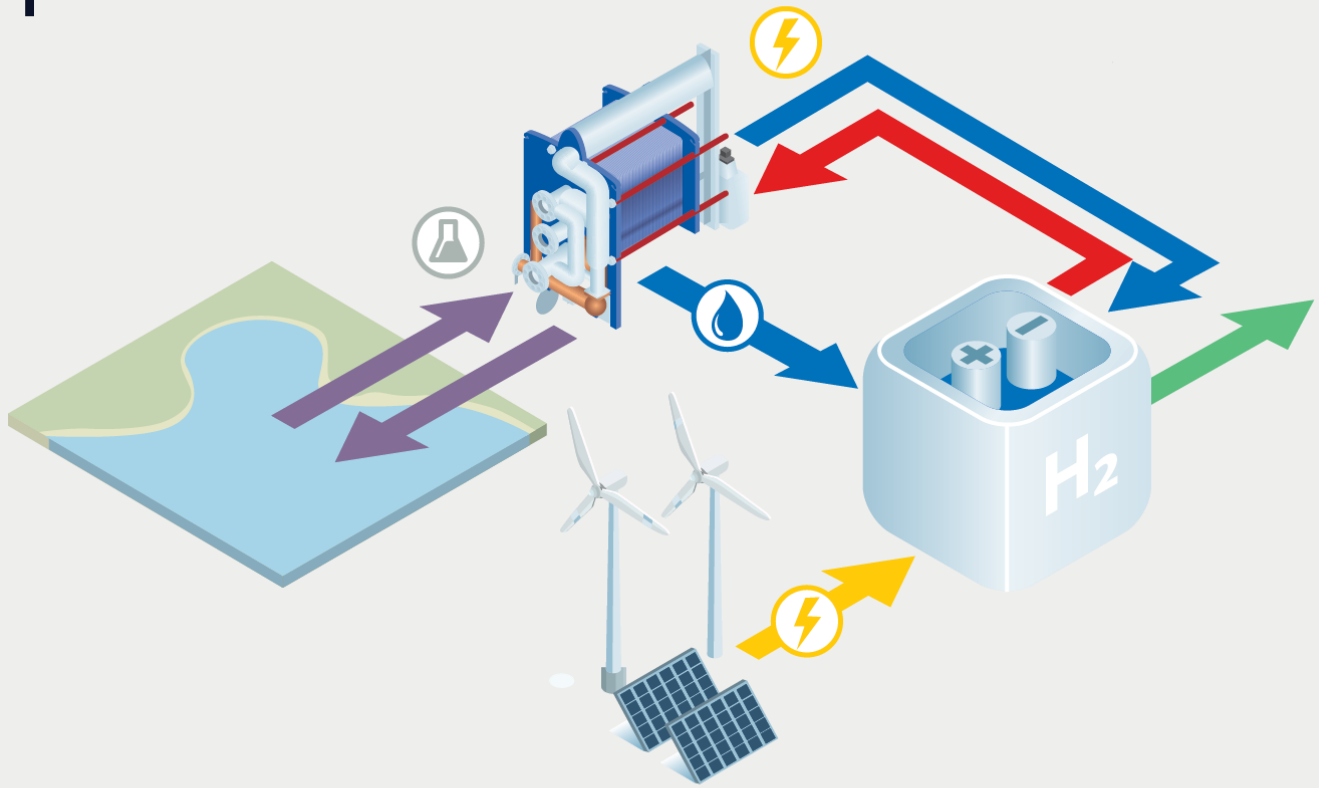
- Optimized temperature control and efficient cooling is crucial for maximizing process efficiency and equipment lifetime.

Every 10 MW electrolyser capacity requires 50-60 m^3/day of clean water

- Utilizing the excess heat for water purification is crucial to maximize electrolyser system efficiency

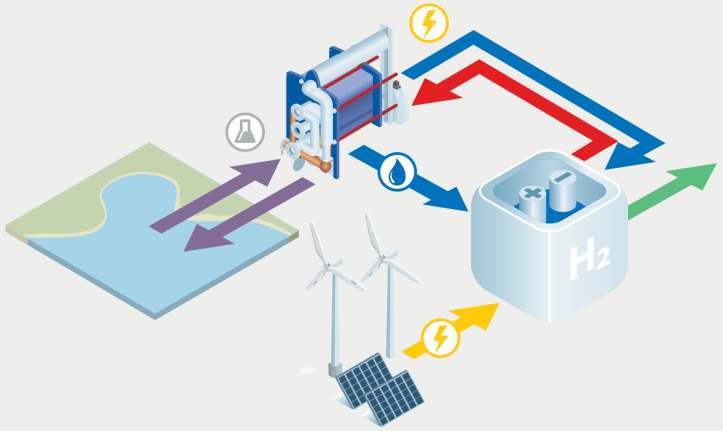


Waste heat recovery for water purification



Water purification for electrolysis

Water purification with thermal desalination using **Alfa Laval HyDuo™**



Water purification with conventional reverse osmosis

Combining electrolyser cooling and water purification with:

- ✓Highest water quality
- ✓Smallest footprint
- ✓Minimized chemicals
- ✓Minimized electricity consumption
- ✓Low maintenance needs
- ✓Variable production

Minimizing chemical usage

Chemicals are needed for Seawater pre-treatment:

- Anti-scaling
- Anti-fouling

Alfa Laval HyDuo™ features enables the use of little to no chemicals due to:

- Vacuum operation – evaporation at lower temperatures
- High-grade titanium plates

Minimizing chemical usage brings two straight forward benefits:

- Lower OPEX
- Lower environmental footprint

Is there enough excess heat?

