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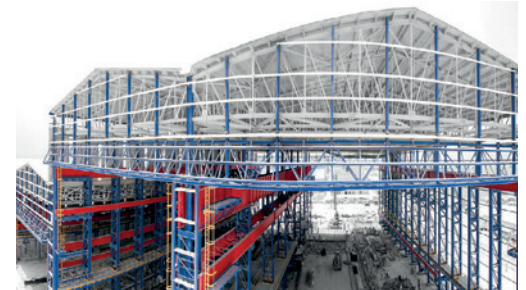
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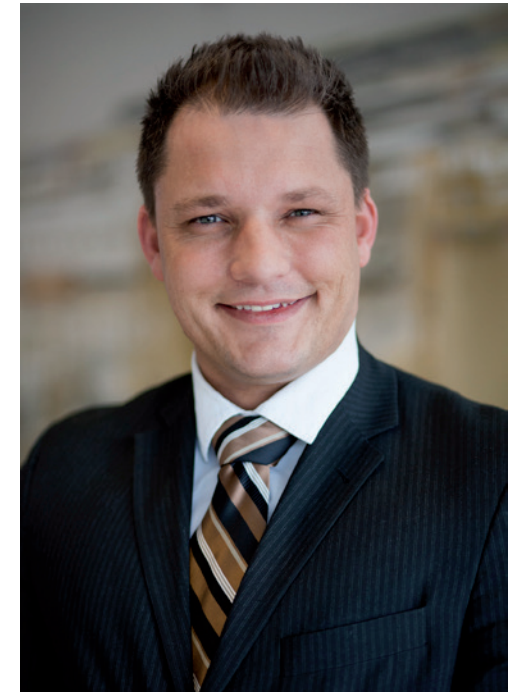




QUALITY THROUGH COLLABORATION

This brochure, presenting the people behind the projects and their work, was made partly with the support of our suppliers and partners. On behalf of the entire Petrogas team I wish to thank them for their effort and commitment, which has helped Petrogas grow over the years into a leading company. Together we create innovative solutions and guarantee excellent service.

André Nederlof, Head of procurement



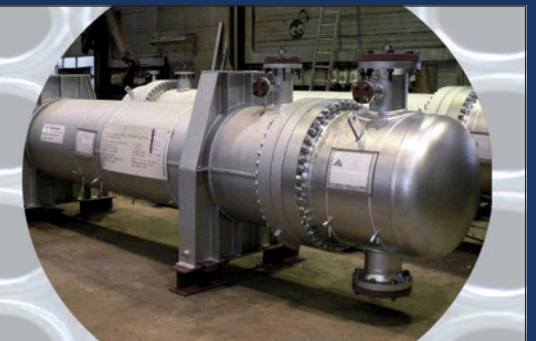
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'Everyone is equally important at Petrogas'

'Petrogas was established in 1949 and initially worked mainly for the Dutch urban gas industry. We were also an early adopter of LPG automotive gas, building the first LPG filling station in the Netherlands. Towards the end of the 1950s, after the discovery of the gas fields at Slochterveld, we shifted our attention to natural gas.

Innovation and market expansion are core elements of our operational management. Over the course of the years, Petrogas has developed a stronger focus on energy production, in which sustainability plays an important role. By anticipating our customers' needs and treating them as we would want to be treated ourselves, Petrogas has enjoyed significant growth.

I have worked at Petrogas since 1987. I started as an assembler and then developed into a draughtsman and commissioning engineer. I was appointed managing director of Petrogas in 2001. In our company everyone is equally important, and there are lots of opportunities for people to develop their career here.

I would like to thank our people, our customers and our suppliers for believing in us and supporting us.'

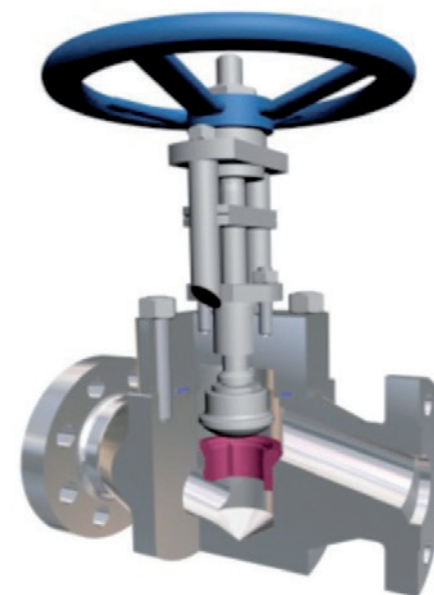
Chris van der Ree, CEO



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Petrogas Gas-Systems

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Process technology engineered by passionate people Petrogas designs and delivers tailor-made processing systems that provide maximum value for our customers in the gas and energy industries. The heart and brains of Petrogas are a team of committed process specialists. We have a passion for technology and you can rely on our extensive experience.

Service and support

At Petrogas we consider our customers' challenges as our own and we don't step out until everything works as it should. Our service and support team guarantees smooth and effective functioning during the entire lifetime of our systems. We offer worldwide service, maintenance and supply of spare parts.

Added value engineering

Our high-quality processing systems enable our customers to maximize their use of the available natural resources with minimal environmental impact. We do this through Added Value Engineering; building on advanced yet proven technologies with real potential for innovation.

