CORPORATE SUSTAINABILITY
CASE STUDIES 2016

Featuring Singapore Apex Corporate Sustainability Awards 2016 Winners
MEINHARDT (SINGAPORE) PTE LTD

WRITTEN BY:
DIANA CHNG
GLOBAL COMPACT NETWORK SINGAPORE

TAYEF QUADER
NANYANG BUSINESS SCHOOL
NANYANG TECHNOLOGICAL UNIVERSITY
In Singapore, since the launch of Singapore’s Building and Construction Authority (BCA) Green Mark scheme\(^2\) in 2005, the number of green buildings in Singapore has grown exponentially from 17 in 2005 to more than 2,100 in 2014. This translates to about 62 million square metres of gross floor area (GFA), which is equivalent to 25% of the total built-up area in Singapore.

In 2016, Singapore was ranked second among global cities for green buildings\(^3\). Today, the BCA Green Mark scheme is not just applied to new and existing individual buildings, but also deployed to promote environmental sustainability beyond buildings. This includes parks, supporting infrastructures, districts, rapid transit systems, and even occupant-centric spaces within buildings such as in supermarkets, restaurants and healthcare facilities.

### COMPANY PROFILE

Meinhardt Group is a multi-disciplinary engineering company with offices in 47 countries worldwide. The company employs close to 4,500 staff and provides engineering consulting services in civil and infrastructure, planning and urban development, structural engineering, mechanical, electrical and plumbing engineering, project management and water and environment engineering.

The Group was established in 1955 in Australia and is now headquartered in Singapore since 1974. The Group provides a one-stop approach for comprehensive project delivery, offering clients original and highly buildable design solutions. Over the years, Meinhardt has been involved in a number of international and local projects which include iconic landmarks such as Singapore’s Gardens by the Bay, The Sail @ Marina Bay, KL Sentral, The River in Bangkok, Bank of China building in Hong Kong and the Dubai Mall among others.

Over the past decade, Meinhardt has won more 350 awards globally for its engineering services and has the highest number of BCA’s Green Mark Platinum and Gold Plus awards in Singapore.
CORPORATE SUSTAINABILITY COMMITMENTS

SUSTAINABILITY STRATEGY
Sustainability is essential to the long term future of Meinhardt and is built into the way the Group conducts and operates its business. From corporate social responsibility to producing environmentally sustainable designs, Meinhardt endeavours to contribute to the global community to enhance and preserve the built environment.

The Group views health and safety as a top priority and implements procedures rigorously for both its employees and end-users. The Group’s operating facilities are ISO 9001, ISO 14001 and OHSAS 18008 certified.

ENVIRONMENTALLY SUSTAINABLE DESIGNS
Sustainability is integral to Meinhardt’s core business and the Group has always prioritised it in its engineering design and projects. It pursues sustainability by looking at how its designs and solutions impact the environment. In every project the company undertakes, it embeds a design philosophy that promotes environmentally beneficial solutions and technologies that optimise energy and resource utilisation.

In addition to bringing new business and customers, Meinhardt’s promotes environmentally sustainable designs through:

- energy and water savings through use of green and renewable energy technologies
- lower operational costs through management of lifecycle costs
- higher building performance
- improved occupant comfort
- healthier building environment
- responsible sourcing of materials

Some of Meinhardt’s recent Green Mark Platinum projects include the Tanjong Pagar Centre, Telin-3 Data Centre, Park Place Residences @ Paya Lebar Quarter, Assisi Hospice, Lee Kong Chian School of Medicine (Yunnan), SBF Center, SMU Law School, Yale-NUS College, Orchard Gateway, Asia Square Tower 1, Credit Suisse Regional Data Centre, City Square Mall and Resorts World Sentosa.

CARBON FOOTPRINT
In order to maintain a forward-looking approach, Meinhardt closely monitors and takes steps to minimise carbon emissions. It conducts life cycle assessments on its engineering projects in energy content, construction, operation, maintenance and end of life disposal. In addition, Meinhardt adopts a proactive approach towards actualising various commercially and operationally sustainable design solutions that minimise its carbon footprint, protecting the environments in which it promotes work, live and play.

USE OF TECHNOLOGY
Green buildings are one of the most important elements in the discussion of sustainable development. Accounting for more than 40 per cent of energy use and responsible for an estimated 30 per cent of city-wide emissions, buildings make up the largest energy-consuming sector worldwide.

