

# Catalytic Methanation

Green Methane Production



# Large-Scale Hydrogen and Carbon Dioxide Conversion with Catalytic Methanation

Kanadevia Inova's catalytic methanation solution is designed to convert hydrogen, carbon dioxide and carbon monoxide into synthetic methane and water. Methane is an advanced and CO<sub>2</sub>-neutral gaseous energy carrier, that can be readily stored and transported in existing natural gas infrastructures.

Leveraging our experience as a system integrator to fully integrate turnkey solutions for catalytic methanation into your existing infrastructure.

Our overall offering for methanation plants also encompasses upstream gas and downstream and polishing to allow compliance with grid specifications.

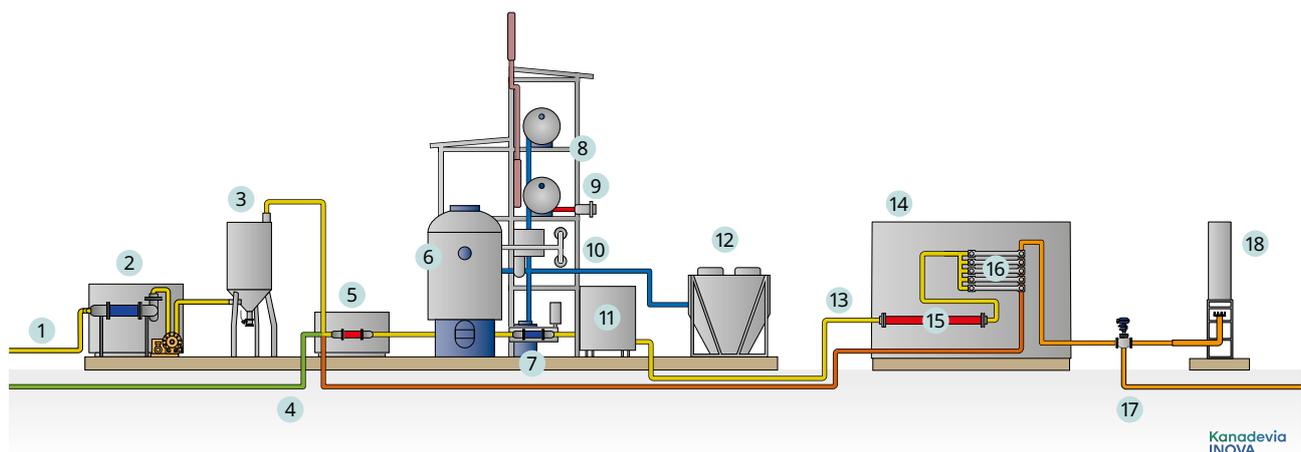
Kanadevia Inova's catalytic methanation is available in fully modular containerised units with a feed gas throughput of 2,000 Nm<sup>3</sup>/h and 6,000 Nm<sup>3</sup>/h, ready for outdoor installation. The plants are qualified for full dynamic as well as continuous opera-

tion modes. They can operate as stand-alone or as a cluster to meet required volumes of synthetic methane at a large scale.

The scope of Kanadevia Inova's catalytic methanation technology consists of the power supply, a reactor with steam system, relevant auxiliary aggregates, and downstream gas polishing. Feed gas compression and polishing can be offered as an optional add-on.

## Benefits

- Wide range of H<sub>2</sub>/CO<sub>2</sub> ratios accepted
- Long-term availability of the Ni catalyst
- Simple reactor control by natural draft water/steam circulation cooling
- Low power consumption
- Low operation and maintenance cost
- Europe-wide service network in cooperation with local partners



### Pretreatment

- 1 Carbon dioxide
- 2 Drying and compression
- 3 Gas polishing
- 4 Hydrogen

### Catalytic methanation

- 5 Economiser
- 6 Reactor/s  
( $\text{CO}_2 + 4\text{H}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$ )
- 7 Product gas cooler
- 8 Steam drum/heat exchangers
- 9 Heat export (high-pressure steam or hot water)

- 10 Start-up heater
- 11 Chiller
- 12 Air cooler

### Upgrading product gas

- 13 Product gas
- 14 Gas upgrading
- 15 Product gas preheating
- 16 Membranes
- 17 Substitute natural gas (SNG)/synthetic methane for further use
- 18 Safety flare

		Pythia2000	Pythia6000
--	--	------------	------------

#### General product data

Type		Catalytic methanation	Catalytic methanation
Reactor type		Proprietary fixed bed plate-type reactor	Proprietary fixed bed plate-type reactor
Pressure (CH <sub>4</sub> output)	barg	Up to 7	Up to 7

#### Output

Product gas flow at 100% load	Nm <sup>3</sup> /h	400	1,200
Demineralised water at 100% load	kg/h	700	2,100
High-pressure stream at 100%	t/h	1.3 @230°C @ 25–34 barg	3.9 @230°C @ 25–34 barg

#### Gas purity

Methane at 100% load	%	Up to 96	Up to 96
Hydrogen at 100% load	%	Up to 3.5	Up to 3.5
Dew point	°C	Up to –30	Up to –30

#### Input

Feed hydrogen flow at 100% load	Nm <sup>3</sup> /h	1,600	4,800
Feed carbon dioxide flow at 100% load	Nm <sup>3</sup> /h	400	1,200

#### Scope of supply/features

Load range	%	50–100	50–100
Grid connection	V AC	3 x 400	3 x 400
Power consumption at 100% load BOL	kWh/Nm <sup>3</sup> SNG	≤0.3 (does not include feedgas compressor)	≤0.3 (does not include feedgas compressor)
Total footprint area	m <sup>2</sup>	20 x 25 (depending on required SNG quality)	20 x 25 (depending on required SNG quality)
Temperature range (outdoor)	°C	–20 up to +40	–20 up to +40
Housing		1 x reactor with rack 1 x 40' container (LV distribution and DCS), 1 x 40' container (gas upgrading)	3 x reactors with rack 1 x 40' container (LV distribution and DCS), 1 x 40' container (gas upgrading)
Design standard		CE certificate	CE certificate

**Kanadevia Inova AG**

Hardturmstrasse 127  
8005 Zurich  
Switzerland  
P +41 44 277 11 11  
[info@kanadevia-inova.com](mailto:info@kanadevia-inova.com)  
[www.kanadevia-inova.com](http://www.kanadevia-inova.com)