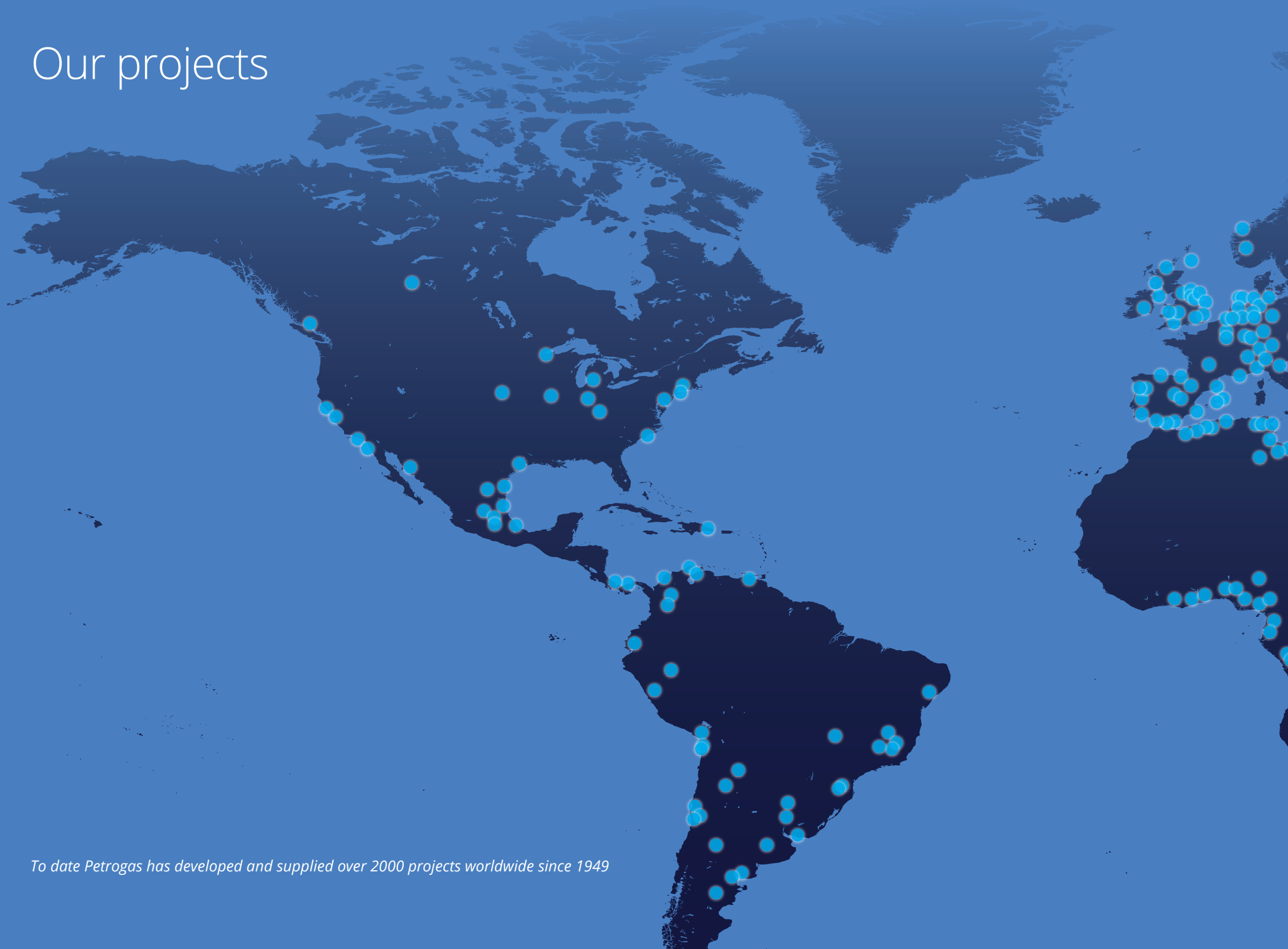
Renewable energy production

Petrogas invests heavily in research and development. Our long-term innovation focus is squarely on renewable energy production. Renewable energy is a goal within our reach. Until we reach this goal, we will help you get the most out of every precious drop of today's resources.

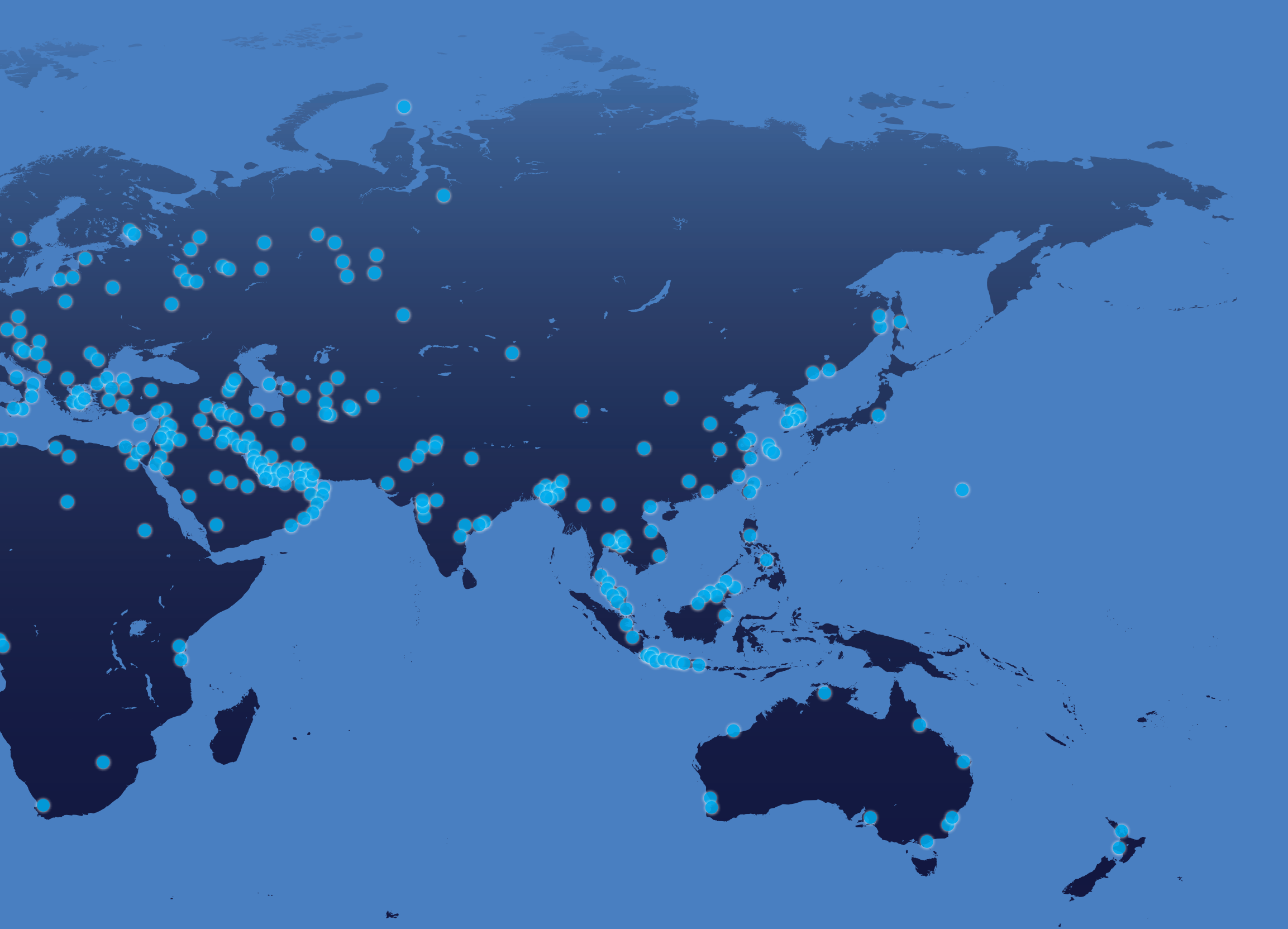


Tijs Intven - Senior Project Engineer

Our projects



To date Petrogas has developed and supplied over 2000 projects worldwide since 1949



Responding to the situation



What was the customer's request?

