Concrete solutions for fighting climate change

05/01/2026
Solutions

Power-to-X technologies with over 15 years of experience

Core expertise: Own patented microbiological methanation

- Technology innovation research started already in 2007
- First industrial scale plant soon running in Harjavalta

Complete Power-to-X solutions, together with partnering technologies

- Hydrogen production, carbon capture and handling, gasifiers, gas processing, storage…
- Integrated and designed for Customer needs

Consulting services to help Customers' projects onwards

- Feasibility studies, piloting and gas testing services

Power-to-X technologies with over 15 years of experience

ST1 methanating CO_2 side stream **from bio-ethanol** production

2019

Strategic **Power-to-Methane** cooperation begins with Kerava Energy

2021

P2X Solutions and Q Power agree on the **first industrial-scale (3MW)** e-methane production facility

2022-

2nd generation Methanation reactor design started. Aiming for wider capacity, more efficiency and less steel

2023

Synferm Pilot in Sweden Methanation with **Cortus Energy syngas**

2024

EPC biochar and synthesis gas plant delivery to Qvidja Gård (biochar,heat,power and biomethane)

2025-2026

2007-> MTT, LUKE

Piloting, Commercializing

Industrial Scale

Power-to-X test platform built at Qvidja. Based on 1st generation methanation module design.

2017-2018

A successful pilot in which **low-quality landfill gas** was methanized in Salo

2020

The world's smallest methanation plant **Wärtsilä** Dubai **World Expo** Demonstration unit

2021

Waste-to-Energy pilot at **Fortum's** Riihimäki waste incineration plant.

