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WHY SUSTAINABLE BUILDINGS?

Sustainability will be key to finding the solutions that enable humans to thrive.

Urbanisation, social inequality and climate change represent three global megatrends that will put human kind to the test over the next decades. Under these increasingly challenging conditions, sustainability will be key to finding the solutions that enable humans to thrive. It is essential that the concept of sustainability permeates the way we build the framework around the lives we live. Our schools, hospitals, offices, our homes and other buildings all need to have a positive contribution to the people who use them, to their surroundings and to future generations; they have to be sustainable buildings.

Ramboll’s approach to sustainable building design is best described by our motto: ‘No building is an island’. It is important to see a building as a part of the wider city and design it in a way that is optimal and cost efficient for the neighbourhood as a whole. When ensuring sustainable solutions for our clients, the process always starts with an analysis of the cultural, environmental and climatic preconditions of the project, the end-user and the client’s current and future marketplace.

We believe that true sustainability can only be achieved in collaboration with the local community and the future building user and by ensuring a balance between the building design and the environmental and climatic conditions of the particular site. A sustainable building in Jeddah differs from a sustainable building in Oslo.

At Ramboll we believe that:

- Buildings should be designed to be attractive to the individual users. People should feel well in the buildings they live and work in.
- Buildings should stimulate people, make us interact with each other, adapt to the local environment and to the surroundings of the building.
- The planetary boundaries presents the framework for development of human society. Hence, a building should have a net positive contribution to the planet.

The three points are central to our way of approaching sustainability. The Ramboll way is to create buildings that are not only sustainable, but also a joy to live and work in. A building should perform at a high level in the physical aspect, but also within the social and cultural aspects. We call this approach LIVEABILITY.

As a sustainable society consultant, we have a responsibility to empower and enlighten our clients on sustainable building design. With the broad span of experts and wide geographical coverage, we are in a unique position to fulfil this responsibility. Over the next few pages you will get a glimpse of how we strive for a better future through our sustainable design and consultancy.

Part one of this capability statement describes different systems and methods available to our sustainability specialists when designing the interdisciplinary process for each sustainable building project.

When it comes to sustainable building design, there are a number of issues that are usually addressed when implementing and designing concepts for our sustainable projects. Examples of these challenges are described in part two of this capability statement.

The concept of “Liveability” in buildings considers the physical, social and cultural aspects. For more on this concept, please contact one of our experts in part 3.
Ramboll Head Office,
Copenhagen, Denmark
An holistic and sustainable office building for around 1700 people. Ramboll’s definition of sustainability includes economy, environment, society and climate and is based on the notion that no building is an island, but always part of a wider context.
SYSTEMS AND METHODOLOGIES FOR CREATING SUSTAINABLE BUILDINGS
ABOUT SUSTAINABLE BUILDING DESIGN

What signifies a sustainable building design in Ramboll?

Sustainable building design is a multidisciplinary method concerned with developing holistic strategies focusing on all three pillars of the Brundtland report — i.e. social, environmental and economic sustainability. On each individual project we therefore ask ourselves these simple questions to gain a better understanding of which approach to sustainable building design is relevant in the project:

1. What is the client’s motivation for including sustainability? Does the client want a certificate or is the client’s motivation with sustainability to meet a company goal (e.g. CSR) or to change a behavioural pattern? Or is the main goal to ensure a high return on investment at low risk?

2. What is the client’s current approach to sustainability? And which issues does this approach address?

3. What is the client’s wishes for his/her future approach to sustainability? And how can I help him/her reach that goal?

4. What is the climatic, environmental, economic and social context of the client’s product or building project? What kind of infrastructure does the client have available for his/her product or project? And which issues should the sustainability strategy address in relation to this?

5. How do we ensure the liveability of the building/product and most importantly the liveability of the people spending time in the building or utilising the product?

Each project is different from the last with various socio-cultural, functional, environmental and economic preconditions the term ‘sustainable building’ has as many different definitions as there are people.

By asking ourselves and our client these simple questions we can help them identify a path that leads towards the goal they dream of.

Sustainable building design is an interdisciplinary service that needs to be integrated into most services in a project. To ensure commitment across all disciplines in our projects, our specialists focus on how to facilitate this interdisciplinary process and ensure commitment with each discipline leader on the project.

Sustainable building design as a discipline

Ramboll’s specialists in Denmark, Finland, Sweden, Norway, UK, Middle East, USA etc provide world-class consultancy on sustainable building design.

Our specialists have diverse backgrounds and are connected in an international knowledge network which ensures interdisciplinary discussion, international collaboration and allocation of appropriate resources for each project. What signifies a sustainable building design specialist in Ramboll is the holistic approach taken to the development of project specific sustainability strategies and the ability to facilitate the realisation of these strategies. Read more on www.ramboll.com/megatrend

Q1 Ramboll Head Office, Copenhagen, Denmark
An holistic and sustainable office building for around 1700 people. Ramboll’s definition of sustainability includes economy, environment, society and climate and is based on the notion that no building is an island, but always part of a wider context.

Q2 Oslo Fossil Free, Oslo, Norway
Oslo has developed a new strategy for how the city can be free of fossil fuels by 2050. The strategy includes energy resources, energy production/distribution and energy consumption in all sectors, with a particular focus on transport, which accounts for 60% of Oslo’s carbon emissions. Ramboll has assisted the municipality of Oslo by acting as field expert and sector manager, while also being involved in developing the strategy report and subsequently a cost-benefit analysis of 10 prioritised measures and development of an implementation plan.
STARTING WITH SUSTAINABILITY

CSR - a great place to start the process

In order to end up with a sustainable building you need to have the right processes and methodology. This will involve a range of experts in various disciplines. This makes an interdisciplinary design process key to success when aiming for a sustainable building. The sustainability specialist is the anchor in the interdisciplinary design process. He or she facilitates the process for sustainable design and ensures that each stakeholder knows their role in the realisation of the shared vision and strategy for how to achieve the goals set for sustainability.

When facilitating interdisciplinary decision and design processes the sustainability specialists have a wide set of methods at their disposal. There are numerous accreditations schemes providing pre-set methodologies or there is the more tailored approach. A reasonable place to start is the corporate social responsibility.

CSR strategy
A client’s CSR (Corporate Social Responsibility) strategy or CR (Corporate Responsibility) strategy is a great place to start when you are aiming to build a sustainable building. The CSR strategy tells us how the client sees their role in their market place and this knowledge enables a discussion of which approach to sustainable building design is aligned with the strategy of the client. This discussion will focus on how to ensure that the approach taken to sustainability creates value for the client. From the initial dialogue between the client and the design team, a set of criteria is developed. These criteria will help choose the right methodology and the appropriate sustainability goals for the project. Over the next few pages, we will give you a short insight into some of the most widely adapted methodologies in the market for sustainable building design.

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ACCREDITATION
AND CERTIFICATION

Quantitative standards to measure the concept of sustainable development

By defining a set of criteria and a rating system to score them, these systems assess projects through a specific process. In working with these over the years, we have experienced that the accreditation creates value beyond the strict assessment. They help facilitate both the design and the building processes to produce more sustainable buildings.

Ramboll can guide development of projects from design inception to project completion using a number of different environmental accreditation metrics to suit the country conditions and building type. We have assessors accredited in BREEAM, LEED, DGNB, GSAS and Estidama along with other systems such as Code for Sustainable Homes, GRIHA, Miljöbyggnad, GBCA, Green Mark Manager, FiGBC, REM meters Building Performance Indicators, and Envision Sustainability Rating System. These assessors are able to advise and drive the process in order to achieve the projects sustainability aspirations. One of our advantages is that the assessors share knowledge across borders, systems and fields of expertise and thereby aim at constantly developing our competences on sustainability.

