

Uponor

Sustainable solutions for  
the built environment



# Uponor's solutions enrich people's way of life

The human living environment is everything around us. Where we live, where we work and where we spend our recreational and family time. Uponor has a mission to improve the quality of life for people and societies. Our solutions can enrich that way of life, by providing comfort, efficiency and health to every building type.

Uponor is a leading international provider of plumbing and indoor climate solutions for residential, commercial and industrial building projects as well as for civil engineering. Serving both the new build and refurbishment market, our competitive strength is based on our wide geographical presence and deep knowledge of the industry. Combined with this, we have vast experience in serving customers in the heating, cooling and plumbing markets, as well as our ambition to fulfil customers' exacting needs in a professional way.

Sustainability related to construction is markedly gaining in importance, with an impact on both consumers and professionals. At Uponor, we have found that getting involved early during the preconstruction phase has the greatest potential influence on a project's overall success, and we are committed to building a more sustainable future for our business and the people of the world.

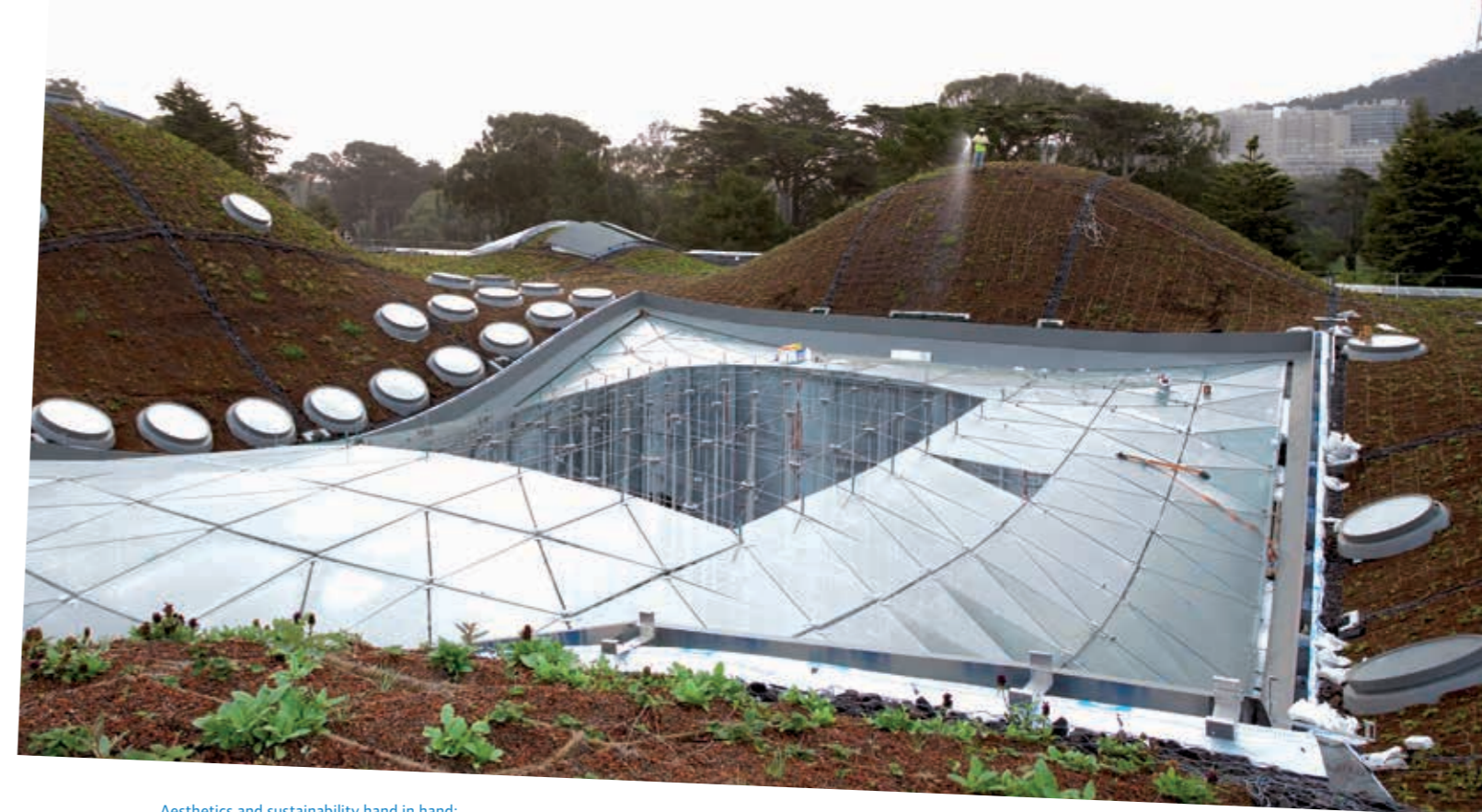
We continuously strive to create innovative solutions for more comfortable, safe and eco-efficient buildings.

We have worldwide references which prove that our solutions can help you to achieve your sustainability targets, a few of which are featured in this brochure. Treating the environment and one of our most precious commodities – water – in a respectful and considerate manner is central to all our activities and the innovative solutions we develop, and well as the thermal comfort level for the occupants of buildings is also one of the important goals of all designers. So, together with other industry professionals, we work all the way from the concept design stage through to the completed operational project support throughout the life of a project.

## Silent, effective, sustainable – and invisible

Often you cannot see what Uponor contributes to a building's quality nor can you hear it – however you can feel it! It is the discrete charm of our solutions which keeps the quality of life consistently high. This serves not only the people and workflows in the building, but also the environment, with great energy savings.

