

**Chartered Institution of Building Services Engineers Annual Dinner 2016**  
**Address by Ir Frank Chan JP**

**Urbanization**

According to the World Urbanization Prospects 2014, 54 per cent of the world's population lives in cities or urbanized areas. Back in 1950, 30% of the world's population was urban. By 2050, we would have 66%, an increase more than double in a century. The latest figures published by the United Nations revealed that the world population had reached 7.3 billion as of mid-2015 and is projected to reach 9.7 billion by 2050. As a result, urban population is projected to increase by 2.5 billion by 2050. To accommodate these additional 2.5 billion people, buildings of all kinds would be needed. Assuming a household of four, we would need to build about 50,000 residential flats every day until 2050, not to mention other buildings and infrastructures.

Today, buildings account for 40% of global energy consumption and one third of global greenhouse gas emissions. In pace with the growing population and human activities, global energy consumption will rise by 50% by 2050 as projected by the International Energy Agency. This is indeed a huge challenge against the backdrop to reduce global carbon emissions by 70% by 2050, not to mention the goal to further reduce to near zero by the end of the century.

**Climate Change**

There is strong evidence of irreversible climate changes should we fail to limit global warming to 2°C, and many of the world's governments have now adopted this limit as their goal. To prevent the Earth's average temperature from rising more than 2°C above pre-industrial levels, there is a converging consensus to limit cumulative carbon emissions to no more than 1 trillion metric tons. The task is daunting because human activity has already exhausted more than half that allotment since the Industrial Revolution. If carbon emission continues at a trend resembling the past 20 years, the 1 trillionth metric ton of carbon emission will be done in 2038! Isn't that alarming!

It is probably one of the toughest challenges for the global community to achieve the target of limiting global warming from rising more than 2<sup>0</sup>C. It is even more difficult if not impossible should we set the target at 1.5<sup>0</sup>C or lower. Not only we are compelled reduce carbon emission to near zero by the end of the century; we must also strive towards carbon negativity too.

### Carbon Capture

Over the years, researchers around the world are looking for technologies and methodologies to reduce the carbon dioxide level in the atmosphere. Last year, the George Washington University had successfully converted carbon dioxide into nano-carbon fibers which could be used as building materials. Professor Licht said that if the electrochemical process was powered by renewable energy, the result would be a net removal of carbon dioxide from the atmosphere. The research team calculated that given an area less than 10 percent of the size of the Sahara Desert, the method could remove enough carbon dioxide to make global atmospheric levels back to preindustrial levels within 10 years.

At the University of Texas at Arlington, a team of chemists and engineers have proven that concentrated light, heat and high pressures could convert carbon dioxide and water directly into useable liquid hydrocarbon fuels. Published on the University's webpage last month, Professor Dennis remarked that the "Solar photo-thermo-chemical alkane reverse combustion" process could potentially help limit global warming by removing carbon dioxide from the atmosphere to make renewal fuel. The process also reverts oxygen back into the system as a byproduct of the reaction, with a clear positive environmental impact. However, before all these technologies and methodologies for carbon capture or carbon conversion become viable in all respects, building services engineers must carry on with the mission and continue making buildings more energy efficient, green and sustainable.

## HK's Energy Saving Plan

As you are well aware, the HKSAR Government has collaborated with stakeholders concerned to set energy performance standards for buildings, and mandate periodic energy audits with a view to promote continuous improvement. Last December, we updated the Building Energy Code and the Energy Audit Code, driving for a 10% improvement in building energy efficiency. We also tightened the Mandatory Energy Efficiency Labelling Scheme for electrical appliances. The cumulative electricity saving arising from the abovementioned initiatives would reach 8 billion kWh by 2025, equivalent to 5.6 million tons of carbon emission. The saving is a small drop in the ocean as compared with the global scale but indeed a remarkable accomplishment given the community wide representation and endorsement, as well as the collective commitment and determination to upkeep Hong Kong at the forefront of smart cities.

Apart from regulatory regime, the Government also leads by example to reduce electricity consumption in government buildings by 15% over the years, and pledges to reduce a further 5% by 2020. All major new government buildings and public housing are encouraged to achieve a higher green building standard. We are particularly delighted to see the concerted efforts taken by building developers and owners, the trade and the community to promote energy conservation, low carbon living and green building.

The Government has set out in the "Energy Saving Plan 2025+" the target, policy, strategy as well as key actions to be taken in the ensuing years until 2025. It is a road map for Hong Kong, an action plan for all sectors and a mission that can only be accomplished together with everybody involved. With this, May I appeal for your professional contribution to help realize the plan and look forward to your continual support. Thank you

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