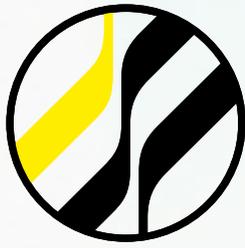


Kelvion



HVAC market

# TEMPERATURE CONTROL IN ANY BUILDING



**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 HVAC market – facts and figures

# TEMPERATURE CONTROL



### Heating and cooling for everyday comfort

Hospitals, offices, shopping centers, factories and houses – just about any building you could name requires some form of heating, ventilation and air-conditioning (HVAC) system.

### Building boom boosts demand

The boom in construction projects and rising sales of commercial buildings and homes around the world is driving growth in the HVAC sector. In particular, advancing urbanization and industrialization in developing countries have created a demand for more factories and residential complexes fitted with HVAC systems.

### Drive for energy efficiency

Energy efficiency is now a key requirement for new HVAC installations. Governments worldwide have introduced regulations designed to encourage the take-up of HVAC systems that comply with industry standards for energy-efficient performance. This has also provided an incentive for replacing old HVAC systems with modern versions.

### Smarter systems

The HVAC market faces a smart future as a result of advances in intelligent technology. These include systems for monitoring a building's energy consumption and controlling the energy output of a HVAC system.

### Solutions for every application

Whether for heating, ventilation, air-conditioning or cooling, Kelvion has the optimal heat exchange solution. From swimming pools and solar units, to district systems, our equipment ensures the right temperature is achieved.

## HVAC - An innovative market for energy saving

# THE DRIVE TOWARDS ENERGY EFFICIENCY IS MAKING NEW HVAC SYSTEMS INDISPENSIBLE IN MODERN BUILDINGS

### Growing construction sector

The construction industry is driving the growth in HVAC systems due to the rapid rise in new homes and commercial buildings. Air conditioning has transformed the architectural landscape around the world, allowing glass-fronted skyscrapers to be built in hot climates, such as the Burj Al Arab Jumeirah in Dubai.



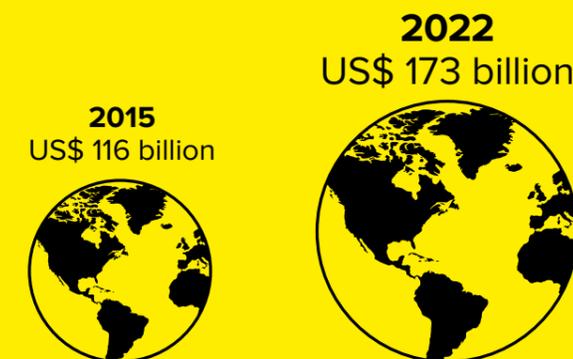
### Replacing to save energy

As part of an energy-efficiency drive, governments in many parts of the world are providing incentives for replacing old HVAC systems. In Germany, the strategy for energy-efficient-buildings and CO<sub>2</sub>-rehabilitation-program covers energy upgrades for buildings and energy-efficient new buildings. Heat demand is supposed to be reduced by 20% and greenhouse gases by 40% till 2020. By 2050 -80% greenhouse gas emissions compared with 1990 level and -50 % primary energy demand compared with 2008 level should be achieved.



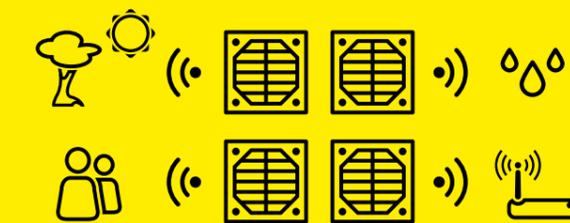
### Heating up the market

By 2022 the HVAC systems market is forecast to reach US\$ 173.16 billion (a compound annual growth rate of 5.9%). The APAC region is expected to grow at the highest rate, with China, Japan and India leading the way. A combination of lower operating costs, energy efficiency and government incentives is encouraging the replacement of HVAC systems in Germany, Japan, the UK and the US.

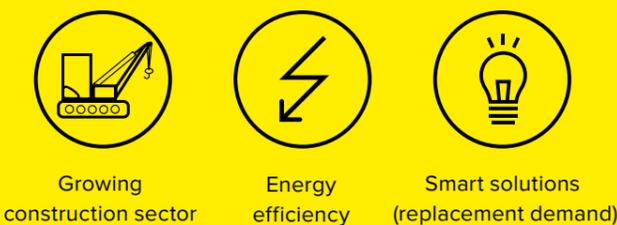


### HVAC the smart way

Advances in the Internet of Things are boosting the development of smart HVAC control systems which use wireless sensors to adjust output automatically, based on natural climate, humidity and motion. In 2014, 33% of thermostats sold were wifi-enabled and the number is predicted to increase to 75% by 2019.