At Ramboll we believe that the accreditation process should be efficient and effectively communicated to ensure that the project achieves the credits our client is aiming for. We have experienced personnel who are able to advise on the requirements to achieve the rating of the assessment metric in the most cost effective manner.

Our experts have completed sustainability assessments across all sectors, including residential, schools, offices, universities, airports, hotels and healthcare. We work closely with clients and design teams to ensure that optimal credits are targeted and achieved. We also liaise with specialist in-house consultants and design team members to ensure that all the sustainability aspects of a development are fully considered. This has enabled projects to achieve high standards of sustainability through certification.

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TAILORED STRATEGIES

Unique consultancy service through bespoke sustainability strategies.

The certification systems all have their special pros and cons and individual focus areas. Some of them might fit quite well into a specific context, but in some cases it can be a better solution for the client to develop an individual or tailored sustainability strategy or profile for the building.

Tailored strategies for sustainable building design are often used if:

1. The client would like a sustainable building, but there is no obvious business case in pursuing one of the certification systems.

2. The client is pursuing a certification, but in addition to that, the client also wishes to go beyond the accreditation system.

Many of Ramboll’s numerous experts on globally recognised accreditation systems are educated and experienced in several systems. The insight in several systems gives these experts the ability to provide unique consultancy services on which systems would be the best match for the client in the specific context, and also to develop a tailored strategy.

A tailored strategy can consist of a list of specific sustainability targets and measures, inspired by relevant criteria from different certification systems. The process of implementing the agreed measures in the design and construction process is handled by the specialists in close collaboration with the design team. Documentation will in this case not be sent for 3rd party review, but will be handled as agreed with the client in each individual project. Through our insight and experience in several systems we have identified a great potential that adds to and goes beyond standard sustainability certification systems. We call this the Liveable Building Concept.

New Children’s Hospital, Helsinki, Finland

Based on the needs and wishes of the future building occupants and visitors, ten perspectives were developed to help, guide and evaluate the design and construction process. These aspects are patients’ medical processes, children’s and parents’ experience, hospital as a working place, performance and efficiency of the hospital, safety, operational reliability, functional adaptability, energy efficiency and the role in the society. Ramboll’s role in the project is working as specialist in structural engineering, HVAC design, healthy indoor environment, energy efficiency and sustainability in a broader sense. The project specific Bespoke criteria of BREEAM certification scheme, together with the ten perspectives, are used as guideline for Ramboll’s sustainability consulting in the project.

Image: SARC Architects
Økern Sentrum, Økern, Norway
20-30,000 m², shopping centre and office building as part of a bigger development scheme at Økern sentrum. The office building and Shopping center are programmed to achieve respectably "Excellent" and "Very Good" in the BREEAM-NOR scheme. Both buildings strive for a high energy efficient level, and the office building is designed to Norwegian passive house standards. Combined with a shared heating/cooling systems with neighbouring buildings and an extensive energy well system the energy consumption is reduced to a minimum.

Navitas, Århus, Denmark
Navitas is the future home for The School of Engineering - Aarhus University, Aarhus School of Marine and Technical Engineering and INCUBA Science Park. The project utilizes ready and available passive and active technologies (approximately 1500 m² PVs, regenerative elevators, vertical windmills). These technologies are a part of the learning lab available to students, teachers, researchers and businesses living in the building, thus providing an innovative working environment aiming at the development of new or remodeled technologies. The project is currently undergoing a BREEAM assessment aiming at BREEAM Excellent in the Bespoke 2010 scheme. Picture: Adam Mørk

BREEAM is one of the world’s leading sustainability assessment methods for masterplanning projects, infrastructure and buildings. It addresses a number of lifecycle stages such as new construction, refurbishment and in-use. The certification system was developed in the UK in 1990 and is now represented with both an international version and a local version of the scheme in several countries where Ramboll is present. The BREEAM assessment process evaluates the procurement, design, construction and operation of a development against targets that are based on performance benchmarks within 10 sustainability categories. Ramboll has both licenced assessors and Accredited Professionals (AP) worldwide, as well as specialists within all disciplines that can help you design and reach your ambitions within BREEAM.
LEED

LEED is administered by the U.S. Green Building Council and there are LEED-certified buildings in more than 135 countries.

LEED, or Leadership in Energy & Environmental Design, is a green building certification programme that recognises best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and credits to earn points to achieve different levels of certification. Prerequisites and credits differ between rating systems, and teams choose the best fit of rating system such as BD+C which is for a specific building type. In the Building Design and Construction rating system (BD+C), the major prerequisites and credits are categorised as Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality. Ramboll has accredited professionals all over the world to make sure we can deliver the best expertise and guidance to our clients.

KAPSARC, Riyadh, Saudi Arabia
King Abdullah Petroleum Studies & Research Center (KAPSARC) is a community development comprising a research centre, community facilities and single family residential buildings. The community facilities, with seven buildings, are pursuing LEED Platinum under the LEED NC for Multiple Buildings, making it one of the first developments targeting this rating in the Middle East. In addition, the single family residential development of 200 residential buildings is targeting a Platinum rating under the LEED for Homes, the first project to attempt this outside of North America. The project adopts sustainable design and construction practices from the concept stage to achieve the Platinum certification and to reduce the carbon footprint of the project from a life cycle perspective. The project introduces multiple on-site renewable energy systems and water saving strategies. In addition, the project limits site disturbance through considerate design and the implementation of a construction activities.

AVIA LINE III, Office building, Vantaa, Finland
Ramboll worked as LEED consultant for Avia Line 3, an office building which earned LEED Platinum. Ramboll helped the client to set green targets and to ensure that these ambitions were implemented and achieved. Our sustainability specialists assisted the design and construction team throughout the project. The LEED certification entailed energy simulation and the building earned maximum points in the category Energy and Atmosphere category as well as in Water Efficiency. Ramboll also carried out a life cycle assessment of the building that included calculations of greenhouse gas emission from e.g. material used, product replacements and energy consumption in the total life cycle of the building.
Ramboll Head Office, Copenhagen, Denmark
Ramboll Head Office at 40,000 sqm is a holistic and sustainable office building for around 1700 people. This means that in our assessment of possible sustainable initiatives, the architectural expression of the building and the surrounding social structure played a very important part. We have installed a sophisticated groundwater cooling system and the building has an effective building envelope controlling temperature and indoor climate. The building is designed to collect, carry and recycle rainwater and the overall energy consumption is reduced by a number of saving solutions. The public café on the ground floor, the atrium and the open spaces on each floor are social space to share knowledge and lives. Ramboll’s definition of sustainability includes economy, environment, society and climate and is based on the notion that no building is an island, but always part of

Green Solution House, Bornholm, Denmark
Renovation and expansion of an old hotel to a modern conference center at 4,400 sqm. The project has a bespoke sustainability strategy, which demonstrates the cyclical processes of biodiversity, materials, energy, water and waste. The choice of materials is inspired by Cradle to Cradle thinking and “design for disassembly” is implemented where ever possible. Energy consumption, light levels, hot water consumption and indoor climate in hotel rooms is visualised for the guests in order to support awareness and sustainable behaviour - through a customised app, graphic data comparisons and info screens. The project is certified as an Active House and also seeks a bespoke “mixed use” DGNB-DK certification.

The German organisation DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen) certification system is an evaluation of the overall sustainability performance of a building. DGNB is a bespoke system and can be adjusted to comply with national standards and legislation.