With 10 manufacturing facilities in 4 European countries and in the United States, combined with local presence and customer support in over 30 countries, we are at your service all over the world.



Aesthetics and sustainability hand in hand: the living roof of the new California Science Academy in organic shape with native California vegetation and photovoltaic cells

SUSTAINABILITY – EFFICIENCY – COMFORT – HEALTH – SAFETY

### Front cover:

- Ericusspitze Spiegelhaus (Hafen City), Hamburg, Germany
- 1300 m² Uponor underfloor heating and cooling
- 8150 m² Uponor TABS
- 3000 m Uponor tap water system
- Completion: 2011

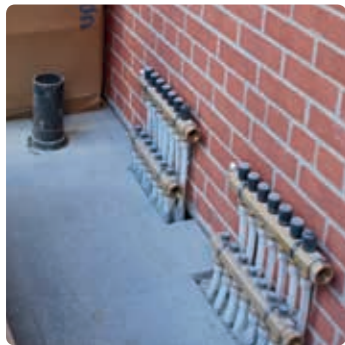
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# Shangri-La hotel and residences Toronto, Canada

## EFFICIENCY AND RELIABILITY IN WATER DISTRIBUTION



Maintains a snow & ice free surface for year round safety



Uponor manifolds for water distribution

At 214 metres, the Shangri-La tower is one of the tallest buildings in Toronto. The building is home to a five-star hotel and luxury condominiums. Safety and security of the water distribution system are of paramount importance in projects of this nature and Uponor has extensive experience to offer with our solutions.

Uponor Q & E plumbing solutions are installed throughout the tower's 500+ rooms (220 guest rooms and 353 condo units). The system provides guests and residential unit owners with a highly efficient water distribution system. Q&E is a unique and innovative expansion jointing system from Uponor that guarantees a secure, watertight connection with minimal pressure loss, by making use of the thermal memory and shrink-back effect of Uponor PEX-a pipes.

The life cycle credentials of Uponor PEX-a pipe using the Uponor Q&E jointing system have been independently certified by TEPPFA (The European Plastic Pipes and Fittings Association) to demonstrate the efficiency and sustainable benefits of this innovative system in comparison to copper systems. The study was commissioned by TEPPFA, but carried out by research consultants Vito and verified by Austrian LCA experts, Denkstatt.

During winter months, Toronto can get up to 115 cm of snow and this makes snow removal a time-consuming and often costly task. Uponor delivered the ideal solution with the snow-melting system. With the Uponor snow-melt system, installed in the restaurant patio, pool deck, main entrance and parking garage the surfaces are now kept ice and snow free. Warm water circulates through the crosslinked polyethylene (PE-Xa) pipes which are embedded safely in the structural concrete, creating an efficient and chemical free solution to this common problem. Efficiency, health, safety and sustainability are all key elements delivered with Uponor solutions on this project.

### Project data

- 81,100 m<sup>2</sup>
- Uponor plumbing solutions
- Uponor snow and ice melting system
- Developer: Westbank Projects Corp.
- Architect: James Cheng
- Completion: 2012



Uponor Q&E plumbing solutions are installed throughout the tower's 500+ rooms (220 guest rooms and 353 condo units). The system provides guests and residential unit owners with a highly efficient water distribution system.



# California Academy of Science San Francisco, USA

A PARAGON OF EFFICIENT,  
SUSTAINABLE ARCHITECTURE



Planted roof on top – Uponor heating and cooling system inside

Nestled within San Francisco’s lush Golden Gate Park and featuring an undulating roof planted with vegetation native to the region, the newly rebuilt California Academy of Science is an example of commitment to green values. A key aspect of this commitment is an Uponor radiant floor heating and cooling system that provides energy-efficient comfort to much of the main exhibition level – and reduces energy needs by 5–10%.

The Academy is now the largest public Platinum-rated building in the world, and also the world’s greenest museum. It earned the platinum rating (highest rating possible) for Leadership in Energy and Environmental Design (LEED).

The building houses an aquarium, a planetarium and a natural history museum, which have totally different functions and, therefore, present totally different challenges.

**Project data**

- 3,500 m<sup>2</sup> Uponor floor heating and cooling system
- 30 km Uponor PE-Xa pipe connected to six boilers with total 3,500 KWh heating capacity and three 15 KW chillers
- Architect: Renzo Piano, Building Workshop Genoa/Italy with Stantec Architecture, San Francisco/USA
- Completion: 2008



PLATINUM



Paul Switenki, Project Engineer at Arup, the Academy’s main contractor

“The Academy’s main level is a bare-box, high-ceiling space with glass exterior walls, making it an ideal application for radiant. The system keeps the heating or cooling near the floor where the people are, not blowing around the ceiling, as with a conventional forced-air system.”

The high ceiling space with exterior walls made of glass make it an ideal application for radiant indoor systems, which keep the heating near the floor where the people are. Quick return on investment is guaranteed by the energy savings over time.

# Manchester Metropolitan University, Business School Manchester, United Kingdom

## COOLING FROM THE CONCRETE STRUCTURE



A low energy University building incorporating thermal mass, natural daylight, controlled ventilation, a number of integrated energy generation features and ground source heat pumps

Design of the £65m new Business School at Manchester Metropolitan University was driven by the University's ambition to create a low energy building utilising thermal mass, natural daylight and controlled ventilation.