### The main drivers behind HVAC demand



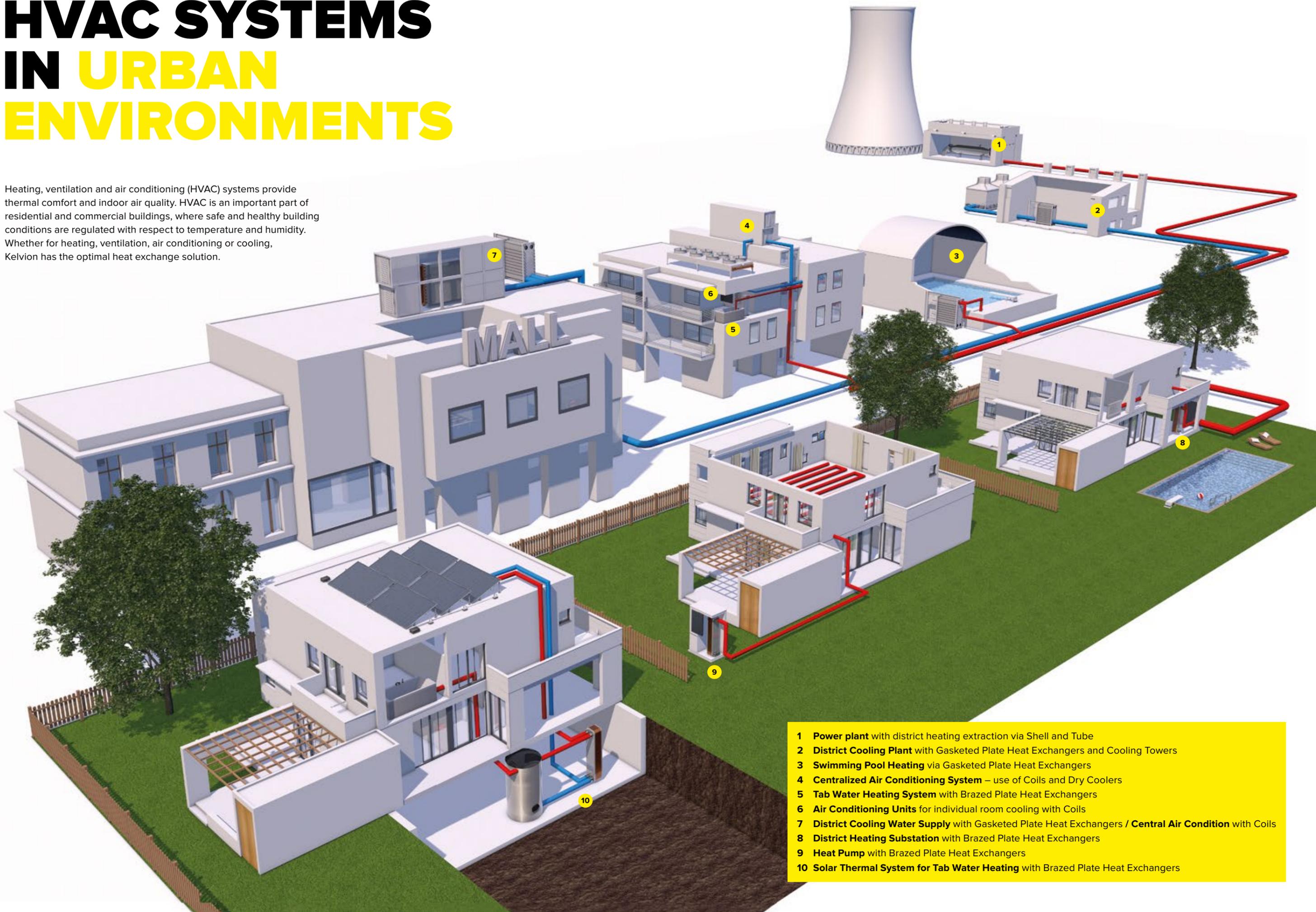
Source: Federal Ministry for Economic Affairs and Energy

Source: HVAC Market - Drivers and Forecasts by Technavio and Europe HVAC Market by TechSci Research

Source: Emerson Climate Technologies

# HVAC SYSTEMS IN URBAN ENVIRONMENTS

Heating, ventilation and air conditioning (HVAC) systems provide thermal comfort and indoor air quality. HVAC is an important part of residential and commercial buildings, where safe and healthy building conditions are regulated with respect to temperature and humidity. Whether for heating, ventilation, air conditioning or cooling, Kelvion has the optimal heat exchange solution.