The system has been developed for different building types and urban districts. It covers a broad spectra of sustainability aspects: Environmental, economical, sociocultural and functional aspects, technology, design processes and the building site.

The first four evaluation areas have equal weight in the assessment, making the DGNB-system the only one that pays as much attention to the social and economic aspects of sustainable building design - as to environmental criteria. DGNB has a comprehensive perspective on both social quality and quality in terms of flexibility, risk minimisation and minimizing life cycle costs, which makes it extremely relevant if the client views the building as an investment object and is targeting a low risk and a high return on the investment.
The Khalifa University Extension Phase 1, Abu Dhabi, UAE
The Khalifa University Extension is intended to provide students with world-class research facilities and add an area of 120,000 sqm to the existing campus. The new extension will service a total of 3000 students and 762 members of faculty and staff. The project was assessed under the Pearl Building Rating System, version 1.0, released in April 2010 to incorporate sustainability principles to achieve a more energy efficient, resource conscious and sustainable solution with reduced environmental impacts. The project has achieved a 2 Pearl Rating under Estidama Pearl Building Rating System (PBRS). The building is designed to maximize passive cooling strategies to reduce mechanical loads and demand for cooling dehumidification, as well as for daylight harvesting whilst also providing indirect shading. Water savings and indoor and outdoor occupants comfort and wellbeing was also considered; the project has achieved 24% of indoor water savings over the baseline.

Abu Dhabi’s Plan 2030 establishes a clear vision for sustainability as the foundation of any new development within the Emirate of Abu Dhabi. Hence, UPC has introduced a Development Review Process to ensure that individual developments knit together and advance the Vision 2030 and at the same time align with Estidama Requirements for a sustainable development. The Pearl Rating System for Estidama aims to address the sustainability of a given development throughout its lifecycle from design through construction to operation. The Pearl Rating System provides design guidance and detailed requirements for rating a project’s potential performance in relation to the four pillars of Estidama (environment, economic, social and cultural). The Pearl Rating System is organised into seven categories that are fundamental to more sustainable development. These form the heart of the Pearl Rating System:

1. Integrated Development Process
2. Natural Systems
3. Livable Buildings
4. Precious Water
5. Resourceful Energy
6. Stewarding Materials
7. Innovating Practice

Within each section there are both mandatory and optional credits and credit points are awarded for each optional credit achieved.

Polymer additive plant, Abu Dhabi, UAE
The site layout has been derived following extensive interrogation of the building form organisation, configuration, pedestrian movement and vehicular access/egress movements to ensure the most efficient site usage in terms of building orientation, building entrance, service yard and car park location as well as protecting the site and building for future expansion. Ramboll is undertaking structural, mechanical and electrical engineering design services together with the associated submissions to Estidama to gain a 1 pearl rating for the project.
Ramboll was appointed as a specialist structural sub-consultant to Diwi to provide engineering services on the new medical facility located in Doha that houses dental, dermatology and other specialty outpatient clinics. The client, Hamad Medical Corporation (HMC) shares the same vision as Qatar’s 2030 vision which focuses on four pillars namely; Human Development, Social Development, Economic Development, Environmental Development. In line with this vision it was HMC’s aim to achieve the GSAS 3-Star rating for this premise.

The GSAS Healthcare Version 2.1 was sought for the project assessment and certification. Ramboll assisted the design team and the client to meet the 3-Star target by organizing integrated sustainable design workshops, providing the compliance reports and reviewing GSAS tools to streamline the GSAS.

The Global Sustainability Assessment System (GSAS) is a green building certification system developed for the state of Qatar. The development of GSAS took advantage of a comprehensive review of combined best practices employed by a mix of established international and regional rating systems. This review was performed while taking into consideration the needs that are specific to Qatar’s local environment, culture and policies. It was developed by the T.C. Chan Centre for Building Simulation and Energy Studies at the University of Pennsylvania in collaboration with and on behalf of the Gulf Organization for Research and Development (GORD).

The criteria of GSAS are divided into eight categories, each with a direct impact on environmental stress mitigation. Each category measures a different aspect of the project’s environmental impact. Hence, these categories define broad impacts and address ways in which a project can mitigate any negative environmental effects. Each criterion within a category specifies a process for measuring individual aspects of environmental impact and for documenting the degree to which the requirements have been met. A score is then awarded to each criterion based on the degree of compliance. Figure 1 illustrates the GSAS categories and their corresponding environmental impacts.

Doha Marina Mall, Doha, Qatar
Marina Mall is a 180,000 sqm retail and leisure facility. The mall includes over 70,000 sqm leasable retail over three main levels, a hypermarket, cinemas, family entertainment centre, restaurants with terraces overlooking the marina and spa facilities. The design is inspired by natural forms created when water and land meet. Five interconnected retail ‘islands’ link the mall to a body of water that runs through the centre of the scheme. Water guides the visitor through the mall, leading to and from the marina, while internal waterfalls connect the different levels. The project is aiming for 5 stars under QSAS, Qatar’s sustainability rating tool. To integrate all engineering services precisely within the structure, BIM was embraced by the Project Team to deliver a 3D solution using REVIT. This provided the client with a powerful design, collaboration and management tool to ensure the optimal design is achieved during the design process through construction drawings and maintained post completion and into occupancy.
OTHER ACCREDITATIONS

In addition to the major accreditation schemes across the globe, Ramboll has capabilities within a large range of other accreditations that includes essential aspects of sustainability.

PASSIVE HOUSE STANDARD
Passive Houses require very little energy to achieve a comfortable temperature year round, making conventional heating and air conditioning systems obsolete. The criteria for a building to attain this certification may vary from country to country. One of the key issues is to have a low demand for energy to the building. One example here is the criteria put forth by the International Passive House Association stating that energy demand is not to exceed 120 kWh annually for all domestic applications (heating, cooling, hot water and domestic electricity) per square meter of usable living space.

ACTIVE HOUSE STANDARD
Active House defines highly ambitious long term goals for the future building stock. The accreditation is based on a holistic approach where aspects of energy, indoor climate and environment are integrated at a balanced level. An Active House is energy efficient and all energy needed is supplied by renewable energy sources integrated in or on the building or via a nearby collective system or grid. The interplay between energy and indoor climate supports creating healthy and comfortable indoor conditions and ensures generous supply of daylight and fresh air. Materials used also have a positive impact on the indoor environment. The building interacts positively with its surrounding environment through an optimised relationship with the local context, focused use of resources, and its overall impact through its life cycle.

Oslo Skatehall, Oslo, Norway (Passive House)
Ramboll has, in cooperation with DARK Architects, designed the new skate arena at Voldsløkka in Oslo, Norway. The facility contains approximately 1500 sqm indoor area and 1000 sqm outdoor area. The indoor area will be completed as a passive house project. This has set high requirements with regards to thermal transmittance and an efficient heating system.

New Heimdal high school and sports hall, Trondheim, Norway (Active House)
Design and construction of high school and sports hall. The project’s ambition is to be the most environmentally friendly school in Norway and it will be a pilot project for the Zero Emissions Buildings research centre with the goal of minimum zero emissions with regards to greenhouse gas emissions from energy use in the operational phase, defined as ZEB-0 level. Greenhouse gas emissions from materials and transport are also in focus. The building is also planned to meet the requirements of an energy plus house by optimising the architectural qualities and technological solutions. The energy solution will be based on biogas (CHP) and integrated solar panels on the roof.
Miljöbyggnad is a third party Swedish certification system for buildings, developed for Swedish conditions. Miljöbyggnad focuses on qualities of energy, indoor environment and material use, and can be used for both new and existing buildings. In addition to the certification, there is a verification of the building after it has been in operation for two years. Ramboll has certified professionals who can manage the certification process. In addition we can provide specialists to facilitate the specific indicators. That way we provide our clients with a full service package and make sure the property owner can feel confident with each indicator. Swedish Green Building Council (SGBC) administrates the certification system. SGBC is a non-profit organisation and an established member of the World Green Building Council.