Uponor Thermally Active Building Systems (TABS) was chosen for the scheme. A precast concrete floor slab with a fair faced permanent formwork concrete was utilised, which incorporated Uponor PE-Xa pipes were embedded beneath the soffit surface. Visual appearance, colour and finish of the concrete was of particular importance to the design. Regulating the temperature of the exposed concrete to 20°C meant that the room's air temperature would always be maintained between 21°C and 26°C. With groundwater utilised as a cooling source, a chilled water circuit is passed through the concrete, creating a radiant space cooling system.

Mechanical ventilation is provided to most areas using the raised access floor as a supply plenum. Return air passes into the atrium via cross talk attenuators, where it rises to the air handling plant rooms at roof level for heat recovery. Therefore, cooling is provided by a combination of cooled supply air and the Uponor TABS system in the precast floor planks.

The inherent thermal mass, fire resistance and sound insulation of the concrete structure have also contributed to a BREEAM rating of 'Excellent'.

### Project data

- 20,000 m<sup>2</sup> University building with 8 storeys
- 13,500 m<sup>2</sup> of Uponor TABS cooling in semi-precast concrete planks
- 2,000 m<sup>2</sup> of Uponor underfloor heating to the atrium area
- Client: Manchester Metropolitan University
- Architect: Fielden Clegg Bradley Studios
- Main Contractor: Sir Robert McAlpine
- M&E Engineer: AECOM
- Completion: 2011



13,500 m<sup>2</sup> of Uponor TABS cooling in semi-precast concrete planks



With a history dating back 150 years, the Manchester Metropolitan University combines tradition and contemporary. Its modern low energy building results from the university's million investment programme set up to ensure a strong future.

# Innova 2 office development Jyväskylä City, Finland

## ENERGY SOLUTIONS WITH STEEL PILES



Ruukki steel piles are driven 28-30 metres into the ground. These serve both as the load-bearing structures to support the foundations and collect ground-source heat to heat and cool the building

Ruukki and Uponor Energy piles create an alternative solution for borehole or horizontal based ground energy systems.

Innova 2 is a 10,000 m<sup>2</sup> six storey office development, which forms part of the property portfolio of Technopolis Oyj, who is both an owner and developer of office buildings, for renting. The building uses partly geothermal energy which is brought to the building with the Ruukki Steel Piles integrated with Uponor piping technology. Nearly 3 km of PE-Xa pipes were integrated within the 38 steel piles that operate as energy piles.

Ruukki steel pipe piles can be used to collect energy stored in the ground and bedrock. Therefore, the Ruukki steel pipe piles allow the installation of heat collecting pipes directly inside steel piles installed in the ground without extra excavation work or drilling of energy wells. The energy pile system is especially suited for buildings that need both heating and cooling, since this also assists to maintain the thermal balance in the ground energy system, protecting the energy production for years to come



Uponor PE-Xa pipes are integrated into the energy piles, which are then concreted. Ground-source energy then transfers to the heat exchange fluid in the piping. Energy piles both heat and cool the building

### Project data

- 10,000 m<sup>2</sup> office development with Ruukki and Uponor energy piles
- 3 km of Uponor PE-Xa pipes are integrated in the 38 steel piles, that operate as energy piles
- Client: Technopolis Oyj
- Architect: Arkjaatiset Oy
- Main Contractor: NCC Construction Oy
- Completion: 2011



PLATINUM



Innova 2 is the first building in Finland to use geothermal energy harnessed with energy piles in the ground. This has contributed to achieving the LEED platinum-level.

# BMW Welt Munich, Germany

EVEN AND COMFORTABLE INSIDE  
TEMPERATURES THROUGHOUT THE YEAR



The construction incorporates a range of smart Uponor systems

Not merely an exclusive dispatch centre for its vehicles: the BMW Welt appeals to all senses, allowing visitors to experience the fascination of mobility. Also striking is the architecture – a double cone, manufactured from glass and steel, at the forefront. The double cone is complimented by a further remarkable building feature: the gallery. A large curved bridge which connects the BMW Welt with the BMW museum (itself constructed in 1973), runs right through the centre of the BMW Welt to the functions forum (which plays host to every kind of event).

The BMW Welt was built on a plot of approx. 25,000 m<sup>2</sup>. The building stretches over a distance of 180 m at its longest point and has a height of approx. 28 m. The total floor space of the building's two storeys amounts to around 73,000 m<sup>2</sup>. The roof of the avant-gard style structure spans a total area of 15,500 m<sup>2</sup>.

#### Project data

- 7,800m<sup>2</sup> Uponor industrial underfloor heating and cooling for the base loads. In addition to the 25 x 2.3 mm PE-Xa-pipes selected for use with the industrial panel heating system, underfloor collectors and air-curtains for extreme climate zones within the building were also fitted
- Architect: COOPHIMMELB(L)AU Wolf D. Prix/W. Dreibholz & Partner ZT GmbH, Vienna, Austria
- Completion: 2007



Wolf Prix, Architect Coop Himmelb(l)au

“The roof of a building does not necessarily need to follow a structure. The roof has taken a new meaning in modern architecture.”



During the cooler months, the panel temperature regulation system, integrated into the floor of the BMW Welt, generates a comfortable temperature without air turbulence, with an energy-saving supply temperature of 34 °C. On hotter days, the system runs at the supply temperature of 17 °C, to transport heat from the light and airy, spacious areas of the BMW Welt, leaving the floor comfortably cool.



