MAN news

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IN FOCUS

Sustainable Cities and Infrastructure

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Sustainable Cities and Infrastructure

Green building is the planning, design, construction, and operations of buildings with several considerations including energy and water use, indoor environmental quality, materials selection, and on-site building effects. The construction and operations promote a healthy environment for all stakeholders, and it does not disrupt the land, water, resources or energy in and around the building.

With new technology continuously being developed to complement current practices in creating greener structures, the benefits of green building are many. They range from environmental (reducing water waste, conserving natural resources, improving air and water quality, protecting biodiversity and ecosystems), to economical (reducing operating costs, improving occupant productivity, creating markets for green product and services), to social (improving quality of life, minimizing strain on local infrastructure, improving occupant health and comfort).

MAN Enterprise is working toward executing more green buildings to help preserve the environment in its natural state.

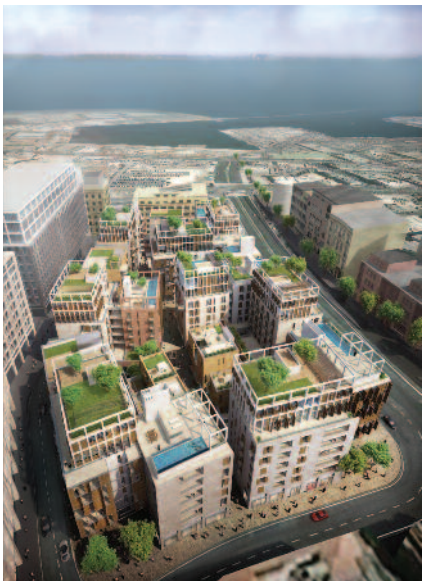
MAN ENTERPRISE'S ROLE IN LEED TARGETING PROJECTS

LEED, a registered trademark of the U.S. Green Building Council (USGBC), is a green building certification system that provides third-party verification to measure how well a building performs across the metrics that matter most: energy savings, water efficiency, CO_2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impact. Points are awarded to meet LEED criteria per the following scale: Certified, Silver, Gold, and Platinum. The LEED certification requires that both the design and the construction team adhere to certain concepts and thresholds that are challenging in five categories:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Air Quality

MAN Enterprise has been the general contractor on several green building projects and has greatly contributed to their certifications. There are a variety of strategies that have been successfully implemented.

ABC VERDUN, LEBANON
LEED BD+C: CORE AND SHELL



DISTRICT//S, LEBANON
LEED FOR NEIGHBORHOOD DEVELOPMENT

USGBC MEMBERSHIPS

CONSTRUCTION ACTIVITIES POLLUTION PREVENTION

Under this strategy, MAN Enterprise has developed and implemented an Erosion and Sedimentation Control Plan (ESC) that is compliant with the USA EPA Construction General Permit. The plan requires the contractor to protect against environmental pollution caused by water and wind erosion.

- Surrounding streets and sidewalks were monitored and kept clean from construction activities
- All vehicles leaving the site had to pass through a tire-wash station
- During rainy seasons, all water leaving the site was mud-free in order to protect the public drainage network
- All wind activities were closely monitored and their impact minimized through best managerial practices (BMP) such as covering piles, wetting, compacting, etc.
- Dust screens were erected on all façades

INDOOR AIR QUALITY PRACTICES

An Indoor Air Quality Plan was developed to reduce air quality problems resulting from construction and to promote the comfort and well-being of construction workers and future building occupants.

During construction, MAN Enterprise met the recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008. The main measures for compliance were:

- Protect stored on-site and installed absorptive materials from moisture damage
- Protect HVAC equipment from dust accumulation
- Protect workers from construction activities such as dust inhalation

PURCHASING REGIONAL MATERIALS

To increase demand for building materials and products that were extracted and manufactured within the region, the purchasing of regional materials supported the use of indigenous resources and reduced environmental impact resulting from transportation.

MAN Enterprise used materials that were extracted, harvested, recovered or manufactured within 500 miles of the site.

