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**JOINT OPENING KEYNOTE SESSION – WEDNESDAY 2 OCTOBER 2013 – 9AM**

- Dr. Twarath Sutabutr, Deputy Director-General, Department of Alternative Energy Development and Efficiency, Thailand
- Governor of Electricity Generating Authority of Thailand, Thailand
- Dr. Pyasavati Ammanand, Chairman, Energy for Environment Foundation, Thailand
- Mr. Markus Lorenzini, Head of Energy Sector, ASEAN Pacific Cluster, Siemens, Indonesia

**TOPICS DISCUSSED AT THE CONFERENCE INCLUDE:**

- Trends, Finance & Planning
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- Power Plant Technologies
- Operation, Optimization & Servicing

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JOIN US IN BANGKOK, THAILAND ON 2 - 4 OCTOBER 2013
FEATURES

10 SUSTAINABILITY: COVER STORY:
JTC wins BCA Green Mark Champion Award
Singapore’s leading industrial infrastructure specialist is rewarded for its environment-friendly developments.

14 MECHANICAL & ELECTRICAL ENGINEERING:
Energy usage by Original Equipment Manufacturers - busting the myths
Understanding the realities governing energy efficiency generates savings.

16 MECHANICAL & ELECTRICAL ENGINEERING:
SGBC and Carrier organise Distinguished Sustainability Lecture Series
The presentations, delivered over two sessions, covered various aspects of green buildings.

20 INDOOR ENVIRONMENT QUALITY:
Engineering a mould-free building
This is important for ensuring the health and productivity of people.

22 PROJECT APPLICATION:
JK Induction Highbay Lighting systems installed at Woodlands and Tuas checkpoints
The benefits include improved quality, less maintenance and energy savings.

24 PROJECT APPLICATION:
Siemens contributes to infrastructural development of New York City
A first-hand report on a few important projects undertaken by the company.

32 ENVIRONMENTAL ENGINEERING:
‘Baffling’ solution makes airport pollution ‘take off’
A method to reduce the effects of emissions from aircraft engines is presented.

33 ENVIRONMENTAL ENGINEERING:
Flood defence idea wins investment support
The innovation could replace sandbags currently used to resist rising water levels.

33 ENVIRONMENTAL ENGINEERING:
‘Magnetic soap’ could be a safer way to clean up oil spills
The research work has produced interesting results.

REGULAR SECTIONS

02 IES UPDATE
34 EVENTS
40 NEWS
Message from the Chairman, Environmental Engineering TC

This year, the haze in Singapore, caused by forest fires in Indonesia, reached its highest level in 16 years - which is indeed very worrying.

The reason for the smog is said to be the slash and burn agriculture adopted by farmers, which has the advantage that land can be cleared cheaply and the ash produced by the burning provides the nutrients for the next cycle of crops to grow, although, in course of time, the procedure causes depletion of the soil nutrients.

At the same time, the slash and burn cultivation releases nitrogen, sulphur and carbon into the atmosphere. And when the atmospheric pollution reaches dangerous levels, like what we encountered recently, it not only causes discomfort but is actually harmful to health. The greenhouse gases released also contributes to climate change.

The solution to the problem lies, on the one hand, in the rapid detection and accurate location of slash and burn activities and in the deployment of efficient fire-fighting equipment and techniques, and on the other hand, in the development and implementation of alternatives to slash and burn agriculture.

The development of new and improved technologies can help in several ways, as for example, in the detection of fires and in fire-fighting, and in the production of low-cost fertilisers, the distribution of which will make the production of ash through burning unnecessary.

The World of Engineers’ Summit 2013, which will be held in Singapore, in September and which will address the theme ‘Innovative and Sustainable Solutions to Climate Change’, could provide an international platform for an exchange of ideas on how engineers could help address the problems caused by slash and burn agriculture.
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COURSE PREVIEW

14 August 2013, Wednesday
7.00pm to 8.00pm
Somerset City Campus
To register, call: 6733 5731
e-mail: enquiry@saage.edu.sg

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w: [www.saage.edu.sg](http://www.saage.edu.sg) t: 6733 5731 e: enquiry@saage.edu.sg f: facebook.com/SAAGlobalEducation
IEM delegation visits Singapore

On the invitation of Er. Alfred Wong, Chairman of the IES Environmental Engineering Technical Committee, a delegation from the Institution of Engineers, Malaysia (IEM) paid a two-day visit to Singapore.

Ir. Fan Hong Poh, Chairman of IEM ENETD and 10 delegates were in the republic on 27 and 28 May 2013.

The visitors were received by IES President, Prof Chou Siaw Kiang and Er. Alfred Wong. Following a short briefing, the delegates proceeded to the lunch reception.

After the lunch reception, the delegates were invited to attend the talk on ‘Solar in the City State’, which was organised by the IES Environmental Engineering Technical Committee for IES Members.

After the talk, the IEM delegates continued their programme, with visits to Marina Barrage and Gardens by the Bay.

On the morning of 28 May, the delegates visited the Changi Water Reclamation Plant (CWWRP). The visit was arranged by the IES Environmental Engineering Technical Committee.

The delegates were greeted by Mr Lim Swee Sen, Principal Engineer who briefed the delegates on the Deep Tunnel Sewage System (DTSS) and organised a guided tour of the plant.

The delegates continued their technical visit to the NEWater Visitor Centre in Bedok, which gave them an insight on the treatment processes for obtaining NeWater.

Talk on ‘Solar in the City State’

The IES Environment Engineering Technical Committee Chairman, Er. Alfred Wong invited Mr Christophe Inglin, Managing Director of Phoenix Solar Pte Ltd to give a talk on ‘Solar in the City State’, on 27 May 2013 at IES Auditorium.

The afternoon talk was attended by 45 participants from various industries including a 11-member delegation from the Institution of Engineers, Malaysia, that was visiting Singapore.

Mr Inglin’s presentation illustrated some projects funded by the CERT (Clean Energy Research and Testbedding) Programme, as well as some Green Mark projects.
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IES UPDATE

Courteous visit by delegations from Kenya and Hong Kong

IES warmly welcomed to its premises two groups of delegates, one from the National Construction Authority (NCA) of Kenya, on 11 June 2013, and the other from The Hong Kong Institution of Engineers (HKIE), on 13 June 2013.

The delegation from Kenya, which was headed by Arch Daniel O Mandukuas, was received by IES Deputy President Er. Chong Kee Sen and CEO Ms Angie Ng. IES was also pleased to have the presence of Er. Louis Tay, Managing Director, Aviation & City Management & Africa, Surbana International Consultants Pte Ltd, during the visit.

IES presented a video on ‘IES 2012/2013 Year in Review’ to the delegates, which includes the various activities and media coverage that took place during the year.

A presentation by Surbana on ‘Sustainable Developments - A Singapore Perspective’ was presented to the NCA delegates, so as to give them a better understanding of the construction industry in Singapore and how prefabrication assists in shortening the time taken to build an HDB flat.

HKIE President Ir. Prof Choy Kin Kuen and his delegation of eight protégés were received by the following IES Representatives: Er. Chong Kee Sen, Deputy President; Er. Seow Kang Seng, Honorary Treasurer; Ms Fam Mei Ling, Council Member; Er. Edwin Khew, Council Member; Mr. Lee Kwok Weng, Council Member; Er. Emily Tan, Council Member; and Ms Angie Ng, CEO.

IES also invited student representatives from Nanyang Technological University (NTU) and Temasek Polytechnic (TP) to join in the meeting. As a result, the students were able to have a brief exchange of views with the HKIE protégés and gain an understanding of what inspires them to take on a career as an engineer.
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Employers bear responsibility on various levels: they should protect employees and business processes, conserve resources, exploit potential for energy savings and engage in sustainable energy management. Intelligent building technology supports these endeavors, makes energy savings of up to 50 percent possible and reduces CO₂ emissions – without compromising comfort. The high-precision interaction between building automation and security systems ensures greater security, flexibility and efficiency of the building, which pays off day after day. That’s why Siemens continues to be the preferred partner of farsighted employers.

Answers for infrastructure.
Pro-bono partners helping to make IES Building project a reality

Representatives of some of the companies that are contributing valuable time, materials and manpower, give reasons for their involvement in the project and outline the scope of their work.

Mr Koo Chung Chong, Executive Director of CS Construction & Geotechnic Pte Ltd

“We were invited by then IES Vice President (now Deputy President) Er. Chong Kee Sen to participate in the piling works for the redevelopment of IES Building. He was looking for a piling method that is environment-friendly, so that it causes no disturbance to the neighbours of IES. As part of our social corporate responsibility, we accepted the IES invitation to propose and sponsor an environment-friendly pile installation system. IES is surrounded by schools, and part of the redevelopment is on a slope, thus we felt that we can contribute to this redevelopment by proposing the use of our jack-in piling and micro-piling systems. Jack-in piling is a more economical system, compared to micro piling, thus we proposed jack-in piles to be used on the less challenging terrain, and micro piles on those areas nearer or below the slope. Both methods are noise- and vibration-free, which suits the environment around IES.

Various stages in the piling work
Before the award of any contract, we normally visit the site to ensure the suitability of the proposed piling system. If the site is located near residential or sensitive locations, we will advise our clients to use a suitable piling system that would minimise disturbance to the neighbours.

Once the piling system is confirmed, we will prepare the applications to authorities for permits, create access within the site, and set up site facilities like wash bay, site office, toilets etc. We will also conduct a photographic pre-condition survey around the site, commission a pre-computation survey by registered surveyors and a CCTV sewage survey, install essential monitoring instruments around the site etc. Upon the approval of all the surveys and permits by the architect and authorities, we will commence our piling works.

Challenges relating to the environment and ground conditions
The challenges that we are facing these days relate to the environments neighbouring our piling sites. As Singapore is getting more and more built up, it is very important to ensure that piling works are carried out with minimum disturbance to neighbours working or living around the site. The most common issues in piling sites are vibration and noise. We need to use the right system to install piles without causing excess noise and vibration, and also ensure that the installed piles achieve their design capacities.

Another challenge is to ensure that public and private properties are not damaged. This can be overcome by carrying out an environment impact assessment before commencement of piling works, to anticipate the damage that could be caused during the piling works. From this assessment, we will decide on the form of instrumentation to be installed in order to monitor any soil movement and also to determine the sequence of piling works”.

Mr Tan Bian Tiong, Chief Executive Officer, Excel Precast Pte Ltd

“I am an active member of IES so when IES approached me to participate in the new building project, we decided to offer precast products.

After we examined the drawings we found that the feasible precast components that we can offer are the precast columns with consistent dimensions of 400 mm x 400 mm. The precast columns will be provided for 1-, 2- and 3-tier columns. But the length of the precast 3-tier-column is limited to 12 m due to the LTA limitations on transportation without escort.

Specifications of the precast columns
We complied with the specifications given by the structural consultant for the precast columns. High yield rebar with a minimum tensile strength of 460 N/mm² and Grade 40 environment-friendly Green Concrete are used. Excel Precast is one of the first precasters to use Green Concrete in structural precast components.

Special considerations
There are some special considerations in the implementation of this project, for increasing the productivity.

- The use of a ‘socket’ connection between the precast columns and the foundation pile caps will eliminate the overcrowded
lapping and congestion of rebars that will make it difficult to cast the concrete.

• The use of a ‘box system’ avoids punching holes on the metal mould for the dowels to connect the columns to the retaining walls.
• The lightning arrester conductor will use the column rebars, saving the use of electrical cable and it will be very well protected inside the precast columns.
• The cast-in-item steel angle protection in carpark driveway areas will eliminate the steel angle installation on site and minimise the finishing works”.

Mr Loh Zhi Ming, Sales Manager, Industrial Concrete Products Sdn Bhd

“The main reason for participating in this esteemed project is to introduce our high strength spun concrete piles (concrete grade 90) as an alternative (and a greener system in comparison) to conventional foundation systems, such as RC square piles and bored piles.

Advantages of spun piles
• By using the hydraulic injection system, our high strength spun concrete piles are installed in an environment-friendly manner, free from vibration and noise.
• With the use of grade 90 concrete, we are using less material (such as cement and aggregates) compared to RC square piles and bored piles which are generally based on a concrete strength below grade 45. Using less material means more protection to our planet.
• Compared to bored piles, we do not go through the hassle of moving soil out of the project site in an urban environment, thus maintaining the cleanliness of the city. Our products are made under indoor factory conditions, with better quality control compared to bored piles.

Application of spun piles in the project
Our spun piles are used for the foundation system to support the building. The piles are installed by using the hydraulic injection system.

Specifications of the spun piles
The specifications of piles used are Class B with grade 90 concrete. The diameter of piles used are 300 mm, 400 mm and 500 mm”.

Mr Ong Lian Teck, Group Business Development Manager, BRC Asia Limited

“We believe that engineers are value creators and we want to participate and contribute in IES’s mission to advance and promote engineering for the well-being of mankind.

We are providing the steel reinforcement for the project. The steel reinforcement will be used in the columns, beam and slabs. The reinforcement is manufactured to BS4449:2005 and are all made of steel grade B500B”.

IES Building Fund-Raising Golf Tournament

On 30 May 2013, about 150 golfers turned up at the Raffles Country Club to play a round of golf as part of the fund-raising activities for the new IES Building.

The winners were:

Division A (0 to 20 handicap)
1. Jeffrey Yu
2. Robin Chia
3. Lee Teck Leong

Division B (21 to 36 handicap)
1. Goh Peng Tong
2. Vincent Lim
3. Jonathan Yeo

During the dinner after the tournament, the winners in the two divisions were awarded prizes by the Guest-of-Honour; Er Dr Lee Bee Wah, Past President of IES, and four lucky draw prizes were given out by Prof Chou Siaw Kiang, President of IES.

In all, the event was a great success and raised about $110,000 for the Building Fund.
JTC wins BCA Green Mark Champion Award

The award is presented to leading developers and building owners who have demonstrated a high degree of Corporate Social Responsibility by actively promoting and driving Singapore’s green building movement.

To receive a Green Mark Champion Award from the Building and Construction Authority (BCA), the developer or building owner has to deliver at least 10 projects rated Green Mark Gold and above, including at least six projects rated Green Mark GoldPlus and above, which in turn should include at least three Green Mark Platinum-rated projects.

JTC Corporation (JTC), which currently has 10 projects rated Green Mark Gold and above, including six Platinum, three GoldPlus and one Gold rated projects, received the Green Mark Champion Award, at BCA AWARDS 2013.

Mr Png Cheong Boon, CEO of JTC, said, “JTC is honoured to receive the BCA Green Mark Champion Award for 2013, which is testament to JTC’s growing commitment to environmental sustainability. As Singapore’s leading industrial infrastructure specialist, it is crucial for JTC to play an active leadership role in environmental sustainability and stewardship. Sustainability is a key consideration in our master plans and developments, and we are continuously stepping up on our efforts to address environmental challenges in a pragmatic manner”.