# Multifunctional complex Premium West Moscow, Russia

SOLUTIONS DESIGNED TO LAST THE LIFE OF THE BUILDING



Pe-PEX pipes are integrated into the building structure



Final checks on site before the concrete pour

The multifunctional complex Premium West occupies 10 ha next to the Moscow motorway ring MKAD. Construction began in 2004-2005. Nowadays such car dealerships as AUDI, Skoda, Volkswagen, KIA are operating successfully here, as well as SafeSpace - the European operator of individual storage. In 2012 a parking space for 2000 cars was commissioned. A fitness club is due to open at the end of 2013.

Within the framework of the project, there is: a showroom which is currently under construction, a Class A commercial and storage building, which is currently in the process of being reconstructed, and a Class A energy efficient business centre, consisting of eight-storeys with the same name, which is the core of the complex, and will soon be complete. The second phase of the business park construction, is due to be launched in the near future and will accommodate offices, retail spaces and in-house parking.

Impressive features of Premium West office center:

- Smart home system
- Geothermal heating and cooling systems
- Unique facades, combining advantages of monolith and glass
- Radiant temperature control system
- Landscape design

**Project data**

- 112,000 m<sup>2</sup> Multifunctional area
- 25,000 m<sup>2</sup> of Uponor TABS cooling and heating
- Developer: GEMA Invest
- Completion: under formation

Elena Semenikhina, Director of Development GEMA Invest

“Premium West is unique in terms of energy-efficiency and the composition of engineering systems.”

The entire business park reflects the overall concept: buildings combining high technology with environmental friendliness.



# Glenelly Estate Winery Stellenbosch, South Africa

SOUTH AFRICAN WINE WITH A FRENCH TOUCH – BROUGHT TO PERFECTION IN A COOLED WINE CELLAR



Laying of the pipe mats

Internationally considered a benchmark in climate engineering, Glenelly Estate is a winery that features South Africa's first thermally activated building (TAB) systems project and sets new standards for the construction industry in terms of innovation and climate engineering. It ensures room conditions of 16°C and 75% relative air humidity year round. An integrated passive strategy uses passive night time cooling combined with an evaporative cooling tower in winter and air cooled chiller plant in summer.

The successful operation of the project has defined new boundaries for TAB systems as a technology and has proven its functionality in harsh South African summer climates.



Cellar cooled with Uponor TAB system all the year round

A total area of 3,000 m<sup>2</sup> is activated by circulating water through the structure of the building. Thermal inertia of the 1,600 tonnes of concrete controlled by sophisticated logic plays a significant role in the detailed design.

**Project data**

- 3,000 m<sup>2</sup> Uponor TABS with 25 mm Uponor PE-Xa
- Owner: Glenelly Wine Estate, Stellenbosch, South Africa
- Consultant: Orange envireneering design, Bloubergrant, South Africa
- Completion: 2009



Sebastiaan Jacobsz, Managing project engineer from ORENGE envireneering design

“ Uponor, the professional's partner of choice when in need of innovative solutions. ”

Outside view of the wine cellar. The Uponor TAB system has been used to activate the concrete slab and use it for energy storage.

# Sheikh Zayed Desert Learning Centre, Al Ain, United Arab Emirates

## SOLUTIONS TO THE MOST DEMANDING CONDITIONS



The Uponor TABS cooling system is incorporated into a BubbleDeck® construction



High cooling loads of 1.5 MW are mainly delivered from the Uponor TABS of 7,500 m²

Located in one of the hottest and most humid climates on earth, this multifunctional education building was designed with the target of reducing the life cycle costs and environmental impact, to provide a leading reference for sustainable architecture in the Emirates. This is the first building to be developed as a part of the master plan for the Al Ain Zoo, which also includes a safari area, hotels, a shopping centre and residential areas. The Centre will function as an educational museum and research centre for desert and environment related issues.

The building has obtained LEED Platinum and Estidama five pearls design rating. This achievement has been a result of a combination of passive and active measures in saving energy and water consumption, as well as using partially local and recycled materials. This makes it the first government sustainable development to attain the highest sustainability rating.

The challenging high cooling loads of 1.5 MW are mainly delivered from the Uponor Thermally Active Building Systems (TABS) of 7500 m², with an average water temperature of 16 °C. The building is equipped with six adiabatic cooling towers, minimising the need for cooling water. Apart from the compression chillers, the building is equipped with solar absorption chillers, enabling solar cooling. The solar collectors, with an area of 1.134 m², provide 825 kWh/m²/a.

### Project data

- 7,500 m² of Uponor TABS cooling system
- Incorporated into structural "Bubbledeck" construction
- Concept and design development by Uponor
- Architect: Chalabi Architekten & Partner – ZT GmbH
- Contractor: S.O.L.I.D. GmbH; Züblin Abu Dhabi (daughter company of Strabag Intern. GmbH)
- Consultant : S.O.L.I.D. GmbH, iC Consultants
- Client: Al Ain Wildlife Park Resort
- Completion: 2013



HE Falah Al Ahbabi, general manager UPC

“By achieving the highest Pearl Rating, the Sheikh Zayed Desert Learning Centre will be the catalyst for all upcoming sustainability-driven projects.”



The LEED Platinum standard certified building with its 13.000 m², offers areas for auditorium, theatre, cafés, galleries and one library. At full operation 1.600 visitors per hour are expected. Moreover, the building is to be certified with 5 Pearls according to the local reference System Estidama.

