35th Meeting of APEC Expert Group on Energy Data and Analysis (EGEDA35)
Economy Sharing from Hong Kong, China

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1. Distinguished Guests, Ladies and Gentlemen, good morning.   It is my privilege to have this Economy Sharing from Hong Kong, China with you.

EMSD's Continuous Efforts

2. Representing Hong Kong, China in the APEC Energy Working Group, the Electrical and Mechanical Services Department (EMSD) has been fully supporting APEC and actively participated in APEC activities.

3. The year 2024 marks the 30th anniversary of the Energy Efficiency Office (EEO) of EMSD.

4. EEO was established in 1994 to provide technical expertise and drive for energy efficiency and conservation in Hong Kong. The Office issues codes of practice, establishes guidelines, publishes energy database, conducts benchmarking, explores advanced energy efficiency technologies and promotes wider use of new and renewable energy in Hong Kong.

5. In parallel, EEO of EMSD has played and will continue to play an active role in the APEC Energy Working Groups, and collaborate with Working Group members and international organizations in conducting APEC funded and self-funded projects and putting forward relevant initiatives.

6. During the COVID-19 epidemic, Hong Kong, China kept hosting 8 APEC projects, such as Promoting Energy Modelling in APEC Region, during 2019 to 2023.

7. Hong Kong, China also hosted various APEC meetings including the EWG55 in 2018, EGEE&C53, 55 and 60 in 2019, 2020 and 2023 respectively, in addition to

this EGEDA35.

- Representatives from Hong Kong, China are also active in taking leadership at APEC EWG and Sub-fora.

- Our Mr Barry CHU is the Deputy Lead Shepherd of the APEC EWG for 2 consecutive sessions up to 2025.

- Our Mr Ek Chin VY was the EGEE&C Chair for 2 consecutive terms from 2019 to 2023.

- Our Ms Jovian CHEUNG is now the EGEE&C Vice-chair for 2023-2025.

Set Green Goals and Targets

8. Combating climate change is a global responsibility of every APEC member economy. To promote green growth and to jointly address both the region's economic and environmental challenges while speeding the transition toward a global low-carbon economy, two aspirational energy goals are set by the APEC economies:

- Reduce the aggregate energy intensity by at least 45 percent by 2035 (with 2005 as base year); and

- Double the renewable energy in the regional energy mix from 2010 levels by 2030.

9. According to the Hong Kong Energy End-use Data 2023, in 2021, the energy intensity of Hong Kong, China has been reduced by 33% from the 2005 level, which is on track to achieve the APEC goal of 45% reduction in 2035.

10. Hong Kong, China announced the Hong Kong Climate Action Plan 2050 in 2021 to set out our vision of "Zero-carbon Emissions - Liveable City – Sustainable Development", and outline the strategies and targets for combating climate change and achieving carbon neutrality before 2050.

11. With such well-defined vision and goal, data can help us monitor and evaluate the

progress of our actions. It allows us to assess our performance to ensure that it aligns with our goals and suggests area for improvement.

Use of Data to Drive Energy Efficiency and Conservation

12. To pursue a better and greener performance, we consider it necessary to adopt a result-oriented approach. As such, Hong Kong, China has been continuously upkeeping our energy end-use database.

13. We make use of relevant data to formulate policies and schemes, develop tools and push forward measures. The energy data also supports our benchmarking for continuous monitoring in our journey to combat climate changes and achieve carbon neutrality by 2050. It helps us understand our current situation and plan for the future.

Energy End-use Database (HKEEUD) and Energy Consumption Indicators & Benchmarking (ECIB)

14. Energy data in Hong Kong, China is mostly contributed voluntarily from different stakeholders, such as government departments, public utilities, public transportation, etc.

15. Even though such contribution is voluntary in nature, thanks for the stakeholders' collaboration in the past years, we manage to upkeep the Energy End-use Data covering all four major sectors, including Residential, Commercial, Industrial and Transport, thus facilitating the formulation of our energy efficiency policy and establishment of benchmark tools.

16. Some stakeholders such as green organizations, academic institutes, engineering consultants, etc., adopt our published Energy End-use data and Benchmarks as reference in their researches, conducting energy performance assessment for their clients, holding energy saving competitions, etc.