‘BCA is pleased to confer this award to JTC Corporation for seeing through their commitment towards environmental sustainability. Apart from greening their building projects, they have also embraced green district design under the Green Mark for Districts scheme for CleanTech Park, the first project to attain the highest Green Mark Platinum rating since its launch in October 2009. In developing Singapore as a model green city, we need to move towards this green paradigm, of green buildings, green districts, parks and other infrastructure and facilities to enable us to achieve social, economic and environmental sustainability. BCA encourages more owners, developers and master planners to set their sights on attaining the BCA Green Mark Champion and Platinum Champion status to firmly anchor themselves as champions for sustainability of our environment”, said Dr John Keung, CEO, BCA.

JTC’s emphasis on sustainability

As Singapore’s leading industrial infrastructure specialist and a socially responsible corporate citizen, JTC creates value for customers by developing sustainable and future-ready industrial infrastructure solutions that will differentiate Singapore as an investment location. Landmark projects by JTC customised for industry clusters include CleanTech Park, Jurong Island, Seletar Aerospace Park, water fabrication parks, Tuas Biomedical Parks, and Biopolis, Fusionopolis and Mediapolis at one-north. Other key projects in JTC’s portfolio include Tukang Innovation Park, MedTech Park, business parks, as well as logistics hubs. Today, these industrial estates and business parks are home to a host of renowned global companies and promising local enterprises. Sustainability is a key driver of JTC’s innovative culture, and is recognised as the way forward for industrial developments. Green building strategies and eco-friendly features are actively being incorporated in JTC’s developments, and innovative technologies and initiatives are being test-bedded by JTC to optimise resources. JTC also strives to explore creative space solutions to increase land productivity in land-scarce Singapore with ground-breaking projects such as the Jurong Rock Caverns, Southeast Asia’s first subterranean storage facility for liquid hydrocarbons.

<table>
<thead>
<tr>
<th>Project</th>
<th>Category</th>
<th>BCA Green Mark Award</th>
<th>BCA AWARDS Year</th>
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<tbody>
<tr>
<td>15 Changi Business Park Central 1</td>
<td>Existing Non-Residential Building</td>
<td>Gold</td>
<td>2013</td>
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<tr>
<td>Mediapolis</td>
<td>District</td>
<td>GoldPlus</td>
<td>2011</td>
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<tr>
<td>Biopolis Phase 1 at one-north</td>
<td>Existing Non-Residential Building</td>
<td>GoldPlus</td>
<td>2013</td>
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<tr>
<td>Fusionopolis Phase 1 at one-north</td>
<td>Existing Non-Residential Building</td>
<td>GoldPlus</td>
<td>2013</td>
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<tr>
<td>Fusionopolis Phase 2A at one-north</td>
<td>New Non-Residential Building</td>
<td>Platinum</td>
<td>2012</td>
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<tr>
<td>United World College of South East Asia (East Campus)</td>
<td>New Non-Residential Building</td>
<td>Platinum</td>
<td>2010</td>
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<tr>
<td>CleanTech One</td>
<td>New Non-Residential Building</td>
<td>Platinum</td>
<td>2011</td>
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<tr>
<td>JTC’s CleanTech Park Green Core</td>
<td>New Parks</td>
<td>Platinum</td>
<td>2011</td>
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<tr>
<td>The JTC Summit</td>
<td>Existing Non-Residential Building</td>
<td>Platinum</td>
<td>2013</td>
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<tr>
<td>CleanTech Park</td>
<td>District</td>
<td>Platinum</td>
<td>2013</td>
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</table>

JTC’s projects rated Green Mark Gold and above.
With its emphasis on innovation and speed of implementation, JTC is well-positioned to develop quality industrial infrastructure that will differentiate Singapore as a choice investment location.

The JTC Summit
The JTC Summit exemplifies the corporation’s sustainability and land intensification efforts. The building, which is the headquarters of JTC, also symbolizes the constant pursuit of new heights of excellence in products and services.

CleanTech Park and CleanTech One
With a ‘blue network’ of water bodies, including streams, bioswales and ponds, as well as a compact and ‘walkable’ district pattern for the working community, CleanTech Park is the first development to clinch BCA’s Green Mark for Districts Award with the highest Platinum rating. The 50-hectare eco-business park, located next to Nanyang Technological University, boasts energy-efficient infrastructure and public amenities that can potentially help save more than 40% of energy consumption and 25% of potable water usage. In keeping with the green focus of CleanTech Park, JTC has also planned for a district-level energy monitoring and automatic control system to monitor and optimise energy consumption and performance of buildings in the park.

Serving as the gateway to CleanTech Park, CleanTech One is the first multi-tenanted BCA Green Mark Platinum building in the park. The iconic CleanTech One, with its unique green features such as a sky trellis, landscaped sky gardens and a green perforated façade that provides optimal solar orientation, offers attractive new green work spaces for cleantech professionals. To-date, it has anchored world class research institutes such as the Nanyang Environment and Water Research Institute (NEWRI), the Solar Energy Research Institute of Singapore (SERIS), as well as top global companies such as DHI Water & Environment, Toray Industries and Yingli Solar.

Biopolis Phase 1
Positioned as Asia’s premier research hub developed to boost the Singapore’s biomedical industry, Biopolis will anchor the entire life sciences R&D value chain. It is now thriving with a vibrant community of well-known pharmaceutical companies as well as researchers from the private and public sectors.

Fusionopolis Phase 1
Fusionopolis Phase 1, comprising Symbiosis and Connexis North and South, is a vibrant cluster that offers facilities, infrastructure and an environment conducive to growth in info-comm technology, media, physical sciences and engineering industries. The presence of major players here creates significant synergies for these industries, thus promoting possibilities in scientific research and technological breakthroughs.

United World College of South East Asia (East Campus)
United World College of South East Asia (East Campus), boasts ‘green’ walls, naturally ventilated interaction zones, as well as an elevated podium that connects the various schools, thus freeing up space beneath for other uses. This provides a conducive green environment for the campus community.
Biopolis Phase 1, a premier research hub for biomedical sciences, has been purpose-built to house key public and private biomedical research institutes and organisations. It is also the first major development in one-north.

Fusionopolis Phase 1 comprises the Symbiosis and Connexis North and South towers. This vibrant cluster in one-north introduces facilities, infrastructure and an environment conducive to growth in infocomm technology, media, physical sciences and engineering industries.

The iconic CleanTech One, with its unique green features such as a sky trellis, landscaped sky gardens and a green perforated façade that provides optimal solar orientation, offers attractive new green work spaces for cleantech professionals.

All images by JTC Corporation.
World Engineers Summit (WES) 2013
Innovative and Sustainable Solutions to Climate Change
www.WES2013.org

CREATE AN IMPACT. SPREAD THE MESSAGE. INSPIRE ACTION.

WES Biennial Photography Competition
Jointly organised with The Photographic Society of Singapore (PSS).

“Environmental Sustainability – The Challenges”
Capture the essence of the environmental challenges facing the world and what is being done to overcome them.
Submit your photos now and stand the chance to earn your FIAP distinctions and win cash prizes!!

Two categories:
- Youth (16 – 21 years old)*
- Open
Take part in one or more sections:
- Digital Colour (PC)
- Digital Monochrome (BW)
- Digital Experimental (DE)
* Entry is Free for Youth Category

Submission Deadline: 26 July 2013

WES Young Engineers Competition
‘Trust Us, We Are Engineers’

Called “Trust Us, We Are Engineers”, the competition aims to:
1. Promote engineering as a course of study.
2. Raise awareness of energy sustainability and climate change issues.
3. Encourage young minds to propose innovative solutions to promote the Energy-Water-Waste nexus.

Calling on budding engineers to develop viable solutions to energy sustainability and climate change, the competition will focus on three key themes: Energy, Water and Waste. Entries will be judged based on the following criteria: Creativity, Technical Feasibility, Quality of Deliverables, Relevance and Cost Effectiveness.

If your proposed solution is shortlisted, we will fund you to build a prototype for the final round!

The best 8 finalists from each section will be awarded the following cash prizes:

<table>
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<tr>
<th>Prize</th>
<th>Secondary</th>
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<td>1st</td>
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<td>Commendation</td>
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In the Preliminary round, teams with a maximum of five members will submit a proposal, which should include a cost-benefit analysis. Teams that advance from this round will receive funding of S$5,000 per team to build their prototypes, which will be presented in the Final Round at WES 2013.


The inaugural World Engineers Summit 2013 is proudly hosted by Singapore and organised by the Institution of Engineers, Singapore.
Energy usage by Original Equipment Manufacturers - busting the myths

by William Hoo, Vice President, Industry Business Unit, Schneider Electric Singapore

In today’s economic climate, businesses everywhere regardless of industry are being forced to keep a close watch on their bottom lines, in order to continue staying profitable. As competition becomes more intense, generating additional revenues is going to be more difficult, and organisations are starting to look at making their business more efficient in order to reduce operational expenditures (OPEX).

The OEM industry has not been spared this trend either and we are seeing more of our OEM customers gravitating towards efficiency. In particular, they are looking towards making their operations more energy-efficient as the cost to power these machines is not insignificant. And with the increasing cost of electricity, it is imperative that OEMs start soon.

However, before starting on their journey, OEMs also need to understand the truth behind some of the widely held myths in the industry around sustainability and energy efficiency, that will help them in the effort to become more energy-efficient.

**MYTH 1:** It costs too much to be sustainable - energy-efficient or green manufacturing equipment demands too big an investment cost and as a result products will become too expensive to sell.

**THE REALITY:** The constraints of cost reduction, usage of resources and energy reduction are becoming key demands for manufacturing customers. Additionally, as consumers apply pressure to produce more sustainable products, they are also demanding greater transparency in how the products they buy are produced.

Just because a product is made from sustainable or recycled materials does not mean that the other aspects of its lifecycle are considered sustainable (ie material sourcing, production, packaging and transportation). For manufacturers to create a truly sustainable product, they need machines that operate efficiently and have green lifecycles.

Furthermore, end-users are now putting a greater focus on developing strategies to reduce their own operational and production costs, and as a result are looking for ways to reduce energy costs at the machine level. Experience shows that simply taking an active approach to energy efficiency can provide additional energy savings without incurring additional costs.

Mechatronic machine designs alone can provide up to 60% energy savings, in turn making for more productive machines. In addition to their consumption and sustainability benefits, they also create less waste, enjoy more flexible production and are more compact machines for end-users, with fewer components, optimised power and a smaller control panel.

There are a couple of recommended best practices for OEMs to incorporate energy efficiency into their machines, among which would be:

- Custom-sizing components and capabilities to meet specific customer needs, allowing significant reductions in both cost and energy footprints.
- Concentrating on building machines with better throughput and OEE (optimal equipment efficiency), in turn enabling machines to achieve a level of energy savings on their own - without increasing costs.
- Counselling customers to look at the total cost of ownership (TCO), allowing them to understand their energy costs year over year; and showing that value-added performance makes efficient machines less expensive over time.

**MYTH 2:** The purchase price represents the main cost of the machine. There are little to no lifecycle costs to worry about.

**THE REALITY:** Among expenses, from the acquisition to dismantling of a machine, the purchase price accounts for 2% to 3% of the overall cost over the machine’s lifetime. The remainder of the cost comes from its energy consumption. Fortunately, energy management solutions exist today to make the most of the available energy and minimise this cost. OEMs have a huge opportunity in helping to improve lifecycle costs, as machine engineering is the most critical source of improvement in this area.

An engineer’s goal should be to find the most efficient, economic, and competitive solutions - and motor selection is the result of these choices. Making intelligent choices about efficient motors can lead to almost 30% energy savings over the entire lifecycle of the machine. Precisely matching a motor to its application can achieve additional savings of 3% to 4%.

OEMs can differentiate themselves at this point in the supply chain by making their machines critically valuable to end-users by allowing them to meet sustainability demands. As a cornerstone of sustainability, energy efficiency becomes a key method to significantly deliver this value to customers.

**MYTH 3:** HVAC/R machines are just a small component of energy usage. It is the area in which I can focus the least, and can turn my attention to implementing energy efficiency in other areas.

**THE REALITY:** HVAC/R machines are the heart of energy performance in commercial buildings and facilities. The commercial building sector represents almost 42% of global electricity consumption, with HVAC/R systems representing up to 40% of a building’s energy use. The HVAC/R market is unique because it requires machines that exceed market demands at the lowest possible costs. OEMs want the fastest start-up times, while customers require the lowest possible electrical...
MECHANICAL & ELECTRICAL ENGINEERING

consumption, the simplest maintenance and a good initial functionality/price ratio.

Solutions such as single software solutions reduce complexity, programme design and implementation times. These solutions can offer up to a 50% drop in design and installation time. ‘Re-commissioning’ or even ‘continuous commissioning’ has also become an on-going requirement for a building’s HVAC/R mechanical systems in order to maintain peak energy efficiency throughout the life of the HVAC/R equipment.

The need for energy reduction throughout the entire lifecycle of a building has become an important goal for both end-users and OEMs. Due to recent attention around the emissions and energy use of commercial buildings, there is rising concern over their environmental impact.

For the HVAC OEMs, this goal demands higher efficiency ratings for their equipment and lower initial cost. This means the HVAC/R equipment controller must operate the machine at peak efficiency for both full load and part load, while communicating through the Building Automation System using a variety of protocols. For the end-user, it means finding cost-effective and innovative ways to reduce energy consumption.

At the same time, technology has reached the point where the contracting industry is facing increasing demand for technicians well-trained in the latest energy savings technology which can be provided by OEMs. It has become necessary to ‘dig deep’ into the operation of the HVAC/R equipment itself in order to deliver the best possible energy efficiency, while providing enhanced software features to the HVAC/R technicians and building owners with as much ‘plug and play’ application and functionality as possible.

CONCLUSION

While energy is typically the largest operating expense for businesses, contributing to approximately about a third of total operating costs, it is also one that is controllable. Making smart choices about energy-efficient equipment and having a comprehensive energy management programme in place can generate savings of up to 30%. These savings can help OEMs gain a competitive advantage by making their products and solutions more cost-effective and attractive to customers.

Schneider Electric launches initiatives to fight fuel poverty

Schneider Electric recently announced the launch of a programme to fight fuel poverty in mature economies. For the group, a global specialist in energy management, the aim is to tackle the energy gap through commitments to populations at the base of the pyramid all over the world.

With this programme to fight fuel poverty, Schneider Electric intends to develop, in mature economies, a similar approach to that already taken by the Group since 2009, promoting access to energy in new economies (ie BipBop). The first actions will focus on three main initiatives:

• Creating awareness and training of underprivileged populations, via partnerships with associations fighting fuel poverty. Recent partnerships developed by the Schneider Electric Foundation, under the aegis of Fondation de France, have committed to this approach.

• Investment in social and community enterprises focused on achieving better living conditions through clean and efficient energy. The impact-investment fund Schneider Electric Energy Access is instrumental in this field.

• Development of a dedicated and well-targeted offer for people in fuel poverty to help them measure their consumption and acquire fuel-saving habits in the long term.