# Bangkok International Airport Bangkok, Thailand

SPECIFIED TO THE NEEDS OF THE VERY  
WARM AND HUMID CLIMATE OF THE REGION



Its 150,000 m<sup>2</sup> of cooled floor area is recognised as the world's largest application. With the length of 440 m and a width of 110 m and an area of almost 500 000 m<sup>2</sup> the terminal became the largest combined building complex of its kind in the world



The concourses, from which the gates to the aircraft can be accessed, and which surround the terminal in an H format, have a total length of 3.5 km

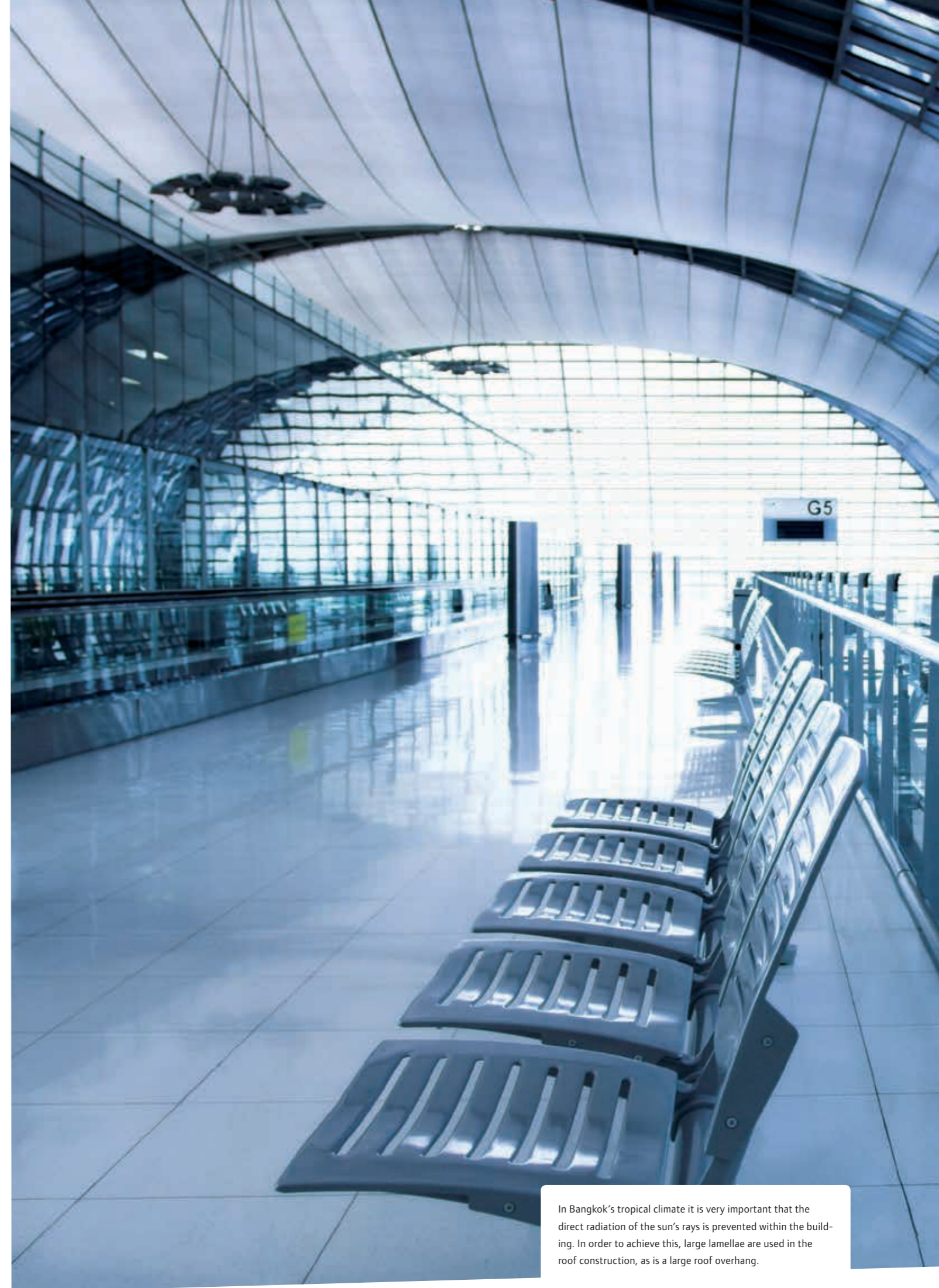
Bangkok Suvarnabhumi International Airport provides cooling and thermal comfort by combination of two separate systems. Uponor provided the underfloor cooling system utilising PE-Xa pipes, which directly draws off the solar rays absorbed by the floor. This allows the floor to maintain a comfortably cool temperature (a minimum of 20°C). A displacement ventilation system with a variable flow volume provides dehumidified fresh and re-circulated air at floor level via an approx. 2 m-high air diffuser. The combination of both systems ensures a comfortable thermal environment in the occupational zone (2.5 m) throughout the building.

The H-shaped concourses have a total length of 3.5 km. The concourses are around 30 metres high. Since the combined cooling system of underfloor cooling and displacement ventilation conditions only the occupational zone, the treated areas are significantly decreased, greatly minimising the energy consumption. The latter is emphasised by the fact that the cooling concept utilises natural phenomena, since hot air is moving higher and colder air remains in the lower levels at the height of occupational zone.

