

RNG

Our mission

We believe that world development is driven by the production and use of **clean energy**.

Protecting the environment and ensuring **sustainable** development is **our mission**.

Driven by this mission, we build clean tech solutions for the compression of **biomethane**, **hydrogen** and **natural gas** as primary energy sources along the **entire infrastructure energy value chain**.

Full-stream provider

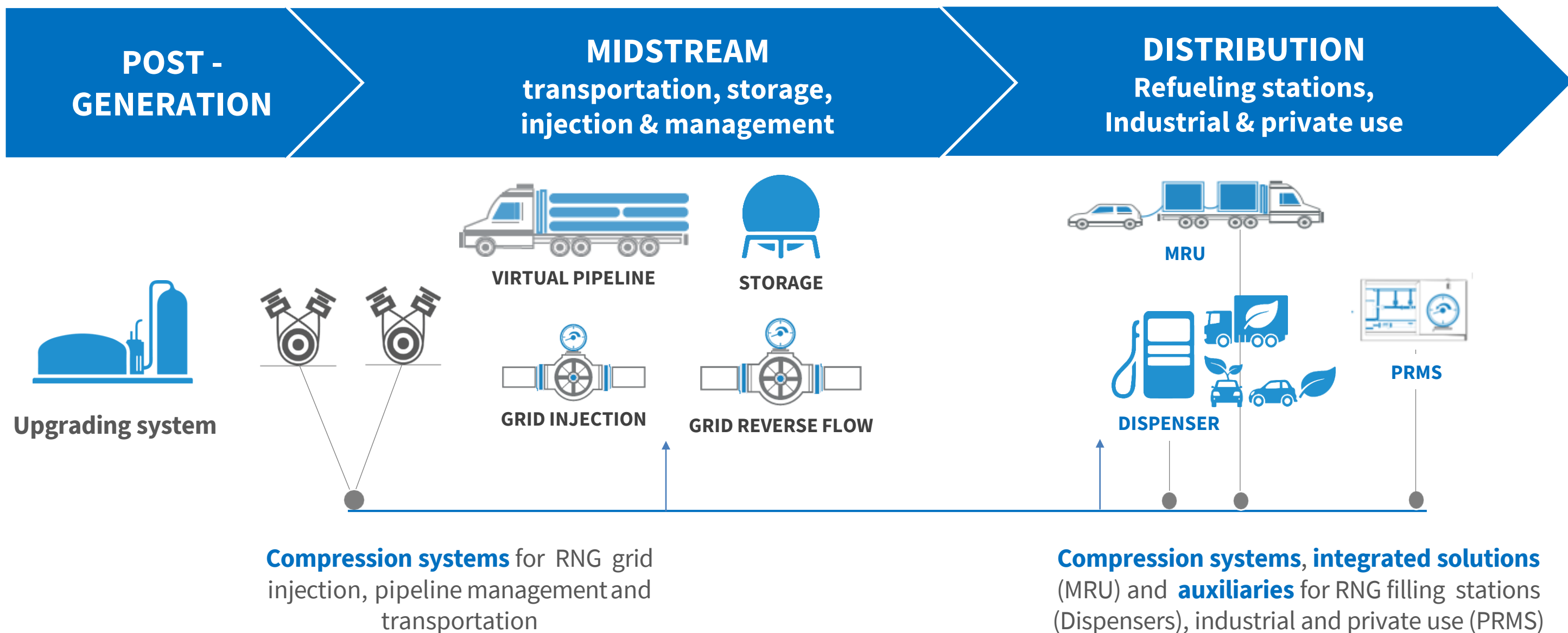
From biogas/biomethane **grid injection**, **virtual pipeline**, **storage** and “**recovery**”, till **distribution** for industrial, private and mobility applications, with our **tailor-made** approach, we address every single requirement by providing a unique and customized response.

We provide **compression solutions** consisting of compact single or double skid designs with the compressor unit coupled to an electric motor or gas engine and all **auxiliaries** including VFD, cooling, filtration systems, pulsation damper.

High safety standards are guaranteed through weather and sound-proof enclosures equipped with gas and fire detection systems.

Providing clean technology solutions through the entire biomethane infrastructure value chain

We foster energy forward using compression/decompression systems along the entire infrastructure energy value chain. With our expertise and know-how we provide our customers with cutting-edge compression/decompression systems.



Compression units: the right choice in

FLEXIBILITY & PERFORMANCES

Serving any application and operating over a **wide range of pressures** in both suction and discharge, they can reach up to **400 kW power** and a flow-rate of up to **7,000 Scm/hour**. **Torsionally rigid shim-type coupling** - used for direct drive - makes the product highly efficient, preventing **any loss of power** during operation.

