Solar Thermal in Qatar Today and Tomorrow

COUNTRY HIGHLIGHT

In recent years, the population of Qatar has grown at an increased rate than was previously seen and so has carbon emissions. As the population has grown at a faster rate than previously seen and demand for resources that will result in further increases in the rate of carbon emissions. Considering the wider impacts of carbon emissions on our climate, it is vital to reduce these emissions using effective renewable solutions. In the context of building design, as investment in the built environment continues the requirement to deliver low-energy buildings will become ever more pressing as natural resources dwindle and the cost of energy fluctuates.

QATAR NATIONAL STRATEGIES

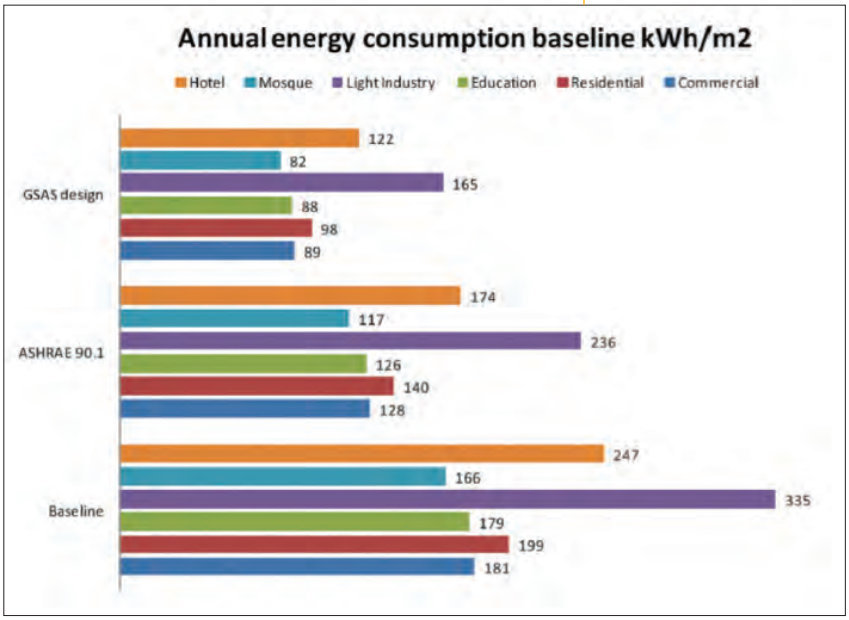
By 2030, Qatar aims to be a society capable of sustaining its development and providing a high standard of living for its people. The Qatar National Vision 2030 (QNV 2030) embraces four main pillars 1) economic, 2) social, and 3) human and 4) environmental dimensions. QNV 2030 defines the long-term outcomes that are sought for the country and provides a framework within which national strategies and implementation plans can be developed. The initial path for this vision was set out within the Qatar National Development Strategy (QNDS) 2011–2016, launched on 28 February 2011, which describes a strategy for sustainable development in Qatar and promotes energy efficiency in new buildings.

Population and Society

The total population of Qatar is expected to continue to grow steadily at an annual average rate of about 2.1%, and with such projected growth further demands for resources will compound the already high carbon emissions of the country. Considering the wider impacts of carbon emissions on our climate, and the need to reduce emissions, it is necessary to investigate and arrive at strategies for effective solutions to achieve Qatar's overall goal to reduce its carbon emissions.

Building Codes and Legislation

As a response to an overall environmental policy laid down by government initiatives as per QNV 2030, the Gulf Organisation for Research and Development (GORD) has repeatedly demonstrated its commitment to sustainability, notably by the development of the Global Sustainability Assessment System (GSAS).



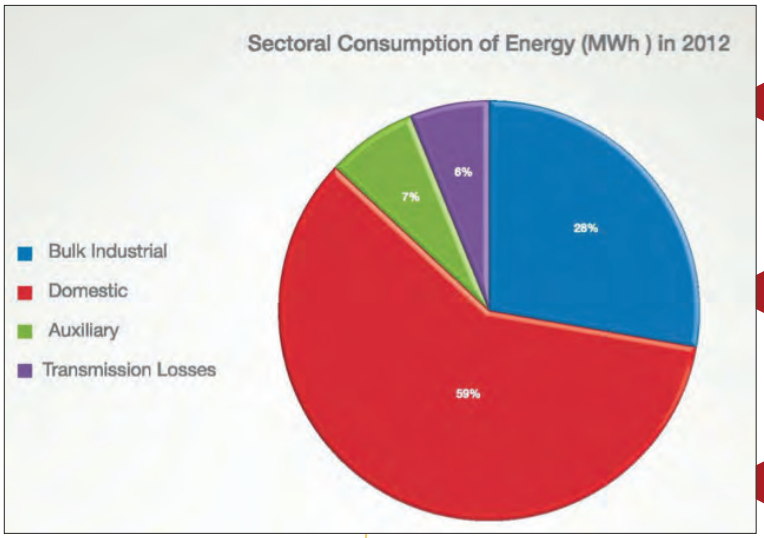
Energy Benchmarks of New Buildings

continued on page 21

Qatar *from page 20*

QNDS (2011-2016) stated, "The Qatar Sustainability Assessment System for Green Buildings will establish green building standards to which all government buildings will have to conform by 2016. Afterward, all new commercial buildings and residential buildings will be brought into the new regime."

