

Kelvion



Oil & Gas market

# ESSENTIAL RAW MATERIALS FOR EVERYDAY LIFE

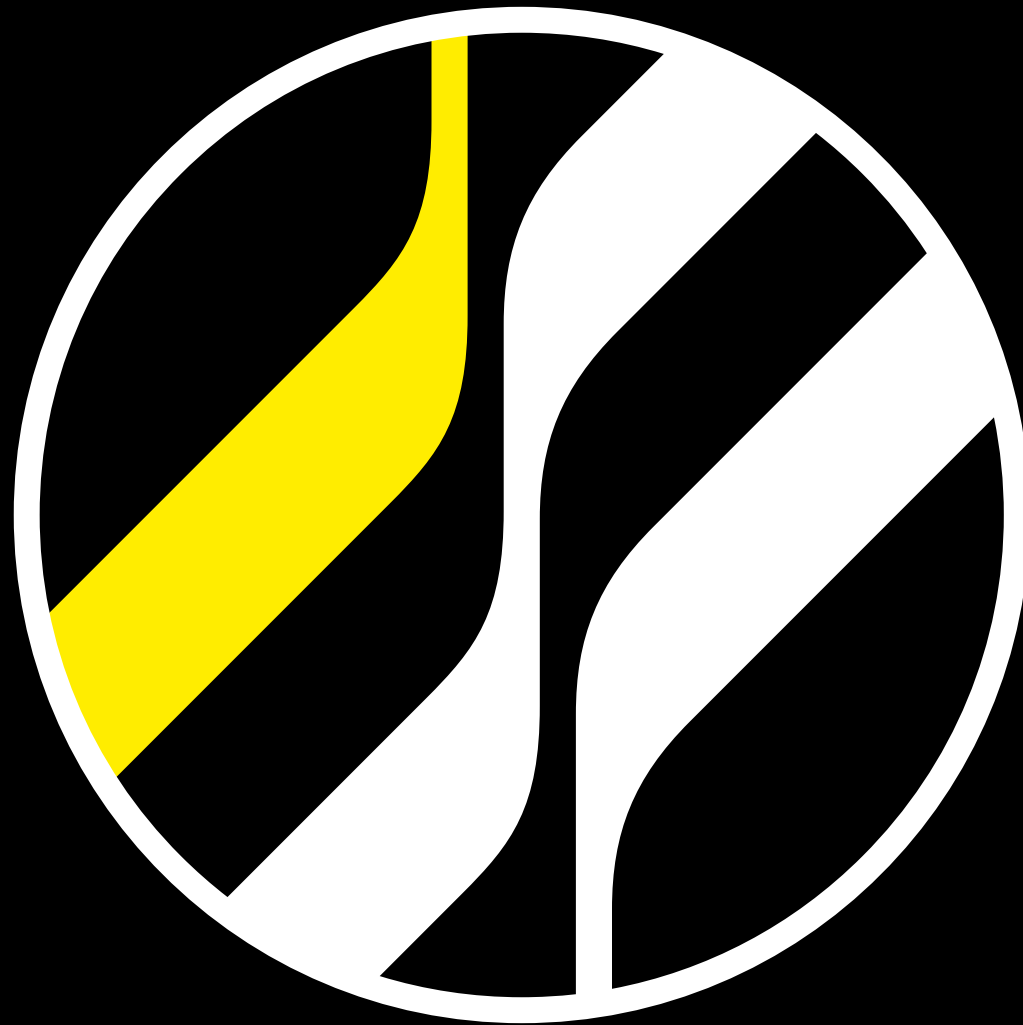


**Kelvion –  
a tribute to  
Lord Kelvin**

**70 branches and  
sales partners  
worldwide**

**More than 4,000  
employees  
worldwide**

Lord Kelvin (1824 – 1907) formulated  
the laws of thermodynamics



# EXPERTS IN HEAT EXCHANGE – SINCE 1920

Welcome to Kelvion. As successor to the GEA Heat Exchangers Group, we continue to break new ground, making discerning customers more successful than ever with our integrated heat exchanger solutions.

**Our solutions for your applications:**

We offer our customers one of the world's largest product portfolios in the field of heat exchangers. It includes individual solutions for practically all conceivable applications and complex environmental conditions: plate heat exchangers, shell and tube heat exchangers, finned tube heat exchangers, modular cooling tower systems, and refrigeration heat exchangers.

**Your markets are our markets, too:**

The markets in which you and we together operate are among the most important in the world: the chemical industry, food and beverages, the heavy industry, climate and environment, marine applications, the oil and gas industry, energy, refrigeration technology, sugar and transportation. We provide every single market segment with solutions of outstanding efficiency, safety, and sustainability.

**We are highly committed to earning your trust:**

We want to win your trust with everything we do and convince you with the solutions we offer. With this high aim in mind, we invest our extensive know-how, our great precision, and our passion in everything we do: including product development, manufacturing, installation, and after-sales support.