Mandatory Energy Efficiency Labelling Scheme

17. In the residential sector, energy consumption data of household appliances is utilized for shaping our product Energy Labelling Policy. The scope and variety of

products covered in our Mandatory Energy Efficiency Labelling Scheme have been kept expanding since the introduction of the Scheme in 2008. Under the Scheme, the law mandates that, for the sale of prescribed products in Hong Kong, they must have energy labels.

18. Data on grading distribution and energy efficiency performances of products have greatly helped us in planning and upgrading the Scheme. Let me illustrate this with the case of refrigerators, for which mandatory energy labelling was first introduced in Year 2008 and the assessment grading was upgrade in 2014:

- Since 2012, we observed that over 85% of models in the market had obtained Grade 1, the most energy-efficient grading level under the Scheme. Consumers were therefore not able to identify and differentiate energy-efficient models by simply checking whether a product is of Grade 1 level. Accordingly, an upgrading was conducted in 2014, introducing more stringent requirement for awarding higher grading levels.

- The upgrading served as an incentive for suppliers to introduce more energy-efficient products into the market. We observed that there had been a 20% improvement in the average energy consumption of all refrigerator models in the market over the subsequent 6-year interval. With consumers gradually having more energy-efficient refrigerators in their homes, and coupled with our other energy saving drives, reduction in overall electricity consumption of the residential sector has been observed.

- However, as time passes by, the proportion of Grade 1 refrigerators in the market has rebounded to over 70% in recent years. Therefore, we have recently embarked on another upgrading exercise to sustain the momentum of improvement. This 2nd updating will be effective by mid 2024, requiring an energy efficiency improvement of about 26% for getting a Grade 1 level.

- By utilizing sales statistics, we can extrapolate and estimate the future trend in replacement of energy-efficient models, thereby enabling us to provide a pragmatic estimate on the ongoing decrease in electricity consumption of the residential sector attributable to the Scheme.

19. Presently, our Mandatory Energy Efficiency Labelling Scheme covers 11 types of appliances, which consume about 80% of the total energy consumption in a household.

20. In addition to upgrading the assessment grading level, we are eager to expand the scope of the Scheme. While all the prescribed products under the first three phases of the Scheme are electrical appliances, the fourth phase introduced in 2023 includes gas cookers and gas instantaneous water heaters in order to further capture potential energy savings from different types of fuel.

21. We will also consider expanding the scope of the Scheme to cover non-domestic or commercial appliances to help consumers select energy efficient products and cultivate their energy awareness behaviour.

BEEO, BEC and EAC

22. Buildings account for about 90% of the total electricity use and 50% of carbon emissions in Hong Kong, China. Promoting energy saving in buildings is one of the primary focuses in achieving carbon neutrality in the long-term.

23. The Buildings Energy Efficiency Ordinance (BEEO) in Hong Kong, China governs the energy efficiency standards and mandates the energy audits of building services installations. We review and update the standards once every 3 years. In the latest 2021 edition, there is an overall 23% uplifts on the minimum energy efficiency requirement compared to the 2012 first edition, or 15% uplifts with respect to that of 2015.

24. Since implementation of the ordinance, over 2,100 new buildings and over 13,000 retrofitting works are regulated to comply with the required energy efficiency standards, and over 2,600 commercial buildings have carried out energy audit.

25. To further promote energy saving, we have initiated an amendment to the ordinance, in order to cover more types of buildings, shorten the interval of energy audit and require the mandatory disclosure of energy audit information to enhance data transparency.

26. We believe the enhancement on data availability to the public can further help drive energy saving and develop a green economy.

Online Building Based EUI Benchmarking Tool and Building EUI

27. To help owners and property management companies of commercial buildings to benchmark the electricity consumption of their buildings with other similar buildings, we have developed an online benchmarking tool in collaboration with the power companies.

28. The tool provides benchmark for 5 types of commercial buildings, using data provided by the power companies.

29. By analyzing the building energy consumption data of the sampled commercial buildings, we noted that there was a 15% energy consumption reduction compare to that in 2014/15.   We also found that the reduction is not much related to the floor area of the buildings, implying that energy management opportunities equally apply to buildings large and small.

30. Such energy data gives us insight on the building energy consumption pattern and helps us continue to fine-tune the policy on energy saving for buildings.

Energy Audits

31. Mandatory energy audit for buildings in Hong Kong not only helps identify energy management opportunities for building owners and property management companies, but also provides valuable energy data for analysis.