Johanneberg Science Park, Gothenburg, Sweden
Johanneberg Science Park is a Miljöbyggnad Gold project, built to encourage academia, business and community stakeholders to exchange ideas and knowledge in an cooperative environment at Chalmers University of Technology in central Gothenburg, Sweden. The project was rewarded with Glaspriset 2016 (‘the Glass prize 2016’) by the Swedish Federation of Glazing Contractors, based on the criteria architecture - function - innovation. It has several sustainability features such as geothermal energy, climate and lighting control based on attendance, low-emitting materials, climate impact and mobility - bike pool, electric bus. The over all sustainability goals for the project was an inspiring, collaborative environment, a healthy physical environment and sustainable technology. For the social sustainability goals, a big focus in the project was to create attractive and inspiring meeting places and venues that can be used jointly between the tenants and visitors, and which supports a flexible way of working.

MILJOBYGGNAD
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In implementing the 'green building' model, MARINELLA has been conceptualized with environmental sustainability in mind, from the construction process to the building features. With full devotion to green building, MARINELLA became Hong Kong’s first private residential project to achieve BEAM Plus New Buildings Final Platinum.

Today, MARINELLA remains a showcase of eco-friendly construction and green living. The implementation of soft landscape was maximized with the provision of green roof and sky garden with over 40% coverage of native species. The green roof, trees and shrubs are planted to reduce building heat gain, carbon emission and air pollution. The sky garden and 5-metre gap between two building blocks further enhanced the microclimate by allowing permeability bringing in natural ventilation.

**BEAM PLUS**

The Hong Kong BEAM (Building Environmental Assessment Method) is a green building assessment tool tailor-made for high-rise, high density built environment of subtropical climate in Hong Kong. The tool embraces a range of good practices in planning, design, construction, management, operation and maintenance of building, and is aligned with local regulations, standards and code of practice.

Appreciated by the various stakeholders, BEAM assessment and certification provide building users with a single performance label that demonstrate the overall quality of building. BEAM certified buildings are safer, healthier, more comfortable, more functional and more efficient than a similar buildings that do not achieve the level of performance prescribed in BEAM.

BEAM is organized into eight different aspects that evaluate the planning, design, construction and operation of a building:
- Site Aspects
- Energy Aspects
- Management
- Water Aspects
- Innovations and Additions
- Material Aspects
- Community Aspects
- Indoor Environment Aspects

MARINELLA, Aberdeen, Hong Kong

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Fat Tseung Street West Public Housing Development, Aberdeen, Hong Kong

The concept of sustainable living should not be limited to only the residence itself but also the underappreciated ecosystem that it is inherently part of – the surrounding neighborhood. The BEAM Plus Neighborhood is the latest sustainable building assessment tool in Hong Kong designed to assess neighborhood-scale developments. Apart from the usual assessment categories, it factors in Community Aspects that emphasizes on enhancing local character and social identity of the neighborhood. Ultimately, the scheme promotes sustainability through both environmental and social-economic values.

Ramboll was appointed as the sustainability planner for the Fat Tseung Street West Public Housing Development to carry out comprehensive micro-climate studies and BEAM Plus assessment strategies. The project is the first residential community development to be awarded with a BEAM Plus Neighborhood Platinum.

WELL BUILDING STANDARD

The world’s first building standard focused exclusively on human health and wellness. The WELL Building Standard™ (WELL) marries best practices in design and construction with evidence-based medical and scientific research – harnessing the built environment as a vehicle to support human health and well-being. The WELL Building Standard sets performance requirements in seven Concepts relevant to occupant health in the built environment – air, water, nourishment, light, fitness, comfort and mind. WELL Certified™ spaces can help create a built environment that improves the nutrition, fitness, mood, sleep patterns, and performance of its occupants.
ISSUES AND FOCUSES IN DEVELOPMENT OF SUSTAINABLE BUILDINGS
LIVEABILITY

When creating a sustainable building there are several issues to be addressed.

A high focus on environmental sustainability might cause other issues to be downplayed. In some cases buildings are constructed to be sustainable, but fail to create spaces in which humans can thrive. At Ramboll we believe “liveability” to be the answer to this issue. Liveability describes the conditions required for a good life for all the inhabitants in cities, regions and societies, regarding both their physical as well as mental health. We focus on a physical, a social and a cultural dimension. All these conditions must be included when a site is developed in order to make it successful. Sustainable development is a fundamental precondition to improved liveability.

In this way, liveability takes all aspects of creating a sustainable building into account. It is important to create buildings that are both environmentally friendly and great to live in for the end users. By always having liveability on the agenda the sustainable design process develops a building that takes all relevant aspects into account.

01 Krokslätts factories, Göteborg, Sweden
The historic urban environment in Krokslätts factories will be rebuilt with 250 new apartments and several office buildings and service functions. The area is developed with a comprehensive solution in both existing and new buildings, focusing on energy-efficient technology systems, climate-adapted architecture, sustainable mobility, user participation and multi-functional outdoor environment. Through user participation, the area is planned to be developed with common patios, playgrounds and outdoor fitness for all ages. One large greenhouse is supposed to work as a meeting place and activity center for the residents, in combination with the vegetation delaying and cleaning roof and gray water. Ramboll has developed the concept, design, outdoor environment and traffic planning in the area. Image: Wingårdhs arkitektkontor

02 Østensjøveien 27, Oslo, Norway
Østensjøveien 27 is an office building of approx. 17.600 sqm situated in Oslo, with six floors and parking below the ground. Flexibility, efficiency and comfort was in focus while designing the building, which meets tomorrow’s demands for a modern workplace. The building has been awarded the certificate for BREEAM Excellent, meets the requirements for passive house standard and is also a Futurebuilt project.

03 New Bergen Academy of Art and Design
Bergen, Norway
Multidisciplinary detailed planning and design, use of Lean tools in planning, design and execution. Ramboll has all disciplines except the architectural design, which is Snahetta. The use of Lean methodology at every phase was added as an award criterion. As developer, Statsbygg has set strict demands for the materials used in this project. Requirements for emission levels for materials facing the indoor air were described in relevant posts in the tender documents to ensure the environmental qualities were taken care of in the procurement face. Image: Snahetta & MIR
Risk is always present when investing and every building project presents an investment. Therefore risk is a natural part of our building project and sustainability approach, in which we believe transparency is vital for our clients.

In our experience, sustainability can play a vital part in reducing risk while increasing market value e.g. through increased rental rate, decreased energy demand, improved indoor environment etc.

A clear tendency shows that the market for sustainable buildings will grow, supported by the fact that buildings are increasingly being sustainability certified all over the world. Eighty percent of the Danish building industry expect an increased demand for sustainable buildings and none expect a decline (see Market Survey by Danish Green Building Council). The desire to invest in sustainability in the market is closely related to the development and is coupled with the fact that the market perceives sustainability as a good investment. For example around 90 percent in the Danish building industry evaluate that a building’s value increases as a result of sustainability certification and the reality is that the value of improved productivity, increased employee satisfaction and operational and maintenance savings far exceeds the cost during the construction phase.