Through the use of technology, Meinhardt helps its clients address the global energy challenge by reducing the negative impact during the design and construction process. The company has pioneered the use of artificial intelligence in air conditioning, power and lighting control system which uses energy proportionately according to the occupancy and activity levels of the building. This enables energy savings of over 30% compared to conventional solutions.
A CASE STUDY OF MEINHARDT’S SUSTAINABLE DESIGN PHILOSOPHY

In every project that Meinhardt is involved in, the Group embeds a design philosophy that meets the needs of the client and community while ensuring the solutions are environmentally sustainable.

Meinhardt was involved in the construction of the recently completed Assisi Hospice as the M&E Engineer, Structural Engineer and environmental sustainable design (ESD) consultant for the building.

As a key player in the design and construction of the hospice, Meinhardt’s ESD team performed solar studies and energy modelling for the project as can be seen in Figures 1 and 2.

The development’s energy efficiency index (EEI) is approximately 177.08 kWh/m²/year; the proposed model saved 33.15% of energy from the baseline model. The overall annual energy saving was estimated as 169905.49 kWh, this is equivalent to $233,861.10 (based on tariff of $0.20/kWh).

FACADE SYSTEMS

The building façade has been designed integrating passive design concepts. The building has been shaded with the use of horizontal as well as vertical fins. The design team, comprising Meinhardt’s engineers selected energy efficient and high performance glazing which achieved 35.3 W/m² for the overall envelope thermal transfer value (ETTV). This ETTV figure meets Green Mark Platinum standard (i.e. below 40 W/m²). The façade systems are designed to be durable and permeable, effectively optimising natural ventilation and daylight in campus areas. The architectural elements were designed in synergy with the existing compound and built with the flexibility for future expansion.

Staying true to its design intent, the building forms and materiality provides a recognised architectural expression, demonstrating a commitment to environmentally sustainable design, sound buildability principles combined with select material innovation. The new campus incorporated low energy and smart systems for environmental control into its architecture. A well-integrated building management system, the team employed extensive conservation strategies to manage energy and water consumptions.

AIR-CONDITIONING AND VENTILATION

The chiller plant system achieved overall efficiency of 0.70kW/ton. The plant efficiency meets Platinum certification requirement. Carbon monoxide (CO) sensors were installed in the basement carpark to monitor the level of CO, making sure that the carpark is adequately ventilated. Car Park Guidance System has been installed as a Green Innovative strategy. Ultraviolet light –C band (UV emitters) were installed in all air handling units for improved air quality. In addition, automatic Tube cleaning system for Heat Exchangers have been introduced for heat exchanger operation with better efficiency.

ARTIFICIAL LIGHTING CONTROL

Motion sensors are installed in the building’s staircases. These sensors help to save significant amount of lighting energy annually. High frequency ballasts were used throughout the development. The lighting power density (LPD) design achieved approximately 36.2% saving from $S530.

DAYLIGHT UTILISATION

Sun Pipes have been used to harvest the natural daylight and reduce the artificial light consumption. A technology called cool-tube along with specially designed optical lenses was also used to disperse daylight throughout the area to reduce the glare and visual comfort.
CONSTRUCTION & STRUCTURE

The project achieved a concrete usage index (CUI) which meets the requirement for Platinum certification. Usage of Green Cements and Recycled Concrete Aggregates and Washed Copper slag has been used as a sustainable initiative.

WATER FITTINGS

The buildings have water efficient fittings (covered under WELS) installed and these fittings have excellent WELS rating which is estimated to generate 913% water savings compared to code compliant buildings.

SAVINGS

<table>
<thead>
<tr>
<th>Key KPIs</th>
<th>Estimated savings during any operational year</th>
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</thead>
<tbody>
<tr>
<td>Energy Saving</td>
<td>• 33.15% reduction compared to code compliance building</td>
</tr>
<tr>
<td></td>
<td>• 116305.49 kwh energy savings per year</td>
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<tr>
<td></td>
<td>• $233861.10 savings per year (based on $0.20 per kWh)</td>
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<tr>
<td>CO₂ emission reduction</td>
<td>• 584.52 tonnes (based on the assumption of 500g of CO₂ produced for every kWh electricity consumed)</td>
</tr>
<tr>
<td>Water Saving</td>
<td>• 9.13% savings compared to code compliance building (operational phase)</td>
</tr>
<tr>
<td></td>
<td>• 10163.79 m³/ year</td>
</tr>
<tr>
<td></td>
<td>• $33,449 savings per year</td>
</tr>
<tr>
<td>Expected overall annual cost savings in water and energy</td>
<td>• $267,310.10</td>
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ENVIRONMENTAL COMMITMENT

Meinhardt recognises its legal and social responsibility to prevent pollution and other adverse impacts on the environment resulting from its day-to-day consulting services. Hence, senior management at Meinhardt is committed to:

• Meet and exceed statutory and regulatory requirements and best-practice guidelines in environmental performance;
• Consult with employees, suppliers and the community where applicable on environmental issues;
• Implement environmental sustainable design principles; and
• Minimise any adverse impacts we have on the environment, through efficient use of resources and ongoing reductions in emissions and waste.