“We are using innovation to reduce the energy gap we can see throughout the world. Although a third of our planet’s inhabitants benefit from secure, affordable energy, there are 1.3 billion people still without access to electricity and hundreds of millions in mature countries whose energy bills leave them in a situation of fuel poverty. Schneider Electric has set itself the goal of providing innovative solutions to tackle both problems, and this priority is at the heart of its economic and social responsibility”, said Jean-Pascal Tricoire, Chairman & CEO of Schneider Electric.

“Schneider Electric is setting up an ecosystem adapted to both new and mature economies, combining business and philanthropy with community, public and private partners. These ecosystems enhance development for the populations at the base of the pyramid, which benefit from it, but also drive innovation and value creation for Schneider Electric and its stakeholders”, explained Gilles Vermot Desroches, Sustainability Senior Vice-President of Schneider Electric and General Delegate of the Schneider Electric Foundation.

As with the initiatives for access to energy, employees and retirees from Schneider Electric will have the option of participating in these programmes to tackle fuel poverty. They will be offered assignments by the Schneider Electric Teachers association, created in 2012, to foster volunteering amongst the company’s skilled personnel.

The BipBop access to energy programme is continuing in parallel with this new commitment from Schneider Electric. Since 2009, 1.7 million households in new economies have gained access to reliable, affordable and clean energy thanks to Schneider Electric solutions. More than 25,000 people have been trained in energy management, and the dedicated investment fund has invested in three companies in Africa and India.

Schneider Electric

As a global specialist in energy management with operations in more than 100 countries, Schneider Electric offers integrated solutions across multiple market segments and has leadership positions in Utilities & Infrastructure, Industries & Machines Manufacturers, Non-residential Building, Data Centres & Networks and in Residential. The group’s 140,000 plus employees are focused on making energy safe, reliable, efficient, productive and green.

Schneider Electric Foundation

Created in 1998, the Schneider Electric Foundation contributes, together with its partners, to providing solutions to the energy challenges facing the most underprivileged populations all over the world. In new economies, the foundation supports vocational training in energy management, contributing to the access to BipBop, Schneider Electric’s energy programme. In mature economies, the foundation fights against fuel poverty, offering education and awareness programmes for households in this situation. In both cases, the commitment of Schneider Electric employees is at the heart of the foundation’s activities.
SGBC and Carrier organise Distinguished Sustainability Lecture Series

by Jeremy Chia

The objective is to promote a shared vision that can be realised through green technologies.

The Singapore Green Building Council (SGBC) and Carrier, a part of UTC Climate, Controls & Security (UTC CCS), a unit of United Technologies Corporation, co-organised two sessions of Carrier’s well-received Distinguished Sustainability Lecture Series. A Founding Member of SGBC in 2010, Carrier has been working closely with SGBC since its inception and helped bring the Lecture Series, first launched in the Middle East in 2011, to Singapore so as to educate building professionals and to promote a shared vision of a sustainable built environment. The two sessions, one held on 29 November 2012 and the second on 14 May 2013, brought together notable speakers who spoke on the importance of green technologies in the global context and the benefits of embracing sustainability as part of a business model.

Both sessions of the Lecture Series were opened by Mr John Mandyck, Chief Sustainability Officer of UTC CCS. As CSO, Mr Mandyck assesses global environmental trends to guide product development, brand positioning and market opportunities, while interfacing with global environmental stakeholders and leading Green Building organisations around the world. He has presented energy efficiency and sustainability strategies to audiences in Brazil, Europe, India, the Middle East and the US, among other countries.

The line-up for the first session included Mr Ng Eng Kiong, President of SGBC; Mr Valentine Lehr, Founder and Principal of Lehr Consultants International, an internationally recognised mechanical engineering consulting firm; Assoc Prof Lee Siew Eang, Board Member of the Building Energy Standard Review Committee; and Mr Ho Thim Seng, Vice Chairman of the Asia Institute of Intelligent Building (Singapore Chapter).
The line-up for the second session included Mr Nils Kok, Associate Professor at Maastricht University; Dr So Ping Lam, Associate Professor in the School of Electrical and Electronic Engineering at Nanyang Technological University; and Mr Huston Eubank, an international Green Building expert who currently serves as Chief Knowledge and Innovation Officer and Director of Consulting for Regenerative Ventures Inc.

**The Global perspective of sustainability**

In his opening speeches for both sessions, Mr Mandyck spoke on the global perspective of sustainability and Carrier’s role as a strong proponent of green technology education. The movement of people into cities has created an unprecedented situation. In 2009, for the first time in human history, more people lived in cities than in rural areas. This level of urbanisation is expected to increase, with the projection that more than two-thirds of the earth’s population will be living in cities by 2050.

This is significant because urban areas use more resources than rural areas and would put a considerable strain on the infrastructure needed to support that significant increase in urban population, making investment in green building technology of vital importance. As a large proportion of a building’s use of electricity presently goes into the HVAC (Heating, Ventilation, and Air-Conditioning) system of the building, Carrier saw the importance of becoming a change leader in the green technology movement and working with Green Building Councils around the world.

“Carrier understands the important balance between building technology today and the world we live in tomorrow. Singapore has an incredible opportunity to accelerate building efficiency and save energy”, Mr Mandyck said.

“It is not a question anymore that a major development will be green - it is only a discussion of how green”, he added.

According to a research study conducted by McGraw-Hill Construction and United Technologies, strong growth is expected in the global green building market. It has become a long-term business opportunity, with more than half of the firms studied saying that they are planning for more than 60% of their work to be green by 2015.

Client demand for green buildings has increased at an accelerated rate, driving the rise of green building construction and retrofitting. Green building activity has doubled every three years, with a projected 51% of all building projects being green by 2015. Singapore is a clear leader in this area. The main driver is the cost savings that green buildings provide through improved health and productivity and through more efficient use and conservation of resources over the long term, despite having a higher up-front cost.

Speaking about the change in how sustainability is viewed, Mr Mandyck said, “Five years ago, sustainability was an emerging fad in many markets across the world. Today, it is a market reality. I do not see any major development in almost any part of the world that will not be built green. In particular, Singapore is a growing global leader in the sustainability movement - in the regulations that are developed in Singapore, in the very sophisticated Green Mark programme and in the excellent work done by the SGBC”.

**Embracing sustainable technology**

Mr Valentine Lehr, a recognised industry leader, educator; lecturer and published engineer; spoke to the audience about change in sustainable practices and technology. He also illustrated the difference between simply having the capability to change as opposed to being a change driver - someone who initiates change.

Almost everyone is capable of change given the right mindset and personal involvement.

“To have technology work for them, people have to embrace it. If you look at any individual person, he is comfortable where he is and he is drawn to technology because he sees benefits that are derived from it. So the challenge is to bring everyone to the point where they are going to accept and use technology”, said Mr Lehr.

He continued, “New technologies come into being because people recognise when to push them. At the same time, any new technology has to have an economic advantage to it. It could be an immediate cost benefit or a benefit associated with the standard of living. New technology only comes into being because people push it into being. They are the drivers for change. Everyone who becomes a driver participates in the overall improvement of the environment.”

**Sustainable design in green buildings**

Mr Ng Eng Kiong talked about the reasons Singapore invests heavily in green building technology and has become a leader in the region for sustainable projects. As a small island with limited land and space, Singapore is increasingly affected by the effects of climate change, thus the need for green building design which can take active and passive approaches.

Mr Ng delineated the difference between active and passive design. Unlike active design features like the use of alternative sources of energy in the development, passive design features help reduce the consumption of resources by adapting to the environment.

“In the residential sector, many developers are building residences in a north-south direction. so that it does not get the full impact of the sun from the east or west and so reduces the need for cooling. There is also the wind from the north during certain months of the year and the south and south-west winds during the other months of the year. This is already being done in most of the developments in the public and private housing sectors”, he said.

Illustrating the limitations of design, he said, “An eminent problem that seems to be creeping up as Singapore gets denser is that residential buildings are now being built closer to highways,
creating noise pollution in homes. Blocks are also being built too close together, preventing the wind from flowing through the apartments. Both of these are examples of design that create problems for a more urbanised society”.

He said that the solution to the limitations of the environment and design is to employ consultants to carry out studies and by using Building Information Modelling (BIM) to create simulations before buildings are built. An increasing number of people, coming from all sectors and disciplines, are continuously looking into these problems. Architects, engineers, developers, building operators and others have their part to play in making sure buildings are designed to function in a certain manner and are operated in the correct manner. This would also include building users whose behaviour and consumption patterns can contribute to the overall sustainability of green buildings. 

The Singapore Green Building Council roadmap

The Inter-Ministerial Committee on Sustainable Development (IMCSD) was set up in January 2008 to formulate a national strategy for Singapore’s sustainable development. In its final report on the strategies for sustainable growth, it put forth a blueprint for Singapore to become a lively and liveable city, with a 20-year timeframe that identified key goals for 2030 and intermediate goals for 2020.

Dr Lee Siew Eang, an Associate Professor at the Department of Building, School of Design & Environment, National University of Singapore (NUS), spoke about the strategic programmes that the Singapore Green Building Council has put in place to galvanise its membership and support the green agenda of reduction of carbon emissions, pollution avoidance and resource efficiency. He zeroed in on the Green Building Products and Services certification programmes, targeted at professionals in the architectural, engineering and consulting sectors, as a significant component to entrench green practices and professionalism beyond the Green Mark.

“With the success of BCA and their Green Mark system as a brand in Southeast Asia, IE Singapore feels that there is another channel for promoting Singapore, through people and their services. Presently, the SGBC certification is voluntary and is not mandated by any public agency but we hope to build it up as a brand of Singapore best practice. We want people to see that if a company is certified, it must have some standing in the industry,” said Dr Lee.

Dr Lee explained to the audience that the criteria for Singapore Green Building Products are holistic in nature. A whole life approach, that considers energy, water and resource efficiency, as well as carbon emission mitigation and pollution avoidance, is taken. The certification has been successfully implemented over the past two years, with 229 products certified, 64% of which were for passive design and 36% were for active design.

The Singapore Green Building Services certification criteria include having a green knowledge base, green corporate practices, green corporate values and an established track record of being green. The certification promotes the development of professionalism in the building industry, enhances the standing of accredited companies, simplifies selection procedures for service procurement and supports public sector schemes for the promotion of Green Professional Services. Dr Lee added that developing well-tooled and well-skilled green professionals would ensure a healthy growth and development in green building knowledge and technology.

Building sustainability with automation

As Vice Chairman of the Asia Institute of Intelligent Building (Singapore Chapter), Mr Ho Thim Seng works with consultants and developers in Asia to promote open systems for building automation. At the lecture series, he spoke about the Facility Management approach towards sustainability and about the benefits to and limitations of building design.

“TO create a sustainable development, the elements are already prescribed by BCA. The question is that after achieving a Green Mark Platinum Award, are you able to sustain it? Because if you do not have a team of people who understand sustainable Facility Management, the building will not be able to perform to the optimum level that it was designed for”, he said.

He stressed that a holistic approach was required to manage a facility over its entire life cycle and to ensure that the purpose of the building is served. For example, efficiency in commercial use can be achieved through predictive maintenance, which would create zero downtime. The proper upkeep of a green building would in turn create capital gains for the owner of the building, thus providing a financial benefit for investing in green building technology. An investment of 2% at the outset could result in a 92% savings over the life-time of the building.

The same benefit can be derived by upgrading older buildings with green features, for better efficiency and capital renewal. Over the life-time of a building, it houses different occupants with different needs. There is a constant need to look at the facilities of a building as the amount of resources it uses changes and to adjust the building operating systems every economic cycle to maintain continued efficiency.

Intelligent Building Management System for Smart Grids

Dr So Ping Lani talked to the audience about how commercial buildings are treated as non-contestable customers and their resource use is charged under the HTS (High Tension Small) supplies category. With buildings being the second highest energy consumer in Singapore, and with a major proportion of that going towards HVAC systems, he presented a project that he is working on that would reduce energy costs.

The project is an intelligent system that would reduce energy load during peak periods and shift energy use to the off-peak periods by focusing on priority-based load shedding, HVAC system VSD control, sump pump scheduling and EV charging.
scheduling. The Intelligent Building Management System would also incorporate renewable energy sources, like solar photovoltaic cells. By generating energy, less needs to be bought from the grid. Depending on the type of renewable energy source, the investment in this system could be paid back in savings from its use, in just over a decade.

Speaking about the current development of the project, Dr So said that they are currently at the concept stage and doing proof of concept would take another five to 10 years. He added that there is potential for such a system to not only operate in commercial buildings, it could also be adapted for use in residential buildings.

The economics of green buildings

Mr Nils Kok, who has received awards and grants for his work in energy efficiency and sustainability in the real estate sector, spoke about the value of green buildings and about the stakeholders who push green building development.

He stated that 75% of a building’s value is based on its location, and a direct comparison with prices and rents of buildings with similar locations and of similar quality showed that green buildings had a higher value or return than their non-green counterparts - about 13% higher. Green buildings are attractive to investors because they can bring in a higher rental income and have increased property value.

“With a green building, you are able to better attract good Class A tenants. It is no longer about green buildings doing better; it is about the non-green buildings underperforming. Smart investors and smart landlords do understand that”, he said.

Around the world, and especially in Singapore, the number of green label buildings has exploded, due in no small part to the increasing population in urban centres. Aside from the savings that can be accrued from resource efficiency and carbon emission reduction, another measure of savings can be through lowering of insurance premiums by improving Indoor Environmental Quality (IEQ) and thus the health of the people who work in these buildings. This is particularly impactful when it is considered that salaries form the highest proportion of costs to tenants.

With a large proportion of energy usage going towards buildings (24% in the US and 40% in Singapore and the EU) governments can benefit from employing legislation to help push developments through the use of energy labels. This would provide information for global tenants, like those from the legal, petroleum or banking industries, who can in turn push global green standards when they invest in buildings.

Looking forward to how Singapore can improve its energy labelling system, Mr Kok said, “Right now in Singapore, there is Green Mark and non-Green Mark. You do not know how efficient a building is compared to other buildings. What I think is useful to Singapore is to have the real energy consumption of a building listed. You can show the energy label like in Europe or you can show the energy cost per square metre, so they know that when they lease space, they know what they pay in addition for energy. BCA is starting to collect all building consumption data, which will be used for benchmarking, and hopefully that will lead to a benchmark that is public”.

Health and productivity in green buildings

Mr Huston Eubank, who teaches a course on ‘Integrative Design for Energy Efficiency’ for Singapore’s Certified Energy Manager (SCEM) Programme, spoke about effects that green buildings have on productivity and health. He was also a Principal at the Rocky Mountain Institute that did an analysis of papers that studied the links between green buildings and health.

He revealed an interesting statistic, that the Sick Building Syndrome (SBS), which causes building occupants to experience discomfort and acute health problems as a result of the time spent in the building, costs the United States US$ 60 billion every year. The causes of this are varied and can range from flaws in HVAC systems to outgassing of building materials and improper or inadequate ventilation. One of the green building design goals would be to address and avoid the sources of these issues in the planning and development stage.