Al Noor is an oil production site in Oman that also yields a lot of gas. To profit from this natural gas, the customer wanted to inject it into a well using high-pressure compressors. This technique also made it necessary to install a natural gas drying installation using tri-ethylene glycol as a drying agent.

What was the solution provided?

Petrogas built a column in which natural gas is exposed to tri-ethylene glycol under high pressure. The glycol adheres to the water and is then separated from the gas. The Glycol Regeneration Unit ensures that the glycol can be recycled continuously. The saturated glycol is collected in a waste trap and depressurised so that it can release various contaminants. The glycol is then heated to 190°C to boil off the heavier hydrocarbons.

What set this project apart?

The Al Noor natural gas has extremely high levels of acidity. If acidity is too high, this can corrode the metal of the pipes. The customer therefore specified the use of the very best materials. In the end we selected Incoloy and Hastelloy for the job.

What was challenging about this project?

During the engineering phase of this project it was discovered that the natural gas also contained significant amounts of salt. Salt has an adverse influence on glycol and can accumulate in the installation. This meant that we had to reconsider the project design. Within a week Petrogas had put together a multi-disciplinary team to deal with the new situation and presented a viable and cost effective solution to the client.

Marco Adema, Senior Project Engineer





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Strong local network

What was the customer's request?

Our client required a Fuel Gas Conditioning Station for the Al Diwaniya project. This system prepares and conditions the gas before it enters the turbine that in turn generates electricity. The conditioning consists of filtering, heating and reducing the pressure.

What was the solution provided?

Petrogas built the Fuel Gas Conditioning Station, including the pipe systems and control system. We incorporated a Fuel Gas Metering System into the same station to measure the amount of gas used, and we placed a safety valve to enable the gas supply to be shutdown in the event of extreme pressure or excessively high temperatures.



What set this project apart?

Petrogas also performed part of the overall engineering. With our experience in similar projects, we advised the customer to approach a number of things differently in the interests of safety and efficiency.

What was challenging about this project?

Al Diwaniya is located around 250 km south of Baghdad, in a region with security risks. Thanks to our local network of qualified professionals we were able to build the installation on site and bring it into operation. By applying a smart design, the skids were easily mounted against each other on site, leaving just the bolts and nuts to be tightened.

Anton van Waes, Project Engineer



MoPipe is an innovative company that provides multi-disciplined project management, manufacturing, installation and maintenance services to multi-national companies across the world.

References

- Oil and Gas industry
- Nuclear industry
- Petrochemical industry
- Pharmaceutical industry
- Offshore industry
- Water treatment equipment

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Research & Development

Since research and development are a core component of our operation, Petrogas permanently invests in this department. On-the-job development takes place for each individual project. Additionally, Petrogas has set up a special Research & Development unit that concentrates on various programmes.

Black Powder

Black Powder is formed when oxide corrosion in a pipe reacts with sour gas. It can cause major damage to downstream equipment. Due to its flour-like consistency it is difficult to remove from the gas flow. Petrogas has developed a system to separate this powder using a combination of magnetism and filtration technology.

Plastic to oil

Pushing the plastic to oil technology (that turns end-of-life plastics into (diesel) oil) further, Petrogas has built an installation that also draws paraffin from plastic.

Steam Reformer

Developed jointly by Petrogas and Delft University of Technology, the steam reformer enables the conversion of natural biomass into steam. This sustainable technology has no CO₂ emissions, and by upgrading this synthesis gas into natural gas, it can be distributed via the grid.

Certifications

Petrogas is qualified to a wide array of international standards, which enables us to work for clients worldwide.

ISO 9001:2008

Petrogas is continually improving its quality control systems.

ISO 14001:2004

Our environment is extremely important to us, therefore Petrogas chose to commit itself and continuously strives for improvements according to this worldwide standard.

ISO 3834-2

Petrogas meets the ISO 3834 quality requirements for fusion welding of metallic materials.

Welding certifications

- International Welding Engineer IWE (EN14731)
- International Welding Technologist IWT (EN14731)
- Interpretation of Radiographs (EN473 + ASNT-SNT-TC-1A)
- Radiographic Testing (EN473 + ASNT-SNT-TC-1A).

ASME

American Society of Mechanical Engineers. For high quality and safety of your Pressure Vessels and Heaters Petrogas acquired U-stamp and R-Stamp certification.

Pressure Equipment Directive (PED)

Petrogas is certified to PED 97/23/EC. This ensures high quality for piping and welding activities.

VCA*

Petrogas has been assessed and approved in accordance with the standard: SHE Checklist Contractors (SCC) rev 2008/5.1.

DVGW

To design and build installations for the German market, Petrogas holds the DVGW G493-1 certificate for pressurized gas systems.

Local governances:

TRCU, GOST, DPEM, etc.
Petrogas also designs and builds installations that meet local rules and requirements.

CE

Petrogas can supply systems that fully meet all CE requirements and certification.

Richard van Alebeek, QA Manager

Dedication and hard work

What was the customer's request?

The Saline Water Conversion Corporation (SWCC) is a Saudi Government Corporation responsible for the desalination of seawater and producing electric power, and for supplying various regions in the Kingdom of Saudi Arabia with desalinated water. SWCC has had a 2.350MW power plant built to power the nearby Ma'aden/Alcoa Aluminum plant. The power plant is gas & oil fired, and Petrogas won the contract for the fuel gas conditioning station with 1 million Nm³/h capacity for 12 gas turbines. Waste heat is used to desalinate 1 billion litres of sea water per day.

What was the solution provided?

In close cooperation with the owners' engineer Pöyry, Petrogas designed 6 identical blocks, each consisting of two mirrored gas conditioning systems including ESD valves, filters, flow meters, heaters, pressure reducing systems for GTs and boilers, pressure boosting compressors and a high pressure gas buffer system. Petrogas then built the skid-based system in workshops in the Netherlands and China, and erected and commissioned the system on site.

What set this project apart?