While external temperatures rise up to 34 °C, the sun shines almost constantly from directly above and relative humidity is high all year long. The requisite indoor temperature of 24 °C requires constant cooling and dehumidification. The challenging outdoor conditions of high air temperatures and high solar radiation (1000 W/m<sup>2</sup> on many days of the year with solar altitudes near the zenith) all year long necessitates a system that will absorb and fend off solar gains from the floor. Whilst the operative temperature remains at the optimal zone for the occupants, the higher achieved air temperature decreases the convective load providing another energy saving measure.

## Project data

- 150,000m<sup>2</sup> Uponor underfloor cooling (the approximate surface area of 20 football pitches) in combination with a displacement ventilation system
- Architect: Helmut Jahn, Chicago, USA
- Completion: 2006



In Bangkok's tropical climate it is very important that the direct radiation of the sun's rays is prevented within the building. In order to achieve this, large lamellae are used in the roof construction, as is a large roof overhang.

# Bayer MaterialScience Qingdao, China

A MODEL OF BEST PRACTICES AND  
WORLD-CLASS SOLUTIONS IN CHINA



The zero emission building houses the administration of the Bayer MaterialScience plant



Uponor Opti Y ceiling panels in the reception area



Installation of the TABS modules

The Bayer MaterialScience plant in Qingdao, is the first of its kind in China, developed by Bayer MaterialScience under the innovative EcoCommercial Building (ECB) Program. The ECB Program is a global initiative providing an all-in-one solution, through collective work from Bayer and its network of building partners, to meet demand in China and across the globe, creating highly efficient and cost effective commercial and public buildings.

The 1,000 m<sup>2</sup> zero emissions building holds 60 office workplaces and represents a building system where energy needs are covered through long-term efficiency gains and renewable energy generation. The building uses 1,000 m<sup>2</sup> of photovoltaic panels to provide solar power, generating 80.35 MWh of electricity every year. Uponor's Thermally Activated Building Systems (TABS) combined with a Geothermal Source Heat Pump and an energy saving building envelope provide a pleasant room climate during all seasons.

Uponor TABS is responsible for covering the sensible cooling/heating load of the office area. By using favourable night electricity, thermal energy can be stored in the concrete structure overnight. This can be used to compensate the cooling/heating load for the following day. Due to supply temperatures close to room temperatures, the system is ideally suited for the use of ground energy or the use of a free cooling system at night time, which is especially beneficial and will consequently decrease the operation costs. The Uponor OPTI Y ceiling panels are fast reacting and adapt to the load fluctuations in the office area, which provides unique individual user comfort. The active ceiling panels are distributed by a four pipe system, which allows cooling and heating in different areas at the same time, according to the users' need.

**Project data**

- 1,000 m<sup>2</sup> of Uponor TABS and Uponor OPTI Y ceiling panels in combination with a heat recovery system
- Client: Bayer Material Science (China) Co, Ltd
- Architect: Bayer Technology and Engineering (Shanghai) Co, Ltd
- Completion: 2011



**GOLD**



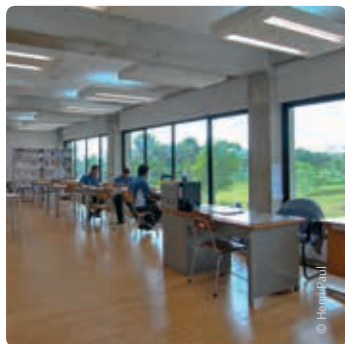
A heat recovery system reduces the loss of energy from the air handling unit for ventilation. This achieves 80% of heat recovery rate with technology provided by local suppliers, while electrical energy consumption is reduced greatly due to LED energy-efficient lighting technology.

# Ignatius Loyola Ecotech Campus Cikarang Baru, Indonesia

THE REALISATION OF A SUSTAINABLE  
CAMPUS THAT FULFILLS TODAY'S NEEDS  
AND PRESERVES THE FUTURE



Installation of Uponor TABS radiant cooling



Studying in a sustainable building with optimum comfort

Built to carry the principles of sustainable construction, the Ignatius Loyola Ecotech Campus in Cikarang, West Java, is the new icon of environmentally-friendly buildings in Indonesia. The four-story building, with a total floor area of 3,672 m<sup>2</sup> was designed to consume less than half the energy required by a standard building of comparable size.

Uponor with partners Holcim and Sanwell made a significant contribution with the design and supply of the radiant cooling solutions. The high temperatures in tropical countries such as Indonesia, are often addressed with the use of conventional air conditioners. The convenience obtained has to be compensated with excessive energy use and strong air draught. An alternative solution to this challenge is the application of a radiant cooling system. At Ignatius Loyola Ecotech Campus two different systems have been applied: Uponor Thermally Activated Building System (TABS) and Uponor underfloor cooling – working together to achieve optimum comfort for students and lecturers.

Other elements contributing to less energy consumption are the building shading that is designed to provide passive cooling, the butterfly roof that collects rainwater and which is prepared to support the installation of photovoltaic panels to cover the building's electricity demand.

#### Project data

- 3,672 m<sup>2</sup> university building
- 2.000 m<sup>2</sup> Uponor TABS
- 500 m<sup>2</sup> Uponor underfloor cooling
- Client: Akademi Teknik Mesin Industri (ATMI)
- Architect: PT Urbane Indonesia
- Main Contractor: PT Multi Sarana Propertindo (Multi pro)
- M&E Engineer: PT Metakam Pranata
- Completion: 2012



While Uponor TABS is utilising the structural concrete slab that radiates cool air upwards and downwards the underfloor cooling system is using the floor concrete screed at the ground floor to radiate cool air upwards, thus achieving a pleasant overall atmosphere that benefits students and lecturers.