**Seeing things from the customer perspective:**

Your specific requirements count – and nothing else. Whatever we offer you, it must meet these requirements. Our entire way of thinking and working is geared towards this aim. Our customers truly appreciate this: after all, this is how we make their companies more efficient.

**We are at your service.**

Kelvion – Experts in Heat Exchange.





The Oil & Gas market – facts and figures

# ESSENTIAL RAW MATERIALS FOR EVERYDAY LIFE



Oil and natural gas are essential to modern life. As well as being the main sources of energy worldwide, they provide the raw materials for thousands of everyday products – from electronic devices and clothing to medicines and household cleaners.

Growing population boosts demand

Over the next 20 years the world’s population is set to hit the 8.8 billion mark. A growing population means an increasing demand for energy as well as the products manufactured from oil and gas. China, India and Southeast Asia are the main drivers of this upward trend.

Increasing capacity

Despite the drop in oil prices over the last few years, the industry continues to invest in new facilities to satisfy the appetite for refined products. The International Energy Agency predicts that global oil demand will increase from 96 million barrels a day in 2016 to nearly 102 million barrels a day by 2022. Between 2017 and 2021 global LNG investment is predicted to reach US\$ 284 billion, an increase of 50%.

Going green

The oil and gas industry is a major consumer of water and energy resources and is subject to increasingly stringent regulations aimed at improving its environmental footprint during extraction, production and distribution. Also many countries around the world have introduced legislation to cut emissions and air-borne pollutants, while refineries are building capacity to meet requirements for low-sulfur fuels.

Reliability essential

Except for planned maintenance, refineries and other operations depend on round-the-clock operation. Avoiding unexpected and costly shut-downs requires robust and reliable technologies that can operate efficiently and cost-effectively in the harshest of environments.

Solutions for every link in the hydrocarbon chain

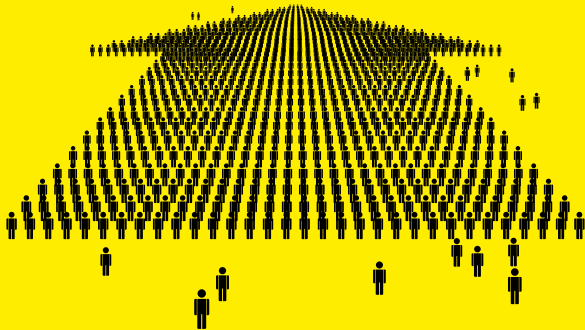
From extraction – onshore and offshore – to refining, processing, transportation and storage, Kelvion has the right heat transfer solutions throughout the hydrocarbon chain. Our products and expert know-how help customers in the oil and gas industry to operate reliably, save energy, increase efficiency and reduce their environmental impact.

Oil and gas consumption continue to dominate

# INDISPENSIBLE SOURCES OF ENERGY AND PRODUCTS FOR A GROWING POPULATION

Global population growth

By 2025 the world will contain an extra one billion people placing ever increasing demands on natural resources. China, India and the Middle East will be the top three highest oil consumers. By 2035 the demand for gas is predicted to be the same as for oil. Leading the surge is China as it switches from coal to reduce air pollution.



Versatile and indispensable

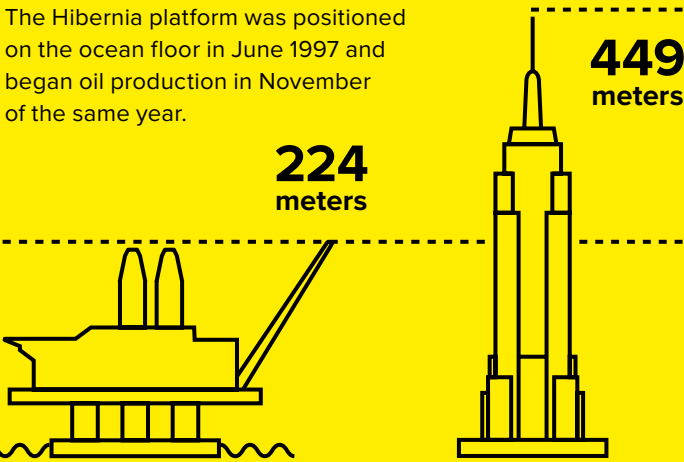
Thousands of products that we use every day are made from crude oil and natural gas. Here are just a few:

- ▶ Toothbrushes and toothpaste
- ▶ Shaving cream
- ▶ Contact lenses
- ▶ Antiseptics
- ▶ Umbrellas
- ▶ Shoes and clothing
- ▶ Food packaging
- ▶ Televisions
- ▶ Computers
- ▶ Sports equipment
- ▶ Kitchen utensils
- ▶ Toys
- ▶ Phones



Eighth wonder of the world

The Canadian Hibernia offshore platform is the largest ever structure to be towed. Weighing a massive 1.08 million tonnes and standing 224 meters high (half the height of the Empire State Building) it was described by TIME magazine as the “eighth wonder of the world”. The Hibernia platform was positioned on the ocean floor in June 1997 and began oil production in November of the same year.



