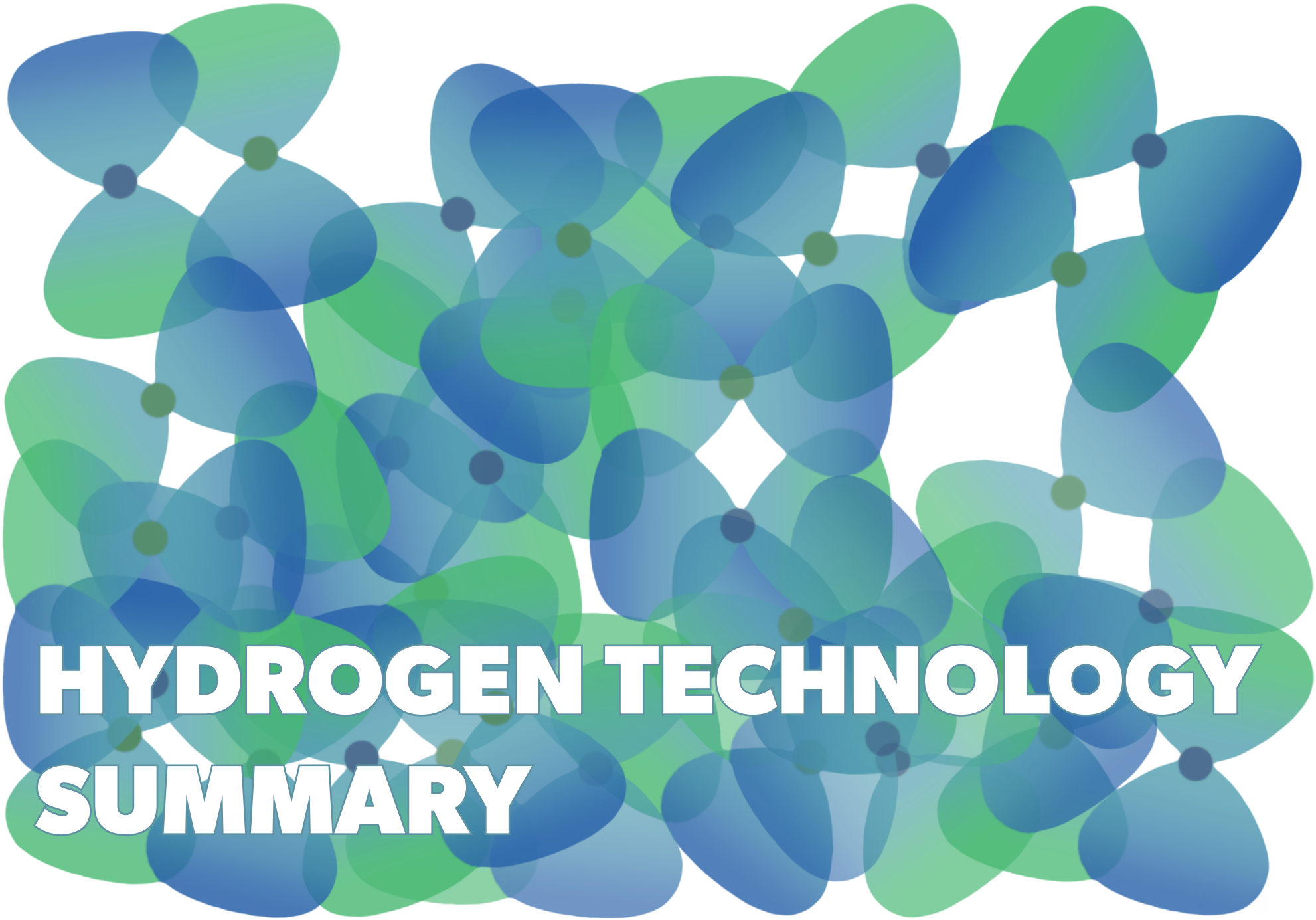


HYDROGEN TECHNOLOGY SUMMARY

HYDROGEN has the potential to become the key energy carrier that can address the climate crisis by replacing conventional fossil fuels, which are associated with significant CO2 emissions. As a green fuel, hydrogen fully meets the global objectives set for the coming decades.