Mr Eubank showed many ways in which it was beneficial for buildings to adopt green technology and gave examples from studies that were done over the last two decades. A study showed that there was an increase of 6% in productivity after a building underwent a retrofit. Another showed that daylight in a retail space can increase revenue by as much as 40%. In schools, students showed increased progress – they were 20 to 26% faster than their peers in non-green environments.

He also said that it was hard to measure productivity and that although these studies showed a link, it would be difficult for business leaders to calculate the Return on Investment (ROI) on productivity benefits from implementing green design standards. Despite this, he stated that the principle and practice of biophilic design - design that emphasises nature and sustainability - should be encouraged and more research is required in order to eventually quantify the health and productivity benefits from green building design.

Speaking to ‘The Singapore Engineer’ after the Lecture Series, Mr John Mandyck agreed with Mr Eubank that this was an area where more progress was needed.

“I think the next evolution of the green building movement is how we reduce the built environment’s impact on people, particularly on the health of people. So if a green building can enhance people’s health, it will enhance people’s productivity. It will help people perform better in buildings whether they are office buildings or schools or hospitals. I think it is important from an economic standpoint as well, because if we can get data that green buildings improve the productivity of people inside the building, green building investments will pay back even faster because of that economic benefit”, he said.
Engineering a mould-free building
by Yen Feng, Director of Marketing and Business Development, Mold Busters Singapore

Mould prevention is key to quality indoor air, and that begins with quality engineering

Considering Singapore is such a humid country, mould, which thrives in moisture-rich conditions, is a real and serious issue.

In people with a history of upper respiratory tract issues, such as asthma, airborne mould spores can trigger an attack within seconds. Mould can also grow on surfaces, infiltrating walls, ceilings, furniture, even shoes and handbags. These items often have to be thrown away when they become mouldy. Within an indoor environment, the proliferation of mould therefore poses not only risks to health, but also to personal property.

In the US alone, it is estimated that as many as half of all homes have mould issues, serious enough to significantly increase respiratory ailment symptoms. Home insurers estimate it costs them some US$ 2.5 billion every year to fix the problems created by indoor mould growth. It should surprise no one that studies have shown that without proper care, indoor environments can be more toxic than the outdoors - some buildings contain as many as five times the number of pollutants when compared to outdoors.

Given how fast mould can spread in Singapore’s climate, prevention and early detection is key in any building management’s anti-mould strategy. That is an idea we hope more people will get used to - and quickly.

Unfortunately, when it comes to mould in buildings, we find there are more challenges present than a general absence of awareness. Such ‘built-in’ issues include poorly designed HVAC systems, an over-emphasis on energy conservation, and a lack of coordination among the various design, construction, and operational aspects of building management.

Generally, the underlying causes for mould growth can be categorised into three areas:

- Design errors and omissions.
- Construction defects.
- Operation and maintenance deficiencies.

Engineers come in, with reference to the first point - design errors and omissions.

Because mould grows only in a moisture-rich environment, mould prevention is all about controlling moisture within that environment. Ways to control moisture include: controlling the air temperature and relative humidity, surface temperatures, and building infiltration. In general, humidity levels of above 60% are considered conducive for mould growth.

In terms of building design, the engineer must therefore work with the architect to ensure that such moisture controls are in place. A well-considered building envelope, for example, can prevent water (rain for example) seeping from the outdoors into the indoor environment.

Within the indoor environment, engineers must achieve a thoughtful balance between temperature and humidity, and between pressurisation and ventilation.

There are many ways to accomplish this. In Singapore, most HVAC systems are controlled only by temperature and not humidity. And while the use of air-conditioners can significantly bring down the relative humidity in an indoor environment, we find that there are also issues in this area that should be better addressed.

For example, when building engineers oversize air-conditioners, it turns on and off more often than it should, resulting in a loss of efficiency and dehumidifying effect. Generally, such oversized air-conditioning systems turn off after about 10 minutes - but, it takes about 15 minutes of run-time before some serious dehumidification occurs.

An over-emphasis on energy conservation can also lead to a loss of the air-conditioning systems’ dehumidifying effects, resulting in an increase in the relative humidity of the ambient indoor environment.

Unfortunately, even with the best-designed systems in place, mould growth can still occur - mainly as a result of Points 2 or 3.

With reference to construction defects or deficiencies in the operation and maintenance of the building, during the construction stage, for example, it is imperative for the contractors to ensure that the building materials remain dry. Wet plywood or plasterboard is especially hospitable to mould, and if untreated, tiny mould spores in these porous materials can germinate and form colonies on the surface even if they are cleaned and painted over.

An example of a deficiency in building operations and maintenance is the lack of moisture-control measures when the building’s air-conditioning systems are shut down after office hours. This can result in condensation and a rise in relative humidity, and ultimately provide the moisture-rich conditions needed for mould growth.

Greater awareness

Over the years, there has been a growing interest in indoor air and environment quality - due in part to rising education levels and access to information via the Internet. With more and more people spending a large part of their time indoors, we believe the need for better quality indoor air to prevent, say, the effects of the Sick Building Syndrome, will become increasingly relevant to building architects, engineers, and operators. Understanding
how mould grows and the ways to prevent and remedy mould contamination is a necessary part of that growing awareness.

Air & Odor Management

Mold Busters Singapore is a division of Air & Odor Management, an indoor air quality company.

Air & Odor Management is a Singapore company with partners in various parts of the world, including Malaysia, Sri Lanka, the Philippines, Australia, Canada, and Turkey.

The company, with its family of air treatment specialists, is on a global mission to help achieve better quality air. Its services encompass all aspects of clean-air living - from performing diagnostic air sampling tests, to air purification, mould removal, odour control, and ambient scenting. What drives the company is the belief that better air can significantly improve a person’s health and sense of well-being - whether at home or in the office. In many parts of the world, indoor air quality (IAQ) is gaining widespread attention as a key indicator of green buildings and homes. When it comes to doing business, the company’s goal is to protect the health of clients and their commercial interests, in every project it undertakes.

More information can be obtained from the company. Tel: 6286 3333. Email: sales@aom.sg Website: http://aom.sg

Guide book for enhancing indoor air quality

The Indoor Air Quality Guide: Best Practices for Design, Construction and Commissioning provides strategies to achieve good IAQ using proven technologies and without significantly increasing costs.

First published in 2009, the guide is the result of collaboration between ASHRAE, the American Institute of Architects, the Building Owners and Managers Association International, the Sheet Metal and Air Conditioning Contractors’ National Association, and the US Green Building Council, with funding provided by the US Environmental Protection Agency.

The book describes 40 strategies for achieving critical IAQ objectives related to moisture management, ventilation, filtration and air cleaning and source control. It also highlights how design and construction teams can work together to ensure good IAQ strategies are incorporated from initial design through project completion.

The book also contains:

- Hundreds of internal and external links to resources for the design, construction, and commissioning of buildings with excellent indoor air quality.
- Access to an incredible variety of in-depth information by topic, to help design, construct and operate buildings using best practices for indoor air quality.
- Best practices for all aspects of IAQ building design, commissioning and construction, including designing for maintainability.
- Tools and materials for demonstrating the value of IAQ to clients.

ASHRAE, founded in 1894, is a building technology society with more than 50,000 members worldwide. The society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability. Through research, standards writing, publishing and continuing education, ASHRAE contributes to tomorrow’s built environment.

Top five mould prevention tips

- Ensuring low humidity: By keeping humidity low, there will be less mould. The United States Environmental Protection Agency recommends a humidity level of 30% to 50%.

- Paying attention to roofs and ceilings. It is necessary to ensure that roofs and ceilings are in working order. Leaks in the roofs or ceilings can result in excess moisture ingress, creating a conducive environment for the growth of mould.

- Air-conditioner maintenance: By keeping air-conditioner pans clean and drain lines working correctly, it is possible to avoid blockages and leakage problems. Filters must also be cleaned regularly.

- Increasing ventilation: Windows must be opened at least once a day or over the weekends to promote air flow. This helps to introduce new air that can dilute mould concentrations and helps to prevent mould spores from settling.

- Using air purifiers and dehumidifiers: These devices can help trap mould spores and also reduce the moisture in the air, thereby reducing the risk of mould contamination in an indoor environment.
The Republic of Singapore has two road checkpoints with Malaysia. Every day, almost half a million passengers and 2000 containers pass through them.

When Singapore’s Immigration & Checkpoints Authority (ICA) decided to upgrade the checkpoints at Woodlands and Tuas, it wanted a lighting system that will provide good quality lighting and which will be practically maintenance-free.

ICA decided on JK Induction Highbay Lighting.

A total of 2300 conventional High Pressure Sodium (HPS) units have been replaced with energy-efficient, long-lasting Induction Lighting systems. The installation work was completed in April 2013.

**Maintenance-free lighting supports 24 hour operations**

ICA’s prime concern was to keep both checkpoints operating, day and night, with no lamp replacement or maintenance. Induction Lighting became a natural choice since it has a lifespan 10 times longer than other HID lamps.

**High visual clarity**

The new induction fixtures have dramatically improved the work environment. Vigilance inspectors now experience more comfort and less fatigue and have improved their performance, due to the Induction Lighting’s low glare and low flicker.

**More economical and better lighting**

With the improved lighting, running costs have been reduced dramatically. The two checkpoints were previously using standard 400 W Sodium Highbay Lighting. With the upgrade to a mix of 200 W and 250 W Induction Lighting, the energy footprint of the checkpoints has been reduced by more than 40%.

Enquiry No: 07/001

One of 10 inspection halls illuminated by Induction Lamps. The hall has a maximum height of 19 m.
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</tr>
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</tr>
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Siemens contributes to infrastructural development of New York City

by Jeremy Chia

In April 2013, Siemens organised a Press Trip to New York and invited reporters from Asia and Europe, to view some of the projects that they are working on in the most populous city in the US.

New York City is a megacity that is home to 19 million people and has a land area of about 1,200 km². It is presently 43% denser than Singapore. To put that into perspective, the population in Singapore would have to increase from 5.3 million to 7.6 million to be as dense, more than the range of 6.5 to 6.9 million that was used as a possible projection for 2030, quoted in the population white paper put forward by the government early this year.

Travelling around the island of Manhattan, the affluent and upscale commercial, artistic and financial centre of New York City, was an interesting experience. Most of the people who work there mainly live in the boroughs surrounding the island and in the nearby state of New Jersey, due to the high cost of living in Manhattan compared to the surrounding areas. With an explosive growth from immigrants since the mid-19th century, the city has become more populous and industrialised, with dense infrastructure like roads, buildings and transportation systems built to accommodate the people working and living there.

Over the decades, the existing infrastructure had to be upgraded along with the times. For example, as road traffic increased, the grid of roads that existed was simply not able to accommodate the traffic, especially with modern cars in many of the narrow streets amid buildings that have existed for twice as long as the period since Singapore’s independence. The first subway system was built in 1904 and has now expanded in complexity and coverage since then.

In Singapore’s relatively short history, and particularly in the past decade or two, we have seen a relatively high growth of population, which has necessitated infrastructure development that parallels the growth that New York faced over the last century and a half. The challenges that Singapore will face in the future demand foresight and proper planning, New York and other rapidly growing megacities show us a path to minimise the disruption that is a negative side effect of an increasing population.

These types of infrastructure issues require specially-tailored technological solutions. With its wide range of products and systems, Siemens has been contracted to deliver solutions to projects in New York and its surrounding areas, some of which were presented to us on the three-day press trip.

Carnegie Hall

The first location that we visited was Carnegie Hall. A cultural institution that has stood the test of time, it has hosted concerts and performances of singers and musicians since it was built in 1890 with the largesse of industrialist Andrew Carnegie. Its history has not been without its ups and downs. It was almost sold and demolished before New York City bought it to run it as a public trust in 1960. The ageing building also underwent major renovation, restoration and expansion with a 10-year Master Plan that culminated at its centennial in 1991.

In the current Studio Towers Renovation Project, which focuses mainly on the two towers that were built above the building in 1894 and 1898, Carnegie Hall’s new building automation, security and access system, fire alarm system and parts of the power distribution system are supplied by Siemens. A large part of the project is to make the building more energy-efficient and environment-friendly.

“In parallel with looking after the facilities of the building, we are completely renovating and expanding the space to provide world-class facilities for artists and we are creating a massive music education centre above the halls. In addition, we are creating a roof terrace which will be a wonderful open, public space where people who are using the building can go. With the work we are doing, sustainability and being green in the best possible way is a core part of what we are trying to achieve in our partnership with Siemens”, said Clive Gillinson, Executive and Artistic Director of Carnegie Hall.

Speaking about the challenge of providing an effective energy control system in an existing building, especially one that is more than a century old, David Armour, Chief City Executive - New York City, Siemens, said, “The first challenge you have in managing energy is measuring where we are because if you do not know where you are it is difficult to improve. This building, when it is complete, will meet (the US Green Building Council’s) LEED Silver certification. It will meet the requirements the city has set for new building construction to be sustainable in a measured way”.

NYC subway system

Getting from Carnegie Hall to our next stop, the World Trade Center Memorial, our hosts brought us on the famed New York City subway. Operated by New York City Transit (NYCT), the subway system makes use of Siemens’ operations control center to help make the network more efficient and punctual while increasing its capacity and safety, with a minimum of disruption. This automation solution also helps to cut costs and reduce the possibility of human error.
The subway system is the most extensive public transportation system in the world, with 468 stations and the seventh busiest. With a daily ridership of six million passengers, compared to the two million that Singapore’s rail system sees, it is extremely important for such a complex and busy system to operate smoothly and it does so with the help of three technologies from Siemens. The first is Communication Based Train Control (CBTC), which transmits commands by WLAN instead of signals, reducing the intervals between trains. The second is Automatic Train Supervision (ATS), a sensor- and software-based technology that allows the location and speed of trains to be tracked in real time. A fibre-optic communications network enables CBTC to interact with ATS. The third is the Public Address Customer Information System (PACIS) which automatically generates announcements and displays tailored to each station.

World Trade Center Memorial

The visit to the WTC 9/11 Memorial was a moving affair. Our group of journalists were brought to the Memorial through three levels of security by two guides - Paul Gembara, a Surveying Engineer for the Port Authority of New York & New Jersey, whose offices were in the World Trade Center building, and Thomas Ferrie, a boat captain whose boat plied the rivers around Manhattan - both of whom were present at or near the World Trade Center site when the two towers came down. Both volunteers told harrowing accounts of their experience on the day of the attack while showing us around the Memorial which lay below the construction of the new One World Trade Center building.

The main feature of the 9/11 Memorial are the two reflecting pools located in the former footprints of the two towers that collapsed. Designed by architect Michael Arad and landscape architect Peter Walker, the pools were a challenge of engineering that Siemens was tasked to solve in partnership with Delta.
Fountains, a firm that specialises in architectural and floating fountains. The pools were designed to have water cascading from all sides down into an infinity well, which required efficiency in use of water and energy. Pool operations are also automated and can also be controlled off-site. Surrounding each pool are bronze plates that are inscribed with the names of the people who perished in the attack, each name placed sensitively in terms of ‘meaningful adjacencies’ to reflect their relationships with others they worked with. The bronze plates are also designed to be heated in the winter and cooled in the summer so that they are comfortable to touch all year round. This was especially important because for most of the families of the victims of the attack this would be the only memorial for their loved ones.

