

Build4Asia Conference 2022
“Engineering Innovations for Carbon Neutrality”
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When A Tree becomes A “Carbon Neutrality” Forest

Ir Eric PANG JP, Director, EMSD

1. Introduction

Good afternoon, Ir Walter Au (Chairman of Organizing Committee), distinguished guests, ladies and gentlemen. I am deeply honored to deliver the closing remark to my old friends from the industry in this exhibition. It is also my pleasure to learn from you all on various innovative applications of renewable energy, IoT, the latest development of electric vehicles and the whole life cycle carbon approach prospective...etc. Thank you for all speakers’ sharing which made the event a success.

The theme of the conference this year is “Engineering Innovations for Carbon Neutrality” and this reminds me of an inspiring story in the Mainland China – the foresting of “SaiHanBa” (塞罕壩) National Forest Park. The “SaiHanBa” Forest is located in the north of Beijing and is critically important to the water and air quality of the capital. Every year, the forest purifies 137 million cubic meters of water for the Beijing-Tianjin area and deliver half a million tons of oxygen. However, it was nothing more than a barren land with only one tree approximately 60 years ago. In 1961, a team of tree specialists went on an expedition and studied the possibility of growing trees there. They believed that if one tree could survive there, so could million others. This is how the rehabilitation of the land started and cultivated into a forest now. Similarly, the tree of “Carbon Neutrality” has set its “root” in Hong Kong and has now grown into a young “Carbon Neutrality” tree. Let’s take a closer look on how our growing carbon neutrality tree has flourished here in Hong Kong and how we can further cultivate it into a “Carbon Neutrality” forest.

2. Seed and Sprout

Every plant starts from a seed and the seed of mitigating climate change worldwide was sowed from the Paris Agreement in 2015. The Paris Agreement was adopted by 195

United Nations members. For the first time, the Agreement brought all nations into a common cause to undertake ambitious efforts to combat climate change. The agreement calls for international actions to keep the global average temperature rise well below 2 degrees Celsius relative to pre-industrial levels and to pursue efforts to further limit it to 1.5 degrees Celsius.

In the Mainland China, the targets were set in 2020 outlining China's peak carbon dioxide emissions level be reached by 2030 and a green, low-carbon and circular economy achieving carbon neutrality be established by 2060.

Locally, the seed of “Carbon Neutrality” was implanted in Hong Kong in 2020. Achieving carbon neutrality before 2050 in Hong Kong was first introduced in the 2020 policy address. This was followed by the release of “Hong Kong’s Climate Action Plan 2050”, setting out the Government's vision of "Zero-carbon Emissions • Liveable City • Sustainable Development” in October 2021. Four major decarbonisation strategies and measures, namely net-zero electricity generation, energy saving and green buildings, green transport, and waste reduction, and their implementation road maps were stated clearly in the plan.

3. Become a Forest

Sprouting of seed is never an easy task and one must not forget that great success often comes from the hard work of many people for a long time. This is why it takes more than a generation’s effort for “SaiHanBa” to turn from a desert into an oasis. Consistent and persistent collaboration from all stakeholders in the industry is one of the essential elements to achieve the forest of carbon neutrality. To this end, we must remember to “ACT” (A—C—T) together. By “ACTing” together, I am not only talking about actions. “A—C—T” is actually the three different aspects of collaboration that we have to act concurrently for us to prepare our path to the “Carbon Neutrality” forest. They are A for Assets collaboration, C for Co-working collaboration and T for Technology collaboration.

Assets Collaboration

First is the A - assets collaboration which is related to the financial aspect. In 2018, the Government launched the “Government Green Bond Programme”. Money secured under

the Programme is used to fund green projects of the Government, such as the District Cooling System in New Development Areas. In May this year, Hong Kong's first green bond for retail investors raised HK\$20 billion, which was the world's largest retail-focused green bond. This popular bond was oversubscribed, suggesting a high level of interest among Hong Kong's individual investors for sustainable investments. In 2020, the "Green Tech Fund" was launched to fund local public research institutions, R&D centers and private companies in carrying out their R&D projects which help Hong Kong decarbonize and enhance environmental protection. Projects amounting to HK\$400 million has so far been approved under the Fund. Recently, the CIC launched the CIC Sustainable Finance Certificate Scheme to provide a common framework and user-friendly assessment system to facilitate application of sustainable finance for the construction industry, as well as small and medium size enterprises, in Hong Kong and the Greater Bay Area. This well recognized third-party assessment scheme enables companies devoted to green operation to capture business opportunities by securing capitals or assets with more favourable financial terms.

Co-working Collaboration

Next comes to the C - co-working collaboration, focusing on the partnership engagement. Participation of the Government, the trade and the public in transforming towards decarbonization through forming a "Carbon Neutrality" partnership has been widely promoted. The "Carbon Neutrality" partners are called on to further deepen and accelerate their pace in pursuing low-carbon transformation so as to set examples for different sectors in the society, drive the green economy, create more green employment opportunities and promote climate action. The "Carbon Neutrality" partners are encouraged to set their targets and timetables to support renewable energy development, green transport popularisation and waste reduction. They are encouraged to share their measures and outcomes with the public to achieve deep decarbonisation for and by all. Currently, about 70 per cent of them have set or planned to set carbon neutrality targets.

A Memorandum of Cooperation on retro-commissioning of buildings was signed among partners from the GBA in 2018, aiming to enhance building energy efficiency through sharing of knowledge, experience and training. As the next step forward, another Memorandum of Cooperation on Building Energy Saving Retrofit was signed earlier this month among these partners to further enhance building energy efficiency. EMSD also participated in the APEC Energy Working Group, setting out the vision for emission

reduction in APEC economies, and sharing knowledge, as well as the challenges and opportunities, in achieving the vision.