Let´s look into the electrolyser side

Assuming 20% heat generated in a 10 MW electrolyser system:

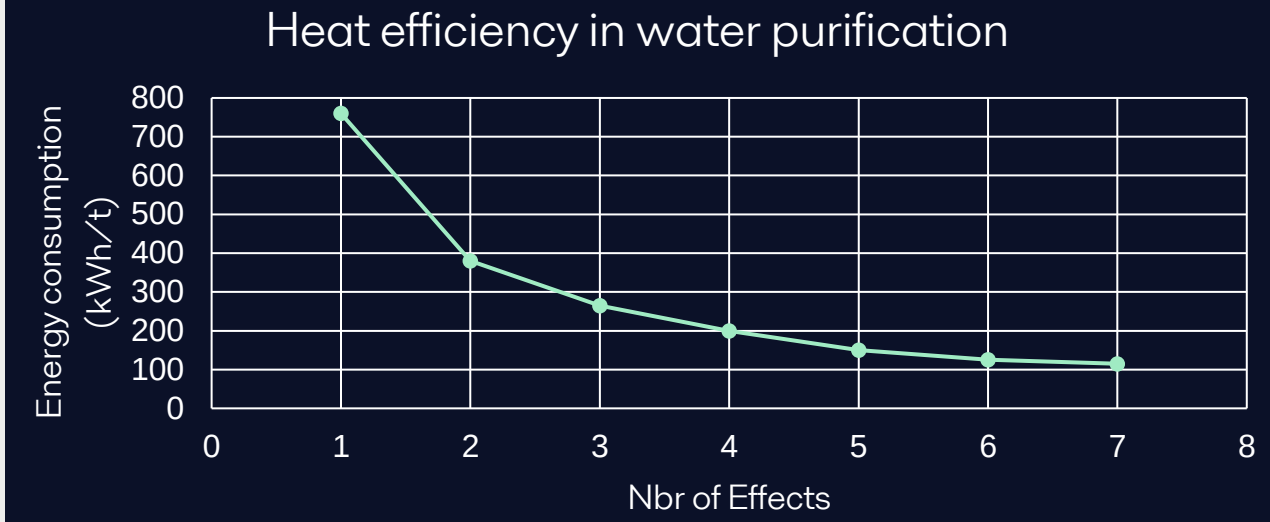
- 2 MW of heat generated
- 60 m^3/day of clean water needed

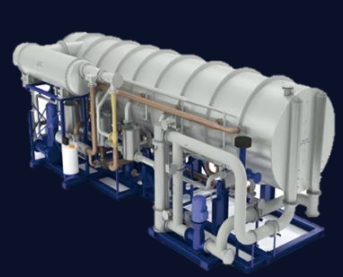
→ **800 kWh heat energy available per m^3 of pure water**

Assuming 11% heat generated in a 10 MW electrolyser system:

- 2 MW of heat generated
- 60 m^3/day of clean water needed

→ **410 kWh heat energy available per m^3 of pure water**





Wind Offshore

Wind offshore on energy transtion

- Wind speeds tend to exceed those on land
- The wind often blows more consistently offshore than it does on land, too
- Less disruptive to most landscapes
- HVDC platforms allows less energy losses
  - Unmanned platform
  - People attendance every other month

Alfa Laval

ORCA

- Unmaned operation
- Remotely start, operation & stop
- Automatic chemicals dosage

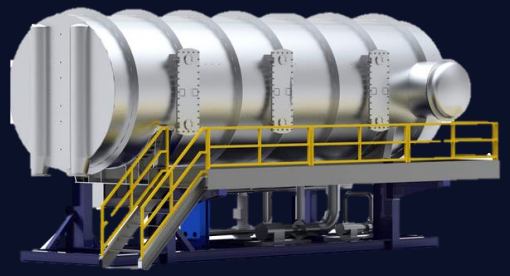
Accelerating desalination performance

In the market since 1954

Continuous R&D

> 30.000 units installed

Capacities from 2 up to 2000 m^3/day



Alfa Laval MEP HyDuo™

Alfa Laval AQUA HyDuo™

Alfa Laval ORCA Offshore

Sundrop Farms - Case: MEP installation in solar power

Installation Purpose

Freshwater production for crops
CSP with electrical production for grid
CSP for heating of greenhouse