32. Based on the second round of energy audit reports submitted by building owners, we realize that over 80% of buildings have their energy utilization indices reduced.

33. This is encouraging since we have put much efforts in uplifting the statutory energy efficiency standard and promote energy saving retrofit and retro-commissioning, and this is the right direction to move forward.

HKC Government's Green Energy Target

34. Enhancing energy efficiency and conservation is one of the Government's priority tasks. To set a good example for the community, the Government has been taking the lead by implementing three rounds of electricity saving plans for government buildings over the past twenty years.

35. In the last round of saving, a target of 5% electricity saving in government buildings in 5-year from 2015-16 to 2019-20 was set. With concerted efforts, the target was achieved one year ahead of schedule in 2018-19, and the actual achieved saving in the five years by 2019-20 was 7.8%, which is equivalent to an annual saving of 111 million kilowatt-hour or 77,700 tonnes reduction in carbon emissions.

36. Overall, since the introduction of our energy saving initiative in the government in 2003, the accumulated saving is over 20%! It is impressive and remarkable.

37. Building on this success, the Government sets goal to improve the overall energy performance of government buildings and infrastructures by at least 6% for the 5-year period from 2020 to 2025. This time, the target covers not only government buildings but also infrastructure facilities, and covers saving not only in electricity, but also other forms of energy such as town gas and liquefied petroleum gas. Energy generated from renewable energy (RE) installations will also be taken into account. After 3 years, as of 2023, the overall energy performance has improved by over 4%, and we are confident that the target can be achieved by 2025.

Innovation in EMSD

38. EMSD is committed to be the Innovation Facilitator to promote the use of innovation & technology (I&T) to achieve carbon neutrality.

39. EMSD launched the E&M InnoPortal in 2018. The Portal matches the needs of government departments, public bodies and E&M trades with the I&T solutions of start-ups, universities and research institutes. We also facilitate the tests of matched wishes and solutions by hosting trial projects at government facilities.

40. Up to now, there are over 500 I&T wishes, 1180 I&T solutions and over 180 matched I&T trial projects.

41. EMSD has also actively established strategic partnerships through Memoranda of Cooperation with 8 local universities, 7 scientific research institutions, and 4 I&T institutions in the Greater Bay Area to effectively match I&T wishes with potential I&T solutions, and to promote the exchange of knowledge, professional skills and experience in the adoption of I&T.

42. EMSD has achieved encouraging results at the International Exhibition of Inventions of Geneva.   From 2021 to 2023, EMSD has received about 50 awards, including 12 gold medals and a special award in the international exhibition.

43. Three inventions, all of which are green solutions for combating climate change, should be worthy of special mentioning here.

44. One of them is our "Semantic AI on the Building Operation and System Optimization".   It applies Semantic AI technology to forecast cooling demand for optimising the setting and operation of air-conditioning systems for saving energy.

45. In its implementation for the chiller control system in our West Kowloon Government Offices, the Semantic AI achieved a 99% accuracy in predicting the cooling demand, and improved the air-conditioning plant energy performance by 10% to 15%.

46. The second one is our Solar Irradiation Map.   It is a user-friendly web-based software package providing estimate on the annual solar irradiation receivable at rooftop of buildings in Hong Kong, with due consideration to the shading effect of the nearby buildings and the different sun angles throughout the year.   With just a few simple clicks on the website, users can easily assess the solar energy potential of their building roofs, estimate the optimal installation capacity and electricity generated a year, as well as the income receivable by feeding the energy to the grid.

47. The third one is our Integrated Solar Energy Performance Management System (iSMS).   Using digital twin and artificial intelligence, the system collects real-time operation data of solar photovoltaic systems by IoT sensors and processes data by AI to advise owners how the real-time performance of their PV systems compared with the optimsed level, and recommends timely maintenance and cleansing of the PV systems to maximize PV output.

48. Common to the above 3 cases are: adoption of I&T, collection and proactive use of energy data, and big data analysis via AI.

Concluding remarks

49. The pathways to combat climate change are certainly full of challenges, but also opportunities.   With proactive and innovative use of energy data in diverse applications ranging from policy formulation, energy benchmarking to energy saving projects, Hong Kong, China eagerly collaborates with APEC members to conquer the challenges and seize the opportunities in attaining Carbon Neutrality. Let us stretch our limits to prevent the climate crisis from further worsening, and to reach our ever-challenging decarbonization goals together.

50. Thank you very much.