

INTEGRATION OF NEW P2X TECHNOLOGIES

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CONTEXT

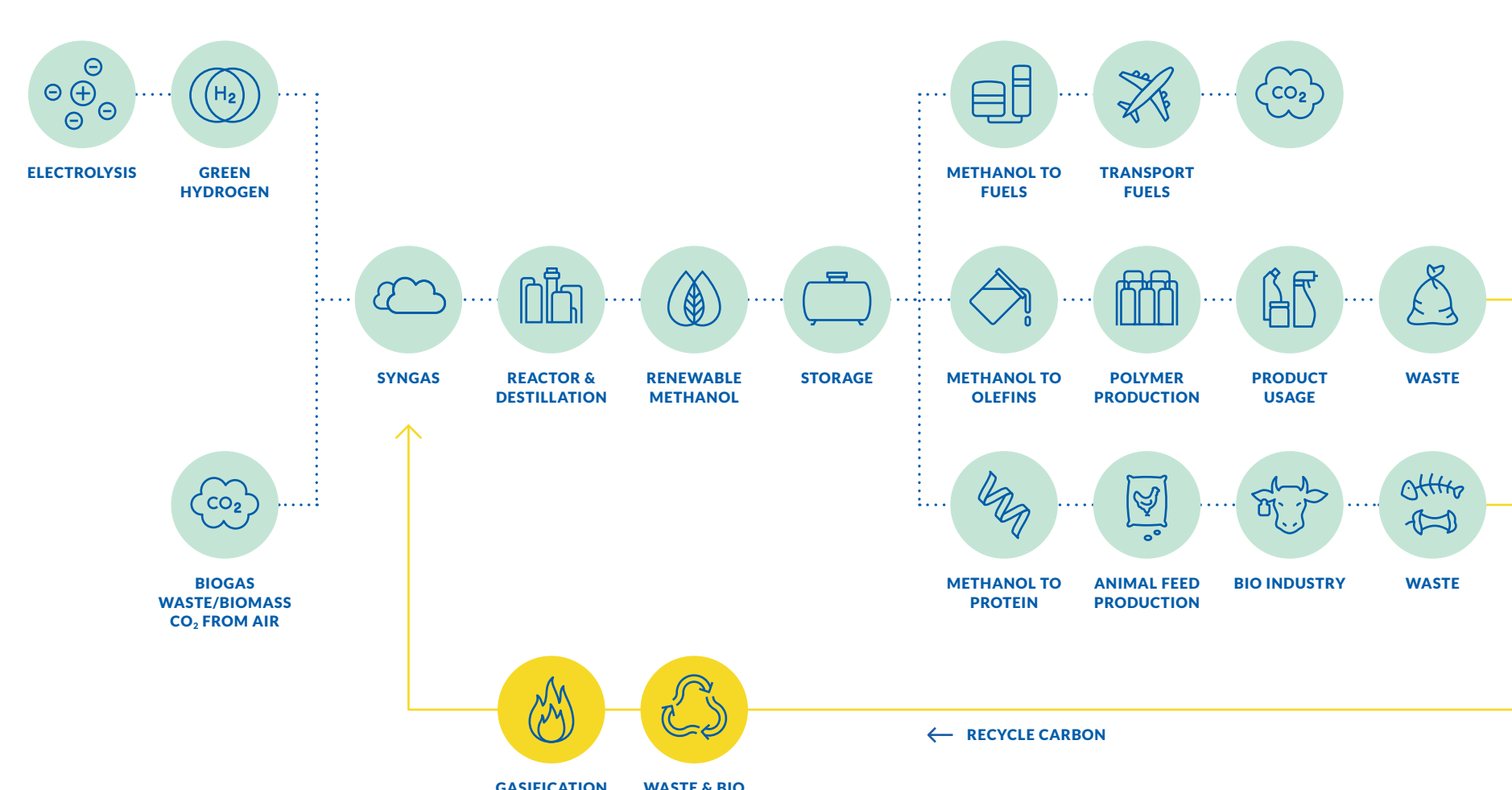
In a Power-to-X process renewable electrons are used in a conversion process towards heat or products like hydrogen, ammonia or syngas. In the future, this will be the way towards net zero of CO₂ emissions. Besides using a new production process, the whole value chain will have to change as the feedstock will change, the green energy demand for the processes will change, a lot of green hydrogen will be needed and new technologies and process routes need to be developed further. This transition is not easily made and the path towards the net zero of CO₂ emission goal has many challenges.

HOW TO USE POWER-2-X

Power-to-X has short term use cases and long term use cases. For the short term Power-to-X can be used to store a surplus of renewable energy in chemicals, maximizing the use of renewable energy and help to stabilize the variations in the electricity grid due to solar and wind energy. For instance, a peak load in wind power can be converted into hydrogen gas which can be used as fuel or feedstock for NH₃ or hydrocarbons synthesis.