Gas giant

The South Pars/North Dome field in the Persian Gulf is the world’s largest natural gas field. Shared between Iran and Qatar, it covers 9,700 square kilometers and holds an estimated 51 trillion cubic meters of natural gas and 7.9 billion cubic meters of natural gas condensates.



## The main drivers of demand for oil and gas



Population growth



Economic growth (GDP per capita)

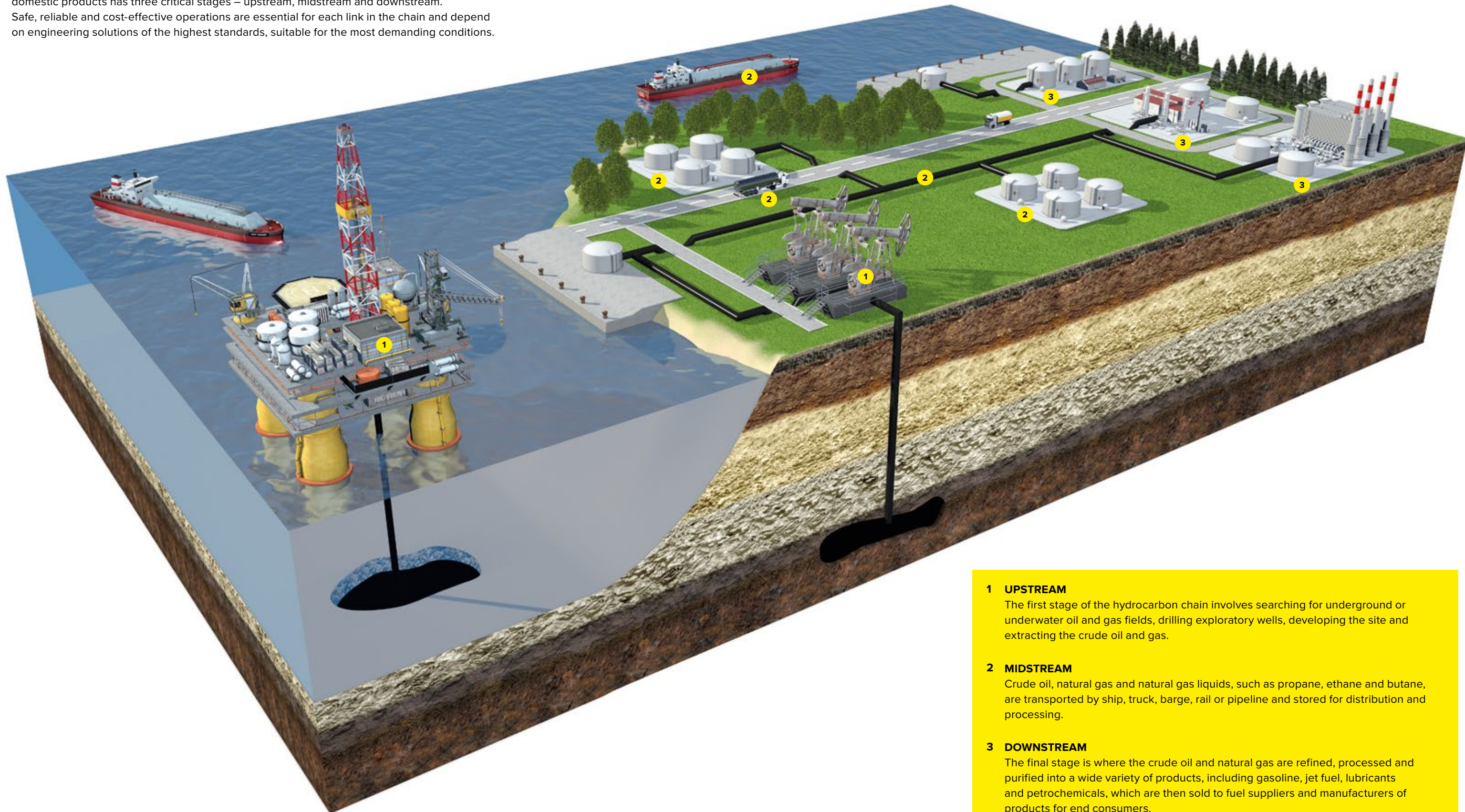


Energy efficiency



# GLOBAL OIL & GAS VALUE CHAIN

Supplying the world with fossil fuels for energy and an extensive range of commercial and domestic products has three critical stages – upstream, midstream and downstream. Safe, reliable and cost-effective operations are essential for each link in the chain and depend on engineering solutions of the highest standards, suitable for the most demanding conditions.



