18th APEC Energy Statistics Workshop:
Joint APEC-IRENA Workshop on Renewable Energy Statistics
Virtual Workshop, 15-17 December 2020
Tokyo, Japan (Host)

Summary proceedings

The 18th APEC Workshop on Energy Statistics was held online on 15-17 December 2020, hosted by Japan. The Energy Statistics and Training Office (ESTO) of the Asia Pacific Energy Research Centre (APERC) organised the workshop with the generous financial support of Japan's Ministry of the Economy, Trade and Industry (METI). The 18th workshop was held online for the first time due to the COVID-19 pandemic. This was also the first collaboration of APERC with the International Renewable Energy Agency (IRENA), the second of the series of collaboration of APERC with other international agencies, with the objective of improving renewable energy statistics for more accurate tracking of APEC's renewable energy share doubling goal.

Representatives from Australia; Canada; China; Hong Kong, China; Indonesia; Japan; Malaysia; New Zealand; Papua New Guinea; the Philippines; Singapore; Chinese Taipei; Thailand; United States and Viet Nam participated in the workshop. In addition to the experts from IRENA, the EGNRET secretariat was likewise invited to deliver a presentation.

The summary proceedings of the 3-day virtual workshop were as follows:

Opening session

The workshop was opened by Dr. Kazutomo Irie, APERC President. He emphasised in his address the issues and challenges relating to the collection of renewable energy data. He was glad that there will be sharing of experiences and practices by some economies and hopes that through these sharing, other economies will take away useful information to help address their respective issues.

Mr. Takanori Yamashita, Director of International Affairs, Agency for Natural Resources and Energy (ANRE) of the Ministry of the Economy, Trade and Industry (METI) welcomed the participants. He mentioned the importance of accurate renewable energy data for the monitoring of the achievement of APECs goal of doubling renewable energy by 3020 from 2010 levels. He noted that APEC members can learn from each other on data collection and estimation methodologies by sharing of experiences.

Session 1: Overview of renewable energy and APEC renewable energy questionnaire:

Mr Edito Barcelona, Senior Research Fellow of ESTO/APERC, delivered a presentation on *APEC's renewable energy doubling goal and tracking the progress from 2010.* He

reported that while 2010 to 2018 is only 40% of the time to 2030, APEC has already increased the share of modern renewable energy in primary energy supply by 41.8% and 44.5% in final energy consumption. In electricity generation, the achievement is even higher at 45.2%. He stated that, the growth of renewable share from 2010 to 2018 was due to rapid decrease in cost and government policies favorable to renewables. However, he noted that increasing renewable energy share further, would affect the stability of electric grids and would need backup and storage capacities. He encouraged APEC economies to study various cost-effective storage options.

Mr. Adrian Whiteman, Chief Statistician of IRENA presented the renewable energy sources such as: hydropower, solar, geothermal, marine, wind and bioenergy. He described and enumerated all products under these categories providing enough information to the participants in determining the renewable data that should be collected.

There were several questions in the chat box that were answered by Mr. Whiteman as follows:

- On whether industrial waste can be bioenergy, he responded that some industrial waste is of biological origin such as chemically treated wood, natural rubber and hospital wastes containing paper.
- On whether there is discussion in IRENA about free cooling as renewable energy, he responded that ambient heat is now being counted as renewable heat. If cooling is treated as an energy product, free cooling must be renewable as well.

Ms. Sonia Rueda of IRENA presented "Global Renewables Outlook 2050" that shows the path to create a sustainable future energy system. She showed that based on IRENA's analysis, renewables, energy efficiency, electric vehicles and hydrogen can provide the bulk of necessary emissions reduction by 2050. In conclusion, Ms. Rueda mentioned that the gap between aspiration and the reality in tackling climate change is significant. Public policies and recovery investment decisions must align with the vision of a sustainable future. Fossil-fuel investments need to be shifted to renewables and energy efficiency instead, while subsidies to fossil fuels must be phased out.