Technology Collaboration

T refers to Technology collaboration. Collaboration should go further than exchanging knowledge and visions, especially when we are at the greatest era for technology. We launch the “E&M InnoPortal” in 2018 to facilitate the collaboration between government departments and public bodies with the I&T sector, and to encourage the application of innovation and green technology. Up till today, there are more than 400 wishes listed, 1,000 solutions offered and 160 trial projects conducted. Last year, with the support from more than 40 co-organizers and supporting organizations, the EMSD joined hands with the Guangdong Provincial Association for Science and Technology and organized the Global AI Challenge, which was the largest global AI event related to building E&M industry. In the Challenge, there was a competition in which participants developed AI models to predict the cooling demand of a commercial building. There was overwhelming response from more than 120 teams around the globe in the competition.

Following the Competition, EMSD initiated the E&M AI Lab this year to establish a network of specialists from the Government, industry, academia and research institutes, for the shared goal of applying big data and AI development in building E&M facilities towards the “Carbon Neutrality” forest. The Lab focuses on three core areas including a data hub, semantic AI and a co-creation platform.

Technology collaboration is happening worldwide without border too. Tech giants including Amazon, Microsoft, Samsung and Meta, joined hands with the global climate consultancy, the Carbon Trust, in September this year to develop the first specification for measuring the emissions associated with connected devices usage. Connected devices are devices such as mobile phones, smart home gadgets etc. that can connect to each other or to a network via the internet. One cannot underestimate the impact brought by these connected devices, as all they, combined globally, consume an annual electricity consumption comparable to 44 times that of HK. The Tech gaint’s collaboration aims at a better understanding on the emission behaviours of connected devices. With such collaboration, accurate baselines for energy efficiency improvements can be established and new technologies can be applied to optimize energy consumption of connected devices, leading to more effective decarbonization over time.

4. *Think Big, Aim High*

Our young carbon neutrality tree has been propagating, yet our Mother Nature may not be able to wait patiently. The past decade was the hottest on record; the area of Arctic sea ice sheet in Winter has been the lowest ever, and forest fires, floods, droughts and storms have become our new normal. Bold and brave moves should be made to save our planet from the countdown of “Climate Clock” before it is too late. As I shared at the same occasion two years ago, we shape our future and create impact by realizing dreams. By “Think Big, Aim High”, our growing carbon neutrality tree would further acquire the boost to thrive and prosper.

Architects in Sweden proposed a concept for turning a building into a wind farm, not by installing traditional wind turbines but innovative “bristle” facades, using plastic straws to generate electricity by piezoelectric effect. This unconventional way of energy generation will be a new breed of urban wind farm that would not bring noise issues to neighbours. The constantly changing façade would also tilt the common concept of skyscraper outlook and the 26-story building will become a moving ornament of the city.

Adopting electric vehicles is one of the key initiatives for achieving carbon neutrality and providing cleaner air. And yet, the driving range of electric vehicle is still one of the major setbacks for its popularisation. A German startup attempted to solve the need for long-range charging of electric vehicles by introducing magnetic concrete to highways. The technology, based on ceramic ferrite tiles under transmitter coil with up to 96% transmission efficiency, enables wireless charging of electric vehicle while moving. The first large scale trial was implemented on a 400-meter closed road in Indiana, USA to offer 200kW charging. We hope that the trial can be extended to highways for real-life application.

To further probe the opportunity of energy generation, we may even look into ourselves as an infinite energy source. Our body, for example, generates heat which cannot be absolutely conserved. Our body digests food to produce the energy that drives our movement. Assuming that an average human consumes 1,500 calories daily, this is equivalent to the amount of energy required to run a car for 15 minutes. With the development of nanotechnology, flexible and vertical thermoelectric devices can be

fabricated as next-to-skin sportswear to harvest body heat. Even though only microwatt-level power generation could be achieved at present, wearable thermoelectric generators might turn out to become a whole different level if we could harvest waste body heat as the unlimited power source for small devices.

These “Think Big, Aim High” innovations are just concepts or even imaginations at this moment. But with more technologies and resources in our hand than ever, the gap between imagination and reality will certainly be bridged and connected. I trust that our “Carbon Neutrality” forest would be able to outrun the countdown of “Climate Clock”.

5. *Closing Remarks*

The Mainland China now ranks first globally in the area of planted forests and forest coverage growth, contributing a quarter of the world's new forest area in the past decade. The true story of “SaiHanBa” is one of the many successful examples demonstrating how striving and determined our motherland has been to build a solid "Green Great Wall" to protect our environment.

There is an old Chinese saying that 「前人種樹，後人乘涼」， which has a similar meaning as the English proverb “Walnuts and pears you plant for your heirs”. Both sayings are encouraging us to take actions that will benefit our heirs no matter how hard or how long the process will take. This is definitely the spirit that we have to carry along on the journey to carbon neutrality. Protecting the environment is a protracted battle, however, and we all shall not lose faith. With more and more collaborations appear in various forms and coming up of innovative ideas and emerging technology utilizing the concept of “Think Big, Aim High”, the ambiguous target of carbon neutrality would one day be achieved. Remember we are not working to achieve carbon neutrality only for ourselves, we are doing this for our next and the generations after which makes every effort worthwhile.

A tree can truly grow into a forest, so long as everyone of us contributes to the vision. Let’s join hands together with the aim of achieving carbon neutrality and build a sustainable ecological environment for the generations beyond.

Thank you very much.