- 1 **Power plant** with district heating extraction via Shell and Tube
- 2 **District Cooling Plant** with Gasketed Plate Heat Exchangers and Cooling Towers
- 3 **Swimming Pool Heating** via Gasketed Plate Heat Exchangers
- 4 **Centralized Air Conditioning System** – use of Coils and Dry Coolers
- 5 **Tab Water Heating System** with Brazen Plate Heat Exchangers
- 6 **Air Conditioning Units** for individual room cooling with Coils
- 7 **District Cooling Water Supply** with Gasketed Plate Heat Exchangers / **Central Air Condition** with Coils
- 8 **District Heating Substation** with Brazen Plate Heat Exchangers
- 9 **Heat Pump** with Brazen Plate Heat Exchangers
- 10 **Solar Thermal System for Tab Water Heating** with Brazen Plate Heat Exchangers



## District heating & cooling

# KEY COMPONENTS FOR EFFICIENT HEATING AND COOLING

District heating/cooling systems supply energy to homes and businesses via a network of insulated pipes.

The growing awareness of the need to use cleaner, more sustainable, energy is making systems that harness the power of alternative sources increasingly attractive. These include geothermal, biomass, CHP and waste energy from industrial processes.

In the Middle East, the development of large district cooling networks promises a viable solution for meeting the region's air-conditioning requirements while reducing greenhouse gas emissions.

District heating/cooling networks can vary from a few hundred meters to several kilometers. Whatever the size, heat exchange systems need to comply with system demands, operate efficiently and be competitively priced.

Our state-of-the-art plate heat exchangers and coil heat exchangers meet these challenges and are reliable partners in helping district heating/cooling systems to operate to the highest standards.



## Air conditioning

# INNOVATIVE HEAT TRANSFER FOR A COMFORTABLE ENVIRONMENT

At the same time, there is a drive towards more compact systems that use less energy and have lower operating costs. We develop our products according to the requirements of the F-Gas Regulation and the Eco-design Directive (ErP), so manufacturers of energy-related products can achieve or surpass their objectives.

New challenges need new solutions and our innovative and world-class portfolio of coils, dry coolers and plate heat exchangers are specifically designed so that they can be tailored to suit a wide range of applications. Whatever the requirement for heat exchange is, we can provide the answer that is reliable, robust and cost-effective.



Potable water & Swimming pools

# EXPERT SOLUTIONS FOR KEEPING WATER AT THE RIGHT TEMPERATURE

Whether heating potable water for washing, showering and cleaning or maintaining a comfortable temperature in indoor and outdoor swimming pools, heat exchange technology has an important role to play. For indoor pools, dehumidifiers are an added essential for avoiding an uncomfortable 'tropical' climate and preventing condensation, which would damage the building.

At Kelvion, we specialise in developing tailor-made solutions for heating and cooling all types of fluids. Our versatile plate heat exchangers, made from stainless steel, are the perfect choice for ensuring maximum heat transfer. Where seawater is used in swimming pools, we recommend units made from titanium, which withstands chloride induced corrosion.

Whatever your requirement, we will provide the optimized solution for your application that will operate to the highest standards over a long service life.



Renewable Energy – Heat pumps, geothermal and solar thermal heat

# TECHNOLOGY SUITED TO EVERY PURPOSE

With heating and cooling capacities higher than the amount of electricity required to operate them, heat pumps are an environmentally-friendly and cost-effective alternative to traditional heating and cooling systems.

Heat pumps use thermal energy from air or diverse soil levels to heat buildings. The energy is transferred, via different heat exchangers in a refrigerant cycle, to a temperature level which is used to condition rooms. During the summer the cycle can be reversed to pump cool air. It is estimated that, by 2020, heat pumps could reduce primary energy consumption by 20-25% through partial replacement of traditional gas or other fuel heating systems.<sup>1</sup>

Most geothermal power plants also use geothermal water to supply heat to district heating networks. Next to solar power plants, solar thermal energy is widely used to heat potable water in residential properties or to support their heating systems.

With geothermal water, special attention must be given to selecting suitable materials that can withstand temperature and pressure and take account of the quality of the water and any salt or hydrocarbons it may contain.

At Kelvion we understand the importance of providing solutions that are individually designed to suit the specific purpose. As well as a competitive price and fast delivery, we promise technology that is efficient, robust and cost-effective.