Let us illustrate with a common example of how one sustainability approach reduces risk for the client while increasing the market value of the building, a realtor is financing the construction of a new office building in a major city. The energy consumption is and will be a great part of a buildings life cycle cost. A building with low energy consumption will be more attractive on the market and thus easier to rent out. The building will also have a marketing value for both the owner and the company renting and therefore energy efficiency should be a basic parameter if stakeholders want a profitably sustainability approach.

However energy efficiency is only one example of exploiting the possibilities to make a building profitable and thus increasing the sustainability value. If a building also integrates other sustainability aspects the risk goes further down and the market value further up.

There is a strong financial argument to the sustainable approach across nations and types of buildings. Some parts of the sustainability approach can be measured, however many parts in a sustainable building are hard to allocate to the sustainability approach such as increased productivity as a consequence of a balanced indoor environment. Our many specialists can help our clients to realise the financial benefits of the sustainability approach in their projects.

We recommend that our clients integrate sustainability in as early phase in the project as possible to exploit maximum value and profit from a sustainability approach. We believe that sustainability is and shall fundamentally be a good business.
ENERGY OPTIMISATION

Maximising performance while minimising costs through integrated energy design

Integrated energy design (IED) is a methodology that defines a working process. It aims for close collaboration between engineers, architects and other disciplines from the early phases of building design in order to maximise performance while minimising costs.

At Ramboll we believe that an IED approach is key to ensuring buildings are energy efficient and minimise the use of carbon emissions. Building layout and orientation are of utmost importance to ensure low energy, sustainable buildings. We believe that passive design philosophies should drive the building layout and form - in that way principles of sustainability are embedded within the design layout. Thereby passive strategies such as natural ventilation can be maximised where possible and rooms can be designed to ensure that high levels of natural daylight can be achieved while minimising solar gains to optimise natural resource gains.

IED focuses on the life-cycle of the building and by doing so provides a working plan that will decrease buildings costs from a life cycle perspective, through three steps:

1. Energy optimisation
   During this phase the building shape, envelope and material properties are considered, passive measures are applied and energy simulations performed on a regular basis to optimize the building design for lowest possible energy demand.
   A range of topics are relevant during this phase:
   - Energy simulations
   - Solar shading strategies
   - Passive heating / solar heating concepts
   - Heat dissipation strategies
   - Windows / glass analysis
   - Envelope analysis
   - Thermal mass studies
   - Daylighting potentials

2. Energy efficiency
   Once the building is optimised the engineering team will analyse active systems that can provide the building with the needed indoor temperature, lighting, air quality, etc. and design low energy systems.
   A range of topics are relevant during this phase:
   - Energy and indoor climate simulations
   - Heating system strategies
   - Cooling system strategies
   - Ventilation strategies
   - Lighting strategies

3. Local building integrated energy production
   Energy production systems will be considered and prioritised to be renewable and local systems. The solution is always based on an analysis of local/regional context of energy supply to create tailored solutions.
   A range of topics are relevant during this phase:
   - Heat production
   - Electricity production
   - Cooling production

There are several standards that benchmark building performance on the design e.g. passive house, near zero energy building, zero energy building, and plus-house.

01 Oslosolar, Oslo, Norway
Oslosolar is the winner of the international competition Futurebuilt Urban+ and a target of BREEAM-NOR Outstanding certification. 16 international teams fought for the best concept of a plus house, also called net positive energy building, which has to produce more than +2 kWh/sqm of energy. Oslosolar has 30 % lower energy demand than a passive house building, and will produce more than 1,4 mill. kWh per year from 8300 sqm solar cells.

02 Crouch Hill, London, UK
Crouch Hill Community Park is an exemplary, Zero Carbon in-use, high quality learning and recreational regeneration project in North London. New buildings are provided for Ashmount Primary School and Bowlers Nursery and an electrical substation is remodelled and extended to house a new energy centre, youth club and ecology centre. Ramboll was the building services engineer and implemented non-compliance based operational carbon modelling using “real life” data and profiles to help the project achieve net-zero carbon status. A heat and power network links up the various buildings in the development and exports excess heat off-site to adjoining residential buildings. The school building uses innovative technologies such as Ecoplay greywater recycling and ‘E-stack’ ventilation system and achieved BREEAM Outstanding rating. An integrative design process that included extensive engagement with all key stakeholders was implemented to create this exemplary project in London.

Image: Penoyre & Prasad
HEALTHY BUILDINGS

How we enhance quality, human health and well-being in buildings

Creating the best possible surroundings for people to unfold their life

Our built environments have great influence on our health and well-being whether in our home, workplace or leisure buildings. We spend the majority of our time indoors therefore a keen focus on indoor climate and daylight optimisation is central to create sustainable, viable and durable living environments.

In Ramboll we aim to create the best possible surroundings for people to unfold their lives. We do that through creating sustainable and healthy buildings for people, to best suit their needs both functionally, physically and mentally.

We pursue an holistic and balanced approach in order to affect each project on the right parameters and the right time. We believe, that by focusing on aspects of indoor climate and daylight optimisation though all phases of an integrated design process, we can influence the quality of the building - also when construction is finalised and the building is in use.

Indoor climate

Good indoor climate is established in balancing thermal conditions, air quality, acoustics and daylight availability. From the beginning of each project, we identify the desired level of each parameter through legislation and as well as through demands and wishes of clients and users. Parametric analysis, calculation or simulation can form a basis for weighing the aspects against each other in an informed design process. We balance this process in collaboration with our clients, who are always integrated in the process of making the best decisions in accordance with the context.

We have a broad range of tools to apply to each theme and process and we constantly expand our knowledge and capabilities.

Healthy materials

Materials in our buildings have great impact on quality of indoor environment, health of users and experience of space and its expression. Through knowledge about materials - from resource, production, transportation, assembly and use to dismantling, waste management and potential reusability - make us able to choose materials that add to the health and quality of the building.

Daylight optimisation

Well lit building spaces can improve our health, well-being and ability to learn and perform well. A project that incorporates well designed lighting is adapted to the use and the users of the building. Creating good daylight is not merely about creating plenty of light at all the times. It is also about enabling the user to have different experiences of light, to have contrasts of dim and bright to support different functions and activities and to have possibilities to adjust when needed.

The daylight environment in a building can be influenced from when the very first contours of the building are drawn. Therefore, a wide knowledge base and a collaborative approach is one of our main focal points

Through our approach, we motivate our design choices and recommendations and support them through recognised calculations and simulation tools - and we make a virtue of visualising and communicating to our customers and collaborators to agree on all choices.

Accessibility

Accessibility is important when creating sustainable buildings that focus on core social qualities and equality for humans. Through the physical layout of a building and its nearby surroundings, we can enhance quality, flexibility and usability for all groups of people. Imagine your colleague having broken her foot at her weekend run and she has to be in a wheelchair for a period. How does she come from the parking lot to the meeting room or her desktop. Are there accessible elevators, stairs or ramps to easy getting arround the building? Are there push-buttons to open doors or do you have to use the doorknob? Our specialists take these challenges in to consideration when a concept or layout for a building is designed.

Interdisciplinary collaboration

Our specialist group has extensive knowledge and experience with applying all aspects of creating healthy buildings of high quality. Quality of indoor climate, optimisation of daylight, healthy materials and accessibility are central areas of expertice and the overlapping integrated design help us create solutions that consider strengths and weaknesses of all of them. We collaborate across specialities, to make sure our design choices are based on a wide range of aspects to develop the best possible solutions for our projects at all times.