Dr. Tarcy Jhou of the secretariat of the APEC Expert Group on Renewable Energy and Technologies (EGNRET) presented the APEC Renewable Energy Roadmap. The preparation of the roadmap is in response to the 2014 APEC energy ministers' aspiration of "doubling the share of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030. In 2016, EGNRET proposed a project to develop a roadmap toward the aspiration. In 2017 EGNRET initiated the roadmap development. EGNRET has a variety of projects related to the goal. Policy recommendations in electricity, transport and heating were developed.

Session 2: Understanding the APEC renewable energy questionnaire and statistics

Ms Elvira Gelindon, Research Fellow of ESTO/APERC started the session with the presentation on "The *APEC renewable energy questionnaire: definition of products and flows*". The presentation was given to ensure that members are all in the same level of understanding of the renewable products to be collected. Ms. Gelindon assured the members that the definition used by APEC on new and renewable products and technologies are harmonised with IRENA.

A question was raised from the chat box by Malaysia on how to categorise fibre heat (coming from palm oil). ESTO explained that there are two by-products of palm oil; other vegetal products and biogas and mentioned that this will be explained on Day 3.

Mr. Whiteman further explained that use of palm oil for electricity generation should be categorised as autoproducer but some electricity facilities in factories are run as separate enterprises with the sole purpose of generating electricity (so they are main activity producers). He suggested that the industrial classification (ISIC code) of the reporting entity should be considered.

Mr. Edito Barcelona presented on renewable energy data collection. His presentation included what and where renewable energy data should be collected. He cited the methodologies of collecting data such as the use of administrative data, energy surveys, and use of trade data as an alternative method. He also mentioned that learning from other economies would also be a good idea.

Session 3: Renewable energy data collection, estimation and validation

The second day of the Workshop continued with presentation/lectures on renewable energy data collection, estimation and validation. This session was relevant especially to economies with no available data collection, measurement and validation system of renewable energy data.

Solar Thermal Energy: The estimation and measurement lecture started with a presentation on estimating renewable heat (solar thermal) from *Ms Fifi Indarwati*, APERC Senior Researcher. The lecture included information on how heat energy is collected from sunlight and how it is converted into usable thermal (heat) energy. By IEA and Eurostat definition, *solar thermal production* is the heat available to the heat transfer medium minus the optical and collector losses.

Exercise 1: The hands-on exercise consisted of calculating the heating data and filling out solar thermal column of an energy balance. Ms. Fifi provided the information on solar water heaters for estimating the consumption and production of solar thermal energy in each economy and asked the participants to calculate their respective economy's solar thermal heat and fill out the corresponding columns of the energy balance.

Biogas : Following the exercise was a lecture-presentation on sources of biogas and estimating the production and consumption by *Ms. Sonia Rueda* of IRENA. The lecture started with the definition of biogas and the types of biogas technologies. She mentioned that IRENA maintained two biogas datasets: 1) Biogas in energy balances from standard questionnaires and 2) Biogas for energy access in the off-grid database. It includes household digesters – capacity, production, numbers of users, plus digesters used for off-grid electricity. She also presented the basic default assumptions that are helpful in estimating energy from biogas.

On a question on domestic biogas, Ms Rueda explained that domestic biogas refers to the biogas produced by small scale biodigesters (fixed dome, floating drum, bag digester) and that is used for household purposes, such as cooking.

Exercise 2: The hand-on exercises for biogas were given in two-parts. In the first exercise, information was taken from the reported data of a project to provide electricity access to the community of Santa Rosillo in the Peruvian Amazon. The participants were asked to calculate the annual electricity generation and verify data consistency.

The second part was estimating the production and consumption of biogas energy, and to complete the corresponding energy balance based on this data. The information for this exercise was based on data from the Indonesia Domestic Biogas Programme (BIRU Program).

Traditional solid biofuels: Mr Nobuhiro Sawamura, APERC Senior Researcher, delivered a lecture-presentation on traditional solid biofuels, including fuelwood and charcoal. Basic assumptions were also given that will help in estimating the energy used and produced from fuelwood and charcoal.

Exercise 3: A sample calculation using Japan data was shown. Later, using FAO's data on production, imports and exports of wood commodities, the participants were asked to calculate their own economy's fuelwood and charcoal energy production and consumption and to fill the corresponding column in the energy balance table.