AVAILABILITY & RELIABILITY

The direct coupling to the motor is **self-aligning**: coupling rigid cover, flanged to compressor to one end, and to the motor to the other, prevent the need for alignment between motor and compressor during assembly or motor replacement. Anti-vibration pads and flexible hose connections on the compressor skid ensure proper **vibration-free** operation.

GREEN

the **B-type distance piece** that increases the distance between the oil and gas seals, together with the installation of an oil slinger upstream the gas seals, prevents potential oil leakage into the compressed gas.



S, ST & SW mechanical compressor product family

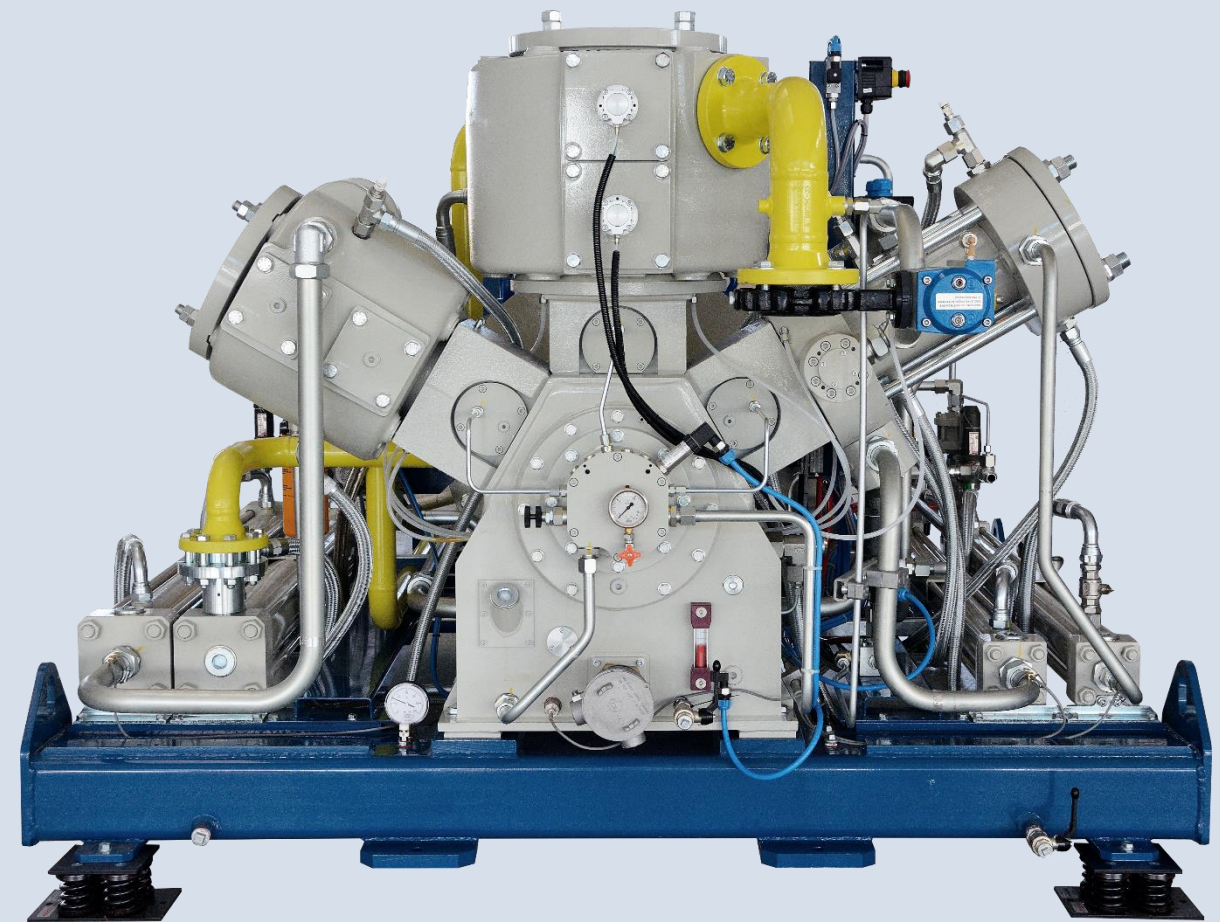
Technical features

Directly-coupled, self-aligning, our compressors can be driven by electric motor or gas engine, up to a maximum of 400 kW. **The skid is the CORE** of our compression solutions. Skid's main components are compressor, driver, lubrication circuit with motor driven lube-oil pump, closed-circuit water-cooling system providing gas-water heat exchangers at the outlet of each compression stage.