01 Sunhouse, Hørsholm, Denmark

The ambition behind the construction of the 1,300 sqm kindergarten is to become the most environmentally sound and climate-friendly daycare centre in Denmark and to be self-sufficient with energy from renewable energy sources.

02 Headquarters of disabled people’s organisations, Taastrup, Denmark

See description on page 9.
HOW MUCH TECHNOLOGY?

Sustainable building design on small and large scales

High-tech, light-tech or low-tech?
Making full use of the technology also means making no use of technology, when technology is not needed. Choosing the right detail level for both for materials, design and building technology is critical to create the optimal composition for each specific building.

To design sustainably is to adapt the design to the needs of the building and its users. In a high tech building, Ramboll designs advanced, smart systems where the different building components and installation systems communicate to create a healthy indoor climate and a safe and comfortable building. For some buildings, this type of fully controllable installation systems is not needed. Ramboll believes in having an open and continuous dialogue with the project owner, building owner, technical facilitators and building users to find the suitable level of detail for each specific project.

As sustainability designers, we at Ramboll want to create a product that is as much as it can be with as little environmental impact as needed - this requires knowledge, experience and the ability to support each unique project’s needs. Therefore we have high demands when putting together our teams, so that they have the right knowledge to interpret what is wanted and needed into the building design.

Urban development and local context
To create a sustainable building requires a design that is not only sustainable on a building scale, but also on a larger scale. A sustainable building also entails that the building is integrated with its surroundings and contribute to the local context and environment.

To build densely is preferable in many ways, but it also sets high demands on protecting our biodiversity, and creating green and blue infrastructure in our neighborhoods. With some small actions the biodiversity can be strengthened or at least protected. Ground surfaces that are suitable for grass and plants on a lot should be identified and used for this purpose, preferably the areas can be linked to habitats on adjacent lots. Green roofs or facades are space-effective ways to add greenery without using buildable land. Other biodiversity actions could be beehives on the roofs, using local plants and bushes that the local birds thrive in and avoid over-trimming grass and hedges or establish wildflower areas.

At Ramboll we use multi-disciplinary design teams to make sure buildings are connected and integrated in to their context. The three main objectives are the physical, the social, and the cultural sphere. This means the building has to include both humans and nature in its scope, for example how we integrate and connect, in what type of surrounding we do so, and how we protect and enhance the local culture. The solution must be cost-effective to meet also the economic objectives. A good governance structure is important to enable resilient city planning. However, even with small means on a building level we can all contribute in a socio-economic way to society.

We are moving towards a greater understanding where biodiversity-actions is not just seen as a beautiful attribute, but a serious attempt to address some of our society’s greatest issues, global warming.

01 Jordal Amfi, Oslo, Norway
Jordal Amfi is Oslo’s main arena for ice hockey and was built for the Olympics in 1952. The new arena will be twice the size of the current one, but has still managed to reduce the energy consumption to 1/3 of today’s situation. The arena is optimised for an efficient and environmentally friendly operation and maintenance and will meet the requirements for passive house standard. The roof top will be a combination of integrated solar panels and green/living roof, which will both help with drainage and contribute as insulation summer and winter. Ramboll has had a parallel project in collaboration with Thermoconsult AS where a process plant based on CO2 has been designed, resulting in a world-leading energy and HVAC system. A local energy central with approx 20 energy wells will be created, where the excess energy will be utilised in the area surrounding Jordal Amfi.

02 Østensjøveien 27, Oslo, Norway
See page 23.
SUSTAINABLE BUILDINGS AND THE LIVEABLE CITY

How to add and enhance values of livability in local communities

To build in a sustainable way also entails supporting or improving the existing and future conditions in relation to the climate, environment, architecture, infrastructure, social values and other sustainability related considerations. Ramboll believes “no building is an island” is a fundamental approach and requires that we through the design of the building add value to the specific local context. In these projects, we focus on enhancing the liveability in and around the building.

At Ramboll, we can engage our many technical specialists to find synergies between city systems and the clients’ specific project. This involves consideration of physical infrastructure such as energy, water and transportation. For example, our specialists can look at how the building energy supply and energy efficient design is considered together with the citywide energy system including current and future environmental and socio-economic benefits. In Ramboll we make sure the building is compatible with the city’s infrastructure and that the technical level for optimal building performance is achieved.

Buildings that add and enhance liveable values in the local community

Our sustainability specialists analyse the existing social and cultural preconditions that set the framework for a contextual building design. In this way, we can point out how the client’s building improves the liveability of the neighbourhood and supports life in the area. We believe it is crucial to take in to account not only the building users, but also other stakeholders in a local context with respect to the social and cultural values. The building has people passing by in vehicles or by foot, spending time in the proximity and having a view over the building from the street, their homes or offices. By activating the façade or even including public accessibility and activities in the building such as integrating a coffee shop, it is possible to create interaction between the different users and stimulate and contribute to the urban life in the area. By understanding how urban users interact with the building, we can adapt the design to further utilise the values of the building and its urban space. This approach also entails physical interior and exterior design choices such as for materials, lighting and soundscaping. As an example soundscaping can be changed through the physical design e.g. by integrating greenery that is attractive for humans and city fauna. Imagine the sound of birds singing and human interaction outside the building entrance before you enter a building. Your state of mind will be different compared to a situation where your senses are on alert e.g. by traffic noise. By combining our knowledge in design with the use of natural triggers for all of our senses, both the people inside and outside the building can benefit and profit from its existence.

At Ramboll, we make it possible to connect the vision of a sustainable building with a liveable city.

Q1 Sustainable buildings supporting the liveable city

Sustainability in small and large scale

Q2 Norrtälje harbour, Norrtälje, Sweden

In Norrtälje harbour a new district in the port and industrial area will be developed. The area will be certified with CITYLAB, a sustainability certification system for urban districts facilitated by Sweden Green Building Council (SGBC). Ramboll is managing the certification and offers a quality assurance of process and strategy, to secure the development of a sustainable and liveable harbor. Ramboll is working closely with the client and continuously manages sustainability in the project including business intelligence, strategic counseling and multi-disciplinary expertise. The district will accommodate about 1,800 new residential units, and Ramboll has developed site- and project-adapted ecological and social procurement requirements for design and construction, and will support the client in future procurements and thus assure the quality of a good level of sustainability efforts.
Ramboll is a leading engineering, design and consultancy company. Our presence is global with especially strong representation in the Nordics, UK, North America, Continental Europe, Middle East and Asia Pacific.

**OUR MARKETS**
- Buildings
- Transport
- Planning & Urban Design
- Water
- Environment & Health
- Energy
- Oil & Gas
- Management Consulting

**CEO**
Jens-Peter Saul

**HEADQUARTERS**
Copenhagen, Denmark

**FOUNDED**
1945

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**13,000 EXPERTS**

**300 OFFICES**

**35 COUNTRIES**

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**REVENUE IN EUR M**
1,419.5  
Revenue, page 7

**EBITA IN EUR M**
63.6  
EBITA, page 7

**CUSTOMER SATISFACTION**
4.27  
Rating 1-5

**MOST ATTRACTIVE EMPLOYER**
1  
Rank in the Nordic Student Survey Universum

**GLOBAL RANK**

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**ENGINEERING**
50%  
Engineering is the most common degree in Ramboll

**EDUCATION**

The most common level of education is a Master’s degree

**AVERAGE AGE**
38 years is the average age of the Ramboll employee

**GENDER DISTRIBUTION IN TOTAL 2015**

- Women: 34%
- Men: 66%
SPECIALISTS

Over the next pages, we have the pleasure of presenting some of our specialists within sustainability. Feel free to get in touch with them to learn more.