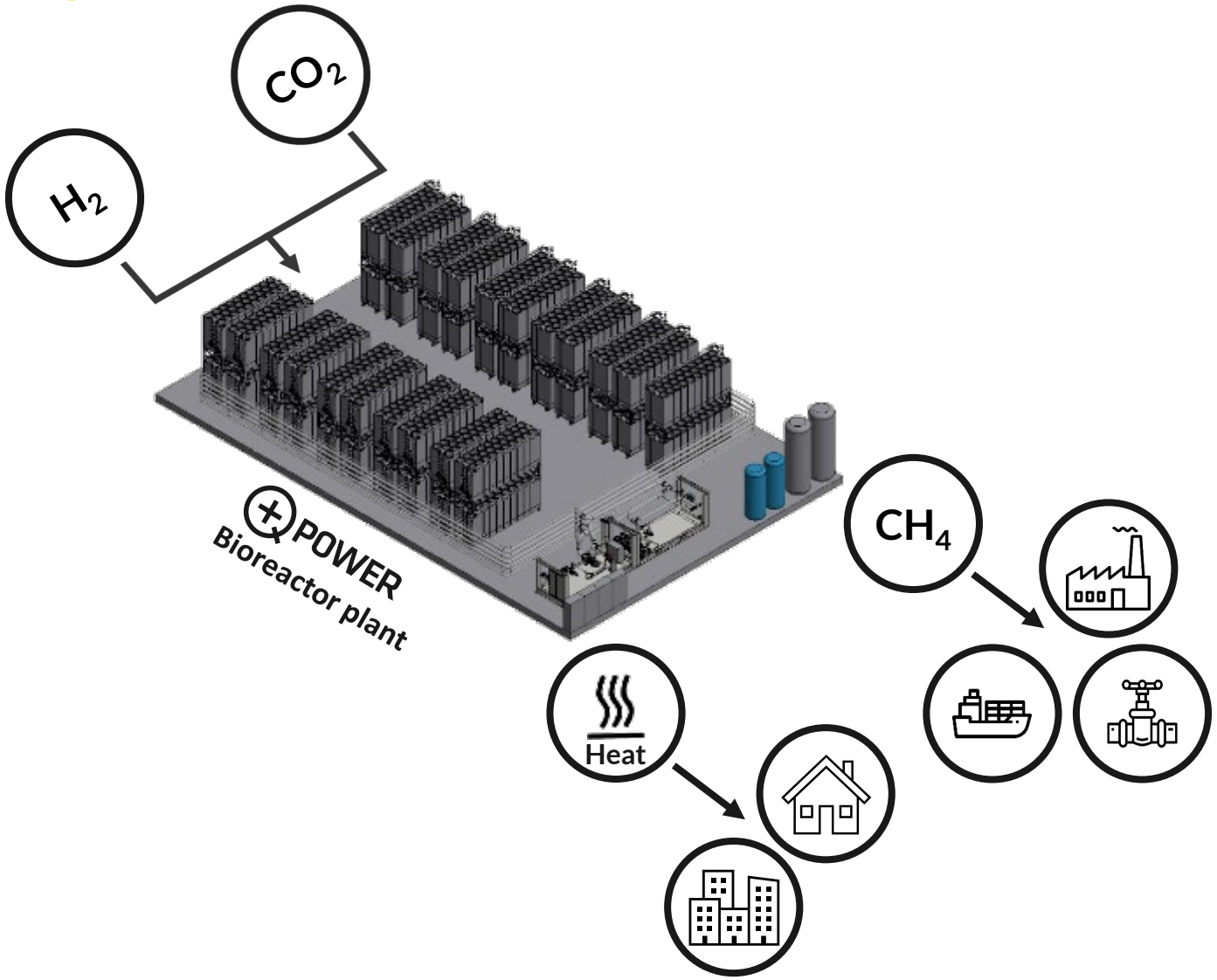
2022

H_2 and CO_2 solutions. Commercialization, engineering and design.

2023 -2024

Turnkey CO_2 purification and compression unit delivered to CarbonReUse Finland

2025



Biological methanation

We have developed unique technology to enable efficient processing of carbon dioxide into valuable products.

Our biocatalytic methanation process utilizes microbes originally isolated from a Finnish marshland.

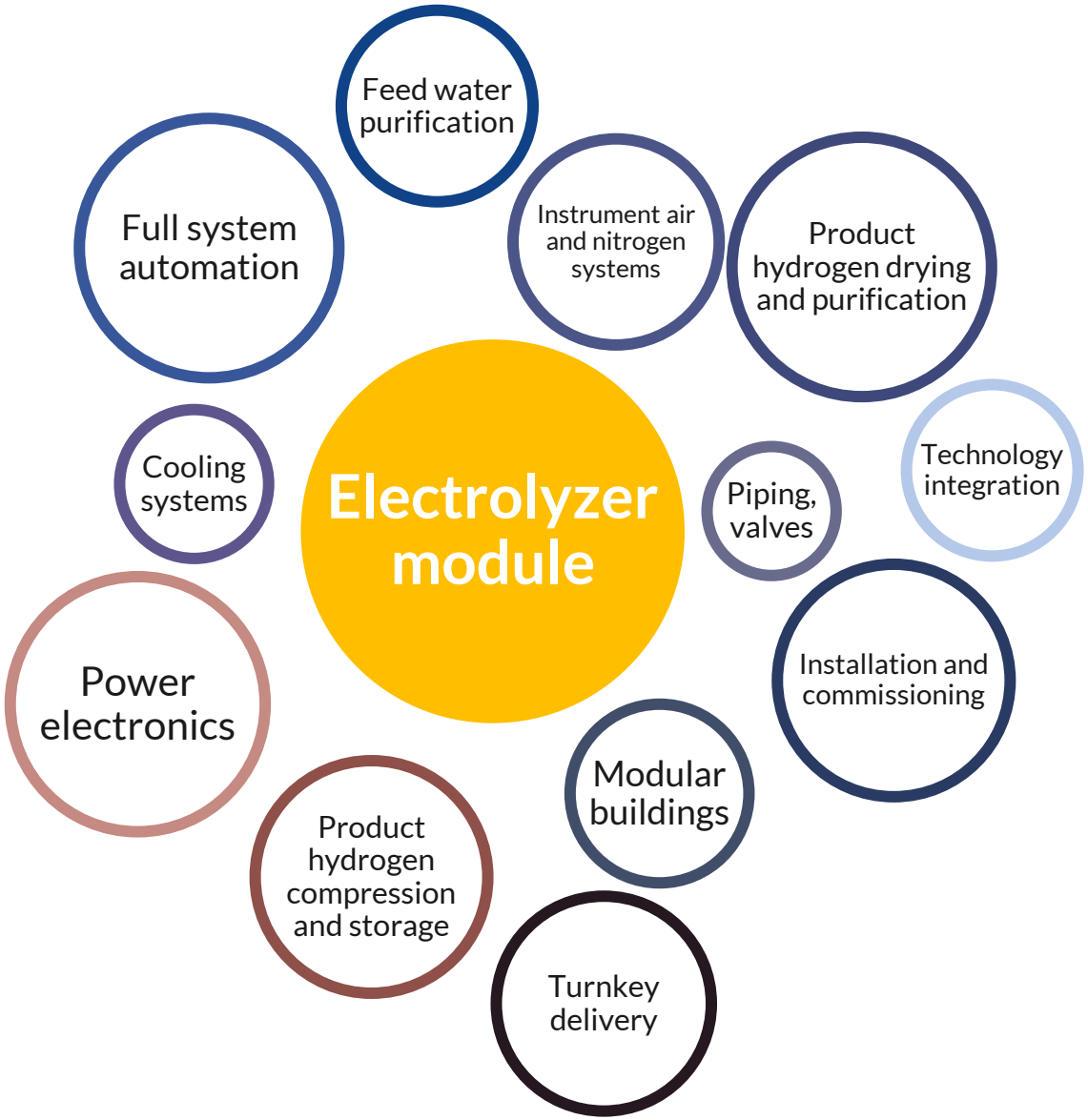
Our methanation technology is the most efficient currently on the market: plant efficiency of methanation is **81 %**