# PERFORMANCE TESTING SEALED THE DEAL AT LA DÉFENSE, PARIS

**“We really appreciate the technical support and product quality from Kelvion.”**

**The Heat Exchangers perfectly meet the customer requirements and give 100% performance and satisfaction.”**

Vincent Antoine  
Project Manager at Engie Axima

When ordering heat exchange equipment for a 171-meter high office building in the heart of Paris' La Défense business district, the client laid down strict specifications for companies to fulfil.

Firstly, the units must contain stainless steel beams and drip trays. Secondly, the company supplying them would have to agree to a factory inspection. The final stipulation involved performance testing in a third party laboratory.

This last requirement proved to be the deal-breaker for the provider originally selected to complete the order. At Kelvion, such is the confidence in the excellence and integrity of our products that we were more than happy to comply. The client was very satisfied with the tests and factory visit and also impressed by our solid global reputation.

We supplied three units from the Kelvion NT and NX range which are used as the interface between the district cooling and building cooling networks. They are installed on a thermal program of  $16^{\circ}\text{C} > 6/4.5^{\circ}\text{C} > 14.5^{\circ}\text{C}$  with high pressure resistance of 25 bar g. We also delivered six smaller units which perform cooling circuit separation and heating circuit separation duties in this prestigious building.



## Overview of our products for HVAC

# CUSTOM MADE SOLUTIONS MEETING THE HIGHEST STANDARDS

Whatever the HVAC system, Kelvion has the technology for maintaining the right temperature. We specialize in providing custom-made solutions from our extensive heat exchange portfolio. All our products are built to the highest standards and designed to operate efficiently and reliably.



### 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.

All our AHRI certified models are performance-rated.

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.



### Brazed Plate Heat Exchangers

Our brazed plate heat exchangers offer tailor-made solutions for the greatest possible range of applications.

Thanks to the automated manufacture and compact design of our BrazePHE Series, we can assemble a customized heat exchanger in the shortest time possible. We choose between copper and nickel-brazed or Vaclnox plate heat exchangers, made of stainless steel, depending on the field of application. We look for the most economical solution from the various sizes and diverse accessories available to us and adapt them precisely to your requirements with customized connections.



### Fully Welded Plate Heat Exchangers

Our fully welded plate heat exchangers offer convincing performance in applications with increased temperature and pressure requirements as well as evaporators and condensers.

They are particularly robust and require very little maintenance. The design advantages are of particular importance where not only performance but also robustness and cleanability are desired. Each model series has its own specific advantages and areas of application.



### Shell & Tube Heat Exchangers

Custom designed shell and tubes are used in district heating / cooling networks as well as geothermal heating networks or air conditioning systems.

We can customize according to the size and connection requirements and use various materials, depending on media restrictions, in order to reduce corrosion. Various global pressure vessel approvals available upon request.

# CUSTOM MADE SOLUTIONS MEETING THE HIGHEST STANDARDS



## Condensers & Dry Coolers

Kelvion Condensers and Dry Coolers are based upon modular designs. We offer various fan sizes, multiple speeds and suppliers, coupled with an extensive range of tube and fin profiles, to enable products to be tailored accurately to meet the application demands.

The wide range of fan choices ensures that the optimal balance between air volume and capacity, operational noise levels and power consumption to meet market price levels are achieved. The tube and fins can be supplied in various materials, depending on the internal or external corrosion properties.

The products can be deployed in multiple applications, from standard commercial stock products to customized, made-to-order units.



## Coils

Kelvion heat exchanger coils are manufactured with copper tubes and aluminum or copper fins. Special fin profiles, developed by our R&D department, enhance heat transfer and maintain pressure drop at a moderate level. Collars allow for customized fin spacing, as well as providing the contact between the fin block and the tubes. Mechanical expansion of the tubes guarantees a perfect bonding between the fins and tubes for maximum heat transfer. Several tubes are interconnected via brazed return bends to form the coil circuits, which receive the working fluid via brazed tubular headers. The thermodynamic design is created with our in-house developed selection software, based on the measurements in our laboratory conform to DIN EN1216. Rigorous testing supports quality control of our coils.

Our extensive product portfolio, with diverse options, means we can configure our coils to suit specific requirements and applications, leading to cost-optimized and energy-efficient products. Short delivery times and an excellent service ensure customer satisfaction.



## Open Cooling Towers

Kelvion's open loop cooling towers offer cost-efficient free cooling and are available in cross-flow and counter-flow. Whether modular or field-erected, our towers have a long-lasting stainless steel frame. Durable, heavy duty, FRP wall casings and direct drive fans, with proven reliability, are included as standard. Our cooling towers can be installed fully assembled, minimizing downtime on replacement projects and reducing congestion at new construction sites. CE and UL fans available upon request. Cooling Tower Institute (CTI) certification available upon request.