PURCHASING RECYCLED MATERIALS

The goal behind purchasing recycled materials was to increase the demand for building products that incorporated recycled content materials, thereby reducing the overall impact resulting from the extraction and processing of virgin materials. At least 10% of all used materials were recycled.

LOW EMITTING MATERIALS

There are several elements related to low emitting materials that required careful planning, purchasing, and implementation practices from the MAN Enterprise on-site team. The use of paints and adhesives with low VOC (Volatile Organic Compounds) content is a major contributor seeking to reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

CERTIFIED WOOD

It was also important to encourage environmentally responsible forest management by using a minimum of 50% (based on cost) of wood-based materials and products that were certified in accordance with the Forest Stewardship Council's principles and criteria for wood building components. Wood products include structural and general dimensional framing, flooring, sub-flooring, wood doors, and finishes.

EA: COMMISSIONING AND ENHANCED COMMISSIONING

Commissioning serves to verify that the project's energy-related systems are installed, calibrated and performing according to the project requirements, basis of design, and construction documents.

MAN ENTERPRISE'S GREEN BUILDINGS PROJECTS

DISTRICT // S
BEIRUT, LEBANON

LEED for Neighborhood Development

The District S project features a 22 building compound in the heart of Beirut's Central District, a high-density neighborhood.

The District S project is targeting LEED for Neighborhood Development (ND) for the entire project to act as a leader in promoting sustainable values in the urban development sector and beyond individual building limits. Additionally, LEED for New Construction (NC) is targeted for one of the buildings, the cultural center.

District S | Beirut, Lebanon

- ☑ Construction Activities Pollution Prevention

District S The Cultural Central | Beirut, Lebanon

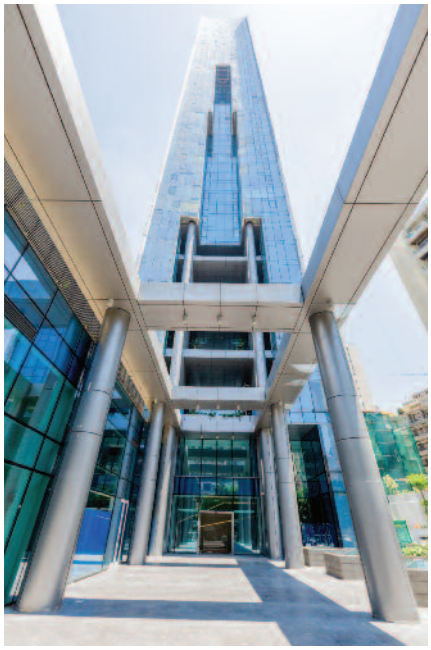
- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Certified Wood
- ☑ Commissioning & Enhanced Commissioning

SAMA BEIRUT
BEIRUT, LEBANON

LEED Silver

A high-rise building is usually criticized as unsustainable as it requires more materials and running cost, consuming large amounts of energy and generating excessive greenhouse emissions.

Creating a new type of mixed high-rise that is environmentally friendly for users and the surroundings from design, development, and construction, to completion and maintenance of the building, Sama Beirut advocates green building practices.



Sama Beirut | Beirut, Lebanon

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Commissioning & Enhanced Commissioning

ABC VERDUN PROJECT
BEIRUT, LEBANON

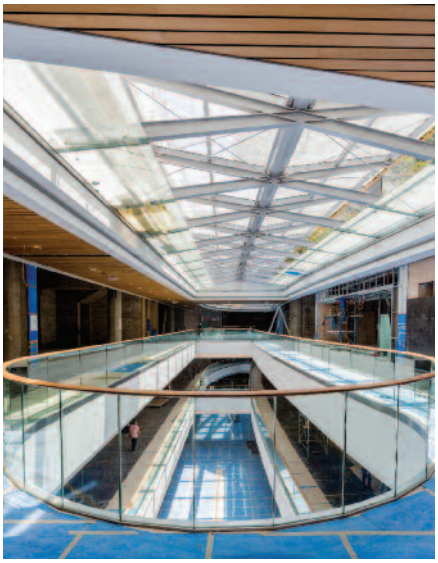
LEED BD+C: Core and Shell

ABC Verdun Mall project is targeting "LEED Certified" LEED BD+C: Core and Shell.