The possibilities for using technology to produce other production fractions are also excellent.

H_2 production

Electrolyzer stack is **the core** of hydrogen production,

but complementing technologies are needed to make it a fully functional hydrogen production plant



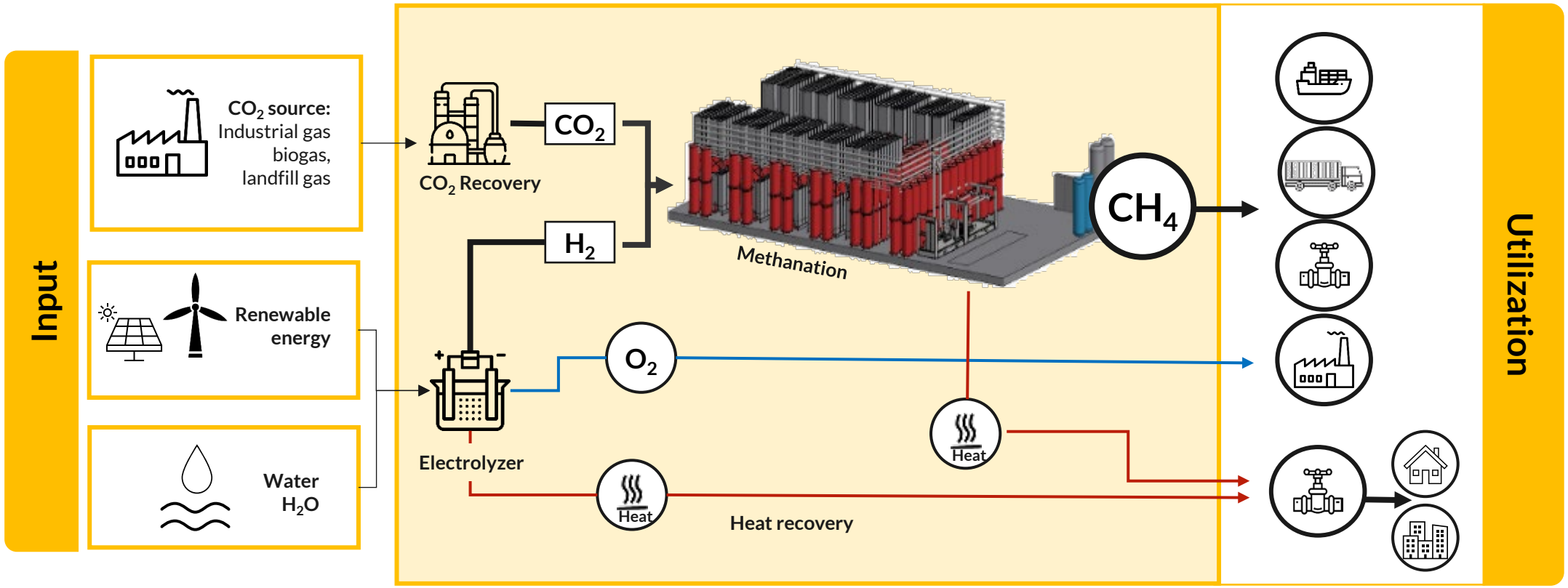
POWER

CO_2 utilization

CO_2 from various inputs

can be recovered and treated to become valuable products for different industrial uses