The organisation’s Environmental Policy, which is continually reviewed to improve standards, awareness and performance serve to:

• Encourage all levels of management and staff to adhere to and contribute ideas, in improving our current environmental practices for all the services we provide;
• Take into account environmental factors when considering our future business plans;
• Minimise waste and the consumption of energy, water and other consumables, so as to provide a cleaner environment for future generations;
• Encourage a culture of sustainability “REDUCE, REUSE, RECYCLE” in our day-to-day activities as a business;
• Undertake regular monitoring and provide reporting against these indicators to staff and other stakeholders where appropriate.

Environmental, Quality and Health & Safety Policy

BizSafe, OHSAS 18001
Meinhardt believes that every employee should contribute to a greener workspace and this starts with little actions such as switching off the lights, shutting down the computers at the end of the day and using recycled paper. In establishing this culture, Meinhardt minimises waste and the consumption of energy, water and other consumables which translates to a greener environment.

In 2016, Meinhardt’s office was certified an Eco-Office for the second time by the Singapore Environment Council. A Green Committee comprising seven core members identified and tracked the following environmental impact indicators:

- Power Index – Measured in kWh/m²Y and kWh/person
- Paper Waste Index – Measured in ream/m² and ream/person
- Water Index – Measured in L/m²Y and L/person

When purchasing office equipment, Meinhardt works with vendors who have ECO Green Certifications. Through these eco-office initiatives, Meinhardt achieves cost savings and promotes the sustainability message to its staff and vendors.
CORPORATE SOCIAL RESPONSIBILITY PROGRAMME

In 2012, Meinhardt launched its Corporate Social Responsibility programme promoting community service, green-office habits and healthy living. The programme serves to:

• Promote engagement between staff and the community;
• Support local community groups and charities;
• Improve the environment in and around its operations;
• Promote broader opportunities for workplace learning;
• Contribute to the development and education of young people;

As part of its philosophy to contribute to the economy, Meinhardt provides scholarships and donations to beneficiary organisations which include BCA, NUS, SUTD, NTU, Singapore Table Tennis Association, Community Chest, and others.

HUMAN RESOURCE PRACTICES AND MANAGEMENT

By investing in developing local people and understanding local cultures, Meinhardt's staff strength grew to over 4000 staff across 40 countries. The organisation recognises that staff play a big role in its success and ensures they receive the appropriate training and are assessed on their performance.

At Meinhardt Singapore, 74% of the staff is recruited locally while 26% are non-local. Besides investing in training, Meinhardt has staff engagement programmes such as long service awards, monthly fruit day, family days and talks on health issues. There is also a Staff Suggestion Scheme where they are rewarded if their suggestions are implemented.

CONCLUSION

Meinhardt has successfully championed sustainability trends and contributed to the national and global economy with its sustainable business practices, pro-environment operations and performance management systems, corporate social responsibility, innovation and green technology implementation.

While it strives to deliver technical excellence, and accomplish high engineering standards; Meinhardt also ensures that the design solutions they offer are viable, cost-effective and eco-friendly. This not only changes the way Meinhardt engineers design the buildings but also brought forth new growth opportunities which harmonises with the Group’s business strategy.


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THE AUTHORS FROM NANYANG TECHNOLOGICAL UNIVERSITY ARE:

DR. S. VISWANATHAN
Professor and Associate Dean (Research), Nanyang Business School

MR. TAYEF QUADER
Research Associate at the Centre for Business Sustainability, Nanyang Business School

THE AUTHORS FROM GLOBAL COMPACT NETWORK SINGAPORE ARE:

DR. RYAL WUN
Deputy Executive Director and Legal Director, Global Compact Network Singapore

MS. DIANA CHNG
Manager, Projects, Global Compact Network Singapore

MS. NUR AMIRAH SENIN
Senior Executive, Global Compact Network Singapore