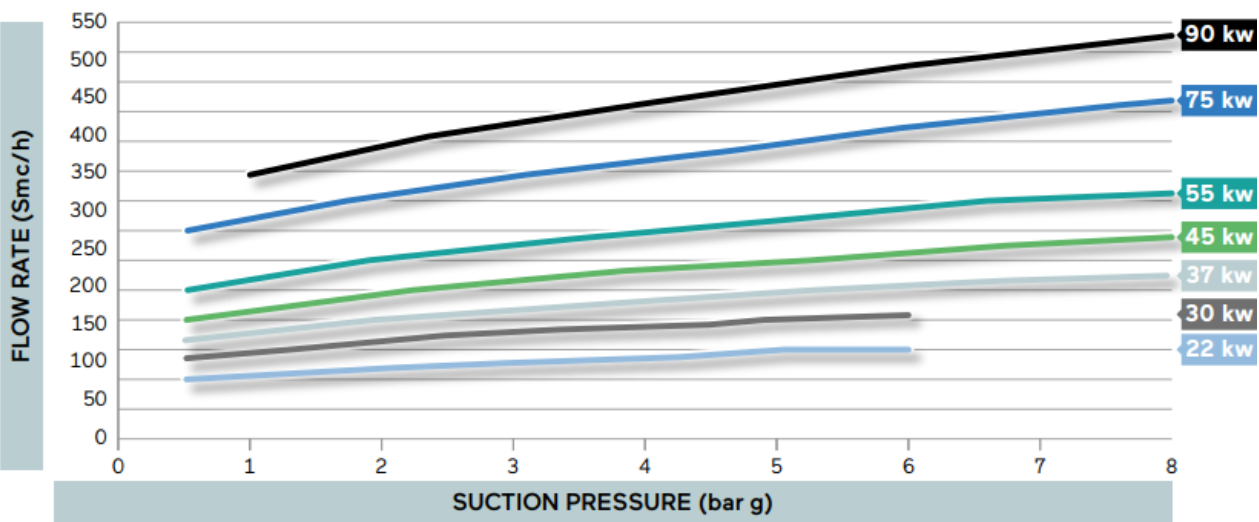
The offering is completed by inlet filter (generally installed outside the skid), the outlet separator filter on the skid, and the water-air cooling unit.

Finally, the electrical panel, ready to be connected to Internet, allows the remote control of the entire unit.

All the components are integrated inside a container – in steel or reinforced concrete – except for the cooling unit which, depending on the available space, can be provided on the ground, or installed on the roof of the same container (ATEX compliance).



Compressors product portfolio



Cylinders	No.	4
Stages	No.	4
Suction Pressure	bar	0.3 – 8
Discharge Pressure	bar	200 – 300
Max flow-rate	Scm/hr	700
Max power	kW	22 – 90
Compressor speed	rpm	750 – 1,500
Maintenance	hours	4,000
Cylinder features	-	Air-cooled, non lubricated
Lubrication system	-	Forced, with recovery
Oil consumption	liters	2 over 100 hrs of operation
Gas leakages	%	0.1% of the rated capacity
Certification	-	EC/EAC - US