GSAS is an expansion of the Qatar Sustainability Assessment System (QSAS) code designed to be the first green building standard in the Middle East and North Africa based on a comprehensive review of global best practices and its adaptation to the regional context. GSAS offers various means for meeting these requirements in the design and operating stages considering building envelope, building services and human factors. Each building type, whether it is civic, commercial or residential (there are also a variety of subcategories within civic – including for example, schools, mosques, sports facilities) have an Energy Benchmark (kWh/m2/year). GSAS benchmarks are equivalent to 30% below the existing average levels of energy consumption in the building type design using current standards. Qatar Construction Specifications (QCS-2014) upgraded its requirements aimed at improving the energy efficiency of domestic and non-domestic buildings by adopting the GSAS requirement.



▲ **Sectoral Energy Consumption breakdown.** Source: Statistics Report 2012, Qatar General Electricity & Water Corporation KAHRAMAA.

Carbon Emissions and Global Context

The worldwide drive towards curtailing carbon emissions and improving the sustainability of our social and economic networks is now well underway. As noted above, the technical reduction potential for Qatar is enormous because of the very high actual energy consumption and emission figures. As such, Qatar could become a world leader in disruptive change towards a low carbon economy.

In such an effort, the building sector is of paramount importance. Domestic energy consumption is about 60% of Qatar's electricity use. However, cooling accounts for 67% of all energy consumption in buildings in Qatar

A GLANCE AT SHC IN QATAR

Installations of solar hot water systems in new buildings across the country have increased dramatically in the last two years. With the average daily sunshine around 9.5 hours, low cloud cover conditions, ample rooftop space on all buildings and a Global Horizontal Irradiance [GHI] of 2,135 kWh per m2 per year, the country is well suited for solar thermal systems and positioned to tap its tremendous solar energy potential. Solar thermal energy has multiple advantages for Qatar in the form of energy security, improved air quality, reduced use of fossil fuels and CO2 emissions.

Solar Water Heating (SWH)

The major solar thermal project in the country being executed to meet hot water demand is Msheireb Downtown, a mixed used development. The buildings have more than 1 MW of solar thermal collectors to ensure a continuous supply of hot water.

continued on page 22

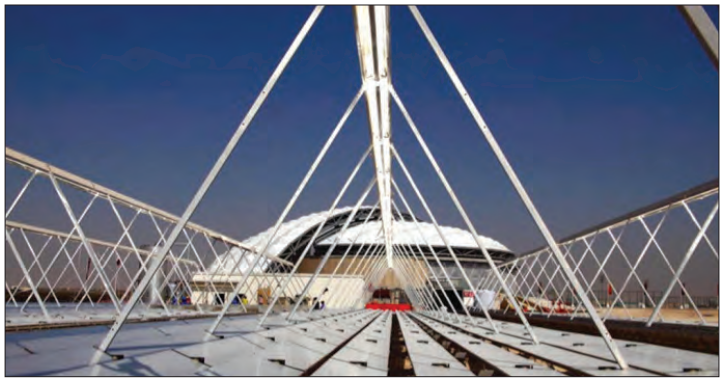
Qatar *from page 21*

Another project, ISF camp, has also installed around 1 MW of solar panels. In addition, many residential and commercial projects have installed solar water heating systems, with a capacity of 1.5 MW. It is anticipated that next year, several buildings in the new development of Lusail City will also install SWH; the anticipated capacity is over 2 MW. And, it is also estimated that over 1 MW will be installed in other projects.

Solar Cooling

One of the biggest projects that incoportaes the solar cooling concept in Qatar is the showcase stadium that was used for the bid for the World Cup 2022. It consists of Concentrated Solar Panels (CSP) for cooling the stadium. The CSP array exceeds 2,000 m2 with the height of the installation around 4.7m (including the base). The CSP system provides super hot water, around 170 degrees Celsius, directly to the vapor absorption chiller that in turn provides chilled water to the showcase stadium.

This article was contributed by Dr. Esam Elsarrag, Director of Research at the Gulf Organisation for Research and Development (GORD) and IEA SHC Executive Committee member. For more information on GORD go to www.gord.qa.



▲ **The CSP solar collector array at the showcase stadium.**

▲ **GORD's Technohub, the first novel technology-based platform for research and cutting-edge technologies in the MENA region, aims to assess, develop and promote affordable, clean and efficient solutions. The Technohub consists of a 17.6kW absorption chiller and 25kW desiccant cooling systems driven by a 40kW solar thermal system.**