**Resilient urban infrastructure**

At the beginning of the second day of the press trip, Dr Roland Busch, Member of the Managing Board of Siemens AG and CEO of Infrastructure & Cities Sector, gave a press briefing on the needs of the city of the future, in preparation for the 23rd Annual Assembly of the Regional Plan Association (RPA), held the day after the presentation. Siemens is working in partnership with RPA, America’s oldest and most distinguished independent urban research and advocacy organisation, and Arup, on the
technologies and trends that can be used to minimise disruptions to and restore basic functionalities in the event of a catastrophe, like Hurricane Sandy, which caused an estimated damage of US$ 50 billion.

Another negative from a lack of resiliency is the effect it has on investors, who will think twice about investing in a city that does not have proper safeguards against disruptions to their business, especially those in manufacturing and production.

Dr Busch presented factors that affect the risk of impact by hazards: the probability and magnitude of a hazard, which are not easily influenced; the chance of exposure in hazard-prone locations, which can be influenced in some ways; and the ability of infrastructure to be resilient and robust to mitigate the risk of impact. This last factor is something that cities are able to directly tackle by designing systems that are less vulnerable to damages.

“If you build a little bit on resilience, you can have a huge impact. If you want to make it completely resilient, it costs a lot of money. There is an optimum in between where you have a maximum of impact with an incremental cost”, said Dr Busch.

Finding this optimum involves risk assessment, exploring of options and then doing a cost benefit analysis. Dr Busch continued, “Resilience is an element within the whole equation but it should be one of the requirements from the very beginning when you develop into the future”.

Dr Busch promoted technology and automation as a way to achieve resilience and robustness while also having the added benefit of efficiency gains. Although it has a higher up-front
cost, such a proactive approach would cost less over the long term when compared to a reactive one that would incur costs from damage.

**Hudson (High Voltage Direct Current) HVDC Link and Bergen (Gas-Insulated Substation) GIS Site**

After the presentation by Dr Busch, our group was brought to two sites located across the Hudson River in New Jersey. The first place we visited was the site of the Hudson Transmission Project, a HVDC back-to-back converter station that takes power rated at 230 kV AC from a gas-insulated substation in Bergen, New Jersey, converts it to 180 kV DC and then back into 345 kV AC, before sending it across the Hudson River through a cable laid under the river bed to the West 49th NYC substation to provide power for the city.

Mr. Wilhelm Kropf, the Project Manager, briefed us on the project and on the station. Usually power conversion is done from AC to DC, transmitted over long distances, before converting back to AC again. The reason for a single site for back-to-back conversion is the high cost of locating a station on Manhattan, thus the need to have the entire conversion system located in New Jersey. A joint venture between Siemens and Prysmian, which provided the ship and technology for laying the cable under the river bed, the project was completed in a very tight schedule of 24 months, a month under schedule. When operational, it would provide 660 MW of power to the island, which makes up about 3 to 5% of the consumption of New York.

The second site we visited in New Jersey was the Bergen GIS, a 230 kV, 80 kA switching station that supplies the power from New Jersey to the converter station. According to Ms. Manuela Hennig, the Project Manager for the GIS project, both projects began at roughly the same time and it was a race for her team to complete their substation so that power could be supplied for Mr. Kropf’s team to do tests.

The pre-existing Bergen substation was located next to a wetland area, so the project team required permits to use some of the land around the substation to move forward with the project. With the constraints of space, instead of having conventional overhead transmission lines that require a lot of clearance, cables are located in gas-insulated pipes filled with SO₂ gas. The gas decreases electrical clearance so that lines can be placed close to each other.

**RPA Conference Opening and Siemens/C40 Press Event**

On the third and last day of the press trip, our group of reporters was brought to the Waldorf Astoria for the opening of the RPA Conference and a press event announcing a technical partnership between the C40 Cities Climate Leadership Group (C40) and Siemens, to help cities measure, plan and mitigate their greenhouse gas (GHG) emissions. The GHG Measurement & Planning Initiative will cover C40 cities, which includes Singapore as an Observer City, to facilitate the exchange of ideas and expertise. This collaboration also includes a C40 & Siemens City Climate Leadership Award programme that will provide recognition annually to cities demonstrating climate action leadership.

“The next step is to encourage and recognised those cities that make progress, because every city needs a chance to be recognised for making a difference, whether they are already advanced in their climate policies or whether they are not yet begun”, said Mr. Rohit Aggarwala, Board Member of RPA and Special Advisor to C40 Chair Michael Bloomberg.

**Healthcare solutions**

Our final stop before leaving on our flight was a tour of the facilities of a branch of Zwanger-Pesiri Radiology, a private clinic located on Long Island that currently uses healthcare solutions provided by Siemens. We were greeted by the CEO of the clinic, Dr Steven L Mendelsohn, who talked about the Siemens products that this particular branch of his clinic used, which includes one 1.5T and one 3T MRI machine as well as one CAT scanner. His clinic currently schedules 150,000 scans for patients a year.

After initially starting with one Siemens PET scanner to replace an outdated unit several years ago, Dr Mendelsohn’s clinic was impressed with the quality and continued to purchase Siemens equipment.

“So far we have purchased 19 or 20 Siemens MRI units altogether. We keep our equipment very high end, with cutting edge technology. I feel I should buy from an American company but the Siemens technology is 3 or 5 years ahead”, said Dr Mendelsohn.
HUDSON HVDC LINK

Siemens Energy is installing a turnkey HVDC (high voltage direct current) back-to-back link to connect the power supply networks of New Jersey and New York. Controlled electric power will be transmitted via a high voltage cable link across the Hudson River from New Jersey to boost the power supply of New York City.

Siemens’ scope of supply includes the open- and closed-loop controls for the HVDC system, the thyristor valves (a semiconductor device), eight converter transformers and the AC filters, as well as operation and maintenance for five years.

The station with the HVDC back-to-back link is located in Ridgefield, New Jersey, where it will be connected via a substation with New Jersey’s 230 kV power supply network. The Ridgefield substation is a back-to-back converter station that converts the 230kV AC power input to 180kV HVDC and back immediately to 345 kV AC power for transmission. A high-voltage cable spanning a total distance of 12 km, part of which will be laid under water in the Hudson River, will provide the connection to the point where the power is fed into New York’s system at the West 49th Street Substation. As the distance is relatively short, this can be done with minimal loss and does not require a long distance HVDC line to transmit the power; as in most other HVDC projects. Thus, 660 MW of controlled electric power will be transmitted.

Siemens HVDC technology, with its fast control function, will also contribute towards stabilisation of the connected systems, which is a key benefit in the event of grid disturbances or blackouts. Furthermore this high capacity power link will make sure that there are no bottlenecks in the power supply for New York.

In 2005, Siemens already received an order to install an HVDC link between New Jersey and Long Island. The HVDC submarine cable link, also known as the Neptune project, transmits as much as 660 MW of electrical energy at a direct voltage of 500 kV. It provides a low-loss, eco-friendly power link between New Jersey’s power supply network and Long Island.

HVDC TRANSMISSION Technology

An HVDC transmission link consists primarily of a converter station, in which the AC voltage of the conventional power grid is converted into DC voltage; a transmission line; and another converter station on the other end, where the voltage is converted back into AC.

The electricity can be transported in both directions. The lines can go across land as overhead or as underground lines, or they can be installed in water as submarine cables. Also, combined installation, e.g. cable and overhead line or submarine and underground line, is possible.
Transmission losses are lower than for AC voltage transmission. DC voltage amounts to several hundred thousand volts. The higher the voltage, the lower the transmission losses are, and the more electricity can be transmitted via the line.

Siemens commissioned the first HVDC transmission link rated at 800,000 V in China at the end of 2009, thereby establishing itself as a technology leader. Siemens will also install the first submarine HVDC cable with a voltage rating of 600,000 V to connect Scotland and England.

Generally, an HVDC transmission link has two poles (and also two lines between them) over which half of the electricity is transmitted. If one pole or line were to fail, half of the remaining power would still be available. Usually the connections are designed for temporally limited overload operation.

Besides conventional HVDC transmission technology, there is also the space-saving variant, HVDC Plus, which is used especially on offshore platforms. In addition, HVDC Plus is the HVDC solution for built-up urban environments as can be encountered in San Francisco, for example.

**Advantages**

HVDC transmission has typically 30% to 50% less transmission loss than comparable AC overhead lines. For comparison, given 2500 MW transmitted power on 800 km of overhead line, the loss with a conventional 400 kV AC line is 9.4%. With HVDC transmission at 500 kV, it is only 6%, and at 800 kV, it is just 2.6%. Generally, given the same width of the cable run, 30% to 40% more energy transmission is possible than with conventional overhead lines carrying alternating current.

As a ‘firewall’, HVDC can prevent the transmission of faults between connected AC grids and hence prevent blackouts. For lengths of about 600 km or more, overhead lines using HVDC transmission technology are more cost-effective than AC technology.

Cable links longer than approximately 80 km are only possible with HVDC transmission. That is because using underground or submarine cables, hardly any electricity is delivered when AC lines are 80 km or longer (the cable capacities absorb the usable electricity). For an HVDC transmission link using submarine cable, such as the one planned between Scotland and England at 600 kV and 2,200 MW, there will be an energy loss of less than 3% in total (including cable and converter losses).

**Market**

The power transmission market is basically volatile, since it is influenced by large-scale projects. The global power transmission market (including HVDC transmission) will amount to €5 billion to €9 billion per year in the next five years.

The HVDC transmission market, which is included in this figure, is expected to double within the next five years from a current €3 billion per year.

The demand for HVDC transmission is increasing rapidly. In the last 40 years, HVDC transmission links with a total capacity of 100 gigawatts (equivalent to the capacity of 100 large power plants) were installed. Another 250 gigawatts will be added in this decade alone.

With a market share of more than one-third, Siemens is one of the two biggest suppliers in the HVDC transmission sector. Siemens has completed about 40 HVDC transmission projects worldwide, one quarter of which were in China. Through these Siemens-built HVDC transmission links, flows an amount of electricity sufficient to meet the average power demand of entire countries, such as Spain or Italy.

**Drivers**

• Connecting offshore wind farms to the grid: cable lengths of approximately 80 km and more are only possible with HVDC transmission technology.

• Germany: Wind farm projects are far offshore, due to landscape protection and higher wind yield (160 km of sea cable for Sylwin/Dan Tysk, for example), which practically creates a ‘northern Desertec’ in the North and Baltic Sea.
Great Britain: Future wind farms are far offshore due to the higher yield and because the near-coastal regions were already contracted out in rounds 1 and 2. For round 3 with 32 GW of wind power, areas have been identified for wind farms that are between 40 km and 200 km off the coast.

Trans-national grid connections: This creates integrated grids that can compensate for regional fluctuations in the production or consumption of electricity, for example, Western Link (England-Scotland), Inelfe (France-Spain) and BritNed (UK-Netherlands).

Power supply for areas, where no new power plant is to be built, often via lines running through water, for examples, Mallorca and San Francisco.

Back-to-back links which connect two AC grids and serve as a ‘firewall’ to prevent faults from passing into the neighbouring grid (eg Georgia - Turkey, New York - New Jersey)

China, India, and Brazil, in particular, where the energy demand is growing rapidly and large distances must be bridged to ensure a supply of electricity from renewables projects.

**Bergen Gas-Insulated Substation**

Siemens supplied an indoor gas-insulated substation (GIS) and associated gas-insulated bus (GIB) to the New Jersey-based Public Service Electric and Gas Company (PSE&G). The GIS started operations in February 2013 and was an expansion of the existing Bergen switching station located in Ridgefield, New Jersey.

The contract between Siemens and PSE&G includes the design, engineering, manufacturing, installation, testing and commissioning of an indoor 230 kV, 4000 A, 80 kA GIS and associated GIB.

The GIS technology allows construction of a substation in a significantly reduced space compared to conventional air-insulated substations (AIS). The new infrastructure helps provide additional load capability and enhanced system reliability.

GIS is also considered a more reliable solution with very limited maintenance required and with less sensitivity to potential external environmental factors.

The system’s partial discharge sensors also predict potential partial discharge in the system, alerting the utility in advance of an irregularity that might trigger a maintenance operation.

Enquiry No: 07/002

A centre in Newark remotely controls the switchgear system that consists of 160 control racks and 9,000 ft (2,700 m) of GIB.

The GIS at Ridgefield, New Jersey will help provide additional load capability and enhanced system reliability for the power supply to New York and New Jersey. Siemens’ scope of supply includes the design, engineering and installation of the GIS. The gas-insulated switchgear consists of 93 single breakers and 80 motor-operated switches.
City residents near airports could have their air quality vastly improved if airports were to use simple ‘blast fences’ called baffles, according to the latest imaginative research.

The baffles would simply make aircraft fumes ‘take off’ in the wake of the airplane. Placed behind a runway, the blast fences could serve in the manner of a ‘virtual chimney’.

These would funnel emissions from aircraft engines upwards to the sky to where they can disperse more effectively, thereby reducing the environmental impact on people living and working near airports.

To research this, prototype baffles have been tested by a team of scientists from many leading universities in the UK. This showed that the aircraft exhaust plume could be made to leave the ground within the airport’s boundary fence, using small prototype baffles made from low-cost agricultural windbreak netting on lightweight frames.

The research was carried out by members of Manchester Metropolitan University, Cranfield University, Southampton University and Cambridge University, with funding from the UK’s Engineering & Physical Sciences Research Council (EPSRC).

After preliminary wind tunnel testing of various baffle shapes carried out by Cranfield University, an array of three rows of baffles (each about 2 m wide) was tested using laser scanning with lidar (the optical equivalent of radar), to monitor the plume’s dispersion, and chemical sensor techniques at Cranfield Airport in Bedfordshire, southern England.

A four-engine BAe146 aircraft was used. It took off 12 times in all and on each occasion burned its engines for 5 to 15 seconds at the end of the runway before take-off.

‘Airfield surfaces are typically covered with grass, over which the wind can blow freely. An array of baffles makes the surface rough in an aerodynamic sense. This sucks the momentum out of the exhaust jet, allowing its natural buoyancy to come into play. By suitably angling the baffles, we can also give the exhaust an upwards push, encouraging it to rise away from the ground’’, said Dr Mike Bennett, of Manchester Metropolitan University, north-west England, who led the project.

‘The baffles we tested were tilted at angles between 40º and 60º, in order to optimise this vertical flow and to ensure the baffles did not blow over. Although the exhaust will still disperse to the ground eventually, it will do so at a lower concentration. We might hope to see a reduction in surface concentrations of around 50% at the perimeter fence behind the place where aircraft are taking off’’, he added.

Long-term ground-level nitrogen dioxide (NO₂) concentrations around many major airports in Europe already exceed the legal limit enforced by the European Union. The aim of the trial was essentially to test the baffles’ aerodynamics. Because the prototype installation was temporary, it was constructed very differently from how a permanent installation might be made.