Q Power-to-X



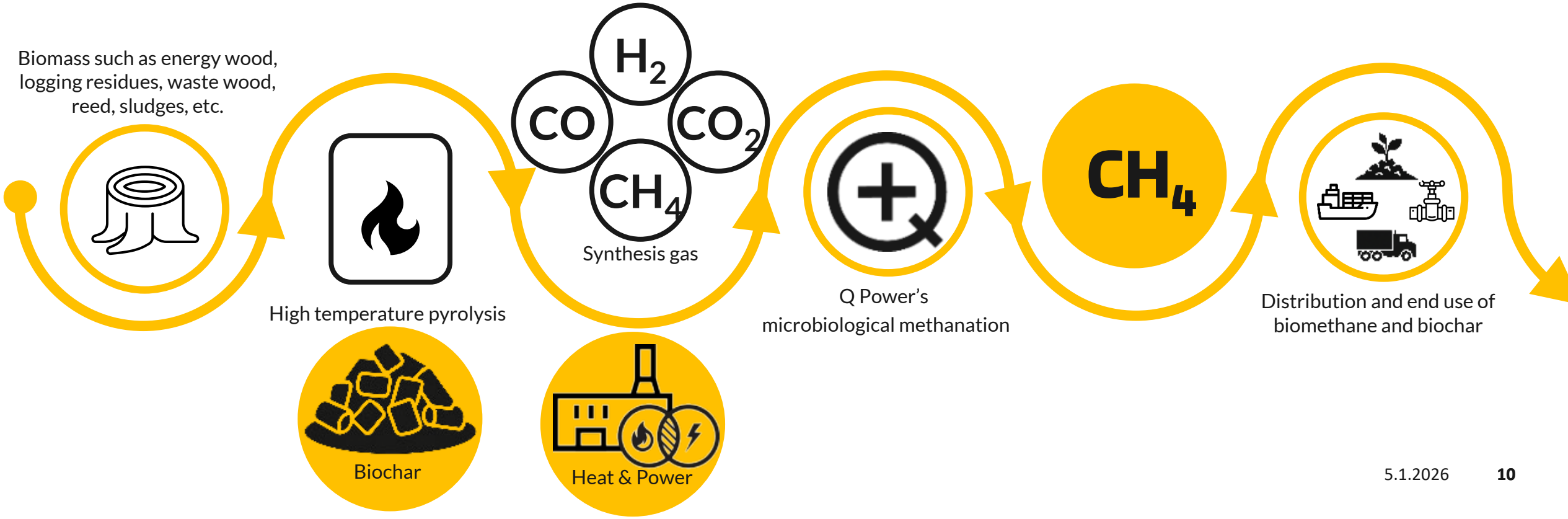
Raw materials: Carbon dioxide, renewable electricity and water

End product: Renewable methane, heat and oxygen

Added value for biomass through high-temperature pyrolysis

- Q Power has identified the need for a technology solution that enables efficient production of biochar, electricity, and heat from biomass. The technology concept also makes it possible to produce low-emission, bio-based transport fuels in the future and to broaden the range of usable feedstocks.

- By combining high-temperature pyrolysis with microbiological methanation, agricultural and forestry side streams as well as other materials, such as reed and sludges, can be refined into transport fuels, energy, and biochar.