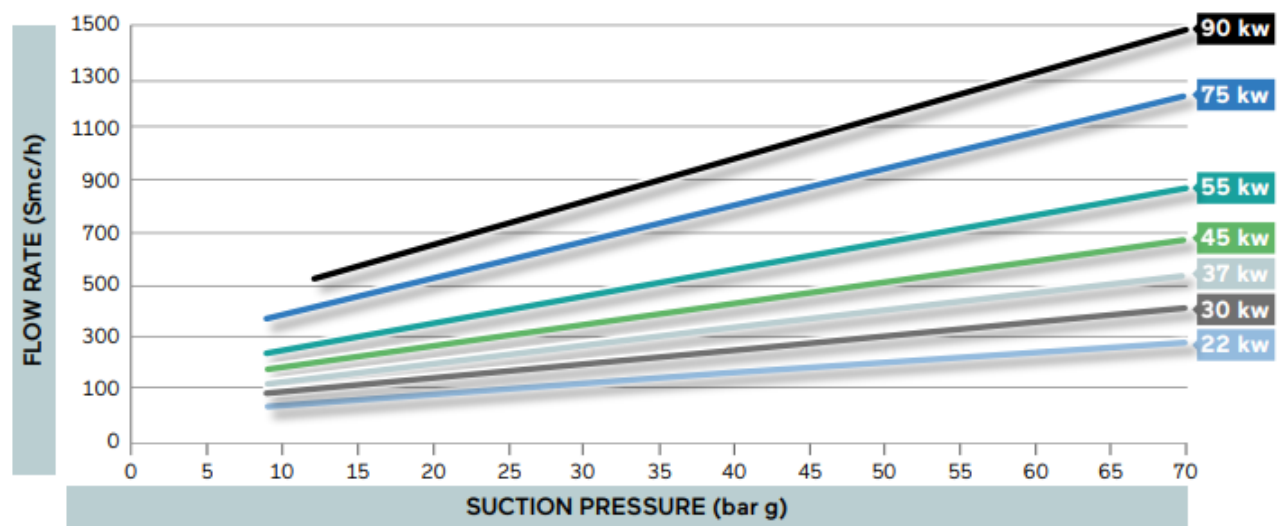
S Series

Small/medium size **mechanical** compressor suitable for:

- Public and private stations featured by low suction pressures and hourly flow-rates
- **Small biomethane plants**



Compressors product portfolio



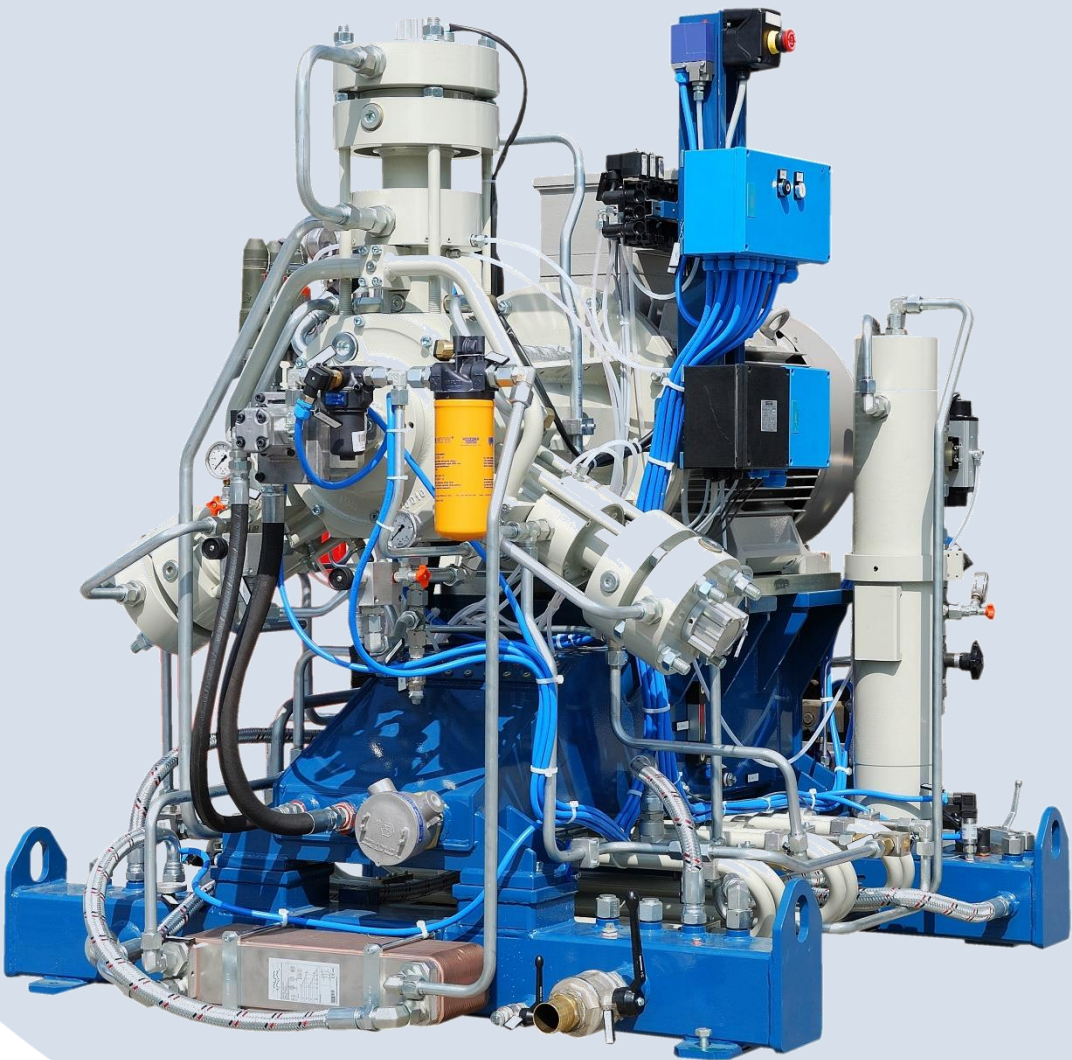
Cylinders	No.	3 - 6
Stages	No.	1 - 4
Suction Pressure	bar	8 – 220
Discharge Pressure	bar	300
Max flow-rate	Scm/hr	1,650
Max power	kW	22 – 110
Compressor speed	rpm	750 – 1,500
Maintenance	hours	4,000 to 8,000*
Cylinder features	-	Water cooled, non-lubricated
Lubrication system	-	Oil-bath crankcase mechanism
Oil consumption	liters	2 over 100 hrs of operation
Gas leakages	%	0.1% of the rated capacity
Certification	-	EC/EAC - US