Our hydrogen technology is particularly well-suited for natural gas producing regions, e.g. the Middle East. Cooling for buildings and industrial processes can be e ciently achieved using the Hydrogen ThermoLift or CryoLift systems, while the Decarbonizer converts natural gas into hydrogen. **See our detailed paper on Hydrogen Technology.**

HYDROGEN USES

Hydrogen can be used in cars and heating and cooling buildings and is completely emission free and should be produced from natural gas.

DECARBONIZER

Natural Gas will be available for the next 600 years so our concept is to **Decarbonizer** natural gas by splitting the carbon atoms of CH4 from the hydrogen atoms under the influence of high heat. The process is known as cracking and, in addition to pure hydrogen, yields only carbon dust (NO CO2) as an additional product. **Pure carbon** is a completely non-toxic, valuable raw material that can find a variety of uses in the future, as carbon fibers for reinforcement of high-strength concrete or basic material for everyday products like inks, paints, tires, and batteries. The additional product from the process is **pure drinking water** which can assist with the desalination of seawater.

THERMOLIFT

Is a thermodynamic machine currently being developed for highly efficient **heating, cooling, and hot water** generation whose gas cycle is driven by a heat source. This heat source can be generated through hydrogen combustion, but also through a high temperature solar collector (Solar Concentrator) or designed as a solar-hydrogen hybrid.

ThermoLift also generates for cold room cooling supporting its air conditioning feature.

CRYOLIFT

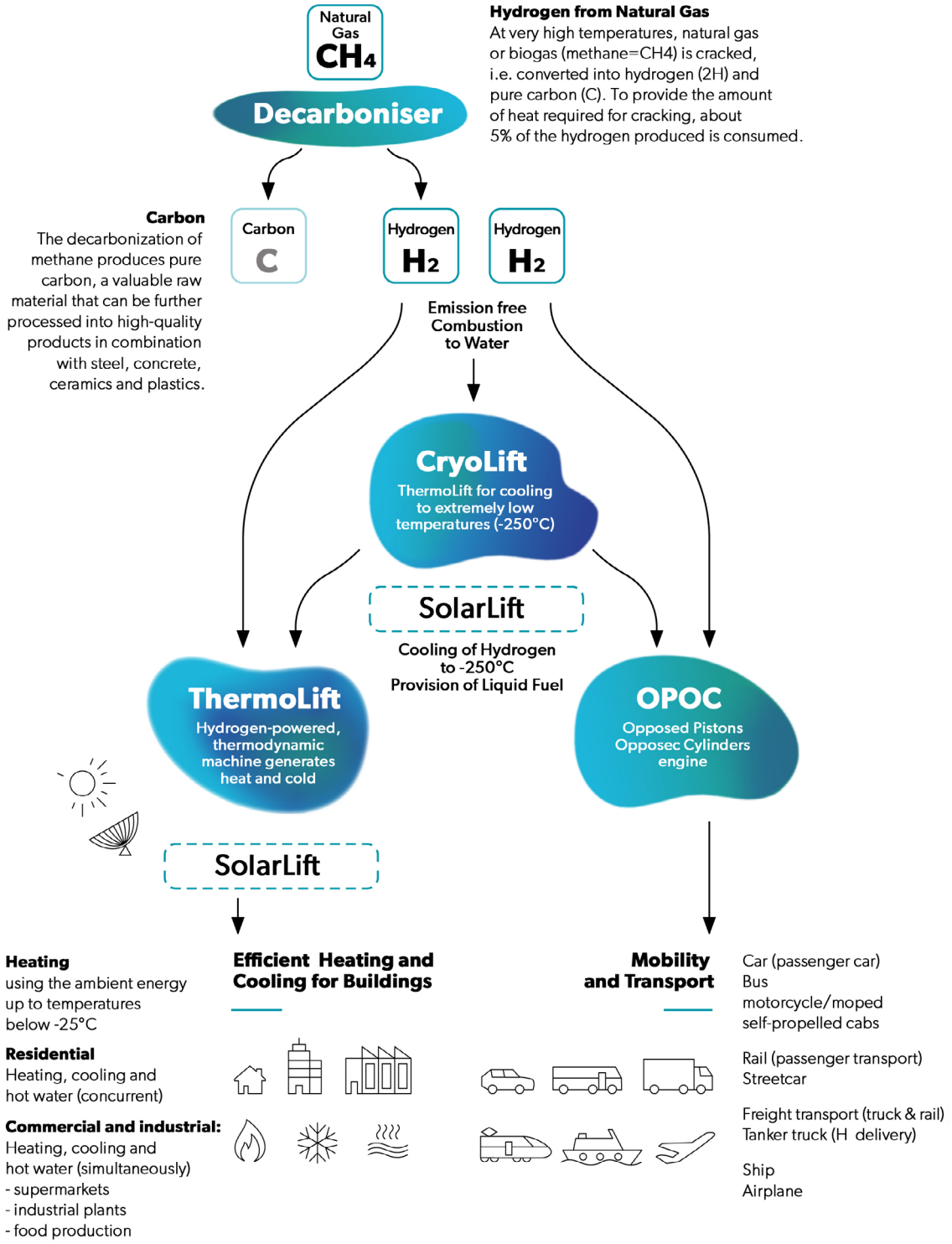
Under the same principle of **THERMOLIFT**, however, temperatures close to absolute zero can also be achieved for **liquefaction of hydrogen**. Therefore, with the help of an optimized low temperature variant of the **THERMOLIFT**, the **CRYOLIFT**, liquid hydrogen can be refueled, stored, and transported. Compared to liquid fuel, it is 800 times larger in gaseous form. Vehicles would need huge tanks to achieve normal (and sensible) ranges. This can be remedied by cooling the hydrogen at atmospheric pressure below its boiling point so that it is present in liquid form.