Each baffle must be sufficiently robust to withstand the blast of 80 to 90 knots from a jet engine, but flimsy enough to collapse harmlessly if an aircraft were to hit it.

For full-scale use, baffles would need to be erected behind a runway, covering an area of 1,000 m². The tests also showed that the baffles dampened engine noise downstream by a modest amount and were helpful in reducing jet blast on the airport perimeter.

‘‘There is no reason why baffles could not start to be installed at airports within two or three years. From the point of view of local air quality, they represent a quick, cheap supplement to developing low-NOx jet engines’’, said Dr Bennett.

Manchester Metropolitan University is the largest campus-based undergraduate university in the UK with more than 37,000 students and an emphasis on vocational education and employability.

The blast fences development has taken place as part of a three-year project under the Research Councils UK Energy Programme that received total EPSRC funding of £ 413,000. Cambridge University provided air quality monitoring expertise for the field tests. Southampton University carried out the acoustic studies.

The energy programme aims to position the UK to meet its energy and environmental targets and policy goals through world-class research and training. The programme is investing more than £ 530 million in research and skills to pioneer a low carbon future.

Source: London Press Service.
Innovations after developing Floodstop for his University, in southern England, from 2001 to 2005, and set up Fluvial Phelps studied computer-aided product design at Bournemouth start working on bringing it to market”. The grant will be used to develop and manufacture FloodBrick, a temporary and portable flood barrier that could replace sandbags in protecting homes and infrastructure from rising water: Product design graduate Simon Phelps, Founder and Managing Director of Fluvial Innovations, said, “The whole thing about sandbags is that they do not work - they make sandy water leak into properties and are really heavy, so need a lot of people to move them”. He added, “If it was not for the grant, it would have been at least two years in the pipeline to develop the FloodBrick. We can now start working on bringing it to market”. Phelps studied computer-aided product design at Bournemouth University, in southern England, from 2001 to 2005, and set up Fluvial Innovations after developing Floodstop for his final-year product. The Floodstop is a unique lightweight and portable barrier that is formed through a series of interlocking units. The units fill up with the rising floodwater, making them heavy enough to stay weighed down - creating a good ground seal, preventing water getting past them. They then empty themselves when the water recedes. The university helped Phelps to develop and commercialise the product and it owns 10% of the company that started life in the university Innovation Centre and is now based in Nuffield Industrial Estate nearby in the town of Poole, Dorset. Phelps, aged 29, said the company has gone from ‘strength to strength’ and now has clients as far afield as the USA, as well as regional authorities in the UK and the Department for Environment, Food & Rural Affairs (Defra). The FloodBrick is a development of the Floodstop product. They are massively more effective than sandbags, and we have combined everything we have learned with the Floodstop, and improved on it. Phelps said, “The Florence was a major breakthrough. We have managed to create the soap that can be controlled by magnets. In their scientific paper, they demonstrated how their laboratory-scale experiment resulted in surfactants that could be pulled out of a mixture using only hand-held magnets.

‘Magnetic soap’ could be a safer way to clean up oil spills

The creation of magnetic soap could revolutionise industrial cleaning products and be especially effective in recovery of oil spills at sea. The research, by chemists at the University of Bristol, in western England, has attracted media attention across the globe.

The creation of a fully functional magnetic soap could calm concerns over the use of soaps in oil-spill clean-ups, and the potential for other applications is huge.

Scientists have long been searching for a way to control soaps, or surfactants as they are known in industry, once they are in solution, to increase their ability to dissolve oils in water and then remove them from a system.

The team at Bristol University had previously worked on soaps sensitive to light, carbon dioxide or changes in pH, temperature or pressure. Their latest breakthrough, reported in the chemistry journal Angewandte Chemie, is said to be the world’s first soap that is sensitive to a magnetic field.

The Bristol researchers dissolved iron in liquid surfactant to create the soap that can be controlled by magnets. In their scientific paper, they demonstrated how their laboratory-scale experiment resulted in surfactants that could be pulled out of a mixture using only hand-held magnets.

Besides acquiring the ability to deal with oil spills, the research may have very important industrial, energy and engineering benefits, including the ability to extract pollutants from waste water.

Prof Julian Eastoe, from Bristol University, said, “We have uncovered a proof of principle, now we have to move on to applications”. “Surfactants and emulsions have many uses from pharmaceuticals, agrochemicals, food, fuel and lubricant additives, paints and inks as well as detergents and cleaning agents. Magnetic emulsions of the kind described in the submission have never before been applied”, he added.

Once the surfactant was developed and shown to be magnetic, Prof Eastoe’s team took it to the Institut Laue-Langevin in France, a world flagship centre for neutron science and home to the world’s most intense neutron source, to investigate the science behind its remarkable property.

Surprised by the results of the laboratory experiments, the team used the high-powered beams of neutrons at the Institut Laue-Langevin to see exactly what was happening with the iron-containing groups. The researchers discovered that they were forming into clusters that would then respond to applied magnetic fields.

Source: London Press Service.
Organised by the Building and Construction Authority (BCA), the Singapore Green Building Week 2013 (SGBW 2013) will be staged from 9 to 13 September 2013. SGBW 2013 is set to fuel the growing green building movement in Asia through a series of international events that will bring together global green building experts, built environment industry leaders and policymakers in a collaborative effort to create more sustainable built environments.

BCA will partner Reed Exhibitions to host the International Green Building Conference 2013 (IGBC 2013) alongside the Build Eco Xpo Asia 2013 (BEX Asia 2013), with the Singapore Green Building Council (SGBC) as a strategic partner. Both IGBC 2013 and BEX Asia 2013 will be held from 11 to 13 September 2013.

Co-located with BEX Asia 2013 is the inaugural World Engineers Summit 2013 (WES 2013), organised by the Institution of Engineers, Singapore (IES). Themed ‘Innovative and Sustainable Solutions to Climate Change’, the event will bring together engineers from various disciplines as well as environmental specialists from all over the world, to share ideas and insights on climate change. WES 2013 will be held from 9 to 15 September 2013.

The three events will be held at the Sands Expo & Convention Center, Marina Bay Sands, Singapore. As a result of the co-location of the three events, this year’s SGBW is expected to attract more than 10,000 participants from 30 countries.

Singapore’s push for sustainable development and green buildings has continued to grow from strength to strength since the release of the first Green Building Masterplan in 2006. In a recent report on World Green Building Trends, by McGraw Hill Construction, Singapore firms recorded the highest level of green involvement compared to other global firms in 2012, with 64% engaging in at least 60% or more of green projects, as compared to 28% among their global counterparts. By 2015, this figure is estimated to reach 89%.

Dr John Keung, CEO of BCA, remarked, “Achieving a truly sustainable built environment is not the sole responsibility of one sector or one agency, nor can it be achieved in isolation. A Public Private and People (PPP) partnership is critical to help drive Singapore’s green agenda going forward through collaborative efforts between private sector and government, profit and non-profit organisations, countries and individuals. This year’s SGBW has brought together three stellar Green Building events in one location, providing an extensive platform that cuts across industries, sectors and professions, in a concerted effort to tackle green challenges in the region and in Singapore”.

IGBC 2013
An annual event, IGBC 2013 continues to build on the vision set out by the second Green Building Masterplan, of Singapore as a lively yet highly liveable and sustainable global city. With this year’s theme, ‘Build Green, Live Green’, the conference aims to provide a platform to discuss sustainable living strategies and explore green building solutions to achieve a greener Asia. At the same time, IGBC 2013 also seeks to inspire a holistic focus on environmental sustainability driven by industry partnerships across the value chain. It will feature dedicated conference topics on green building design, trends and urban solutions, as well as showcase the latest green technologies and innovation.
from the region. In particular, business leaders can look forward to special business-focused sessions, including a high-level CEO Roundtable discussion on the ‘Value of Green to Corporations’.

IGBC 2013 is expected to attract more than 1,000 participants from over 30 countries, including policy-makers, industry practitioners and research experts from countries such as Australia, China, Germany, India, Japan, Philippines, Singapore, the United Kingdom and the United States. Participants can look forward to insights and best practice learning, from an impressive line-up of speakers including industry leaders such as Mr Harvey Bernstein, Vice President, Industry Insights and Alliances, McGraw-Hill Construction; Mr Gary Lawrence, Vice President and Chief Sustainability Officer, AECOM; Mr Christoph Ingenhoven, Architect and Founder, Ingenhoven Architects; and Ms Jane Henley, CEO, World Green Building Council.

Following the success achieved in the previous year, the BCA-SIA-SGBC International Tropical Architecture Design Competition for Institutes of Higher Learning is back again with the theme ‘Live, Study, Play - Our Green Campus’.

The competition is co-organised by the Building and Construction Authority, Singapore Institute of Architects and the Singapore Green Building Council.

As sustainable developments are no longer an option, but a necessity for present and future generations, this competition sets out to raise the awareness of climate change and encourage students, the future leaders, to recognise the importance of sustainability and adopt a green mindset from an early age. Participants can expect to see innovative green building designs conceptualised and produced by students from around Asia on display. At the same time, students participating in the competition stand a chance to win cash prizes and internship opportunities with the competition’s main sponsor, Surbana International Consultants Pte Ltd, at its regional offices.

As part of IGBC 2013, the popular BCA Green Mark Eco-Tours will be conducted once again. Participants can look forward to visiting some of the latest Green Mark certified facilities such as the W Hotel and Quayside Isle (hotel and F&B establishment), Jem Retail Mall (shopping mall), CleanTech Park Central Green Core (District), and TreeTop Executive Residences (service apartments), amongst others.

BEX Asia 2013

BEX Asia 2013 is the key green show in the region, that promises a multi-disciplinary showcase of the latest green solutions for residential and commercial developments.

Over 8,000 industry professionals from 28 countries attended the event last year. This year’s event is expected to draw over 10,000 visitors from 30 countries.

Noting an increase in demand for energy efficiency solutions, BEX Asia 2013 will see a brand new Energy Efficiency Trail that aims to offer a comprehensive range of green solutions from green systems software to Heating, Ventilation and Air-Conditioning (HVAC) systems. On this trail, participants can learn more about advances in green technologies and solutions.

On top of the greater depth in energy efficiency content being offered this year, BEX Asia 2013 will also provide greater business opportunities and will include national pavilions from Japan and Switzerland, for the very first time. In particular, Japan External Trade Organisation (JETRO), a government-affiliated organisation, will be leading more than 15 Japanese companies to BEX Asia 2013.

WES 2013

The World Engineers Summit 2013 (WES 2013) will also feature the World Engineering Expo 2013 (WEE 2013).

Sustainable Building 2013 to be held on 9 and 10 September 2013

Sustainable Building 2013 Singapore, an international conference on sustainable building and construction, will be held at Sands Expo and Convention Center, Marina Bay Sands, Singapore, on 9 and 10 September 2013.

The event is co-organised by the BCA Centre for Sustainable Buildings (BCA CSB) and the National University of Singapore (NUS).

The conference aims to provide an unparalleled view into regional and international sustainable building issues and promote greater sustainability through cost-effective solutions in design, construction and operation. It also seeks to showcase built projects, ongoing research and governance models that specifically address life in the tropics; as well as paradigms, processes and tools that can help designers, developers and policymakers understand the exchange between people and buildings, buildings and neighbourhoods, cities and their surroundings, and man and nature.

With its theme ‘Realising Sustainability in the Tropics’, the conference will focus on peer reviewed papers by researchers and practitioners, plenary sessions, and exhibition displays with participation encouraged from researchers, practitioners, stakeholders, policy makers, investors, students as well as users.

Plenary speakers at the conference include Ashok Lall, Ashok B Lall Architects, India; Herbert Dreisieitl, Founder of Atelier Dreisieitl, Germany; Richard Hassell, Co-Founding Director of WOHA, Singapore; Arab Hoballah, UNEP/DTIE, France; Wolfgang Kessling, Transsolar, Germany; and Charles J Kibert, University of Florida, USA.

More information can be obtained from www.sbsingapore.org
WES 2013 aims to bring together engineers from multiple disciplines and climate change specialists from all over the world to share ideas and insights on climate change. The week-long event will include the World Federation of Engineering Organizations General Assembly 2013 and committee meetings.

Ms Louise Chua, Project Director of Reed Exhibitions said, “We are excited to have the co-location of BEX Asia with IGBC and WES/WEE. With three events under one roof, it will allow visitors easy access to every aspect of the green sector; reaching out to various players in the green industry - from thought leaders to exhibitors who provide specific green solutions. The co-location of these events also reflects the holistic approach adopted by industry players in creating a truly sustainable built environment for all”.


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**European solar energy conference to feature 1600 presentations**

The detailed conference programme of the 28th European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC) is now available - it features more than 1,600 keynote, plenary, oral and visual presentations.

EU PVSEC 2013 will be held from 30 September to 4 October 2013 at Parc des Expositions Paris Nord Villepinte in Paris, France. The five-day conference is combined with the three-day PV industry exhibition, held from 1 to 3 October 2013.

Globally installed cumulative PV capacity has surpassed the 100 GW mark in 2012 and will triple by 2018, according to the new Medium-Term Renewable Energy Market Report of the International Energy Agency (IEA). Considering that PV solar energy is now becoming a major and mature electricity source, the conference programme of the EU PVSEC 2013 extends its focus on application and policy-oriented topics with the inclusion of related areas. New materials, PV system aspects including reliability, dispatchability and grid integration issues and the role of PV as a building material are examples of key topics to be addressed in Paris.

Dr Arnulf Jäger-Waldau, European Commission, DG JRC and EU PVSEC Technical Programme Chairman, said, “The world PV community meets at the EU PVSEC 2013 to present and discuss the most recent innovations and developments along the entire PV value chain. Dedicated sessions on the role of PV in the electricity markets, PV globalisation and new business opportunities in the context of a further increasing global deployment of PV systems complement this comprehensive programme. The conference offers overviews of the latest research findings, industrial progress and political landscape through keynote and plenary presentations and it provides specialised thematic sessions, where details are presented in a focused and technical manner”.

The combination of this leading conference with an international PV industry exhibition and additional parallel events that offer a deep insight into specific topics, forms the unique character of EU PVSEC. Participants benefit from multiple synergies and networking opportunities at this Business-to-Business, Business-to-Science and Science-to-Industry platform.

The programme for this conference has been developed by an international scientific committee made up of more than 200 research and industry experts from the global PV sector. The conference programme covers the following main subjects:

- Material Studies, New Concepts, Ultra-High Efficiency and Space Technology
- Wafer-Based Silicon Solar Cells and Materials Technology
- Thin Film Solar Cells
- Components for PV Systems
- PV Systems and Applications
- PV - a Major Electricity Source

More information can be obtained from www.photovoltaic-conference.com / www.photovoltaic-exhibition.com

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**The Singapore Engineer**

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POWER-GEN Asia 2013 launches preliminary conference programme

POWER-GEN Asia 2013 and the co-located Renewable Energy World Asia 2013, the region’s premier conference and exhibition for all aspects of the power generation industry, has announced the preliminary conference programme for its 21st annual gathering, to be hosted once again, in Bangkok, Thailand, from 2 to 4 October 2013.