Exercise 4: Ms. Gelindon explained about the definition of kraft pulp and palm oil processing, then continued with the exercise on estimating energy use from kraft pulp and palm oil processing using production data from FAO statistics.

The representative from Canada asked what thermal efficiencies should be used in estimating energy used for kraft pulp whether it depends on the type of technologies used. ESTO affirmed that while the exercise used 29% as efficiency, it is recommended to use the actual efficiency for each economy.

Exercise 5: Mr. Whiteman delivered a presentation on the measurement and estimation of off-grid solar PV devices. The exercise session was focused on

estimating the energy data from off-grid solar PV based on several solar PV devices and capacity of device data.

Mr. Whiteman responded to the question about the validity of capacity data of PV installed several years ago, as it is commonly assumed that PV panels should last for 20 years. He mentioned that most PVs has been installed only within the last 5-10 years so no need to worry about the reduction yet. He added that industry associations are already collecting data from their members asking about PV split into capacity additions for new projects and as replacements for old panel. He added that it could become an important question in the next few years, but at the moment, the recommended calculation methods for PV data is by simply adding up the annual capacity additions.

Exercise 6*:* Mr Barcelona briefly presented the definition and flow of bagasse consumption and a more detailed explanation on the calculation methods in estimating energy consumption from sugar production.

Mr. Hou asked whether water content has effect in sugar cane's calorific value. He asked this because in Chinese Taipei, bagasse produced from the previous year are stored and used the following year, which has relative low moisture content. Mr Whiteman explained that bagasse has 50% water content. In a "wet bagasse", so much water is added in the crushing that it doesn't matter what the original moisture content was, as it all becomes extremely wet.

In the chat box, Mr. Zaharin shared that in Malaysia, bagasse obtained from sugar cane were usually disposed of and not used to produce energy. Ms. Ball on the other hand expressed her thoughts that the estimation method of energy production and consumption of bagasse brings close result to the real data in Australia.

Use of energy balances: Finally, Mr Whiteman delivered a presentation on the use of energy balances to assess impacts of RE projects in RE share and energy intensity. In his presentation he showed how the increasing wind energy and solar PV use lower electricity production from fossil fuels.

Mr. Barcelona highlighted how the efforts in estimating renewable energy production and consumption could play an important role in calculating the energy balance table and in monitoring the progress of RE goal.

Economy presentations:

Indonesia - Mr. Harris Yahya of Indonesia was requested to give a presentation on estimating electricity generation in Solar PV installation in off-grid areas. Mr. Harris explained Indonesia's renewable energy program. He mentioned that in calculating electricity generation from off-grid solar PV installations, the capacity is used along with the average capacity factor of 17% in the economy.

Australia – Ms. Allison Ball of Australia presented "Estimating biomass consumption in the industrial sector" using administrative data. Ms. Ball mentioned that they are lucky because the government of Australia mandated energy data submission from industry under the National Greenhouse and Energy Reporting Scheme (NGERS). She mentioned that all her team needs to do is to access the protected data via an MOU. However, Ms. Ball mentioned that despite this, there are still challenges such as the scheme relies on companies choosing correctly from drop down menus to report, and that the agency relies mostly on her team to filter the data correctly to compile and some errors in reporting don't show up in CER data quality assurance process, among others. However, overall Australia's energy data is considered generally good and was designed with international reporting requirements. Most challenges are in the households and small-medium businesses.

Canada – Mr. Simon Prefontaine presented the "Solid biomass consumption in Canadian pulp and paper industry". According to Mr. Prefontaine, the pulp and paper industry was the largest energy consuming manufacturing sub-sector in 2019 and 57% of energy consumed was solid biomass. Data are collected through the Statistics Canada Annual Industrial Consumption of Energy Survey (ICE). Canada's methodology is an example of data collection through surveys.

United States —*Dr Charles Ian Mead* of US Energy Information Administration (EIA) presented their experience in data collection from households and enterprises/ businesses. The US collects energy data through surveys every five years, such as CBECS and MECS for businesses/enterprises and RECS for household. He mentioned that they also encountered several challenges in conducting the surveys such as not all possible improvement works across all surveys. They also need to work constantly with modeling and analytical staff for the estimation of data disaggregation.