ANDREAS QVIST SECHER
Sustainability specialist, Civil Engineer
Denmark

Andreas works collaboratively with contextual design through several DGNB certification projects. In his work, Andreas searches for synergies and provides a mix of both holistic and quantitative methodological approach and interdisciplinary understanding within the field of sustainability, integrated building design, urban planning and city strategies. ‘No building is an island’ is a working mantra for Andreas. Andreas is specialized in sustainability certifications from buildings to urban districts and is one of only a few danish DGNB consultants in both office buildings and new urban districts.

Previously Andreas has worked in the City of Copenhagen and assisted in developing and implementing the Climate Plan for Copenhagen to become the first CO2 neutral capital in the world. Also, Andreas is key coordinator and developing specialist in the Sustainable Building Design Network in Ramboll Denmark - implementing sustainability in a broad sense in Ramboll Denmark.

DAVID LINDGREN
Environmental Project Manager
Sweden

David works mainly as environmental project manager and sustainability consultant in refurbishment and new construction building projects. He ensures the client`s sustainability objectives are implemented contributing to a long-term increased property value. David is responsible for environmental management in projects and to support in issues concerning building performance such as third part certification, energy efficiency, sustainability, choice of sustainable and healthy building materials etc. David identifies the project aims and develops project specific environmental design criteria/program. As part of this process David frequently perform presentations or workshops for developers, design engineers and contractors regarding environmental and sustainability issues. David is certified BREEAM International and BREEAM SE Assessor, LEED AP BD+C, Energy Expert and Miljöbyggnad. Experience from assignments include responsibility for the entire rating process in several BREEAM and LEED-projects.

ERIC P. RUFFEL
Manager
USA

Eric works as sustainability consultant with Primary Specialty in Energy Management Consulting; helping companies and entities, particularly end-users of energy in their sustainability efforts. This may include managing energy consumption and costs on the supply and demand side. Eric has been involved in sustainability, energy conservation, and renewable energy efforts in city-wide projects including Masdar, UAE. Eric has performed and managed successful delivery of thousands of building energy, water, and renewable assessments. He has developed site and campus-wide sustainability and net zero energy plans as well as developed green procurement plans for commercial and government clients. Eric has led and been a part of multiple successful LEED certifications in new construction, renovations, and operation of existing facilities. In addition, he has participated or led multiple other initiatives involving renewable energy, climate change, greenhouse gas accounting, and strategic consulting.
Flavia has a background in architecture with masters in sustainability for the built environment. She has wide experience in the industry of sustainability projects in the Middle East, working at Ramboll Sustainability & Design Innovation in the Dubai office. Flavia is accredited under most of the relevant Green Building rating systems in the region and internationally including LEED, GSAS, Estidama and BREEAM. She works as projects manager and sustainability consultant for a variety of projects driving multidisciplinary teams towards an integrated design strategy. Flavia has successfully managed a variety of projects including the assessment and certification of schools, universities, offices, hotels, residential and mixed use projects.

FLAVIA MARQUES
Principal Sustainability Consultant
United Arab Emirates

With a background in both scientific and practical experience in engineering, architecture and sustainability in a broad sense Gitte offers a strong professional profile. Also, she has a PhD in sustainable architecture. She consider sustainability a holistic matter, where disciplines should meet and collaborate in solving challenges - in order to create the best possible surroundings and built environments for people to live in. She works on many different projects focusing on holistic building design and enquiry, inclusion and integrated design methodology. Gitte works as a DGNB consultant and auditor. Previously Gitte worked with similar projects in architectural firms and a building product supplier why she has insight from different discipline perspectives. Also, Gitte is key coordinator and developing specialist in the Sustainable Building Design Network in Ramboll Denmark. Her goal is to encourage and implement an agenda of sustainability in all departments in Ramboll.

GITTE GYLLING H. OLESEN
Sustainability specialist, Civil Engineer
Denmark

Helene is graduate engineer M.Bc. in Environment and Resource Technology from the Norwegian University of Science and Technology in 1998. She has been employed in Ramboll since 2012. In 2013 she finished her PhD degree in Industrial Ecology with the topic life cycle assessment on household waste-, water and wastewater systems. She is an experienced user of several LCA tools. Her key qualifications are Life Cycle Assessment (LCA), Environmental analysis/Environmental system analysis, Greenhouse gas accounting, Carbon footprint, Production and verification of Environmental Product Documentation (EPDs), Waste management. From 2001 to 2009 Helene was employed in the Norwegian State Housing Bank where she worked with energy efficiency in residential buildings.

HELENE SEDAL
Senior consultant
Norway

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Johanna works in the Green Building and Sustainability Consulting department in Espoo, Finland. Johanna has specialized in sustainable buildings and construction practices and corporate social responsibility. Johanna is certified LEED AP in Building Design and Construction and she works with, for example, LEED and BREEAM certification projects. She has worked with both new construction and major renovation projects as well as existing building certifications. In addition to certification schemes, Johanna has experience on developing corporate responsibility strategies and reporting according to varying frameworks, such as GRI, GRESB and CDP. Before specializing in sustainable buildings, Johanna has worked as structural engineer and contracting engineer within Ramboll and on construction sites. Johanna finalized her studies in Aalto University’s multidisciplinary Master’s Degree Programme called Creative Sustainability. She did her master’s thesis on building Life Cycle Assessment (LCA).

Ian has a passion for daylight analysis, geometry creation and data manipulation. Services Ian can provide include: Daylight and sunlight analysis for prediction of natural light availability including Climate Based Daylight Analysis; glare risk analysis; Solar exposure analysis; analysis of natural and mechanical ventilation strategies using both dynamic thermal and computational fluid dynamic techniques to ensure energy efficiency and thermal comfort is achieved; energy consumption and carbon emission predictions for compliance with Section 6/ Part L of UK building regulations; form and massing analysis to aid Environmental Impact Assessments (EIAs); BR209 assessments for EIAs; Building Physics parametric design using Grasshopper; assessment of the microclimate created in and around developments; studying and analysing local climatic conditions and advising on building massing, orientation and street layout with regard to improving the quality of the external spaces in terms of solar/daylight access, thermal comfort and the wind environment created.

Ida is an experienced consultant to construction clients in preparing tender documents, prequalification of consultants, and holding consultancy contests including the selection and contracting phases. She is used to having a close dialogue with the client in all project phases and pays great attention to the client’s needs, a decisive success factor. Likewise, Ida has a solid background in the planning and management of projects, with regard to time as well as economy and quality - qualifications acquired as project manager, design manager and construction manager on a variety of projects. Through her more than 25 years with consulting engineering companies, Ida has gained extensive knowledge of mechanical engineering. Her special focus has been on indoor climate. From 2002-2009, Ida held the position of Director, with focus on strategic development and innovation management.

SPECIALISTS

IAN VAN DUIVENBODE
Senior Sustainability Engineer
United Kingdom

IDA GARRE
Project director
Denmark

JOHANNA MERO
Consultant
Finland
Kari is working at Ramboll as a head of Green Building and Sustainability Consulting department. Kari has specialized in sustainable building design and construction as well as operation and maintenance. Kari is certified LEED AP Building Design and Construction, BREEAM International Assessor and BREEAM In-Use Auditor. Kari has worked as a project manager in dozens of new construction, renovation and existing building certification projects incl. several LEED platinum level certifications. Kari has also experience on building life cycle cost analysis, energy efficiency consulting and verification, sustainable construction process development as well as sustainability assessments and policy development in corporate activities.