Organised by PennWell Corporation, the event will be held at the IMPACT Arena, Exhibition and Convention Center.

The preliminary conference programme includes presentations by over 120 international experts, across four conference tracks, on topics focusing on strategic and technical power issues and challenges, as well as the continued growth of the renewable and alternative energy sectors.

This year’s Opening Keynote Session on 2 October will feature high profile speakers, including Dr Twarath Sutabutr, Deputy Director-General, Department of Alternative Energy Development and Efficiency, Thailand; Mr Sutat Patmasiriwat, Governor, Electricity Generating Authority of Thailand, Thailand; Dr Piyavasti Amranand, Chairman, Energy for Environment Foundation, Thailand; and Mr Markus Lorenzini, Head of Energy Sector, ASEAN-Pacific Cluster, Siemens, Indonesia.

On 3 October, the Plenary Panel Discussion will take place, on the topic ‘Asian Power - 2020 Vision’. This plenary panel discussion will bring together a group of experienced power industry professionals from a variety of disciplines, willing to share their views and speculate on how the electricity sector will meet the challenges ahead and what the industry will look like in 2020. Panellists include Robert McGregor, Managing Director, Resources & Energy Group, HSBC, Hong Kong; Colin Tam, Executive Chairman, Crystal Vision Energy Ltd, Hong Kong; Michael Thomas, Partner, The Lantau Group (HK) Limited, Hong Kong; and Wouter van Wersch, President, Alstom Singapore and Senior Vice President Sales & Marketing Asia Pacific, Alstom Power.

In addition to the Opening Keynote and Plenary Panel Discussion, the conference which will be held over the three days, will include six concurrent tracks, covering Trends, Finance and Planning; Environmental Challenges / Fuels Options & Distributed Generation; Power Plant Technologies; Operation, Optimization & Serving; and two Renewable Energy World Asia 2013 tracks.

POWER-GEN Asia 2013 will also include, for the first time, an Industrial Water Day, as part of its conference programme. It will be held on 3 October. The addition of dedicated water content is an exciting development, and will include discussions on the latest industrial water treatments and usage as well as the latest technologies and innovations within this industry.

Conference Director, Mr Nigel Blackaby, said, “Increasingly, renewable energy generation is becoming a high priority for governments in the region. The need for its integration into the existing generation mix, means that conferences need to address the entire spectrum if they are to serve today’s power industry. The combination of POWER-GEN Asia and Renewable Energy World Asia certainly achieves this.”

Advancing Asia’s energy future

POWER-GEN Asia and Renewable Energy World Asia provides a platform for the power industry to meet, share information on the challenges facing the power industry and discuss solutions for advancing Asia’s energy future. The regional conference and exhibition, dedicated to power generation as well as to renewable and alternative energy industries, attracted 7,000 delegates and visitors from over 60 countries around the world, last year.

The POWER-GEN Asia 2013 and Renewable Energy World Asia 2013 conference is a key forum for senior executives, industry leaders and senior engineers to discuss a range of important issues and find solutions, in order to meet the challenge of the growing demand for electricity in the region, all under the 2013 conference theme ‘Advancing Asia’s Energy Future’.

This year’s event is supported by Thailand’s top industry utilities, government energy organisations and industry trade bodies. Supporters currently include Electricity Generating Authority of Thailand (EGAT); Provincial Electricity Authority (PEA); Metropolitan Electricity Authority (MEA); and the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy. This is complemented by the support of top industry organisations including the Thailand Convention & Exhibition Bureau, the Energy Regulatory Commission, Thai Electrical and Mechanical Contractors Association, Asian Institute of Technology, Thailand Greenhouse Gas Management Organisation, Independent Power Producers Forum (IPPF), Thai-European Business Association, Thailand Environment Institute, Environmental Engineering Association of Thailand, World Alliance for Thai Decentralized Energy, Centre for Energy Environment Resources Development, Philippine Independent Power Producers Association, the Energy Research & Development Institute, International Private Water Association, Energy Research Institute, International Generator Technical Community, and the Petroleum Institute of Thailand.

In addition to the conference, the event boasts a large and ever growing exhibition floor; displaying the latest and leading technologies and solutions.
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BCA’s expert panel gives the thumbs up for Singapore’s green building efforts

The International Panel of Experts (IPE) on Sustainability of the Built Environment recently reviewed Singapore’s progress on its green building movement. The 13-member panel met from 24 to 26 June 2013, to discuss what more Singapore can do to further advance the effort in green buildings.

The IPE comprises Co-Chairmen Dr John Keung, Chief Executive Officer, Building and Construction Authority, Singapore and Er. Lee Chuan Seng, Emeritus Chairman, Beca Asia, Singapore; International Experts Mr Brian Castelli, Executive Vice President, Programs and Development, Alliance to Save Energy, USA; Mr Jens Laustsen, Technical Director, Global Research, Global Buildings Performance Network, France; Ms Maria Atkinson, Director, XO Pty Ltd, Australia; Mr Stephen E. Selkowitz, Department Head, Building Technologies, Environment Energy Technologies Division, Lawrence Berkeley National Laboratory, USA; and Dr Yamina Saheb, Senior Buildings Expert, Energy Efficiency and Environment Division, International Energy Agency, France; as well as Prominent Local Members Mr Constant Van Aerschot, Executive Director, Business Council for Sustainable Development Singapore; Mr David Tan, Assistant Chief Executive Officer, JTC Corporation; Mr Kenneth Foo, Director, Facilities Management, Raffles Quay Asset Management Pte Ltd; Mr Lim Tow Fok, General Manager, Property Management and Knowledge Management, Keppel Land International Limited; Mr Raymond Wong, Senior Research Fellow, School of Mechanical and Aerospace Engineering, Energy Research Institute, Nanyang Technological University; and Dr Uma Maheswaran, Vice President, Sustainable Development Unit, Jurong Consultants.

The expert panel supported BCA’s plan to focus on greening existing buildings and to engage building users and tenants using BCA’s user-centric Green Mark schemes. This will complement and intensify the green building efforts.

BCA’s Green Building Masterplan has set the framework for policies and initiatives such as legislation and incentives to further the adoption of green buildings.

BCA’s Green Building Masterplan has set the framework for policies and initiatives such as legislation and incentives to further the adoption of green buildings.

The panel members also felt that the current incentive approach can continue to encourage building owners to go for higher Green Mark ratings and save both energy and money and to build up a critical mass of green buildings in Singapore.

In a recent study by BCA on 36 commercial buildings, results have shown that an efficient chiller system can improve energy efficiency by up to 42% after retrofitting. This contributes to an overall energy savings of 16% of the total building consumption. The total energy saved was 85 GWh per annum. In terms of monetary savings, owners of these 36 buildings saved a total of S$ 22.7 million per year.

The international experts also shared their perspectives on exploring some form of building energy performance disclosure and labelling for benchmarking and improvement purposes, to heighten awareness and broaden the reach of green buildings to building owners and consumers. In addition, it is also important to educate the younger generation on environmental sustainability and continue to train a pool of capable green building workers. They also recommended the need for continual government and industry support of the research, development and deployment (RD&D) of innovative and effective green building technologies. All these efforts will help strengthen Singapore’s position as a global leader in green buildings in the tropics and sub-tropics.

These recommendations will be reviewed by BCA for adaptation and inclusion in the third Green Building Masterplan which will be unveiled at the International Green Building Conference 2013, to be held during the Singapore Green Building Week 2013, from 9 to 13 September 2013.

Singapore’s efforts in greening the built environment

The number of green building projects in Singapore has grown from 17 in 2005 to about 1,600 in eight years. This translates to 47 million m² of Gross Floor Area (GFA), or 20% of Singapore’s total GFA. Singapore is thus well on track to meet its goal of greening 80% of Singapore’s building stocks by 2030.

The second Green Building Masterplan launched in 2009 has been instrumental in achieving such stellar results. Recognising BCA’s outstanding achievement in leading the green building movement and energy efficiency improvement, the US-based energy efficiency coalition, Alliance to Save Energy, will confer on BCA the International Star (I-Star) Award in October 2013. Singapore is the first country outside of America and Europe to receive this Award.

The Star of Energy Efficiency Awards are given to individuals, organisations, companies, learning institutions, and government programmes that have demonstrated a significant and tangible commitment to the cause of energy efficiency both in the US and abroad.

Dr John Keung, CEO of BCA, said, “The award is testament to our progress in greening Singapore’s built environment through BCA’s Green Building Masterplan. With a robust plan that looks into all aspects of creating a sustainable built environment, I am confident that our vision of becoming a global leader in green buildings, with particular expertise in the tropics and sub-tropics, can be realised in the next few years”.

With a focus on greening Singapore’s existing buildings, several initiatives, including the S$ 100 million Green Mark Incentive Scheme for Existing Buildings was introduced to encourage retrofitting and upgrading works for improving building energy efficiency. The scheme was fully committed earlier this year, co-funding up to 50% of the costs of energy-efficient equipment and professional services for 81 projects.
A pilot Building Retrofit Energy Efficiency Financing (BREEF) scheme was also introduced in 2011 to provide credit facilities for commercial building owners. Under the scheme, building owners can carry out energy-efficient retrofits under an Energy Performance Contract (EPC) arrangement. BCA currently co-shares 50% of the risk of any loan default for five projects with the participating financial institution issuing the loans.

**Legislation for existing buildings**

Buildings consume about one-third of Singapore’s total end-use electricity. To give a greater push for energy efficiency in existing buildings and to improve Singapore’s energy security, productivity and growth, landmark legislation for energy efficiency was introduced to mandate minimum environmental sustainability standards for existing buildings. The regulations will be implemented from the third quarter of 2013 and building owners will have to fulfill three requirements under the Building Control Act:

- Achieve minimum Green Mark standards for existing buildings when a cooling system is installed or retrofitted (effective from early January 2014).
- Carry out three-yearly energy audits on building cooling systems and compliance with design system efficiency (effective from early January 2014).
- Submit building information and energy consumption data annually (effective from 1 July 2013).

**New family of certification tools improves profitability for cable installers**

Fluke Networks recently announced the release of its new family of Versiv cable certification testers designed to help data communications installers more quickly, accurately and profitably achieve system acceptance for copper and fibre jobs. Versiv is a powerful platform offering interchangeable modules for copper, fibre and Optical Time Domain Reflectometer (OTDR) testing, as well as new software innovations that speed test time and accuracy, and simplify testing setup, planning and reporting.

Mistakes, complexity and rework are adding more than a week of labour to a typical 1,000 cabling drop installation, resulting in average losses of more than US$ 2,500, according to the Fluke Networks Market Research 2012.

To combat these growing challenges, Versiv has been built from the ground up to go beyond testing and troubleshooting to address the entire certification lifecycle. Its new capabilities help contractors manage the complexities of today’s certification landscape and reduce errors that can threaten profitability.

Key to simplifying the complexity is the new ProjX management system. In addition to allowing team leaders to set up test parameters to work across multiple jobs and media, the system accelerates planning and setup of projects by allowing technicians to capture consistent test parameters across an entire job, or switch from job to job by simply clicking between projects stored in the tester. The system also allows up-to-the-minute project analysis and oversight to help speed certification and reporting. If problems are encountered during the testing process, technicians can create a ‘Fix Later’ troubleshooting to-do list for later evaluation by more experienced installers.

Versiv also features an intuitive and instructive touch screen interface that elevates the capabilities of the less experienced installers, and increases the speed of testing and global ISO Level V testing compliance. From wizards that speed set up to the advanced Taptive user interface for navigation to new workflow enhancements, all of the new features in Versiv combine to make it one of the fastest testers on the market, so jobs get done right the first time.

**Fluke Networks**

Fluke Networks is a world-leading provider of network test and monitoring solutions to speed the deployment and improve the performance of networks and applications. Leading enterprises and service providers trust Fluke Networks’ products and expertise to help solve tough issues and emerging challenges in WLAN security, mobility, unified communications and data centres.
Plug-and-play EBoP solution for new gas power plant in Thailand

ABB has been awarded a contract from Mitsubishi Heavy Industries (MHI) to design and engineer a complete electrical solution for the 1,600 megawatt (MW) U-Thai gas turbine combined cycle power plant in Thailand. The power plant will be located in the U-Thai district of Ayutthaya Province, about 70 km north of Bangkok.

As part of the solution, ABB is supplying distribution transformers, low- and medium-voltage switchgear as well as direct current (DC) systems. The solution includes a modular and customised E-house to store the electrical equipment that will integrate MHI's turbine control system.

ABB's modular, pre-engineered approach is a cost-effective plug-and-play solution that ensures faster overall delivery. Containers are pretested in the factory, helping customers to reduce operational and execution risks, while maintaining the traditional ABB standard of high-quality products and installation.

The U-Thai plant is owned and operated by Gulf JP UT Company, a leading independent power producer in Thailand and a subsidiary of Gulf JP Company Limited. Under a 25-year power purchase agreement, the generated electricity will be sold to the Electricity Generating Authority of Thailand (EGAT), and the steam to users in Rojana Industrial Park, serving mainly the electronics and automotive industries.

The plant is part of Thailand's effort to provide reliable and cost-effective power generation by promoting the use of more efficient and environmentally sustainable technology. More than 80% of the country's power capacity comes from traditional fossil-fuel generation. This project supports Thailand's public-private partnerships (PPP) programme by enhancing the efficiency of its power generation infrastructure, and is in line with the national plan to use such partnerships to add an additional 22 gigawatts (GW) to the country's current 34 GW generating capacity within the decade.

ABB is expected to complete its part of the project in the second quarter of 2014.

ABB recently announced that in the two years since its launch, Symphony Plus control solutions won orders for new power plants that generate more than 25,000 MW of electricity. In addition, many plants have upgraded their existing systems with the new Symphony Plus solution to meet their evolving needs.

ABB launched its Symphony Plus distributed control system (DCS) in April 2011 as its latest generation in the ‘Harmony’, ‘Melody’ series. With more than 6,500 systems installed over more than three decades - two thirds of these being in the power and water sectors - the Symphony family represents one of the largest installed bases of distributed control systems (DCS) in the world.

Symphony Plus is designed to meet a wide range of plant configurations and its flexibility and scalability enables it to serve small and server-less applications as well as large multi-system, multi-server architectures. It supports the seamless integration of field devices, process and turbine automation systems, electrical and SCADA (Supervisory Control and Data Acquisition) solutions as well as business and maintenance systems, providing a secure and reliable control environment.

The most recent additions to the Symphony Plus portfolio are new features and functionalities for geographically distributed applications like photovoltaic plants, hydropower stations and water distribution networks. The new capabilities address the challenge of incorporating large numbers of small modular units such as solar trackers, remote terminal units or pipeline sensors into a common operations hierarchy, while providing better visibility and control of the entire plant or network.

Symphony Plus was a reaffirmation of ABB's commitment to continue investing in this platform based on an 'evolution without obsolescence' approach of introducing new technology with enhanced benefits while protecting the long-term investment of customers by ensuring full compatibility with existing installations.