# Gardens by the Bay Singapore

SUB-TROPICAL AND TEMPERATE CLIMATE ZONES IMPLEMENTED IN A BOTANIC GARDEN AT THE EQUATOR



Radiant floor cooling for the conservatories: first developed in a thermal simulation, then transferred into practice



Approval of the underfloor cooling installation in June 2011

Gardens by the Bay comprises two glass-domed conservatories and one waterfront garden in the heart of Singapore, around the Marina Channel. Uponor is proud to supply its radiant cooling solution to this premier tropical garden city. Built on land that was reclaimed from the sea 30 years ago, the total size of Gardens by the Bay is 101 hectares or 177 football fields.

The two conservatories are designed with environmental sustainability in mind, applying cutting-edge technologies that provide energy-efficient solutions in cooling. Uponor is installing 7,500 square metres of radiant floor cooling for the conservatories as well as the concrete walkways. The idea of the project is to create thermal comfortable conditions for the visitors on the walkways with minimum influence on the surrounding Mediterranean and Sub-tropical climate for the Gardens. Uponor's hydronic radiant cooling system absorbs the sun radiation on the floor and keeps the area cool, whereas the set point temperature for the ambient climate zones is approximately 27,5°C.

To further demonstrate sustainable practice, Uponor partnered with German climate engineers Transsolar, who performed a thermal simulation for around-the-clock temperature distribution. Combined with Uponor's long-term experience on radiant cooling solutions the results have been transferred into practice. This indoor climate simulation ensures the highest possible comfort in addition to the lowest possible impact on the environment.

**Project data**

- 7,500 m<sup>2</sup> Uponor radiant floor cooling for the conservatories "Cool dry Biome" and "Cool moist Biome" – and the concrete walkways for the visitors
- Contractor: Taikisha Pte.Ltd
- Developer: National Parks Board, Singapore
- World Building of the year in the in the World Architecture Festival 2012
- Completion: 2011

Esaki Keiichiro, Project Manager Taikisha Pte.Ltd

“ Uponor’s solution is perfect for hot climates. Without the professional support from Uponor it would not have worked out. ”

The main function for the hydronic radiant cooling system is to absorb the sun radiation on the floor and to reduce the cooling load for the A/C system.

# Sustainability – our way

Sustainability is an age-old concept. For us it is just natural.

## Our journey

### We are committed to integrating sustainability into our corporate mindset

To succeed in our journey towards a sustainable future, we recognise the need to develop a corporate culture of sustainability with the full commitment and engagement of all our employees

### We are committed to driving down our environmental impact

We recognise that our conversion of raw materials and supply of products into our markets can make a significant contribution by helping to reduce the environmental impact in the overall life cycle of buildings & construction

### We are committed to enriching life through our innovative solutions

Through our innovative solutions, we can help to achieve zero carbon emissions in comfortable and healthy built environments

### We are committed to engaging with external stakeholders along our sustainability journey

We recognise the value of working together with all our stakeholders to help create sustainable communities for future generations

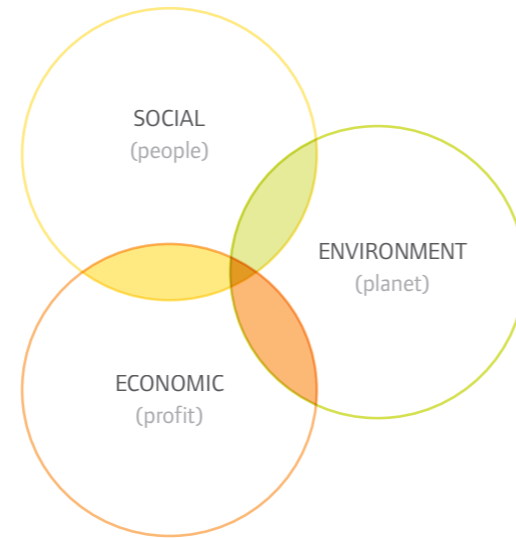
## Along the way:

We will manage our complete supply chain operations to minimise impact on the environment.

We will introduce sustainable solutions for the built environment, which;

- are energy efficient
- provide clean and healthy water
- reduce waste of water and other natural resources
- minimise the emission of greenhouse gases.

We will forge a sense of true partnership with likeminded people who work and live with the solutions we offer.



Jyri Luomakoski, Uponor President and CEO

“Recognised as a leading contributor to the sustainable built environment, we will strive to grow profitably as a sustainable enterprise by developing innovative and responsible solutions that improve human environments whilst reducing environmental impact.”

# Sustainable solutions for the built environment



Uponor horizontal energy collector



Uponor energy cage



Uponor energy pile

The energy performany of buildings plays a major role in curbing climate change.

These aspects include energy efficiency, efficient utilisation of renewable energy sources, health as well as overall environmental friendliness and lifecycle thinking. We view sustainability as a holistic approach to project design that strives to create a balance between the building, its construction and the environment it occupies.

The lifetime of a building is between 50 and 100 years. It is therefore crucial to install a heating and cooling emitter system that can utilise future energy sources. With an embedded radiant system the building is practically future proof, as this would work efficiently with any possible future energy supply system, including individual solutions such as solar and ground energy or possible future district energy solutions. This is valuable for the annual cost of energy as well as for the future property value.