Aiming to achieve this certification, the contraction collaborated closely and regularly with third-party consultants and auditors to achieve high building performance.

ABC Verdun | Beirut, Lebanon
LEED Certified Project

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Commissioning & Enhanced Commissioning



INTERNATIONAL COLLEGE
BEIRUT, LEBANON

LEED Gold

International College - New Elementary School | Beirut, Lebanon
LEED Gold

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Certified Wood
- ☑ Commissioning & Enhanced Commissioning

QATAR FOUNDATION STUDENT HOUSING
DOHA, QATAR

LEED Platinum

The project is comprised of the construction of structural components for 10 buildings three stories high with a total built-up area of 70,000 m².

One of the notable project highlights was the targeted LEED certification for platinum rating. The scope included the removal and relocation of existing utilities, including new infrastructure, earth works, excavation, backfill, and grading for a total site area of approximately 100,000 m².

Qatar Foundation Student Housing | Doha, Qatar

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials

BU FSILA LOGISTIC VILLAGE
DOHA, QATAR

GSAS 2 stars

Bu Fsila Logistic Village | Doha, Qatar

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Commissioning & Enhanced Commissioning

COMMERCIAL BUILDING
DOHA, QATAR

GSAS 3 stars

Commercial Building | Doha, Qatar

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Commissioning & Enhanced Commissioning

OFFICE TOWER AT LUSAIL MARINA PLOT
DOHA, QATAR

GSAS 3 stars

GSAS DESIGN & BUILD CERTIFICATE -
COMMERCIAL BUILDING

Office Tower at Lusail Marina Plot | **Doha, Qatar**

- ☑ Construction Activities Pollution Prevention
- ☑ Indoor Air Quality Practices
- ☑ Purchasing Regional Material
- ☑ Purchasing Recycled Material
- ☑ Low Emitting Materials
- ☑ Commissioning & Enhanced Commissioning