* at min. speed

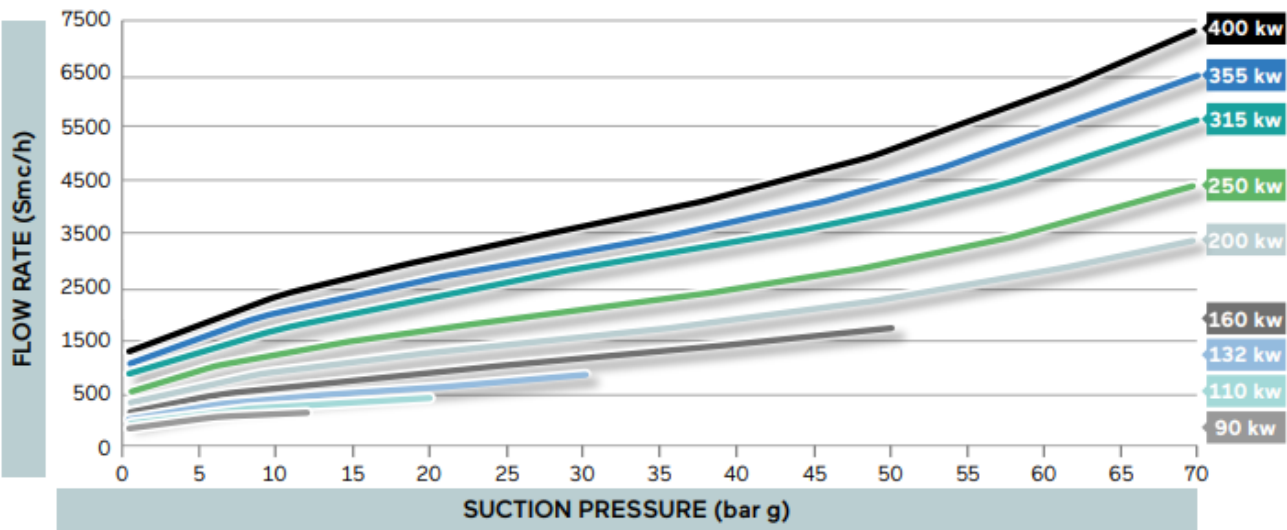
ST Series

Small/medium size **mechanical** compressor with up to six cylinders arranged radially. They are suitable for:

- **All applications** where medium/high suction pressure is required
- Stations with medium/high hourly sales estimates
- Mobile Refilling Unit (MRU)