## **1 UPSTREAM**

The first stage of the hydrocarbon chain involves searching for underground or underwater oil and gas fields, drilling exploratory wells, developing the site and extracting the crude oil and gas.

## **2 MIDSTREAM**

Crude oil, natural gas and natural gas liquids, such as propane, ethane and butane, are transported by ship, truck, barge, rail or pipeline and stored for distribution and processing.

## **3 DOWNSTREAM**

The final stage is where the crude oil and natural gas are refined, processed and purified into a wide variety of products, including gasoline, jet fuel, lubricants and petrochemicals, which are then sold to fuel suppliers and manufacturers of products for end consumers.





Drilling

ROBUST  
SOLUTIONS FOR  
THE TOUGHEST  
CHALLENGES

Drilling is the first link in the hydrocarbon chain. Because rigs are often located offshore and other tough environments, extracting oil and gas pose daunting physical challenges and require reliable cutting-edge technology.

With the growing demand for dwindling resources, companies are under increasing pressure to achieve lower operating costs. Maintaining the integrity of drilling equipment is more crucial than ever for ensuring smooth and cost-effective operation.

Our world-class heat exchangers can be relied on for the toughest of jobs. Flexible and robust, they help to secure the longest possible operational time. We offer solutions for every heat transfer need during drilling operations: in particular, for mud cooling, where safety is crucial to avoid the risk of environmental contamination. Kelvion technologies allow a smooth drilling process, whatever the temperature and pressure level.



Oil & Gas Production

TECHNOLOGY TO  
SUPPORT ONSHORE  
OR OFFSHORE  
PRODUCTION

Rising global demand for hydrocarbons, combined with cost and environmental constraints has put pressure on oil and gas companies to operate their production facilities more efficiently and greener.

In the search for untapped resources, deep water rigs are being built further and further offshore, requiring ever higher levels of investment. It is therefore essential that new, as well as existing plants operate efficiently and reliably, with no unplanned downtime. As operating and ambient conditions in oil and gas production plants can be extreme, it is crucial that equipment is robust and capable of supporting production uptime.

From crude oil treatment to gas compression – onshore and offshore – Kelvion technologies and know-how manage heating and cooling processes to minimize heat losses. In addition, we can build tailor-made solutions from our unique heat transfer portfolio – including air coolers, shell and tube, gasketed and plate heat exchangers – to suit all performance requirements.





## Oil & Gas Transportation

# HARD-WORKING PRODUCTS FOR OPTIMAL PERFORMANCE

Worldwide the demand for liquid natural gas (LNG) is growing, bringing with it an increasing requirement for more production and transport facilities. In particular, floating storage and regasification units are on the rise as a more convenient and cost-effective alternative to facilities on land.

The natural gas delivery network is highly complex, so precision equipment that operates reliably and complies with stringent regulations is essential: unexpected failures can be catastrophic.

At Kelvion we are experts in providing innovative, hard-working products that fulfil the performance requirements of our customers' facilities. We know that compactness, cost-efficiency and accessibility are crucial in LNG fractionation and regasification processes. Our air coolers and welded and gasketed plate heat exchangers meet all three specifications so that every step in those processes is perfectly controlled.



## Crude Oil Refining

# INNOVATIVE SOLUTIONS FOR RELIABILITY AND ENERGY EFFICIENCY

Oil refining is a high-cost, energy-intensive, industry involving sophisticated processes and complex machinery.

In an increasingly competitive market, refiners face the challenges of improving operational efficiency, using less energy and maximizing production, while complying with ever tighter regulations for controlling air emissions, effluent discharge and the sulfur content of fuels. Equipment reliability is therefore critical as system failures can lead to unplanned downtime and lost production.

Kelvion's efficient heat transfer technologies, together with our process and applications know-how, can help refiners to optimize their energy use and cut emissions. On atmospheric distillation units (ADUs) crude preheat trains, Kelvion welded plate heat exchanger K<sup>2</sup>Bloc can provide a substantial increase in the crude oil temperature before the fired heater, reducing operating costs. All our heat exchangers are corrosion-resistant and manufactured to the highest standards for reliable, round-the-clock performance.





Petrochemicals

TRUSTED  
HEAT EXCHANGE  
IN EXTREME  
CONDITIONS

Raw crude oil and natural gas are processed into chemicals, such as ethylene, benzene, xylene and butanes. They are then used directly or to provide the feedstock for manufacturing other chemicals.

Petrochemical production is high on energy consumption and often involves extreme temperatures and pressures. The industry relies on sophisticated engineering solutions capable of operating reliably in challenging conditions.