CERTIFICATE OF RECOGNITION -
MIX 52

BEST HEALTHCARE

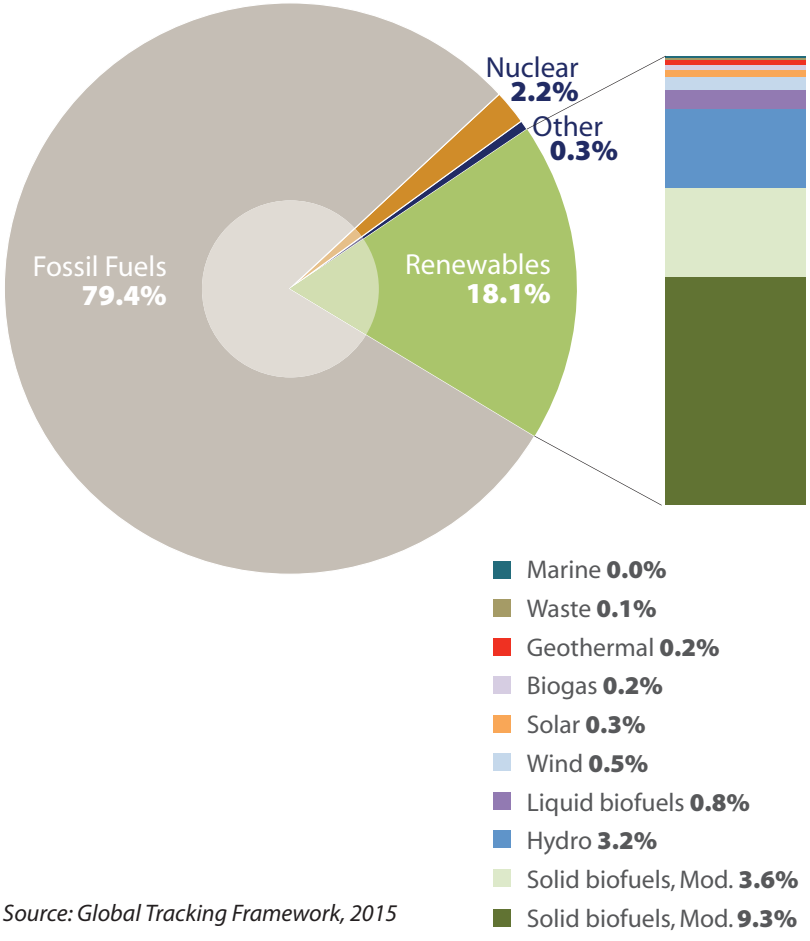
BEST HEALTHCARE

MARKET TRENDS: GREEN ENERGY

Renewable energy has exhibited a stagnant trend since 1990, barely increasing from 16.6% in 1990 to 18% in 2012, of total energy consumption as reported in Global Tracking Framework, 2015.
However, new renewable energy technology, such as solar, wind and geothermal power, are increasingly making their way into the energy mix.

Recent developments have dramatically altered the costs, risk profiles, and dynamics of investing in renewable energy technologies, which are becoming attractive business propositions for the private sector, governments and consumers. Substantial drops in equipment and component prices, enhanced grid integration protocols, innovative off-grid business models, improvements in storage technologies, and other developments are changing the energy landscape, with renewable energy emerging as an increasingly important contributor in both on-grid and off-grid power generation investments.

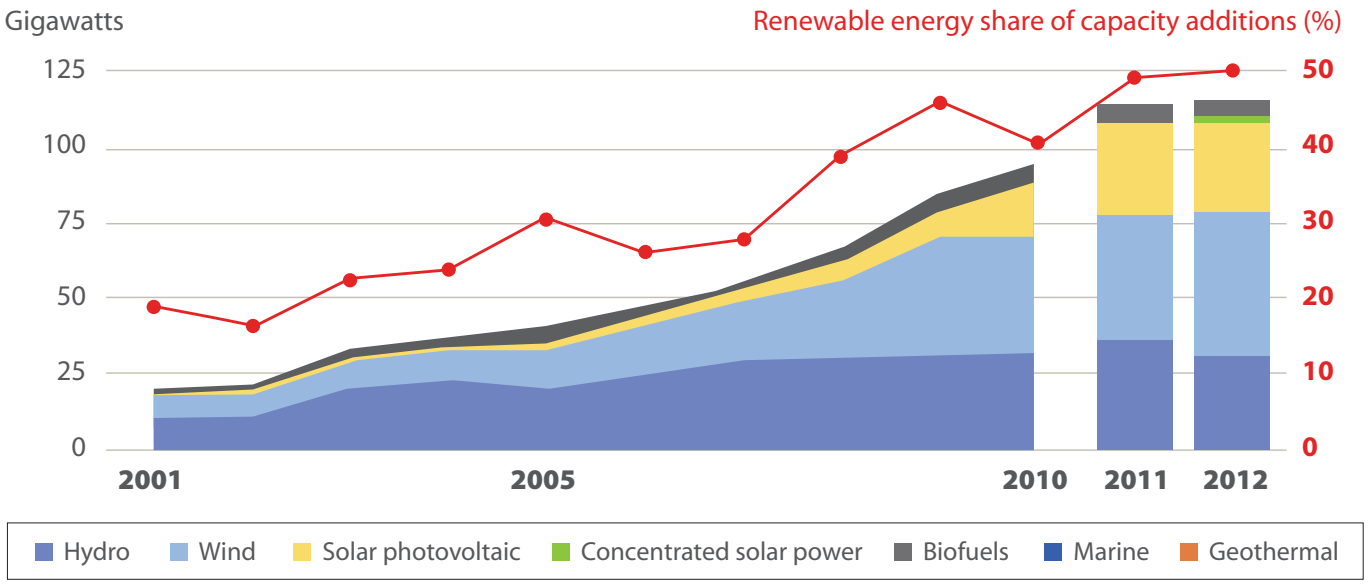
FIGURE 1 – RENEWABLE ENERGY IN GLOBAL ENERGY MIX



Source: Global Tracking Framework, 2015

ZENITH TOWER - SPECIAL SOLAR PANELS

FIGURE 2 – RENEWABLE ENERGY CAPACITY ADDITIONS AND SHARE OF TOTAL CAPACITY ADDITIONS (2001-2012)