Compressors product portfolio

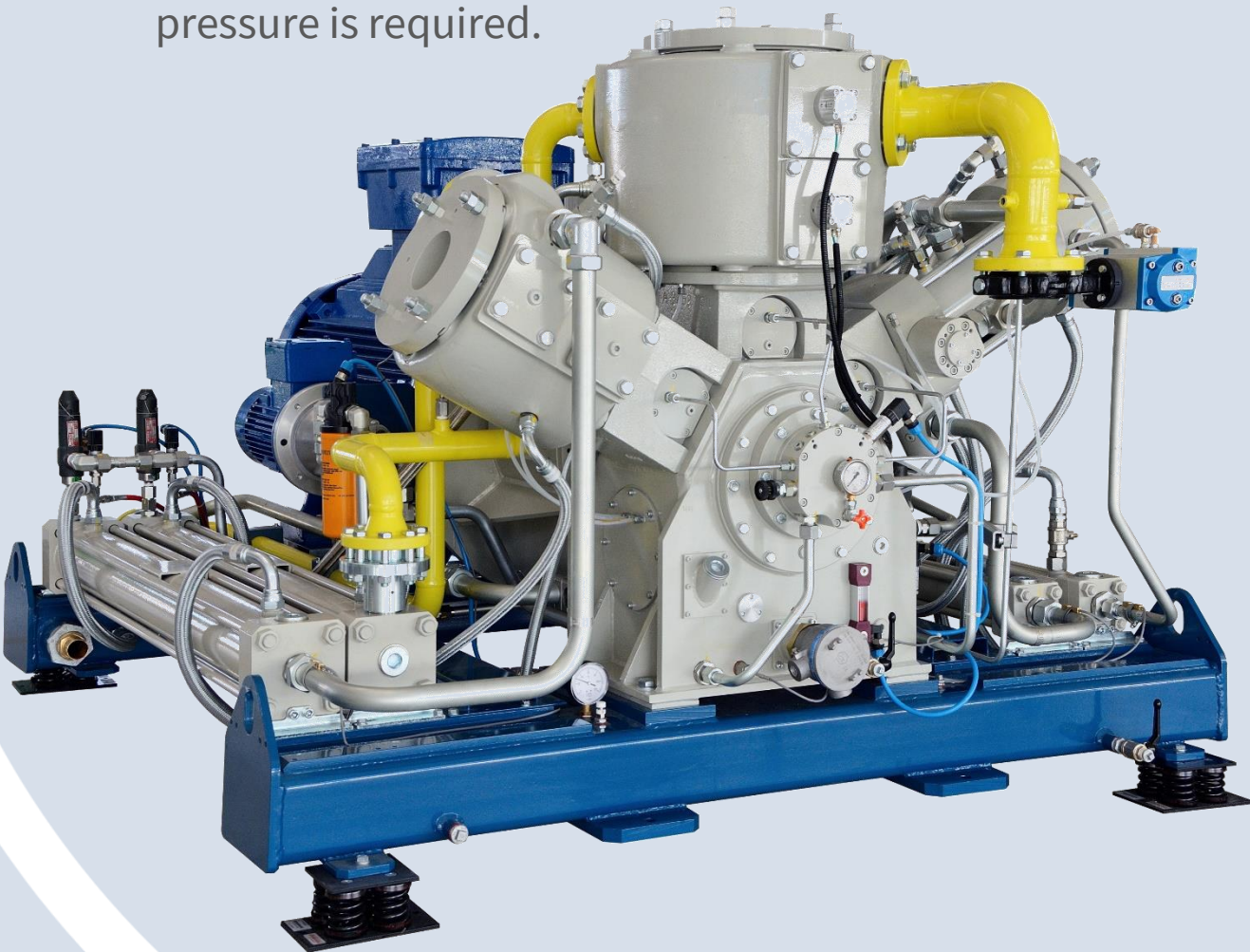


Cylinders	No.	2 - 3
Stages	No.	1 - 4
Suction Pressure	bar	0.3 – 70
Discharge Pressure	bar	300
Max flow-rate	Scm/hr	7,000
Max power	kW	55 – 400
Compressor speed	rpm	750 – 1,500
Maintenance	hours	4,000 to 8,000*
Cylinder features	-	Water cooled, non-lubricated
Lubrication system	-	Crankcase forced lubrication system
Oil consumption	liters	2 over 100 hrs of operation; OIL FREE CONFIGURATION available as std
Gas leakages	%	0.1% of the rated capacity
Certification	-	EC/EAC - US

* at min. speed

SW Series

Large size **mechanical** compressor equipped with two or three cylinders positioned @ 60°. They are the largest compression units produced by SAFE and can operate in a wide range of pressures. They are suitable for **all applications** where high suction pressure is required.



Pressure reduction metering system

Benefits

High performance & flexibility

Designed to work in a wide range of pressures, PRM1200 is able to reduce pressure up to 1 bar thanks to a system of by-pass valves allowing the direct flow of the gas from the first to the second stage of pressure reduction.

Fast installation

Anchor points installed on cab’s foundations together with all wiring connections performed before shipping, allow fast and easy installation @ customer’s site.

Footprint

PRMS1200 together with boiler and electrical control panel is installed in a dedicated steel-made and sound-proof cab.

Model	-	Dry natural gas
Suction pressure	Bar	10 ÷ 275
Inlet temperature	°C	-20/+55
Discharge pressure	Bar	1 ÷ 70
Outlet temperature	°C	0/+40
Flow-rate	Scm/hr	5,000 ÷ 9,000
Max dew point	°C	-45
Gas heating	-	Natural gas combustion boiler
Pressure regulation	No. stages	Up to 2
Certifications	-	EC – EAC - US

PRMS1200

Suitable for **industrial users** as well as bioCNG/CNG refueling stations (especially at **daughter stations** during cylinder trailers offloading activities), it provides non-stop gas supply



Dispensers

Benefits

100% flexibility

Able to match any type of refueling requirement: FAST FILL, SEQUENTIAL FILL and SLOW FILL.