Because Petrogas has both engineering and fabrication in house, the client benefitted from our practical experience in the initial basic design phase. The design was optimized before Petrogas built the skids, wrote the control software and performed the commissioning on site. The system is capable of boosting gas pressure for a prolonged period and can sustain gas supply for several minutes when the gas feed is interrupted to allow the turbines to switch to fuel oil. Petrogas played a substantial role in drawing up the operating philosophy between all these systems.

What was challenging about this project?

The sheer size of the project made it a challenge. This system is in fact a complete 12" gas conditioning system with 100% redundancy systems, 12 times over. The photo shows the stacks of the Water Bath Heaters, 36 in total. Resources, planning, logistics between several workshops and dozens of suppliers all required a creative approach. The order came in 2011 when Petrogas already had a healthy backlog, and the order was worth about a year's turnover. Thanks to the dedication and hard work on the part of Petrogas personnel and suppliers, Petrogas successfully completed the job.

Jacob van den Pol, Commercial Director





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management

What was the customer's request?

After the Thermphos phosphorus plant went bankrupt in 2012, the administrators and the province of Zeeland issued tenders to dismantle the complex and remove all phosphorus. The entire project was secured by Decontamination Services, a subsidiary of Mourik, and Petrogas took the job of processing the stored sludge, which contained phosphorus and was slightly radioactive.

What was the solution provided?

Petrogas built a processing installation for the sludge containing phosphorus. Due to the composition of the material, it proved necessary to design a special pump for the purpose. By subjecting the sludge to a 40 bar pressure, the liquid phosphorus and water were separated from the solid components, which were then pressed together to form a cake. The liquid phosphorus is reusable and the cake is incinerated.

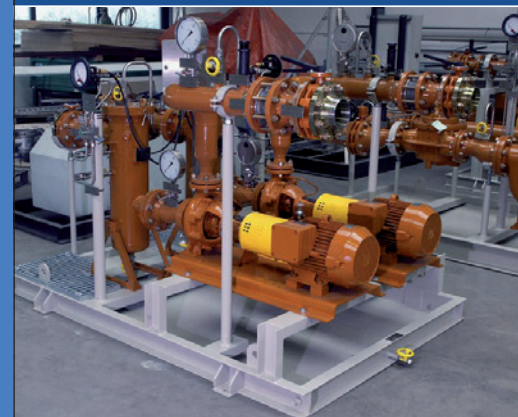
What set this project apart?

Processing phosphorus demands many additional safety measures. Due to the presence of materials containing phosphorus, there are still support services stationed on the Thermphos grounds. To assure the safest possible processing, Petrogas integrated the installation in the former plant.

What was challenging about this project?

The complexity of the project was a challenge. There are just a handful of phosphorus plants worldwide. The processing installation we built had never been built before. Wherever possible, Petrogas made use of the knowledge and experience of former Thermphos employees.

Mathijs Meijs, Project Manager



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Variation on the work floor

In 2007 I started in the financial department of Petrogas, and now I'm the Chief Financial Officer (CFO). What I particularly like about Petrogas is the variety of people who work here. The interaction between engineers, skilled workers (such as welders) and the supporting office staff strongly appeals to me. I really enjoy working here.

A well-established name

With its particular knowledge, skills and added value, Petrogas has built a solid reputation in a competitive market in the past 70 years. As a comparatively small company we're keeping up with the big players, while retaining enough flexibility to allow us to adapt quickly to changing circumstances.

Continuity and innovation

Petrogas combines continuity with innovation. For instance, we are now focusing on renewables. Petrogas is continually investigating into new market segments, such as biogas, LNG and plastic to oil. Right now we have a lot of projects in the Middle East, but our work field covers the whole world. We are constantly exploring new markets.

International orientation

Both the engineering and the international aspects of Petrogas appeal to me. What I find special about working in engineering is that something is really created: you can see a project grow from drawing board design to an actual installation in operation.

Marjo Heijmans, CFO



Getting the customer's needs clear

What was the customer's request?

Wilmar is a global producer of palm oil and palm oil products. For the construction of a factory in the Rotterdam area, this Singapore multinational sought a reliable party to build ancillary installations surrounding the actual processing plant. These were mainly installations for the supply of raw materials and for utilities like gas, nitrogen, water and air.

What was the solution provided?

For this project, Petrogas set up a multi-disciplinary team with Mourik Services, Mourik Infra, Mourik E&I and Mourik Bouw. In partnership, we were able to provide for the full scope of needs. Petrogas was responsible for the engineering and the commissioning. We also supplied the piping, instrumentation, valves, controllers and pump skids.

What set this project apart?

One distinctive feature of this project was the construction of a high-pressure steam pipe (400°C, 50 Bar) of more than one kilometre in length. Although we did have prior experience with such pipes, a pipe of this length was something special.

What was challenging about this project?

It was our responsibility that every connection with the processing plant formed a perfect fit. This required very careful communication with the customer and internally with Mourik. Before starting on the project, Petrogas therefore put a lot of time into getting the customer's needs clear.

Mathijs Meijs, Project Manager



LOCATION: THE NETHERLANDS



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ProlabNL ExxonMobil Test Unit

What was the customer's request?

ProLabNL - based in Arnhem, the Netherlands – offers testing facilities that simulate oil field conditions with natural gas/raw oil and water (hydrocarbons) under high pressure, for instance to test liquid separators. Petrogas was approached by ProLabNL to create a high pressure test facility for subsea liquid separation.

What was the solution provided?

The installation was designed based on information provided by ExxonMobil for the testing of a subsea separator. ProlabNL used this information to create a process flow diagram, which Petrogas then elaborated into a piping and instrument diagram with the required materials list. Next, Petrogas provided for the 3D installation drawing, wiring diagrams and the purchase of components such as pumps, instrumentation, flow meters and valves.