Source: Global Tracking Framework, 2015

Global outlook

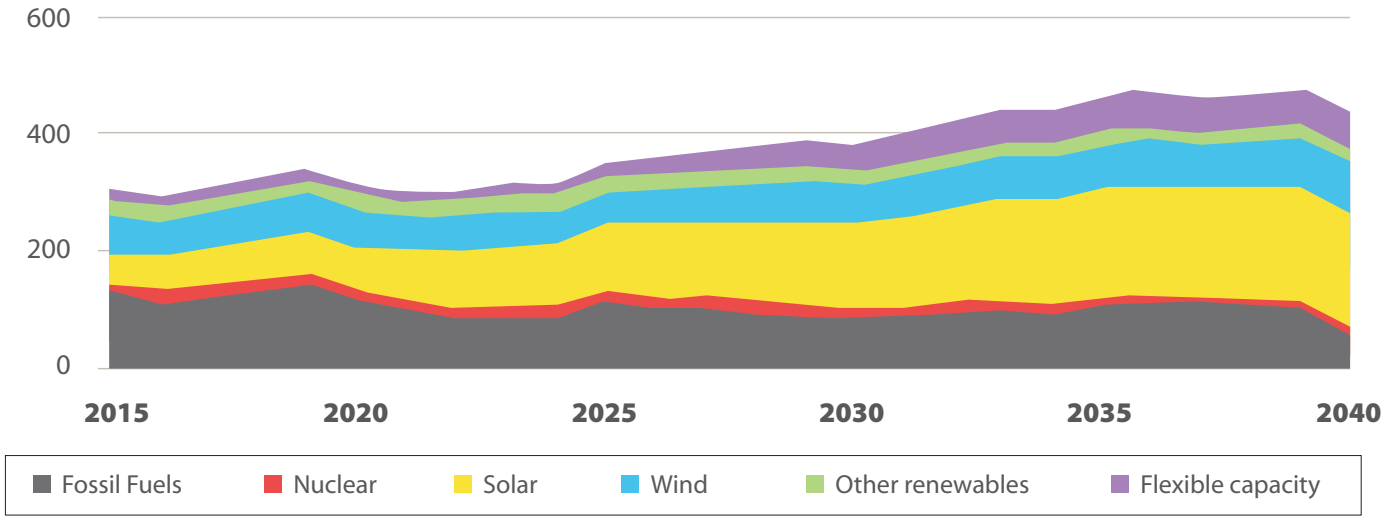
Historically, renewable capacity for power generation grew at a CAGR of 9% in 2009–12 (from around 1,210 to 1,440 GW and accounted for half of all capacity additions), up from 5% in the previous decade, and more than double the growth rate of fossil fuel capacity over the same period (figure 2). Wind capacity increased by 90 GW globally, while solar and hydropower capacity climbed by 61 GW and 68 GW respectively. Over the past decade (2002–12), solar PV saw an extraordinary 40-fold increase in capacity[2].

Looking ahead, preliminary estimations show that the global installed capacity of power generation is projected to grow about threefold from 5,584 GW in 2012 to 14,216 GW in 2040. The composition of the capacity mix will be much altered – fossil fuels are expected to reduce from 65% to 36% while solar energy will increase from a miniscule share to about 26%. The share of other renewables is expected to remain somewhat similar during this period. Together, renewable energy is projected to capture more than half of the global energy mix in 2040 (figure 3).

Solar will add the largest capacity among the fuels for power generation. About $3.7 trillion will be added (of the total $12.2 trillion) on investment in solar energy – evenly split between utility scale solar and small installations between 2012 and 2040[3].

[2] http://trackingenergy4all.worldbank.org/
[3] http://www.bloomberg.com/company/new-energy-outlook/

FIGURE 3 – GLOBAL INSTALLED CAPACITY (GW), 2012 TO 2040



In Collaboration with:
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