Your Partner in Power-to-X Solutions

1

DESIGN

Power-to-X concept and plant design

2

INTEGRATION

Technology integration:

- CH_4 production
- H_2 production
- CO_2 treatment

3

DELIVERY

EPC
Turnkey delivery
Lifecycle support

POWER
Selected Reference Cases

P2X-Solutions' Harjavalta methanation plant delivery

Mechanical completion achieved and cold commissioning done in 2024. Hot commissioning and commercial use during 2025

CH_4

Author | Marko Niskanen

REFERENCE CASE
P2X SOLUTIONS, HARJAVALTA

P2X Solutions, a Finnish pioneer in green hydrogen is constructing Finland's first industrial-scale green hydrogen production plant and methanation unit in Harjavalta. P2X Solutions Produce green hydrogen completely emission-free trough electrolysis of water using renewable energy sources.

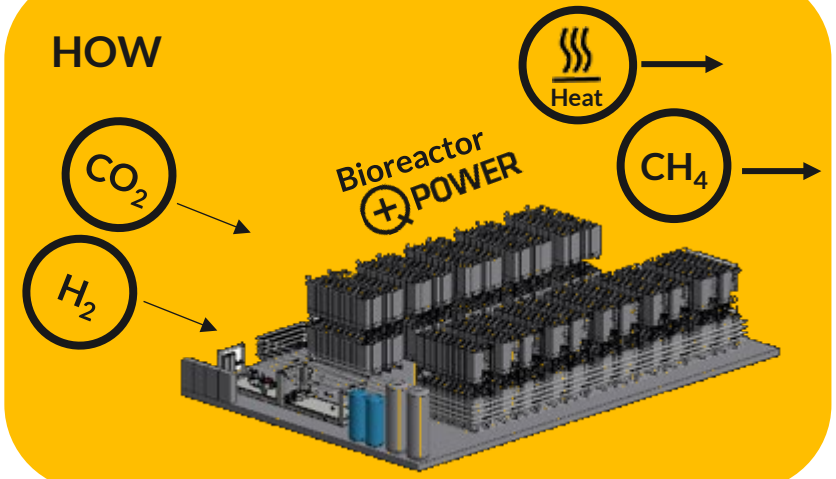
PURPOSE

*"**E-fuels** such as methane, methanol and ammonia, produced without emissions can be used in existing internal combustion engines and thus contain a **huge emission reduction potential**. We are proud of the cooperation with Q Power, another Finnish pioneer in green technology"*, says Herkko Plit, CEO of P2X Solutions.

WHAT

Part of the sustainably produced hydrogen is processed into synthetic methane in the **methanation plant delivered by Q Power**. The carbon dioxide required to produce methane will be captured from industrial processes.

HOW



REFERENCE CASE
QVIDJA GÅRD, PARGAS

Qvidja Gård, a Finnish forerunner in regenerative agriculture and carbon sequestration, is developing and demonstrating sustainable farming solutions in Parainen, Southwest Finland. Qvidja focuses on combining biodiversity, nutrient cycling, and carbon storage into food production, while actively reducing emissions and protecting the Baltic Sea.

The new biochar plant now being built will not only serve as a demonstration and research platform but also as a commercially viable facility, producing biochar, heat and power and creating a pathway to biomethane production from previously unutilized feedstocks unsuitable for conventional anaerobic digestion.

PURPOSE

To produce high-quality **biochar, electricity and heat from biomass**, while creating a pathway to renewable transport fuels through microbiological methanation. The project **reduces emissions**, strengthens **security of supply**, and ensures full **use of all process outputs** without waste.

WHAT & HOW

Q Power delivers the **full EPC plant** with all supporting systems, while our valued partner Anergy provides the high-temperature pyrolysis core. The plant will produce **biochar, heat and power, with a pathway to biomethane** through Q Power's methanation.

MILESTONES

- Q4 2025: Detail Engineering & Procurement
- Q1-> Q3 2026: Construction & Site preparation
- Q4 2026 -> Q1 2027: Site installations and commissioning

Carbon ReUse

REFERENCE CASE
CarbonReUse Finland

Q Power delivered a full turn-key, containerized CO_2 drying, purification, and compression unit to CarbonReUse Finland. The project included complete plant integration with the customer's existing equipment, installation, commissioning, and operator training.

PURPOSE

To

- Enable the **efficient** utilization of captured CO_2 by providing a **reliable** and automated system for purification, quality control, and compression.
- Ensure **seamless integration** to the customer's capture unit and storage logistics.
- **Support** Carbon ReUse Finland in developing scalable solutions for circular CO_2 use.