From the chat box, Malaysia asked about how the government funds the surveys. Dr Mead explained that the surveys are included as part of the U.S. Federal budget. He mentioned that EIA provides a budget proposal every year, but the U.S. Congress makes the final decision, and it is a top line figure for the agency. The surveys are costly, but the least expensive is MECS, in part, because it does not need to build its own sample frame.

Hong Kong, China asked about the modelling tool that EIA used and what are the pros and cons. Dr Mead replied that they use two different types of models: one to allocate total energy consumption by source to its end uses (e.g., heating systems, lights, etc.) and one for projecting long-term trends. The pros are that they force structure on data and allow for the calculation of other statistics that are not possible through direct data collection (e.g., electricity for lights versus water heating.) The cons are that they require resources to be built and maintained. He also mentioned that an accounting framework that accounts for how different sources and uses add up to total energy production and consumption can go a long way to achieve these goals--at least when it comes to verification.

Finally, Dr Mead was asked how EIA comes up with the sample/listing of respondent for RECS. Dr Mead explained that they start with a list of addresses from the postal service which delivers the mail and mentioned that checking the accuracy is done in a number of different ways. There is also typical way of validation to see if values make sense in relation to others--for example, if the electricity bill makes sense for the size of the home. Also, it is checked by comparing the survey and billing data in areas where they overlap.

Malaysia – Mr Zaharin Zulkifli delivered a presentation on "Estimation/collection of biomass and biogas consumption for electricity generation" in Malaysia. He also briefly introduced the Renewable Energy Programme in Malaysia. His report mentioned about the challenges they faced in the data collection, estimation and validation, such as timeliness and completeness, and confusion between biomass and biogas.

New Zealand – Mr. Daniel Griffiths reported the "Direct and indirect use of geothermal energy in New Zealand". Geothermal is the largest renewable energy supply in New Zealand. It is also largely used for non-energy economic activities such agriculture and manufacturing.

The Philippines – Ms Victoria Capito shared the Philippines' experience in conducting household energy consumption survey. Albeit its importance and authorised to be conducted together with the national statistics office, the survey was not conducted regularly due to budget constraint. The surveys which was conducted since 1990 obtained high response rate and as a way forward the Philippines will improve its methodology for RE data collection, processing and analysis.

Chinese Taipei – Ms Chih-Ching Yang talked about Chinese Taipei's methodology in estimating consumption of industrial and municipal solid wastes for electricity generation. She mentioned that they also estimate energy production of some off-grid, solar PV and other renewable technologies. Chinese Taipei also mentioned their concern on the increasing use of Hydrogen, i.e. how it's to be treated in the statistics.

Session 4: Summary and way forward

In the roundtable discussion, the EGEDA Vice-Chair asked the member economies to comment on the following:

1. How would the workshop improve the renewable energy statistics in participants' economies? How could participants encourage their respective governments to improve renewable energy statistics?
2. Are there any other topics that should have been covered in the workshop and suggested topics for future workshops?

The participating economies found the workshop informative as they learned from it especially in the sharing of experiences and the alternative data collection and estimation methodologies that were introduced. They also appreciated the

presentation on the collection and the use of accurate energy data in making policy decisions.

As to the topics for future workshops, most economies suggested to discuss energy process from Hydrogen. Other suggested topics were heat production, new technologies for data collection, electric vehicles and survey design. The secretariat mentioned that it plans to cover collection and estimation of end-use energy consumption in the next workshop due to the difficulty of many non-OECD member economies to complete and submit the energy efficiency indicators template. The suggested topics may be considered in the following years.

In his closing remarks, Mr. Whiteman of IRENA expressed his appreciation to the participants for their interesting questions and active participation. He mentioned that IRENA is committed to work closely with APEC and APERC on renewable energy statistics.

The Vice-Chair also expressed his appreciation to IRENA and the participants. He recognised the important knowledge shared during the workshop by the member economies and the significance of energy statistics in policy making. He encouraged member economies to help each other to improve renewable energy statistics.