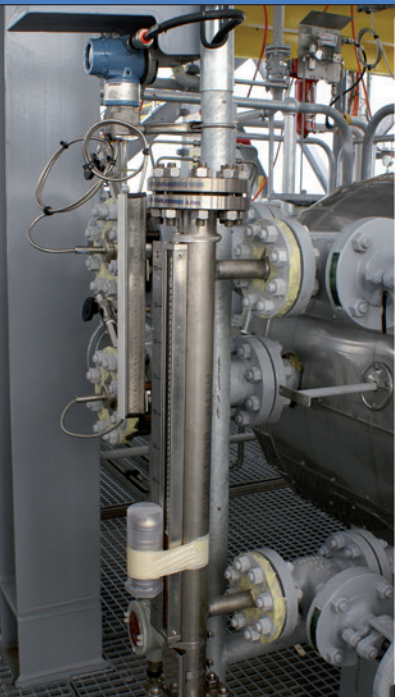
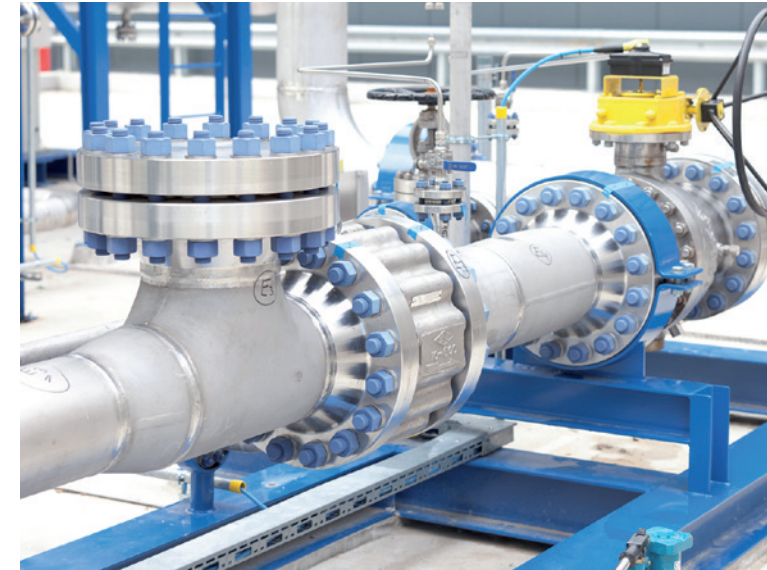
What set this project apart?

Within Petrogas we established a close partnership with our client in order to ensure the best performance of this test facility. Specially with respect to the material we used and the short notice changes we have performed successfully. The material which was used is suitable for the highly corrosive atmospheres and fluids. The opening of this project was performed by a member of the Royal Dutch family.

What was challenging about this project?

The installation had to be designed in such a way that it would fit in the available space, that any emitted vapours could not be ignited by the nearby rail track, and that the installation could be depressurised within a certain amount of time. Petrogas furthermore supplied the information required for the nuisance act license and the fire department.

Peter van Steenvelt, Project Manager



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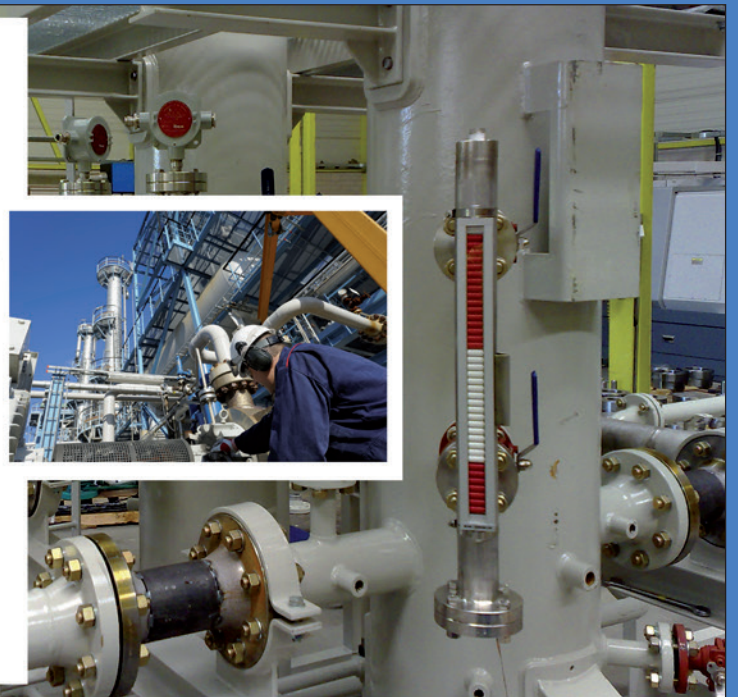
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Our partnership with Mourik

Mourik is a family business with more than 80 years of history under its belt. The company started in infrastructure and in time grew into the industrial sector. Mourik is a very solid business financially, with both domestic and international customers. The company comprises of several units: Mourik Services, Mourik Infra, Mourik E&I and Mourik Bouw.

Engineering branch

In 2009, Mourik acquired a majority share in Petrogas. In Petrogas, Mourik found a strong engineering partner with solid process knowledge. By working with Petrogas, Mourik is able to take on complete large-scale projects: from the design phase to the commissioning. The collaboration has also enhanced market exposure for both businesses.

Own identity

In terms of operational management, Petrogas has remained largely independent with a strong own identity. Mourik and Petrogas have collaborated closely in various large projects – such as Thermphos and Wilmar Autoroute – while other projects are carried out separately from each other.

Passion for the business

Both Mourik and Petrogas have a workforce with passion for the business. Core values are quality and flexibility. There isn't a project of which we will say we can't manage it: together we will always find a solution.





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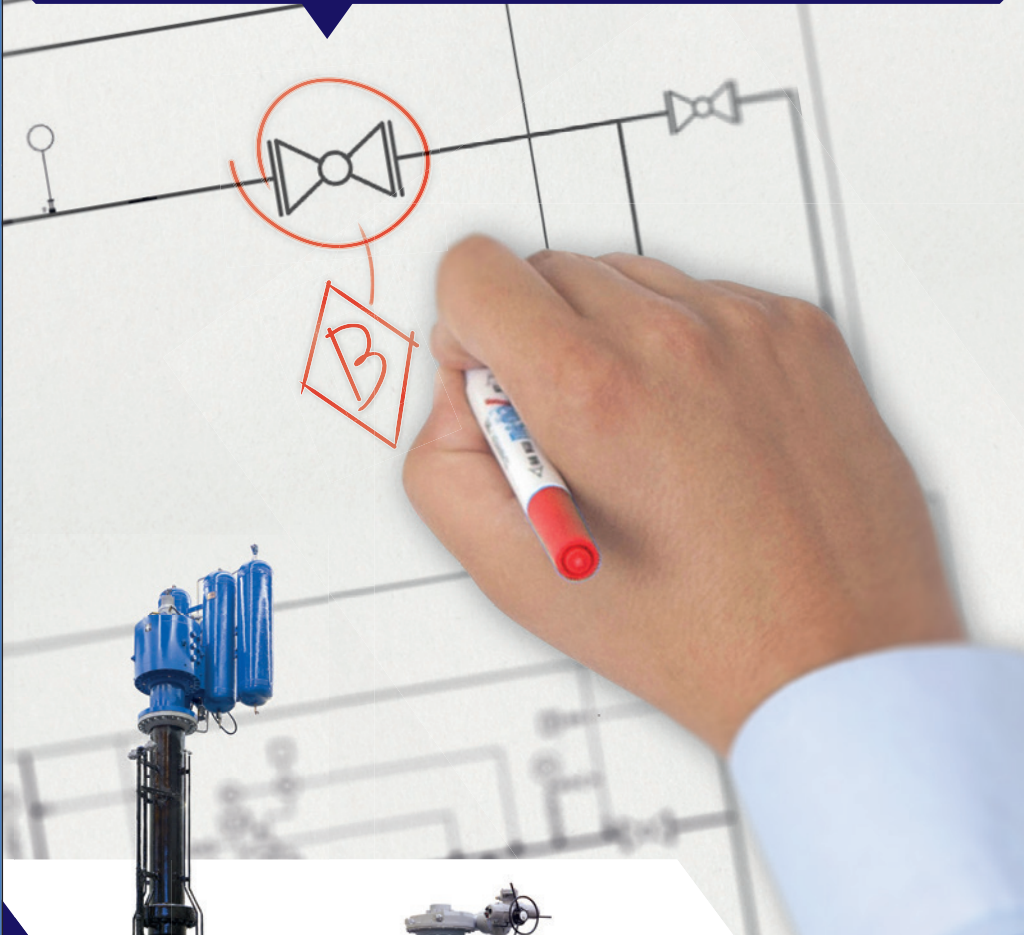
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Unusually short turnaround time