WHAT & HOW

The system takes raw CO_2 from the capture unit, dries, purifies, and compresses it to the set pressure. Up to five storages can be connected, with filling fully automated and based on quality, quantity, and pressure data. Built-in quality control ensures only high-purity CO_2 is stored. Q Power delivered the full EPC scope, including integration, commissioning, and training.

RESULTS

The turnkey delivery was successfully commissioned and is now in operation, providing Carbon ReUse Finland with a reliable, automated solution for CO_2 handling. The system has demonstrated robust performance, secure integration to existing equipment, and consistent production of high-quality CO_2 for downstream use.

REFERENCE CASE
FORTUM WASTE-TO-ENERGY

Fortum's recycling and waste business, lead the change towards a low-emission energy system and optimal utilization of resources. Their goal is to support their customers' business while saving natural resources and promoting the circular economy. Together with Q Power, Fortum conducted a pilot at the Riihimäki waste incineration plant, the aim of which was to capture the carbon dioxide released from the waste incineration plant and use it as a raw material in the production of new high-quality materials, in this case synthetic methane.

PURPOSE

To demonstrate **CO_2 capture** from Fortum waste-to-energy plant flue gas

To demonstrate full **synthetic methane production** technical path.

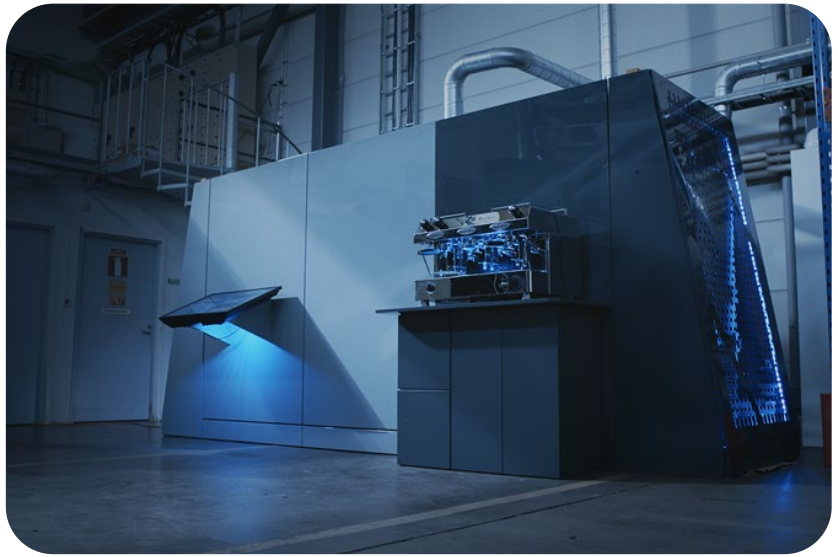
WHAT & HOW

The production of **synthetic methane** was piloted in an on-site pilot, that Q Power has designed to validate the methanation process with the specific flue gas composition.
Q Power provided a **turn-key pilot project** including pilot unit, piloting operation, **data analyze** process and reporting.

RESULTS

All the **targets** set for the piloting project were **met**. Methanation from the flue gas was **successful.** Utilization of flue gases in Riihimäki WtE for CCU and **renewable methane production** is possible with **biological methanation**.

WÄRTSILÄ



REFERENCE CASE
WÄRTSILÄ, DUBAI WORLD EXPO

Wärtsilä, a Finnish global leader in marine and energy technologies, delivers sustainable solutions for efficient shipping and renewable power generation, driving the transition to a carbon-neutral future. In 2021, Wärtsilä, Q Power and Soletair Power carried out a pilot project combining direct air capture, electrolysis and methanation. Synthetic methane was produced from air-captured CO_2 and hydrogen, with Q Power providing the reactor technology and high-level process automation.

PURPOSE

To demonstrate renewable synthetic methane production by **combining direct air capture, electrolysis, and microbiological methanation** in a public setting. Showcase the **feasibility, safety, and international applicability** of decentralized methanation.
Raise international awareness of **Finnish innovation in Power-to-X** solutions.