Radiant systems are based on the principle of low-temperature heating and high-temperature cooling. This is also known as low-exergy design, meaning a system that creates greater output using less energy. The efficient energy conversion of a radiant system results in an overall decrease in CO<sub>2</sub> emissions for any building type. The water in a radiant system has a capacity to transport energy 3,500 times greater than air, so it can heat and cool using less energy than a forced-air system.

A Life Cycle Cost comparison of TAB (Thermally Active Building) System versus other HVAC systems is available for the UK, France, Germany, Russia and Spain.

This report is based on an internal Uponor study “Full cost comparison of TABS vs. other HVAC” conducted in cooperation with Equa Simulation Finland Oy and Mott MacDonald Limited, UK.

### Uponor solutions with “Low Exergy” design:

- Radiant heating and cooling systems for floors, walls and ceilings
- Thermally active building systems
- District heating and cooling systems
- Ground energy systems
- Intelligent energy control systems

# Solutions provided by Uponor



Gazoil Plaza Business Centre, Moscow, Russia

## Indoor climate solutions

Uponor's integrated heating, cooling and ventilation offering, forms the basis for a healthy and comfortable indoor climate. Our solutions help to reduce energy consumption and enable the efficient use of renewable energy sources in the heating and cooling of buildings.

- Radiant heating and cooling
- Ventilation
- Ground energy
- Local heat distribution



Shangri-La hotels and residences, Toronto, Canada

## Plumbing solutions

Our plumbing solutions portfolio includes systems for a variety of needs, such as supplying drinking water in or between buildings, or transporting heat to radiators. Uponor plumbing provides safe and easy connectivity and flexible design, together with multifunctional use, high tolerance of fluctuations in water quality, light weight and ease of installation.

- Tap water
- Radiator connection
- Risers
- Fire safety
- Compressed air



Karisma Shopping Centre, Lahti, Finland

## Infrastructure solutions

Uponor delivers secure plastic solutions in urban or rural areas, for use by current and future generations. Over their extended lifecycles, our systems for transportation and storage of clean water, rainwater and sewage help to reduce costs during installation and while in use.

- Water distribution
- Wastewater and rainwater management
- Ventilation and radon handling
- Cable protection

# Partnering with professionals

The starting point of Uponor's operations is to provide value to our customers and partners. We focus on long-term co-operation, providing a reliable partnership, and offering solutions that enable customers to thrive in their businesses. The ultimate goal is to partner with other professionals to create better human environments.

In order to significantly reduce the impact on the environment within our industry, i.e. the building and living sectors of the market, we are paying more attention to holistic planning whereby ecoefficiency is a factor considered early in the initial planning stages. Therefore we seek participation in projects from the very beginning. Collaboration and forming partnerships is the basis of our approach to promoting sustainability in the

construction industry. In this way, we can contribute to environmental improvements in the construction process, from design all the way through to the completed project.

Uponor has long traditions and extensive knowhow as a plumbing, indoor climate and infrastructure system supplier. But products are just one aspect of Uponor's expertise. The real added value lies in the entire package: anticipating customer needs, helping customers achieve solutions that are ideal for their projects, and providing superior service.

With over 3,000 committed employees and a local presence in over 30 countries, Uponor is at your service all over the world.

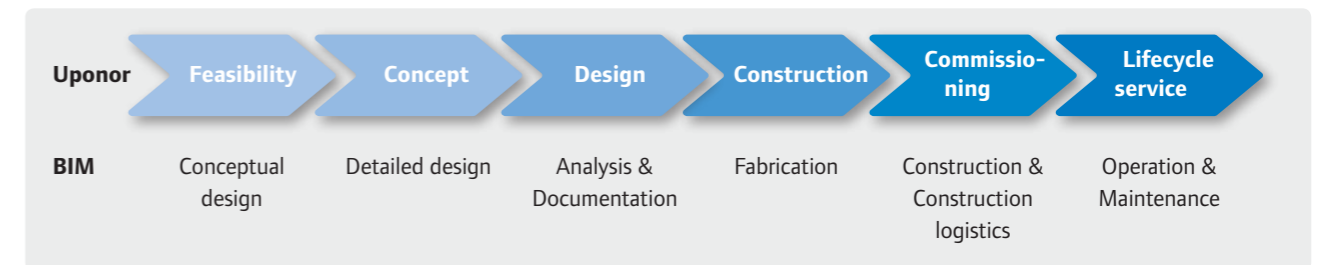
# Service and support throughout the life of a project

Our dialogue with customers has resulted in continuous development of the services we offer to construction projects. We provide support at all stages of the construction- right from the very first concept, to buildings in use.

In the feasibility phase of your project we can assist you with the evaluation of sustainable building design, recommendations for low energy systems and can provide cost estimates comparing different solutions. When involved in your building concept, we can help you with defining the indoor climate and comfort criteria and can

assess the building's overall energy demand, resulting in system recommendations for heating and cooling.

During the design phase we can help you with system layout, drawings, hydraulic calculations and material specifications. In the construction phase we are able to provide direct installations at the construction site, allowing easy integration of Uponor systems to the overall building process. Finally, we are at your side all the way through commissioning, where we provide technical support, trouble shooting and on-site support for the start up of heating and cooling systems and other test procedures.





**Uponor Corporation**  
[www.uponor.com](http://www.uponor.com)

Uponor reserves the right to make changes, without prior notification, to the specification of incorporated components in line with its policy of continuous improvement and development.

The logo for Uponor, featuring the word "Uponor" in a bold, blue, sans-serif font.