This helps customers to balance objectives like asset availability, operational reliability and production efficiency with asset life extension, carbon reduction and regulatory compliance.
A majority (68%) of city dwellers around the world see tall buildings as an essential part of the modern cityscape, according to a recent study. Sixty-three percent think that landmark buildings are important to a city’s image and the same number believe that building upwards is a sustainable way to develop urban areas. Asians and Middle Easterners view high-rises even more positively than Europeans and Americans.

KONE, one of the global leaders in the elevator and escalator industry, conducted an international survey in March-April 2013, mapping out the opinions of over 4,000 city dwellers aged 18 to 59. Respondents came from eight major metropolises around the world - Chicago, Dubai, London, Moscow, Mumbai, Paris, Shanghai, and Singapore.

In general, Singaporeans (53%) and Parisians (47%) are the most eager to live on the highest floors, and men are slightly more enthusiastic than women about living and working in high-rises. The view (88%) and avoidance of traffic noise (60%) are the top two reasons urbanites cite for choosing to live on a high floor of a tall building.

Tall buildings are seen to improve a city’s image, and they are also widely believed to have a positive impact on businesses. For example, half (50%) of the surveyed young adults aged 18 to 29 think that having an office in a tall building reflects positively on a company’s image. Over half of the respondents from Shanghai (65%) and Mumbai (54%) share this opinion.

As for working in tall buildings, three out of four respondents (76%) appreciate easy access to services such as shops and public transport. People from Shanghai (79%) and Dubai (71%) in particular also value the close proximity to business partners.

Elevator users in cities value the quick availability of an elevator more than any other technical elevator feature. Over half (54%) of all of those surveyed want elevators to arrive immediately without needing to be called. Once inside the elevator, however, most (65%) appreciate a moment to relax. A soothing and relaxing environment for calm reflection is seen as the best enhancement to the elevator experience.

In comparison to other urbanites, people from Moscow (51%) in particular enjoy the opportunity to groom themselves as they ride, while people from Shanghai (43%) think natural elements like flowers make elevator trips more pleasant.

When polled on their feelings about elevators, the ‘easy rider’ emerged as the most common (31%) user type. This is someone who has no special demands and is content as long as elevators work. The second most widespread profile is the ‘safety-conscious’ rider (28%) - someone who has high demands regarding safety and expects elevators to be comfortable and clean.

“At KONE, we constantly strive for deeper insight into the demands of the people who use our solutions every day”, said Mr Giuseppe Bilardello, Senior Vice President of KONE Technology and R&D.

“Conducting surveys on a regular basis is one of the ways we collect valuable data that can assist us in product development”, he added.

KONE’s objective is to offer solutions that meet the needs of present day and future building users in a rapidly urbanising world. Urbanisation is the most important global megatrend currently impacting the elevator and escalator industry and is expected to drive demand for years to come. The increasing concentration of people in urban areas heightens the need to build upwards and raises the importance of solutions that enable people to move smoothly and efficiently from place to place.
Otis wins contract for tallest building in North China

Otis Elevator Company recently announced its latest success in the China marketplace with the award of the Goldin Finance 117 contract in China’s northern metropolis of Tianjin. Goldin Finance 117 is expected to become the tallest building in the whole North China region.

Otis will altogether supply 255 units for the project which is expected to be completed in 2016. This new building in the central business district of Tianjin’s High-Tech Park will reach a prominent height of about 600 m and 117 floors.

“It is exciting for us to take on another project of such magnitude here in China and it will be the largest single contract for a commercial building for Otis”, said Mr Tom Vining, President of Otis China Area.

“Innovation is at the core of what we do and this project requires a number of advanced technologies, including our super high-rise capabilities as well as best-in-class energy saving technology. We will continue bringing superior products to the China market, to meet the needs brought along by fast economic growth”, he added.

The four elevator unit types being used in the project include Elevonic, Skyrise and the energy-efficient GeN2-MRL elevators and Otis LINK escalators. All elevators will feature Otis’ ReGen drives, a regenerative drive system that returns energy to a building’s electrical grid for reuse and if combined with GeN2, is capable of reducing energy usage by up to 75% when compared with conventional systems.

Otis wins large contract in India

Otis Elevator Company (India) Limited recently announced that it has been awarded the elevators & escalators contract for Hyderabad Metro Rail Project by L&T Metro Rail (Hyderabad) Limited (LTMRHL).

Otis has been contracted to supply and install a total of 670 elevators and escalators for the project. Of the total units, there will be 260 of the Gen2 Premier model of elevators and 410 units of the 520 NPE model of escalators installed in over 66 metro stations, workshops and other buildings at depots. Otis will also maintain the units for 10 years after the two year warranty period, for which a separate maintenance contract is being entered into with Otis India.

The Letter of Award (LOA) was signed and exchanged by Mr V B Gadgil, Chief Executive & Managing Director, LTMRHL and Mr Sebi Joseph, Managing Director, Otis Elevator Company India Limited.

The Gen2 Premier elevator system combines the benefits of energy efficiency and environmental responsibility along with Invented by Otis, double-deck elevators improve a building’s overall passenger capacity and reduce construction space. Goldin Finance 117 will have 50 of these units installed, with which two floors can be simultaneously accessible using the same hoistway, allowing more passengers to be served than in a standard single-deck configuration. Depending on the building’s various needs, the double-deck elevators will be able to save up to 40% of the space required by traditional elevators.

“Our track record in the world’s tallest buildings, our green capacities, and our ‘Total Solution’ package from planning, engineering and manufacturing, and installation, to servicing, were cited as the reasons for winning”, said Mr Tony Black, President of Otis Elevator (China) Investment Co Ltd.

“We are also honoured to share the same passion for innovation and sustainability with our customer”, he added.

Otis also brings extensive experience to support mega-tall buildings like the Goldin Finance 117 project.

Over the last 100 years, 10 buildings have held the title world’s tallest title and Otis has supplied elevators to eight of them, including the current record-holder Burj Khalifa in Dubai. Other names include the Petronas Towers in Kuala Lumpur and the Shanghai World Financial Center.

The company has created a Global High-rise Contract Logistics Center in Shanghai to support the growing number of high rise structures being proposed around the world.

Otis’ long-time emphasis on passenger safety and comfort. This equipment includes the innovative Gen2 flat belt system that replaces conventional steel ropes.

The Gen2 Premier machine’s compact size eliminates the need for a machine room. This system also includes the of PULSE belt monitoring system which electronically monitors the status of the belt. Gen2 elevators equipped with Otis’ ReGen drives are capable of reducing energy usage by up to 75% when compared with conventional systems with non-regenerative drives. ReGen drives reduce energy usage by capturing the energy normally dissipated as heat during braking and then feeding this energy back into the building’s internal electrical system, for use by other building systems such as adjacent elevators and lighting.

The 520 NPE escalators cater to public transport and heavy traffic environments by offering safety, reliability and service friendly design. Interfaces for remote monitoring and control enhance safe operation. These escalators are also environment-friendly.
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Minimising corrosion in heating and cooling systems

Owing to corrosion and dirt deposits in pipes, electrical pumping costs increase by up to 35%, during the first working years of a heating or cooling system, according to an investigation conducted by Costic (French Research and Training Centre in HVAC) and published in CFP Journal (April-May 2002).

Pipe pressure drops (often called linear pressure drops) depend on:
- The internal pressure in the pipe
- The pipe roughness
- The water density and viscosity
- The flow

The presence of oxygen, due to poor pressure maintenance, creates corrosion. Dirt deposits (due to bad water quality and a too-low water flow velocity in some parts of the plant) consistently alter the pipe roughness by 15% to 70% during the first years, and by 150% to 240% (according to results published by Prof Rahmeyer of Utah State University) after 20 to 50 years. To compensate for the increase in pressure drop, the pump consumption has to increase.

In an example cited by Costic, considering a pipe pressure drop representing 50% of the total pressure drop of the system, an increase of 70% of the pipe pressure drop directly impacts the electrical pump consumption by 35%, to achieve the same flow.

Vento degassing system

TA Hydronics offers the Vento degassing system to minimise corrosion, cavitation and erosion in heating and cooling systems. The Vento range provides universal control and monitoring of all pressure maintaining activities for optimised, safe system operation. Vacusplit technology separates reactive gases completely from the water using an atomising process in a special vacuum vessel. A water make-up system may also be integrated as an option.

The Vento is used in heating, solar and cooling water systems to facilitate central degassing and venting of the system and minimise corrosion, cavitation and erosion. The Vento has a self-optimising memory function as well as a simple and intuitive menu in several languages.

Function of a degasser

Gas-containing water is diverted from the main flow into a separate pressure vessel connected through a bypass. This is where a vacuum is generated. The gases are released from the water and are agitated further by injecting additional water through a separate nozzle, which greatly increases the degassing action. The gases are then discharged and the gas-free water returned to the system.

Pressure step degassing is independent of system parameters and is thus universally applicable.

TA Hydronics

TA Hydronics is a leading global provider and expert in hydronic distribution systems and room temperature control, with experience in more than 100,000 construction projects worldwide. TA Hydronics helps clients optimise their HVAC (Heating, Ventilation and Air Conditioning) systems by providing products and knowledge to deliver the right indoor comfort at the right energy cost.

TA Hydronics is part of the international engineering group IMI plc. With a turnover of £ 2.13 billion, IMI plc is listed as a member of the FTSE 100 on the London Stock Exchange.

In 2011, TA Hydronics brought together three leading brands in the world of hydronic distribution - TA, Pneumatex, and Heimeier.

More information on TA Hydronics’ degassing systems can be obtained from the company. Email tahasia@tahydronics.com Website: www.tahydronics.com
Johnson Controls introduces new energy-efficient HVAC solutions for buildings in Asia

Johnson Controls, a global leader in delivering solutions that increase energy efficiency in buildings, has introduced the YORK YES Series DC inverter, a new variable refrigerant flow (VRF) system, to Asia. The product brings many benefits to both commercial and residential building owners, including energy savings, comfort, a wide ambient range, versatility and smart control.

The YORK YES Series has one of the highest Energy Efficiency Ratio (EER) of up to 4.0 and Integrated Part Load Value (IPLV) approaching 6.0, helping building owners achieve substantial energy savings. EER is a measure of the ratio of cooling output to electrical power input at full load, while IPLV is the measure at various operating capacities.

“We understand our customers’ needs for higher quality HVAC solutions as well as greater energy efficiency due to rising electricity costs in many parts of Asia such as China and Indonesia”, said Mr Chuah Cheng Huat, Director of HVAC for Johnson Controls Building Efficiency Asia.

The wide ambient temperature range enables YORK YES Series to operate under extreme weather conditions - as low as -20º C for heating and as high as 52º C for cooling - making it suitable for the different climates across Asia. It also offers greater comfort as users can set the temperature of each room individually.

Furthermore, the YORK YES Series offers flexibility for installation, commissioning, and product software selection. The comprehensive suite of smart control solutions include touch screen wired controllers, central controllers, smart home connections and building automation systems featuring Johnson Controls’ Metasys Building Management System.

The YES Series was developed based on three decades of pioneering work by YORK in inverter technology. At the recent China Refrigeration Expo, held in Shanghai, the YES Super DC inverter VRF system garnered the New Product Award. This commitment to quality and innovation is further supported by the expansion of Johnson Controls’ Guangzhou factory to increase manufacturing capacity for VRF systems and conduct advanced research and development for this technology.

Johnson Controls achieves top sustainability rating for Hong Kong office space

Johnson Controls has earned the LEED Platinum certification for its new Hong Kong office east of Kowloon Peninsula. The new 55,000 ft² (5,100 m²) leased office space houses more than 300 employees.

“LEED has proven to save money, reduce waste and protect the environment. We have experienced the positive impact of LEED at our own facilities as well as delivered these same benefits to our customers around the world”, said Mr Ricky Chan, General Manager for Johnson Controls Building Efficiency Hong Kong.

Johnson Controls now has more than 2.5 million ft² (230,000 m²) of certified green building space around the world and has impacted 23 million ft² (2.14 million m²) of building space for its customers. Examples of customers in Asia include the Guiyang Convention & Exhibition Center (China), Nanjing Atlas Copco R&D Center (China) and PoMo (Singapore).

Johnson Controls adopted a comprehensive technology and building controls strategy to achieve substantial savings at the building, located on the 12th and 13th floors of the Octa Tower.

The achievements include:
• A 32% reduction in heating, ventilation and air conditioning (HVAC) energy consumption
• A 28% reduction in total energy usage
• A 40% saving in water consumption

With the help of sensors and using its own building management system, Metasys, Johnson Controls is able to control the lighting and temperature as well as minimise the energy consumption throughout the office.

The information gathered from the building management system is displayed on a green kiosk for employees and visitors to monitor real-time energy use and the building’s total carbon footprint. In addition, through a web-based interface on their computers, employees can control the lighting and the temperature settings for their environment.

These efforts align with Johnson Controls’ core values of sustainability and innovation, and are part of its ongoing commitment to the vision of creating a more comfortable, safe and sustainable world.

Johnson Controls has been a leader in energy-efficient buildings by working with the US Green Building Council to help establish the criteria for the original LEED rating system.
LG Electronics (LG) recently announced the release of the Multi V IV, its new Variable Refrigerant Flow (VRF) air-conditioning solution. Equipped with a number of LG’s proprietary technologies, the Multi V IV delivers superior cooling performance that is said to go beyond the standard. The latest in the company’s successful line of Multi V products, this model offers industry-leading energy efficiency, good operational savings and greater convenience.

The Multi V IV boasts a superior coefficient of performance (COP) of 4.34, made possible by LG’s cutting-edge technologies. These include HiPOR (High Pressure Oil Return) which effectively resolves compressor energy wastage, and Optimized Cooling Heat Exchanger which selects the optimal paths for cooling. With LG’s fourth generation inverter compressor - the High-side Shell (HSS) scroll inverter - and a BLDC-type motor coil, the Multi V IV effectively minimises energy loss under part load conditions. It is also able to offer a 30% improvement in integrated part load energy efficiency, as well as an increase of 10% in the COP in cooling operations.

In addition to the impressive energy efficiency, the Multi V IV is said to possess outstanding performance capabilities. The unit’s efficient inverter compressor provides an even wider operational range of 15 Hz to 150 Hz, for fast and efficient cooling. An increased number of valves, from four to six, also allows more meticulous control of the refrigerant under part load conditions.

With enhanced functions and features, the Multi V IV offers convenience and flexibility. The smart control system allows users to remotely monitor and adjust settings via a smartphone or computer. The system also supports piping up to 1,000 m in length, while a lighter outdoor unit makes installation far easier. In addition, it is on average 14% lighter than the conventional model, making installation easy and it exerts less pressure on the roof.

“At LG, the consumer’s benefits are of utmost importance to us. We have integrated all our advanced, industry-leading HVAC technologies into this excellent new solution. This allows the Multi V IV to have superior energy efficiency, performance, flexibility and cost savings. Moving forward, we will continue to expand our R&D investment and strive to become the true total energy solution provider in the near future”, said Mr Scott Jung, Managing Director of LG Electronics Singapore.

The Multi V IV will be available in Singapore from 2 September 2013.
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