At Kelvion we understand these challenges. Our proven welded plate exchanger technology offers unrivalled efficiency for ethylene oxide and ethylene glycol processes. Whatever the process, the different plates, geometries and spacing can be adapted to suit. This means there is no compromise between fouling resistance, ease of cleaning, thermal efficiency and drops in pressure. However demanding the task, our heat exchange solutions provide technology you can trust.

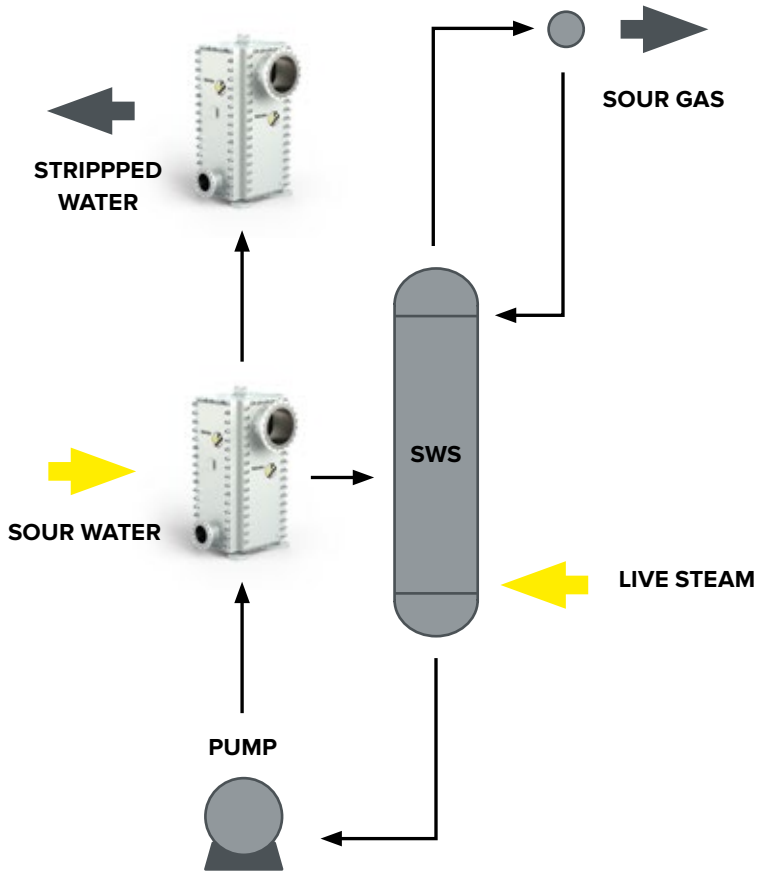
HOW THE K°BLOC  
CAN BOOST THE  
BOTTOM LINE

Using Kelvion’s advanced K°Bloc welded plate heat exchanger in the sour water stripping process has helped a major refinery in the US to improve its profitability. The refinery processes more than 35,000 barrels of crude oil per day into automotive, marine and aviation fuels.

Sour water, or waste water, generated in the refinery is fed into a stripping tower where it is heated with steam, or pre-heated air, to remove hydrogen sulfide and ammonia. The distilled water at the bottom of the tower – commonly called stripper bottoms – can be used to preheat the incoming stripper feed. This reduces energy required for air heaters or steam generators.

The refinery had considered using the standard hairpin shell and tube heat exchange system. In order to meet the thermal duty requirements of 5,420,000 BTU/h, this would have occupied a large area. As well as offering more heat recovery, our K°Bloc solution has the advantage of being more compact, providing significant space savings. As a result, the refinery has the opportunity to install equipment that would otherwise have to be located elsewhere, requiring extensive and expensive piping.

Most importantly, the K°Bloc heat exchanger has enabled the refinery to recover more heat from the stripper bottoms to divert to the stripper feed. This has improved the overall efficiency of the stripper process, resulting in a greater return on the customer’s investment.



MATERIALS AND CONSTRUCTION		PERFORMANCE
<b>Heat Transfer Plate:</b> <ul style="list-style-type: none"><li>▶ 316L Stainless</li><li>▶ SMO 254</li><li>▶ Nickel and Nickel alloys</li><li>▶ Titanium, and others on request</li></ul>	<b>Other Media-Contacting Parts:</b> <p>All other media-contacting parts are made from high-grade alloys, according to the application.</p> <b>Port Connection:</b> <p>Raised Face Welded Neck Flange as standard. Others available on request.</p> <b>Pressure Plate:</b> <p>SA516 Grade 60 or 70, depending on code.</p>	<b>Design Pressure:</b> <p>Maximum standard design pressure is 500 psig (35 barg). Higher pressures are available on request.</p> <b>Design Temperature:</b> <p>Maximum standard design temperature is 662°F (350°C). Minimum standard design temperature is -20°F (-28°C). Higher temperatures are available on request.</p>

Overview of our products for the oil & gas industry

# GLOBAL SOLUTIONS FOR EVERY REQUIREMENT

Kelvion offers a wide range of precision-engineered heating and cooling solutions that operate reliably for the most demanding of duties. Our heat exchangers, air fin coolers, preheaters, cooling towers and air cooled condensers are the benchmark of efficiency and meet the highest quality standards demanded by oil & gas facilities. With our network of manufacturing sites, we can deliver world-beating products anywhere around the globe.