OPOC ENGINE

It has recently been generally known that today's vehicles can run on hydrogen. Without further modifications, however, efficient, higher combustible speed of the hydrogen would lead to relatively loud engine noise and, in the long term, to signs of wear. Adaptions of the existing engines would therefore be necessary. However, we propose a two-stroke opposed piston engine, the **OPOC ENGINE** (**Opposed Pistons Oppose Cylinders**), as the ideal hydrogen engine. Solutions are being developed and we feel that we are way ahead of the market and with additional development funding we are going to upgrade our Patent under a new filing for a completely revolutionary two-stroke hydrogen combustible engine with very few working parts. We need to maintain our existing vehicle technology, distribution systems, and networks (such as filling stations offering liquid fuel) as much as possible.

VISION 2030 EXPENSIVE INFRASTRUCTURE

We do not have time to completely reinvent, finance, and rebuild the entire infrastructure over decades, as is happening with electro mobility. **THERMOLIFT**, **CRYOLIFT**, and the **OPOC ENGINE** are at an advanced stage of development and can be ready for the market in about two to three years with the appropriate funding. The development of the **DECARBONIZER** for CO2 free hydrogen production should be rapidly advanced and promoted as a solution to support all of the above and can interact in an ecologically effective manner and assume their efficient role in an economically stable post-fossil energy future.


Natural Gas
CH4
Decarboniser
Hydrogen from Natural Gas
At very high temperatures, natural gas or biogas (methane=CH4) is cracked, i.e. converted into hydrogen (2H) and pure carbon (C). To provide the amount of heat required for cracking, about 5% of the hydrogen produced is consumed.
Carbon
The decarbonization of methane produces pure carbon, a valuable raw material that can be further processed into high-quality products in combination with steel, concrete, ceramics and plastics.
Carbon
C
Hydrogen
H2
Hydrogen
H2
Emission free Combustion to Water
CryoLift
ThermoLift for cooling to extremely low temperatures (-250°C)
SolarLift
Cooling of Hydrogen to -250°C
Provision of Liquid Fuel
ThermoLift
Hydrogen-powered, thermodynamic machine generates heat and cold
OPOC
Opposed Pistons Opposec Cylinders engine
SolarLift
Heating
using the ambient energy up to temperatures below -25°C
Residential
Heating, cooling and hot water (concurrent)
Commercial and industrial:
Heating, cooling and hot water (simultaneously)
- supermarkets
- industrial plants
- food production
Efficient Heating and Cooling for Buildings
Mobility and Transport
Car (passenger car)
Bus
motorcycle/moped
self-propelled cabs
Rail (passenger transport)
Streetcar
Freight transport (truck & rail)
Tanker truck (H delivery)
Ship
Airplane