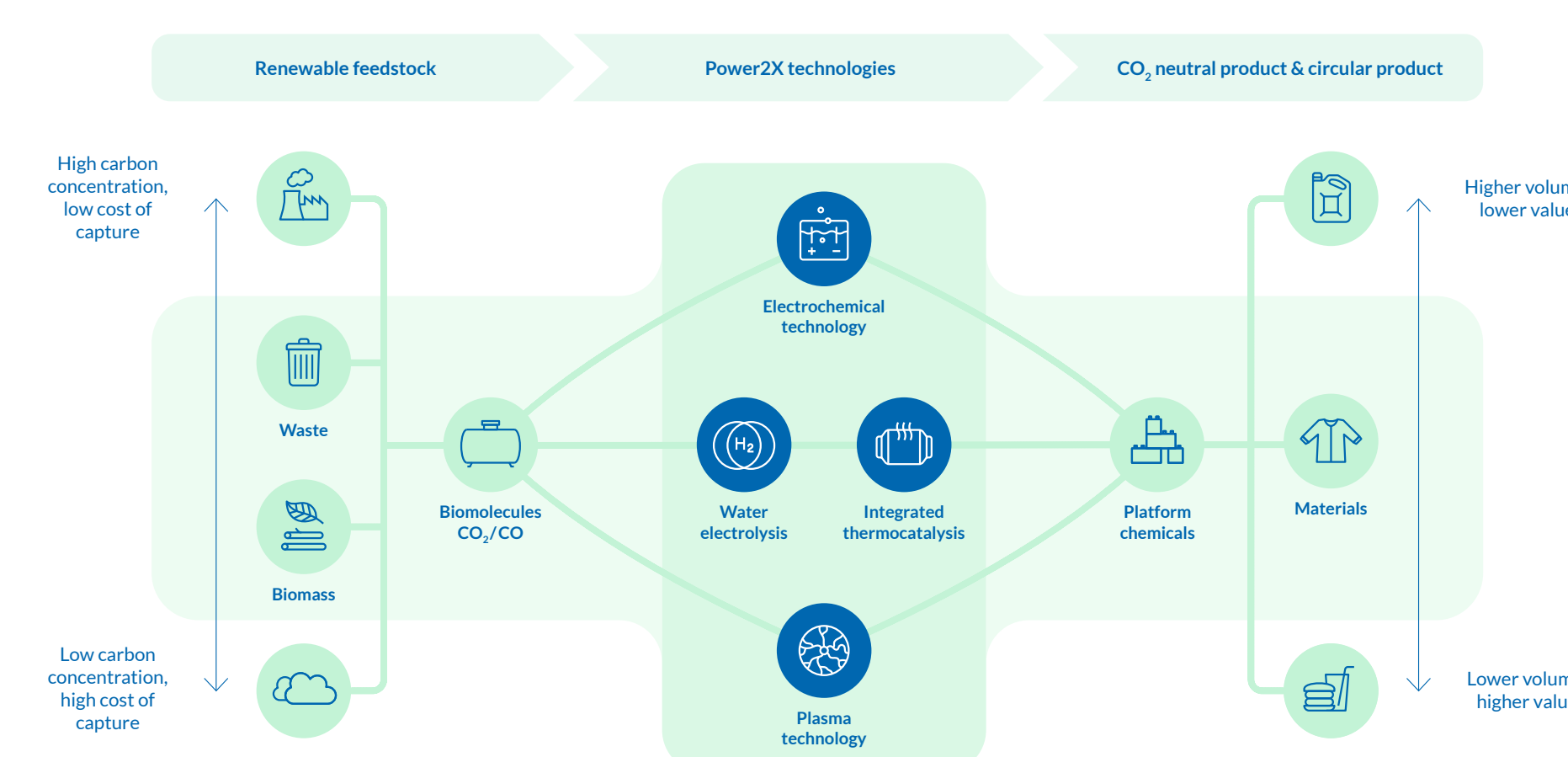
On the longer term, all materials and fuels need to be produced in a sustainable manner. New materials will be developed, matching the available feedstocks and electrified production processes. As a consequence, new value chains need to be developed and new collaborations will emerge.

Investigating and comparing new value chains for economics and environmental impact is part of the Power to Integrate program line of VoltaChem. VoltaChem is also able to help develop such a value chain by connecting parties with each other.



COMPARISON OF TECHNOLOGIES

Besides the technology developments for electrolyzers to produce hydrogen, a lot of work is being done by VoltaChem/TNO to develop thermo catalytic conversion processes, direct electrochemical conversion technologies or plasma technologies. More information about the technology development can be found on the other VoltaChem posters. In the Power to Integrate program line we compare different process routes and technologies with each other to give insights on the economical and environmental impacts.



OBJECTIVES FOR 2030

The Power-2-Integrate team aims to help the acceleration of development and implementation of Industrial Electrification and Carbon Capture and Utilisation in the broadest sense.

1. Giving insight in and taking away investment barriers for adoption of electrification technologies (e.g. business cases, infrastructure, regulatory, policy gaps, economic and environmental impacts).
2. Developing conceptual designs of integrated value chains and comparing different options on the basis of cost and environmental impact.

OPPORTUNITIES

1. Bringing stakeholders together to help create new ecosystems resulting in shared pilots.
2. Disseminate insights and project results to industrial stakeholders through our VoltaChem business community.
3. Give insight by the comparison of different electrification options and their value chains.

CHALLENGES

1. How to help the acceleration of the energy and feedstock transition.
2. Understand possible transition scenarios of the industry better
3. Give insight in factors that are important when a new technology is integrated in an existing industrial area.

PARTNERS

We have a unique VoltaChem business community with companies who are interested in electrification and are willing to cooperate with each other and share information in order to help each other with the energy and feedstock transition.

Global Carbon Demand for Chemicals and Derived Materials
in 2020 and Scenario for 2050 (in million tonnes of embedded carbon)