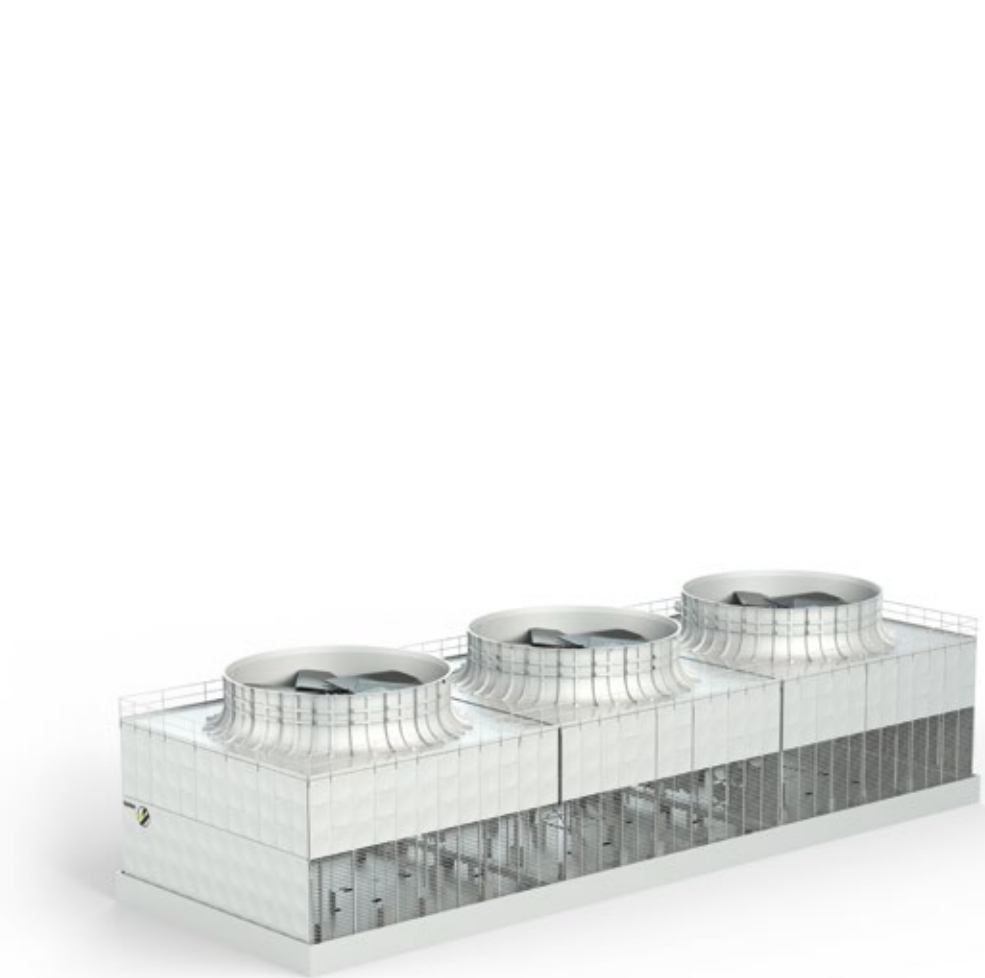


**Gasketed Plate Heat Exchangers**

Kelvion’s gasketed plate heat exchangers reveal what passion, scientific curiosity and technological expertise can achieve. They offer high efficiency at low operating costs and greater application possibilities at lower investment costs. Continuous further development of the plate series, targeted to meet your demands concerning the thermodynamic and fluid-dynamic performance, also ensures that you can achieve maximum economic efficiency. The range of plate corrugations, connection sizes, plate widths and lengths enables them to be made to measure to your requirements. In addition, maintenance-friendly assembly and sealing technologies are applied, which assure that service and maintenance costs are kept low.

**Fully Welded Plate Heat Exchangers**

Our robust, fully-welded plate heat exchangers offer outstanding coefficient heat transfer and require only minimal cleaning and servicing. Their compact size means minimal investment costs. The design advantages come into play where higher output and load capacity are required. In addition, each series - K°Bloc, K°Flex, Rekuluvo and Rekugavo - has its specific advantages and areas of application. Developed for the challenges of specific applications, our fully-welded plate heat exchangers offer convincing performance even in the most challenging conditions.



**Wet Cooling Towers**

We have a range of standard solutions available to suit various capacities. Our modular cooling tower system can also be custom-engineered to meet the specific requirements of our customers. The factory-preassembled modules are employed primarily for smaller projects, for which the customer enjoys significant cost advantages. For larger projects, we recommend field-erected cooling towers.