- ▶ CE and UL approved motors available upon request.
- ▶ Cooling Tower Institute (CTI) certification available upon request.



## Closed Loop (Fluid) Cooling Towers

Kelvion's robust closed loop cooling towers are perfect when water quality and availability are an issue. Closed loop cooling towers can provide free cooling in the milder months when mechanical (compressor) cooling may be turned off.

Different tube materials and configurations are available to meet site requirements. The closed loop means that less water treatment is necessary.

# 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 under-way 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 fulfil 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.**

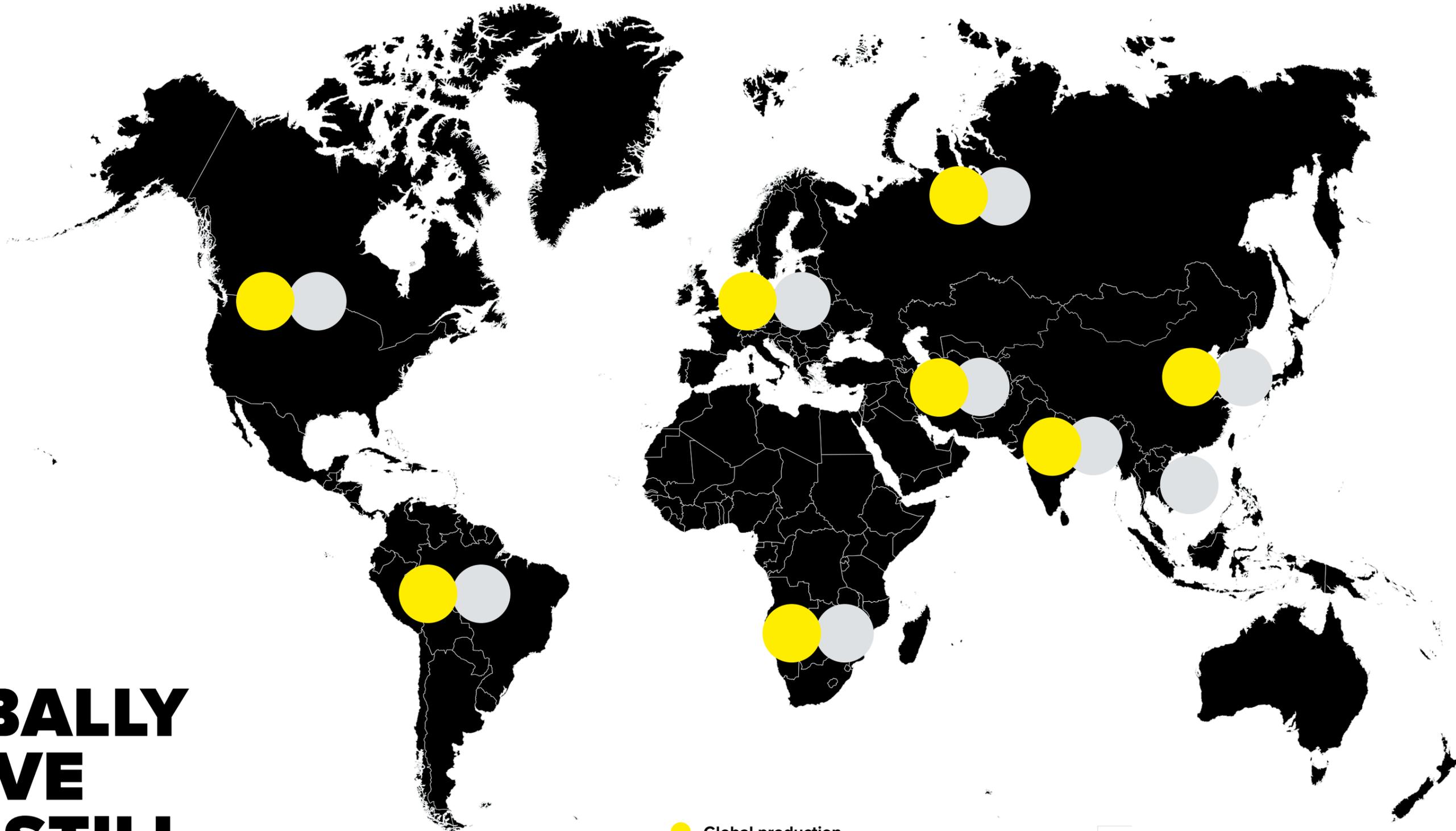
We are committed to the principles of social responsibility towards our employees and society. Kelvion offers its employees fair working conditions worldwide. We reject any form of discrimination, with respect to gender, sexual orientation, origin, skin color, or any other personal characteristics. We 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)