Lars is a process developer and generalist in the field of sustainability. He is an expert on how to systematically manage the development of liveable buildings and liveable cities. He has extensive experience from management of urban developments that focuses on stakeholder cooperation, holistic and integrated thinking, place making and innovation. As a Specialist Manager Lars is leading teams on the local, national and global level who all works with and leads the sustainability dimension in their projects. Lars usually works in early stages of projects and offers a sustainability quality assurance of process and strategy adequate process management and methods to secure the development of a sustainable and liveable buildings and cities. On the global scale Lars coordinates the development of Ramboll Liveable City Assessment Tools in cooperation with Planning and Urban Design and Livable Cities Lab. He is also an expert on Ecosystem Services and Social Ecological Urbanism. Lars is certified in BREEAM-SE AP and Miljöbyggnad.

Lina works mainly as a project and environmental manager and sustainability consultant for building construction projects and urban planning projects. She has experience from both small refurbishing projects to larger, new construction building projects, mostly commercial buildings for retail and offices, but also within national monumental buildings and industrial buildings. Before specializing in sustainability and project management, Lina has worked with cost estimations for construction within commercial buildings, hospitals, schools, preschools and specific energy measurements for buildings. Lina is a certified specialist within the building accreditation system Miljöbyggnad and has experienced in managing both Miljöbyggnad and LEED certification processes. She is additionally responsible for Ramboll Sweden’s development of their LEED certification services. In city planning projects, Lina works with the Swedish urban planning sustainability process certification system, Citylab.
**SPECIALISTS**

**MAGDALINI MAKRODIMITRI**
Senior sustainability engineer  
United Kingdom

Magdalini has extensive experience on environmentally sustainable design of high profile projects within the UK and abroad. She has a wide experience working on sustainable masterplanning, residential developments, office, museums, mixed-use developments/towers, sports facilities, schools and many other high impact projects. Magdalini has previously worked with a number of organisations focusing on sustainable design and architectural practices. She specialises in building performance evaluation and high performance sustainable design. Magdalini has also experience in conducting, environmental design, code for sustainable homes, LEED and BREEAM assessments, energy modelling, building envelop optimization, building regulations Part L compliance, daylight design, comfort analysis and post occupancy evaluation studies. She is an accredited BREEAM Assessor in multiple schemes (Multi-Residential, Office, Industrial, Retail, Education, Higher Education, Healthcare, Courts, Prisons, Other Buildings, Bespoke).

**MONICA KVILJO**
Environmental Advisor  
Norway

Monica has a Masters of Science within energy and environment, with a specialisation towards environmental system analysis, climate change and sustainability. Her master thesis focused on the climate change impacts of co-firing forest biomass from Russia with coal in the Russian power sector, and used life-cycle assessment (LCA) as the analysis tool. So far in Rambøll, Monica has gained experience as the role of environmental advisor, developed several schemes for environmental management in various construction projects, as well as participated in both smaller and larger environmental assessments of health-hazardous substances in various types of buildings. Furthermore, Monica Kviljo has participated in a one-day introduction course to BREEAM-NOR organised by NGBC, and is a certified BREEAM International Assessor and BREEAM-NOR Assessor as of March 2014.

**PAULA RANTANEN**
Consultant  
Finland

Paula works in Green building and sustainability consulting department in Espoo Finland. She has experience in a number of challenging and diverse environmental rating projects as a project manager and as an environmental expert. Her responsibility has been setting and implementing of environmental targets, carrying out energy efficiency analysis for buildings and guiding design and construction work. She has also experience in evaluation of building’s carbon footprint and Life Cycle Analysis. She is LEED Accredited Professional and has been part of several office, shopping center, library and even data center certification projects. She has also worked in architect competition projects as setting sustainability criteria as well as been part of supporting panel. She also has experience on sustainability due diligent projects where buildings features are evaluated according to LEED or other green building certification criteria.
Pernille holds the position as Client Consultant and has a strong background in architectural practices specializing in designing buildings with laboratory and office facilities. As a Project Manager she involves the relevant competencies in Ramboll in order to meet the needs of the client and the complexity of the project. She is dedicated in implementing a constant dialog with all the stakeholders and contributing to a collaborative atmosphere. Pernille is also one of the key developers of the Human Factor Design (HFD), a holistic analysis and programming method that aims to improve employee welfare in the pharmaceutical industry. Through HFD it is possible to e.g. improve staff attraction and retention, reduce sickness absence, reduce risk of procedure failures and mistakes, and support product quality. Pernille has planned and executed several tenders including the pre-qualification of consultants and execution of project competitions. She has experience in developing the briefs and facilitating the evaluation process etc.

Rana works as Senior Building Physicist at Ramboll Sustainability & Design Innovation and has contributed to complex projects with the highest aspirations for sustainability including goals for net zero energy, competitions for international airports in remote locations and projects for Middle Eastern government institutions. She utilizes building physics principals to optimize design parameters with the goal of achieving sustainable and low energy demanding buildings and master plans. Through the software IES Virtual Environment, Rana evaluates the energy performance of a design for LEED certification and local code compliance. Rana also carries experience in Energy auditing to optimize the energy use and facilities management of existing buildings.

Satheesh brings over 35 years of experience, having worked on a variety of large scale high value international projects. Satheesh constantly demonstrates an outstanding ability to understand the customer’s needs and challenges and assists the customer in meeting his objectives. His current research includes studies in the field of high performance liveable buildings. As an ambassador of thought leadership he has applied new technics like matrix management, mind mapping, systems thinking, multi stage brain storming, Leadership and intelligence management into the building services business plan. He is probably instrumental in developing the world’s first 3D business plan. He is a current member of the central excellence panel and training panel in Ramboll . He is also a member of CIBSE, IET and IEEE. Satheesh is also an enthusiastic proponent of innovative leadership and corporate values and has coached, mentored and run seminars in a number of countries.
SOPHIE CHISHOLM
Senior Sustainability Consultant
United Arab Emirates

Sophie has significant technical experience in environmental policy, post occupancy evaluation, energy management and aspects of energy engineering. This is atop an academic grounding in sustainable architectural design, building physics and renewable energy systems. She has played key roles in delivering large-scale, UK Government-funded projects during which she developed a strong skill-set in benchmarking, building portfolio management and stakeholder management. As an energy consultant for public sector, national and global clients, Sophie has experience in energy auditing, energy reduction strategies, resource management, the retrofit of large-scale energy efficiency measures, and recommissioning. Her extensive work in the operational side of the construction industry has also led to an expertise for energy efficiency risk identification and mitigation in projects at the design and construction stages. Sophie is a member of the Energy Managers Association, IEMA and the CIBSE Energy Performance Group.

SUNNIVA BAARNES
Environmental consultant
Norway

Sunniva wrote her thesis on a passivhouse project with energy calculations (Simien), building physics and GHG (green house gas) accounting. She previously worked as a structural engineer with environmental consultants and is now working as an environmental consultant herself in Building Environment. Sunniva works on projects outlined by BREEAM, Framtidens byer and Futurebuilt with GHG accounting, material assessment and reporting. She also conducts environmental surveys (identification of hazardous materials as asbestos, PCB, lead, mould etc. in buildings) and presentations and courses in materials science and GHG accounting. Sunniva focuses on thorough research and realistic solutions in projects. Through several large and small projects, she has acquired a good knowledge of health- and environmentally hazardous substances in building materials as well as effective solutions to reduce greenhouse gas emissions.
New Children's Hospital, Helsinki, Finland
Image: SARC Architects