What was the customer's request?

This project was part of an agreement between Siemens and the Egyptian government to add 50 percent more energy to the power grid within a number of years. Petrogas was asked to build part of the Fuel Gas Inlet Station for three of the prospective power plants.

What was the solution provided?

Petrogas supplied and fabricated the system sections for the power plants, of which the DRIP-barrel (a horizontal liquid separator) was developed specifically on the basis of the customer's needs. Petrogas furthermore supplied ESD, Inlet Filters, Electrical Heaters and the control cabinets.

What set this project apart?

Usually Petrogas builds all the pressure vessels and pipes in its own workshop in Eindhoven, the Netherlands, but due to the size of this project we outsourced part of the production. From a quality assurance perspective we deliberately chose to have all the welding work carried out in the Netherlands.

What was challenging about this project?

The short turnaround time made this a challenging project. A project like this usually comes with a turnaround time of 10 to 12 months, but we managed to deliver the installation within 8 months. With this achievement Petrogas fully satisfied Siemens' expectations.

Marco Adema, Senior Project Engineer



**“IN THE END,
EVEN GLOBAL
SUCCESS BUILDS
ON ONE MAN’S
PRECISION.”**

MARTIN VAN DEN HOEK, CEO

As a company we are proud to work for a global player like Petrogas-Systems BV. As a team we are proud of the trust and personal relationship. Global success also builds on our precision.

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Flexibility in the final phase

What was the customer's request?

Cegelec needed more electric capacity at a petrochemical industrial complex on an island off the coast of Abu Dhabi. The existing capacity was expanded by means of natural gas powered turbine generators. Petrogas was asked to supply the Fuel Gas Conditioning Units. These units ensure that the gas arrives at the gas turbines under the right conditions.

What was the solution provided?

The natural gas is sourced from different locations, so there are differences in pressure, composition and temperature. Gas from one of the suppliers furthermore has a high acidity degree. Petrogas supplied the installation to filter and heat the gas and to reduce the pressure.

What set this project apart?

Due to the limited amount of space available on the island, the installation had to be as compact as possible, though leave enough room for its operation and maintenance.

What was challenging about this project?

Initially, the requirements for the Fuel Gas Conditioning Units were fairly basic. But as the project progressed, the end customer added a number of further requirements. Moreover, it turned out that the basic design provided to Petrogas was insufficiently elaborated on a number of points, requiring further adjustments. Petrogas was able to respond quickly and to incorporate all these additional demands.

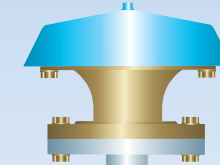
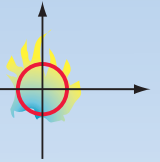
Marco Adema, Senior Project Engineer

CLIENT: CEGELEC OIL & GAS

LOCATION: DAS ISLAND OF ABU DHABI



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The right knowledge on the spot

What was the customer's request?

Petrogas was asked to supply a Back-up Fuel Oil System in tandem with a Fuel Gas Conditioning System (please see page 16). This system allows the plant to run on oil in case the gas supply is not available.

What was the solution provided?

Petrogas provided the design and the hardware of the Back-up Fuel Oil System. We built components such as the Fuel Oil Metering Station including in-line meter prover, Fuel Oil Unloading Station, Fuel Oil Forwarding, Coalescer and Pre-filters, as well as the Minimum Circulation Section, the Recirculation Pump Skids, the Bulk Transfer Pump Skid, the Day Tank Filling Pumps and the Day Tank Filling Metering systems.

What set this project apart?

A special part of this project was the Fuel Oil Unloading Station and the Fuel Oil Metering Station that Petrogas supplied. Since the oil is delivered by truck, we had to design a system that allows the accurate measurement of the oil supplied, in order to determine the costs.

What was challenging about this project?

It is very important that the pressure inside the system is always constant. If one pump fails, another pump must take over within 10 seconds. The Minimum Recirculation Skids ensure a steady flow, and the Accumulator Skids level out any differences in pressure.

Tijs Intven, Senior Project Engineer



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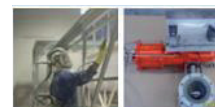
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Room for development

I started at Petrogas in 2014 with my graduation project on the “Design and Process Modelling of a New Indirectly Heated Fluidized Bed Steam Reformer”. This feasibility study contributed to the consortium agreement reached in May 2016 between Petrogas and Delft University of Technology for research on turning biomass into gas.

Sustainable alternative

This research focuses on the gasification of dry and wet forms of biomass, producing synthesis gas, which serves as basis for diesel,

natural gas, methanol and hydrogen substitutes. With a view to the growing natural resource scarcity and in combination with other renewable energy sources, this is a very attractive alternative.

Developing a new type of gasifier

An important part of the research project is the modelling, design and testing of a new type of gasifier, as well as cleaning the gas product of dust, sulphur and tar, the (catalytic) upgrading of the gas for further

catalytic conversion, and scaling up the process from the laboratory to an operational plant.