Overview of our products for the oil & gas industry

# GLOBAL SOLUTIONS FOR **EVERY** **REQUIREMENT**



**Shell & Tube Heat Exchangers**

Shell & tube heat exchangers are the most common design for many applications. We provide a wide variety of products based on the most suitable design and materials to ensure a cost efficient and reliable solution. The full range provides standardized product lines for an optimal price/quality ratio as well as customized designs for the most demanding duties in the oil & gas industry.



**Air Cooled Condensers**

Based on our proprietary MASH technology, Kelvion air cooled condensers [ACCs], are designed to meet the strict specifications and standards demanded by oil & gas facilities, as well as smaller waste-to-energy/biomass plants. This includes compliance with API and ASME codes and quality control.



**Single Tube Heat Exchangers**

Our single tube heat exchangers are tailored for individual applications and are available in a wide range of materials. Air fin coolers, air preheaters and air dryers represent the optimal solution in enabling processes to operate more efficiently and cost-effectively.



A technician wearing an orange jumpsuit, white hard hat, and safety glasses is kneeling and working on a complex industrial machine. The machine has various pipes, valves, and a large circular component with a grid pattern. The technician is holding a red folder and a pen, and is pointing at a small component on the machine. The background shows more industrial equipment and a yellow structure.

# OUR SERVICE IN THREE WORDS: PEACE OF MIND

Developing and supplying products and solutions is one side of our business – comprehensive after-sales support and comprehensive services is the other. The most important aspect is always to satisfy your requirements. This principle has made us a highly reliable service specialist. Our tightly woven network of locations worldwide means we can offer our customers maximum availability everywhere and anytime. We are underway for our customers every day, around the world. The service work we perform provides us with a continual stream of new knowledge and experiences that culminates in valuable improvements and enables us to permanently optimize our range of services. These services include precise installation work, in-house or on-site trouble shooting, visual inspection and performance audit as part of proactive maintenance, repair and cleaning, tube replacement, provision of spare parts, and the chemical cleaning of product components in our own service workshops.

Whatever it is we do for you, our services are oriented to specific values:

#### **Quality and safety**

We provide the ultimate in service quality with individual customer advice and precision work.

#### **Innovation**

Innovative service solutions enable us to fulfill the needs of our customers.

#### **Efficiency**

Our parts and services support ensures greater profitability: we optimize in-house workflows and maximize the availability of our systems at our customers' premises.

#### **Professional knowledge**

Our customers benefit from the knowledge and experience we have gained through decades of service work.

#### **Trust**

The work performed by our service staff is reliable, responsible, and transparent: which is how we have earned the trust of our customers.

#### **The multi-stage model – service as you need it**

Our after-sales and service portfolio is based on service levels in which the range of services agreed upon is an integral part of an individually tailored service agreement. The clearly described contents of the various service levels ensure reliable cost transparency. The various service components can be combined as required to form a tailor-made service agreement. You can put together your own personal service package, tailored to suit your individual needs: to include the provision of spare parts, staff training, a help desk, or permanent on-site service.



# FAIRNESS FIRST: FOR CUSTOMERS, EMPLOYEES, COMPETITORS, AND THE ENVIRONMENT

Companies such as Kelvion that are internationally active are obliged to conform to internationally accepted conventions: of social, political, and legal nature. Our corporate code of conduct describes the principles and procedures behind our corporate actions. This code applies to all our employees worldwide. We ensure compliance with the regulations in a working environment that is characterized by integrity, respect, fairness, and responsibility.

## **We respect and observe the law.**

The basis for all action at Kelvion is the observation of all applicable laws and other regulations. We supplement these rules with especially designed, particularly strict internal guidelines and training with regard to certain aspects of the law.

## **We act internationally.**

Kelvion strictly observes as binding the statutory regulations that apply to our products and services involved in international commerce. We observe all applicable bans on exports and imports and observe all official authorization procedures.

## **We wholly reject corruption.**

Kelvion rejects any type of commercial corruption, both domestically and on foreign markets. In order to underline this fact, we have drawn up our own anti-corruption guidelines that enforce rules of proper conduct to which we adhere at all times. These rules apply both in our dealings with officials and with the bodies and employees of other companies.

## **We support fair competition.**

In a spirit of fair competition, we work hard, orient this work to our customers' needs and ensure the quality of our products and services. We observe all applicable domestic, supranational, and foreign anti-trust laws as well as any laws pertaining to unfair competition. We also expect this level of fairness from our competitors.

## **We ensure socially acceptable working conditions.**

We are committed to the principles of social responsibility towards our employees and society. Kelvion offers its employees fair working conditions worldwide. We reject any form of discrimination, with respect to gender, sexual orientation, origin, skin color, or any other personal characteristics. We see ourselves as a socially responsible employer that treats its employees with respect.