Project data

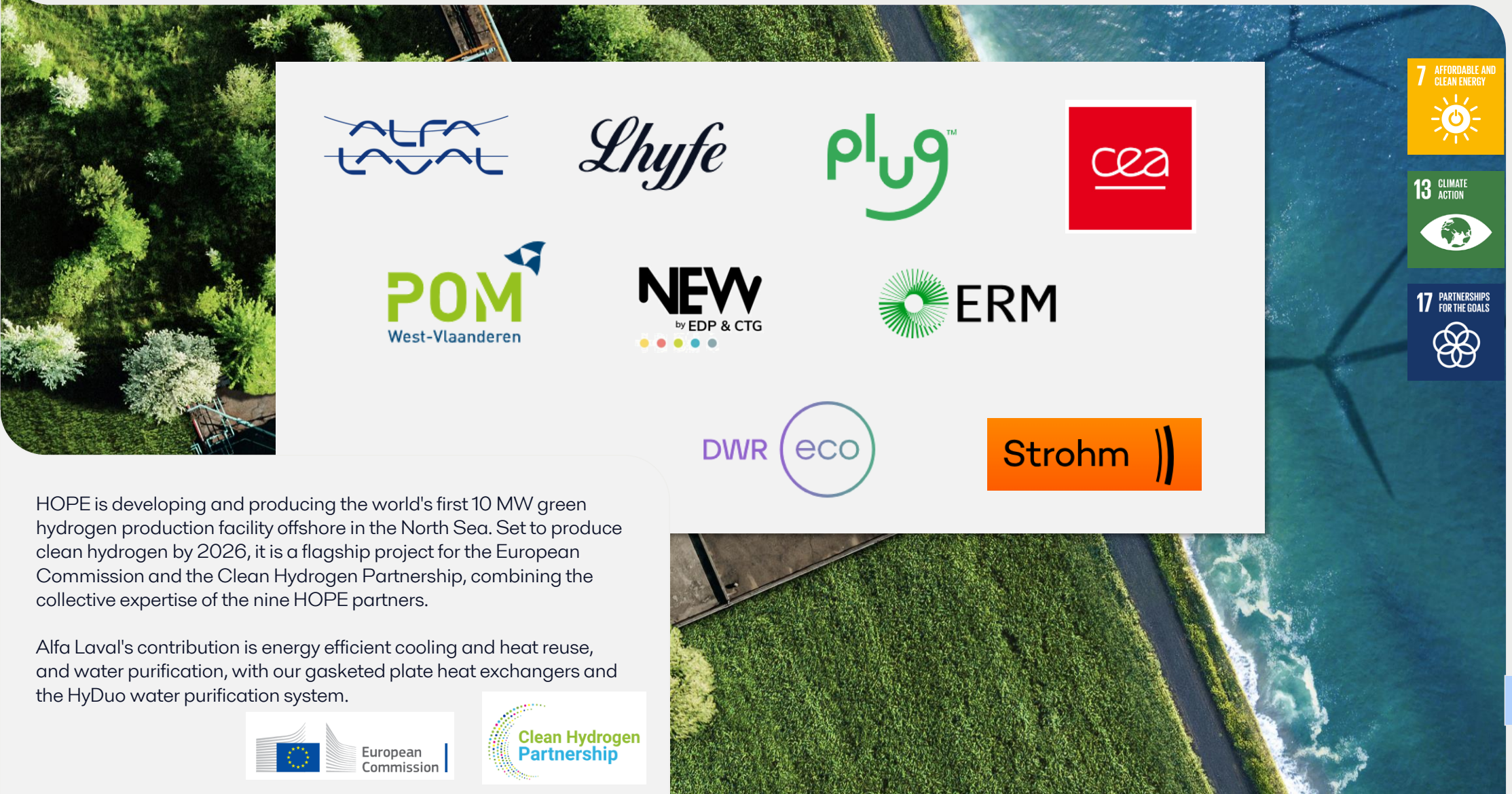
1000 m3/day in a 7 effect system
Dimensions 20 x 6 m plot space

Key benefits with AL technology

- Managing temperature gradients during cloudy conditions
- Fast start up (30 min pulling vacuum + 10-15 min startup).
- Can operate 0-100% turn down ratio

HOPE (Hydrogen Offshore Production for Europe)

Alfa Laval in consortium of the world's largest offshore green hydrogen project



HOPE is developing and producing the world's first 10 MW green hydrogen production facility offshore in the North Sea. Set to produce clean hydrogen by 2026, it is a flagship project for the European Commission and the Clean Hydrogen Partnership, combining the collective expertise of the nine HOPE partners.

Alfa Laval's contribution is energy efficient cooling and heat reuse, and water purification, with our gasketed plate heat exchangers and the HyDuo water purification system.

Energy savings

Emission savings

Water savings

READ MORE >

Way foward

Technology development

Reliability & Efficiency as key driver for technology development

Water as key factor on energy transition

Policies & Regulation to ensure proper and sustainable usage of water

Chemicals

Water treaatment requeries chemicals

Q&A

Luciana.mendes@alfalaval.com