Practical experience

In addition to this project, Petrogas offered me the opportunity to acquire experience in other company units. Right now I'm working as a commissioning engineer at the Thermphos project. I hope to be able to apply this experience when I move back to Steam Reforming and thereby to contribute to the success of the project.

Victor Schouten, Project Engineer



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Unique collaboration with Delft University of Technology

Delft University of Technology is working with Petrogas to develop a process for the gasification of biomass into synthesis gas that is not or hardly diluted with nitrogen. After cleaning, this gas can be upgraded into natural gas substitute. Petrogas has funded a project in this field at Delft University of Technology, with a PhD candidate working full-time on the project for four years.

Room for experiments

The Process & Energy lab at the 3mE faculty offers the possibility of experimental work on an industrially relevant scale size, and they have extensive experience with biomass gasification in integrated process installations, with the means to investigate interactions in process components.

Further upscaling

The goal of this project is to model and experimentally test the new reactor concept for the gasifier. Upscaling is the next step. What's special about this project is how it fuses the unique experience and know-how of the university and of the private sector.

Wiebren de Jong, Associate Professor TU Delft



DEFINING THE LIMIT AS STANDARD

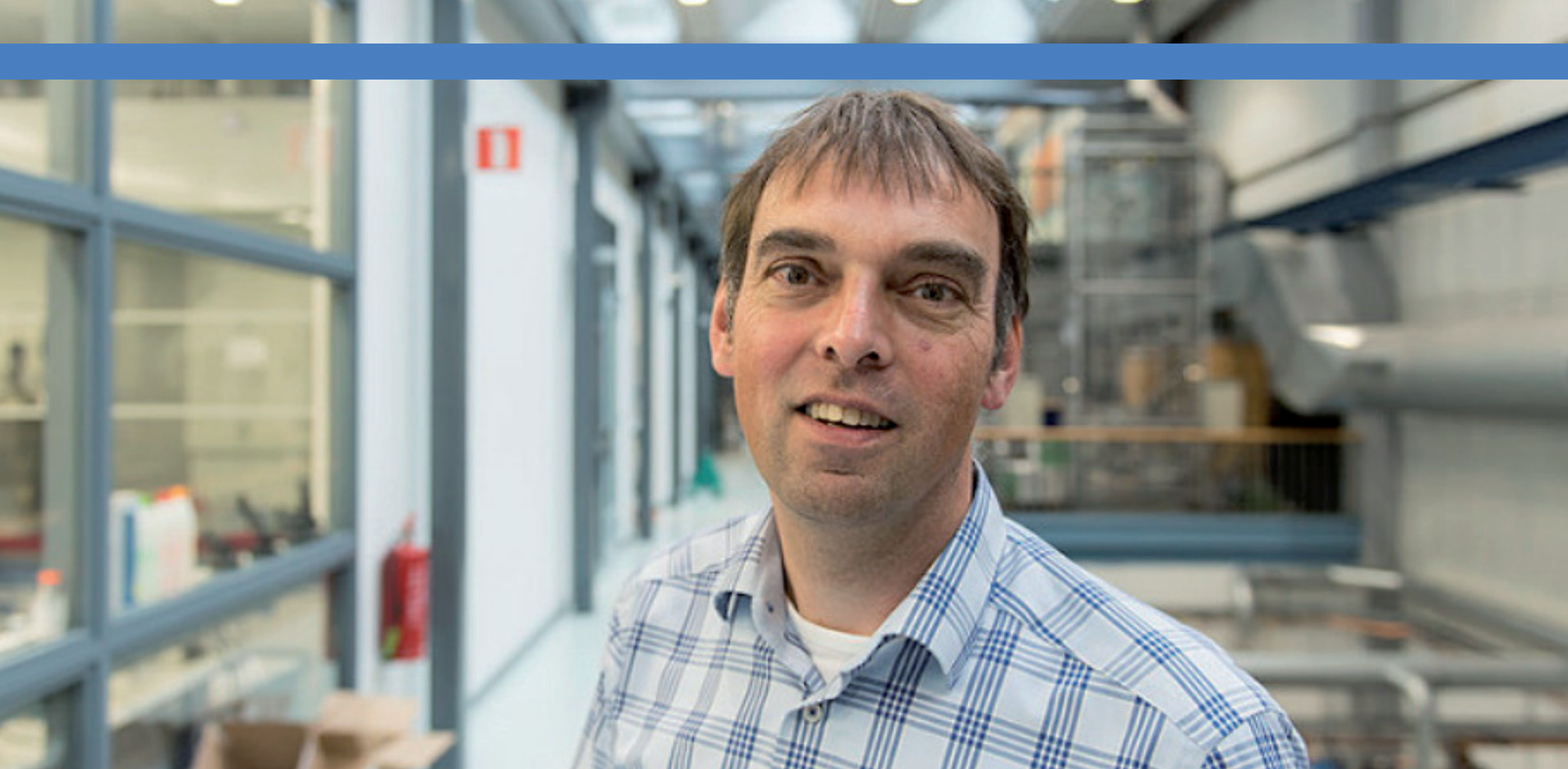
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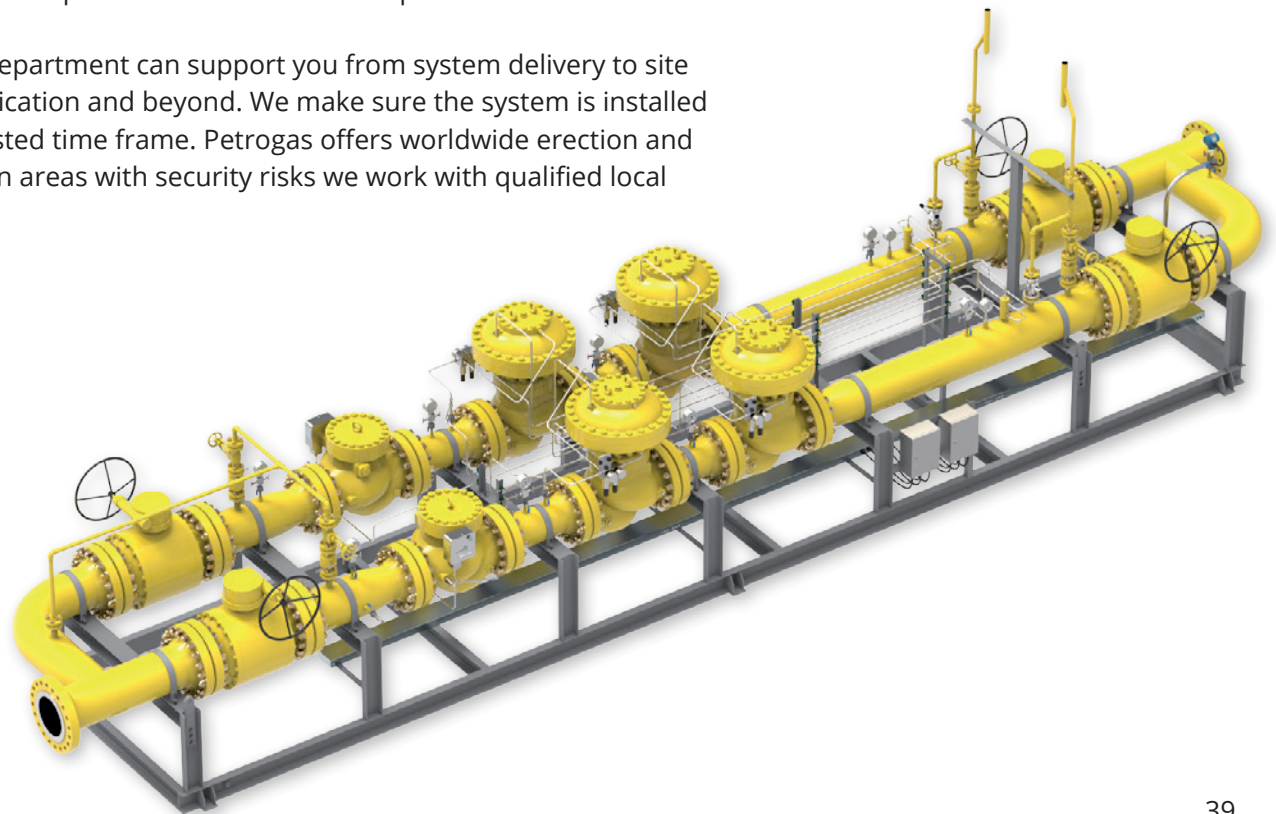