## **We protect the environment.**

From development, to manufacturing, and to the sale of our products, we protect the environment throughout each of these phases. This principle applies not only to the energy we employ, but also to the protection of our natural environment at every workplace worldwide.

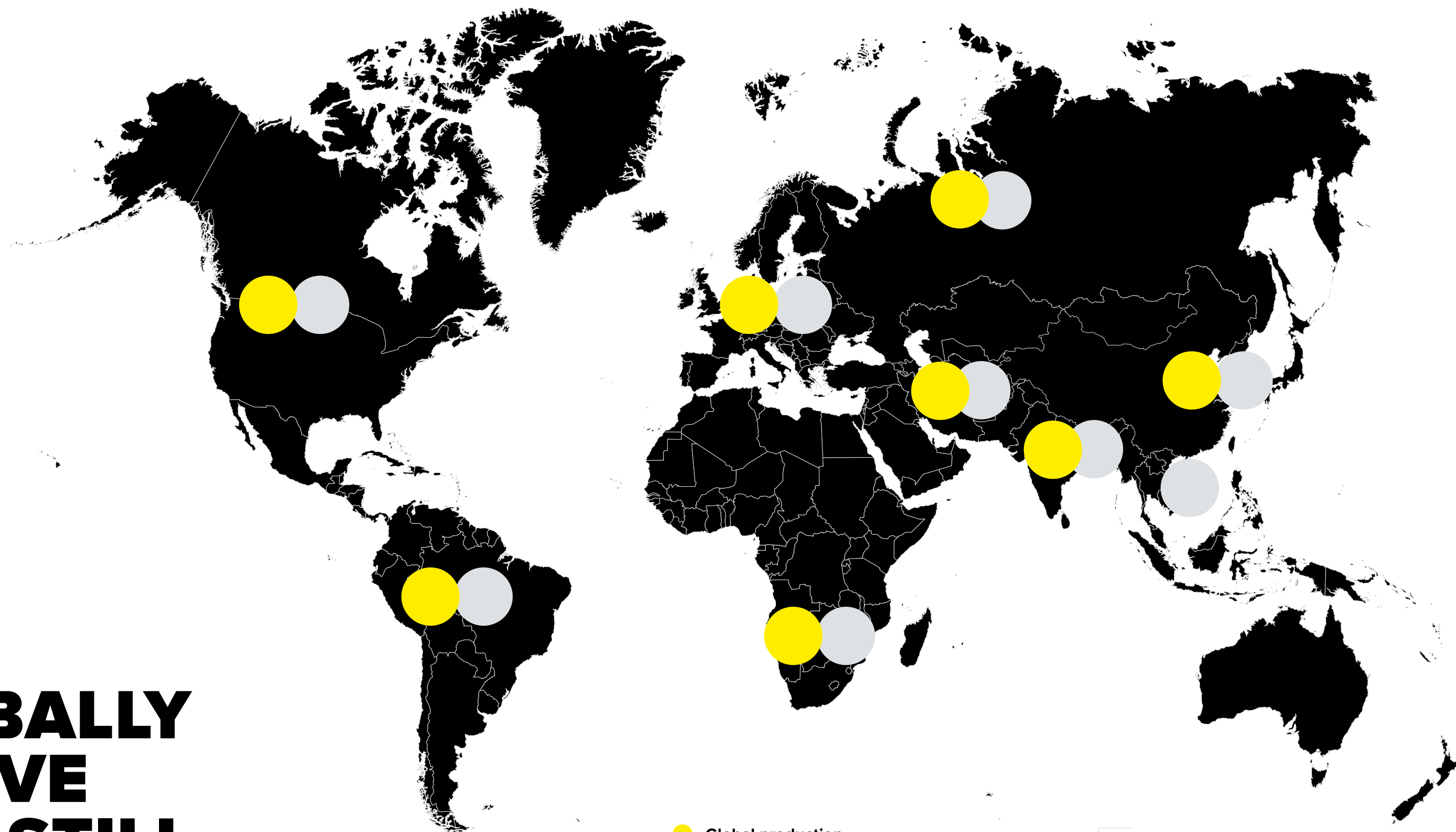
## **We ensure product safety.**

For our customers, we develop innovative, high-quality products and processes – and product safety enjoys top priority.



# GLOBALLY ACTIVE AND STILL CLOSE BY

No matter where your market is, regardless of country, we are never far away. We are always happy to answer any questions you may have and meet your requirements. Even the largest, most successful project begins with an initial, profitable conversation. We look forward to hearing from you.



- Global production footprint
- Global sales and service



Just scan this QR code with your smartphone or visit our website at: [www.kelvion.com](http://www.kelvion.com) – there you will find a highly competent contact in your immediate vicinity.



**[www.kelvion.com](http://www.kelvion.com)**