High performances

Designed and built for continuous operation at the highest capacity while ensuring high standards of safety, accuracy and reliability

100% coverage

Serving any type of vehicles and refueling application: from passengers to HGV's vehicles; from on-load and off-loading stations (VP) up to private and public refueling stations

		ESP	ESV
Hoses	No.	1, 2, 4	1, 2
Lines	No.	2	1
Meters	No.	1, 2, 4	-
Mass-flow meter measurement accuracy	%	± 0.5%	-
Max flow-rate (high-flow conf.)	Kg/min	100	-
Certification	-	EC - EAC	EC - EAC

ESP and ESV

Equipped with electronic head and mass meter that measures the quantity of gas supplied in Kg, **ESP** is the right product for **fast filling** in **public refueling stations**

Easy to maintain, **ESV** dispensers is the right solution for **sequential filling** and for **private fleet** where gas metering is not required



Integrated Solutions: MRU

The Mobile Refueling Unit in its two configurations consists of the following components:

- Mechanical or hydraulic compressor coupled to electric motor or gas engine.
- Control and safety instrumentation performing the compressor’s operational control functions of the compressor unit.
- Priority panel with three pressure lines: low, medium and high.
- Refueling panel with 2 filling points with mass meter.
- The enclosure that hosts (in two separated rooms) all the mechanical components, auxiliaries, electric and control instrumentation.

DATA	UNIT MEASURE	VALUES
Driven configuration	-	Hydraulic or mechanical compressor
Driver configuration	-	Electric motor or gas engine (ICE)
Suction pressure	bar	5 ÷ 75 from piping 250 ÷ 50 from cylinder trailer or storage pack
Discharge pressure	bar	Up to 300
Max Flow-rate	Scm/h	Up to 1,000 from piping Up to 5,000 from cylinder trailer or storage pack
Power	kW	75 ÷ 90
Maintenance plan	hours	4,000
Gas handled	-	Natural gas/RNG
Noise level	dB(A)	75 @ 3 meters
Footprint	Sqm	7
Certifications	-	EC - US



Integrated Solutions: MRU benefits

GREAT EFFICIENCY AND HIGH PERFORMANCES

Available in two configurations (with mechanical or hydraulic compressors driven by electric motor or gas engine) it is able to refill any type of vehicles. The priority panel that manages the flow of gas from storage pack to the filling points through the low, medium and high-pressure lines, minimizes the time of refilling ensuring the highest efficiency with reduced operating costs.

FOOTPRINT

An ultra-compact solution hosting in only 7 sqm the compressor skid and all the accessories and electrical components needed for refilling, including two filling points.

FAST INSTALLATION

Its footprint ensures fast installation and commissioning: erection and installation time is reduced by 3X if compared to a standard CNG/RNG filling station.



90+ units installed worldwide

Our references in RNG since 2010



120+ units in operation worldwide



Application:

MIDSTREAM - GRID INJECTION
Biomethane from OFMSW and grid injection

Scope of Supply:

Compression system
Compressor(s) family: SW series
Flow-rate: 1,000 Scm/h - each
Pressure range: from 3 to 59 bar

Region:

EUROPE





Application:

MIDSTREAM/DISTRIBUTION
HYBRID. System able to:

- inject biomethane produced from biogas into the grid
- make the biomethane available for sale at the public filling station located near the plant.

Scope of Supply:

Compression system for:

Grid injection: from 10 to 80 bar
pressure range

Vehicles or trailers refilling at 250 bar

Compressor family: ST series

Region:

EUROPE





Application:

MIDSTREAM - GRID INJECTION –
GRID REVERSE FLOW

Scope of Supply:

Compression systems
Compressor family: SW series
Flow-rate: from 150 to 1,040 Scm/h
Pressure range: from 4 to 68 bar

Region:

EUROPE





Application:

MIDSTREAM - Temporary storage unit installed on the distribution system (GREEN BUFFER STORAGE)

Scope of Supply:

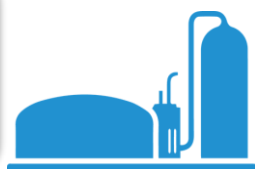
Compressor family: ST series EM driven
Flow-rate: 125 Scm/h
Pressure range: from 3.5 to 250 bar

Region:

EUROPE



We thank GRDF and CH4NGE for pictures published



Application:

MIDSTREAM - GRID INJECTION
Biomethane from agricultural waste
and grid injection

Scope of Supply:

Compressor family: ST series
Flow-rate: 1,000 Scm/h per skid
Pressure range: from 8 to 40 bar

Region:

EUROPE





Application:

MIDSTREAM- GRID INJECTION
(Biomethane from straw)

Scope of Supply:

Compressor(s) family: ST series
Flow-rate: 600 Scm/h
Pressure range: from 9 to 48 bar

Region:

EUROPE





Application:

MIDSTREAM - GRID INJECTION
Biomethane from Organic Fraction
of Municipal Solid Waste (OFMSW)

Scope of Supply:

Compressor(s) family: SW series
Flow-rate: 1,000 Ncm/h
Pressure range: from 3 to 59 bar

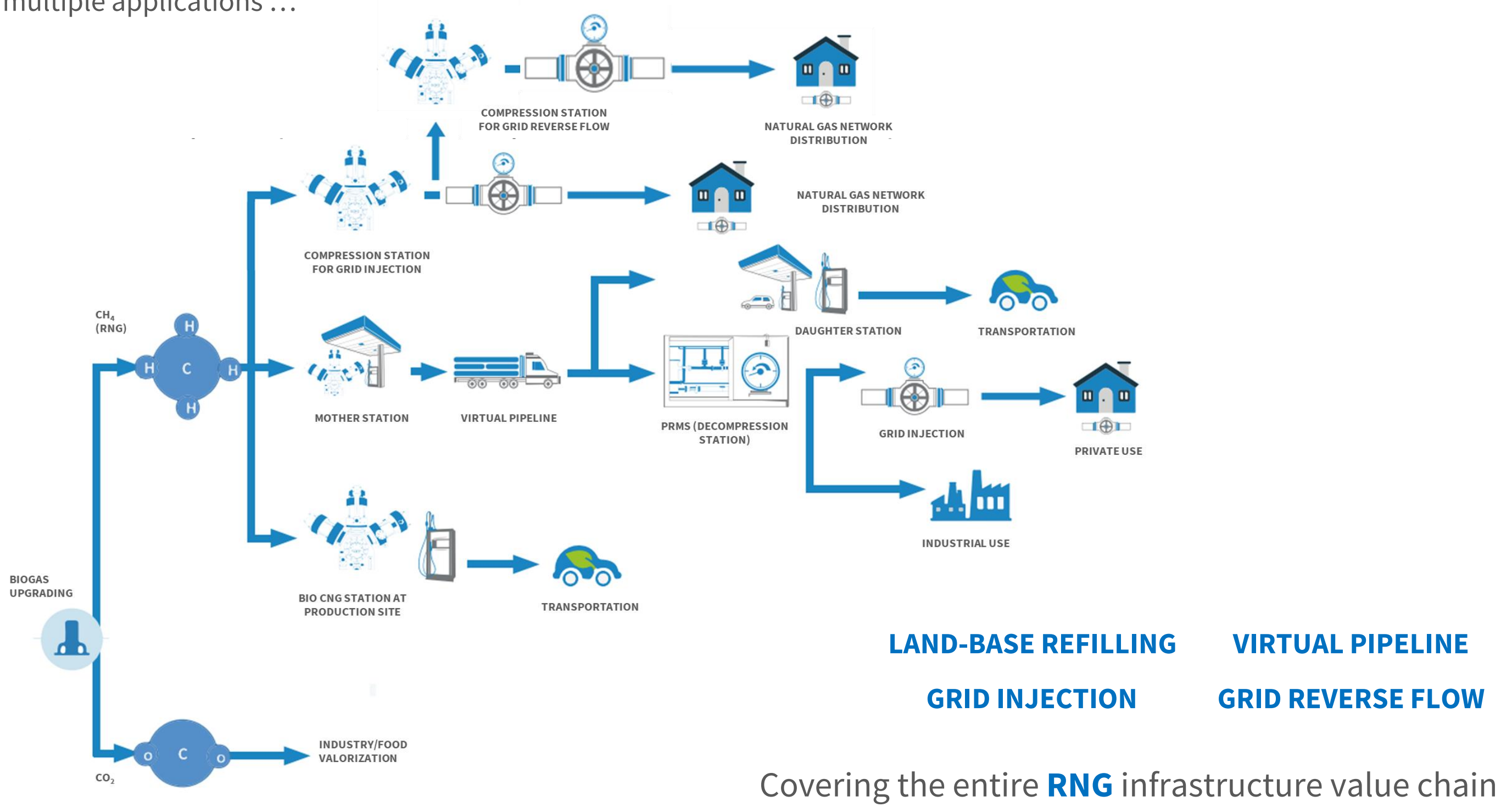
Region:

EUROPE



BIOMETHANE, the driver for clean energy production

We offer a wide range of compression technologies along the entire **RNG infrastructure** value chain:
From **post generation** to **distribution**, we provide our customers with **tailor-made** and **innovative** solutions serving multiple applications ...





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