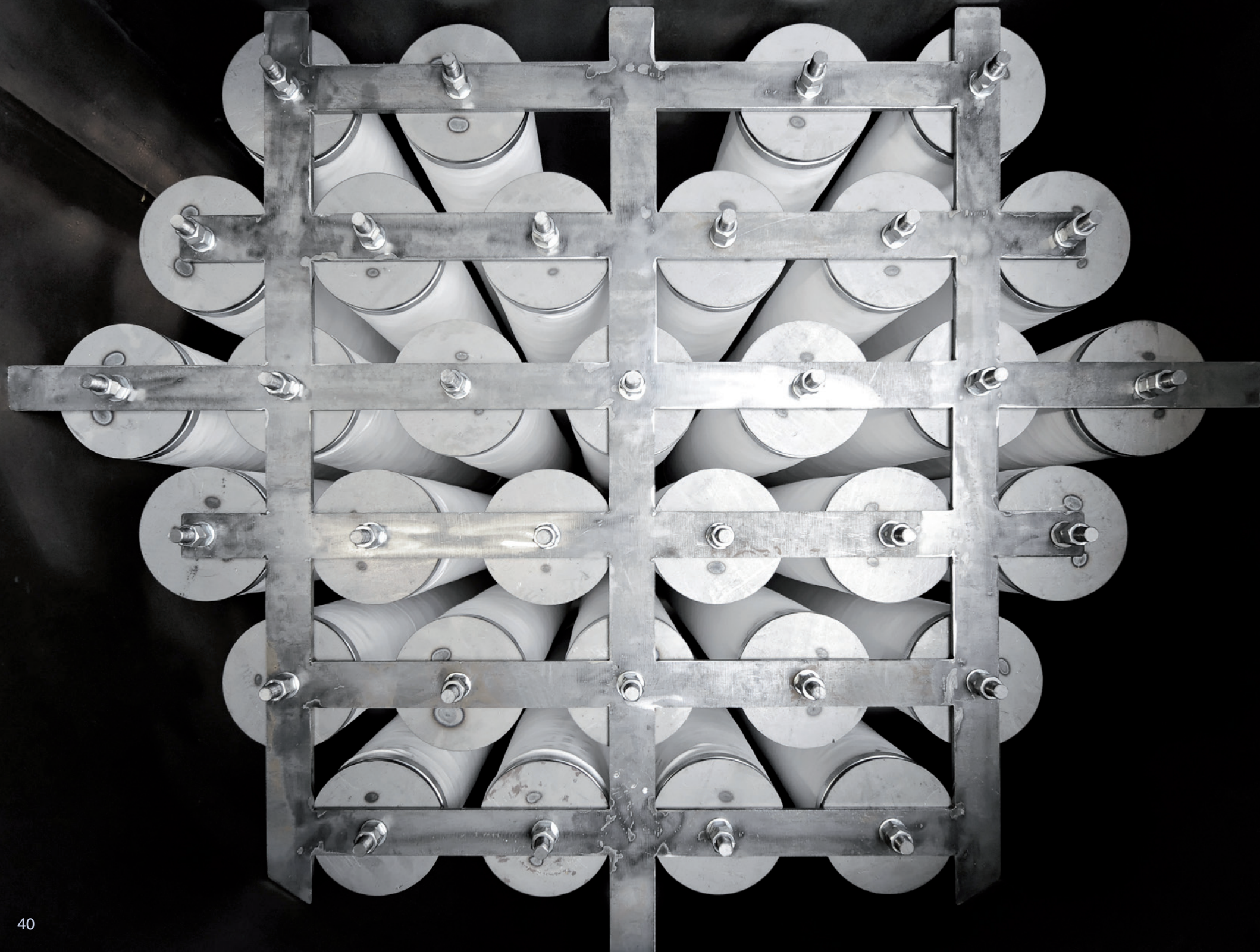
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Sales and aftersales team



Tom Bartholomeus,
Aftersales Consultant



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From left to right, standing:

1. Tjerk Ermen, Service Coördinator
2. Theodoor van der Hulst, Senior Sales Engineer
3. Anouk Hisgen, Sales Secretary
4. Chris Dubbers, Marketeer
5. Maurice van der Meer, Senior Sales Engineer
6. Jacob van den Pol, Commercial Director
7. Rob Vellekoop, Sales Engineer

Sitting:

1. Boyd van der Leeden, Jr. Sales Design Engineer
2. Jacques Kuipers, Technical Sales Support
3. Melanie Petersen, Aftersales Assistant
4. Ben Savenije, Aftersales Consultant
5. Rob Burridge, Sales Engineer



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