WHAT & HOW

Q Power delivered a cabinet-sized methanation unit for the Dubai World Expo, producing **methane from captured CO_2 and electrolyzer hydrogen.** The system was **operated remotely** from Finland with full automation and **strict safety systems** for the public environment.

RESULT

The unit ran **reliably** throughout the Expo with **zero process issues** despite daily ramp-ups and shutdowns. **High-quality synthetic methane** was consistently produced from captured CO_2 and hydrogen, proving the **robustness and feasibility** of Q Power's microbiological methanation in a public international setting.

KERAVAN energia

REFERENCE CASE
KERAVAN ENERGIA, FLUE GAS

Keravan Energia is a modern energy company whose history dates back to 1906. Keravan Energia emphasizes renewable and CO2-free energy in its selection: in its own production, the company mainly uses domestic renewable wood fuel. The company has already reduced its CO_2 emissions by 88 percent since 2010.
Q Power and Keravan Energia conducted a pilot for demonstrating the usage of flue gas in synthetic methane production.

PURPOSE

To demonstrate CO_2 capture and utilization from district heating bioenergy plants' flue gases.

Feasibility study for fully functional synthetic methane production plant technical path and economic feasibility. Considering also excess heat utilization.

WHAT & HOW

The production of synthetic methane was piloted in an on-site pilot, that Q Power has designed to validate the methanation process with the specific flue gas composition. Methane was produced to traffic fuel quality.
Q Power provided a turn-key pilot project including pilot unit, piloting operation, data analyze process and reporting.

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RESULTS

All the targets for the project were met. Synthetic methane was successfully produced from carbon dioxide recovered from the flue gases of the biopower plant and from hydrogen produced with carbon-neutral electricity.

LOUNAIS-SUOMEN JÄTEHUOLTO

REFERENCE CASE
KORVENMÄKI, LANDFILL GAS

The Korvemäki waste management site is operated by the municipally-owned Lounais-Suomen Jätehuolto Oy (LSJH). In 2020, an internationally unique pilot project was conducted on the site. Low-quality landfill gas was successfully refined into synthetic biomethane using Q Power reactor technology. The companies are currently planning to implement landfill gas methanation at full scale.

PURPOSE

To utilize low-quality **landfill gas**, that otherwise was unusable, in methane production.

- **Increase** the amount of methane
- **Upgrade** the methane quality
- **Remove impurities**

Feasibility study for fully functional synthetic methane production plant technical path and economical feasibility.

WHAT & HOW

The **production of synthetic methane** was piloted in an on-site pilot, that Q Power has designed to validate the methanation process with the specific flue gas composition.
No pre-purification for the gas.
Q Power provided a **turn-key pilot project** including a pilot unit, piloting process, data analyze and reporting.
Methane was produced to traffic quality.

RESULT

All the **targets** for the project were **met.**
Synthetic methane was **successfully** produced from landfill gas.
Methane content was upgraded from 40-56% to over 90%.
In addition, the microbiological process effectively reduced the concentration of hydrogen sulfide, siloxanes, and other pollutants in landfill gas.

REFERENCE CASE
ST1, BIOETHANOL CO_2

ST1 and Q Power carried out a pilot project in Vantaa to demonstrate the production of synthetic methane from industrial CO_2. The project explored how carbon dioxide emissions from fermentation could be directly converted into a renewable transport fuel using Q Power's microbiological methanation technology.

PURPOSE

To:

- Test the feasibility of producing **transport-grade synthetic methane** directly from **raw CO_2 streams**.
- Validate the methanation process with **industrial fermentation gas.**
- Demonstrate a scalable pathway for renewable fuel production in Finland.

WHAT & HOW

Q Power delivered a methanation unit to ST1's site in Vantaa, where **carbon dioxide from the fermentation process** was combined with hydrogen to produce **synthetic methane**. The raw **CO_2 was fed to the unit without pre-purification**. Q Power provided the pilot unit, automation, and process validation.

RESULT

The pilot was **highly successful**. Raw CO_2 from fermentation was utilized without issues, and **high-quality synthetic methane** was consistently produced. The results **confirmed both the technical feasibility and fuel quality**, paving the way for further industrial-scale applications.