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Clean Energy Starts-Ups Forum: Advancing Market Reach and Business Growth

APEC Energy Working Group

May 2023

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Report of Workshop Summary

APEC Energy Working Group

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I. Introduction of the Project

The three-days workshop was held on 13 to 15 December 2022 in Bali. This workshop covered four main issues, which are: 1) Providing knowledge of clean technology entrepreneurship and energy investment in APEC member economies; 2) Promoting market development of clean energy start-up; 3) Creating suitable environment for the development of clean energy start-ups and improve their business growth; (4) Providing recommendations for APEC's program on developing and promoting clean energy start-up.

II. Objectives of the Meetings

The Clean Energy Starts-Ups Forum: Advancing Market Reach and Business Growth is a three-day event taking place in Bali in December 2022. The forum aims to provide a platform for stakeholders in the renewable energy sector, including clean energy start-ups, accelerators, academia, and government representatives related to energy, carbon emissions, environment, economy, trading, and industries, to exchange ideas on advancing the market reach and business growth of clean energy start-ups. Experts from APEC, relevant international organizations, and academics with expertise in energy, engineering, business, and economics was attended the forum to share their knowledge and expertise on renewable energy issues and clean energy start-up development.

On the last day of the forum, a policy recommendation was produced based on the input from the APEC economy representatives. The representatives were presented their ideas on the draft policy recommendation containing best practices to promote the development of clean energy start-ups in the Asia Pacific economies.

III. Briefings of the Presentations in the Workshop

The speakers came from different backgrounds of expertise, such as government representatives, energy-related organizations, and business representatives. This three-days' workshop was opened by a keynote speech from the Minister of Energy and Mineral Resources, Indonesia, Mr. H.E. Arifin Tasrif.

- **Opening remarks**

  Mr. H.E. Arifin Tasrif - Minister of Energy and Mineral Resources of the Republic Indonesia.

  The world is currently facing the challenge of climate change, and many policies and initiatives have been developed to address this issue. However, more actions are needed to ensure a rapid green transition and a cleaner global environment. In recent years, the concept of green growth has been widely discussed within APEC member economies. The APEC Energy Working Group has made the advancement of clean and low-carbon energy a top priority in their 2019-2023 working group strategy plan. Each sector must urgently contribute to supporting the accelerated development of renewable energy.

  Start-ups have the potential to become pioneers and create a concrete contribution to the renewable energy sector. Renewable energy start-ups come in all shapes and sizes, with some focusing on solar, wind energy technology and financing, while others explore eco-friendly, efficient battery technology or microgrid systems that utilize the local climate to their advantage. Start-ups must focus on technology as it is the game changer in creating a sustainable energy system. Technology is key to energy transition and achieving net-zero emissions, such as solar technology, smart grids, energy storage, hydrogen, and electric vehicles.

  Indonesia aims to reach net-zero emissions by 2060 or sooner, and technology will play a crucial role in achieving this target. Indonesia plans to develop 600 solar power plants powered by renewable energy sources and new energy source development such as hydrogen and ammonia. Additionally, Indonesia will implement energy efficiency programs such as electric vehicle utilization and highly efficient industrial equipment and home appliances. Indonesia will also develop mineral processing to increase the added value of minerals such as nickel and cobalt for the production of electric vehicle batteries and storage.

  Green energy start-ups and emerging businesses are viewed as key instruments that will help accelerate the development of renewable energy. This forum aims to be a hub for envisioning our energy systems and promoting collaboration in achieving business sustainability for clean energy start-ups. The stakeholders in the forum can set policy recommendations to accelerate the growth of clean energy start-ups in APEC economies. Enabling and supporting the growth of start-ups will advance the Asia Pacific

energy sector and help achieve the net-zero emissions goals.

- **Session 1:**
  Moderator: Reza Huseini – Muhamadiyah University of Jakarta

  Overview of Current Development of Renewable Energy Start Up across economies.
  Ms. Tjut Devi – Indonesia Renewable Energy Society (METI).
  - The Indonesia Renewable Energy Society (IRES), also known as Masyarakat Energi Terbarukan Indonesia (METI), was established on 11 May 1999 in Jakarta, with 874 members. Its main objective is to develop the renewable energy industry in Indonesia.
  - Start-ups have experienced rapid growth over the years, becoming a global phenomenon with startup centers and active incubators and accelerators across the world.
  - Currently, there are more than 800 startup unicorns, with around 35 of them worth over USD 10 billion, which is a rare and unique achievement.
  - Renewable energy start-ups play an important role in the renewable energy industry by developing new technologies and services that help reduce carbon emissions.
  - These start-ups aim to innovate existing technologies to be more efficient and affordable, develop better products at lower prices for consumers, and create job opportunities in areas where they are scarce, particularly in wind, geothermal, hydro, biomass, and solar energy.
  - Energy Tracker Asia (2022) found that 135 economies have renewable power targets, and 156 economies have renewable power regulatory policies. Globally, there is about 3,146 GW installed renewable power capacity. The levelized costs of onshore wind power and solar PV are cheaper than fossil fuels on average, and more than 50% of climate mitigation finance is allocated to hydropower, solar PV, and wind power. Economies that have experienced significant growth in total renewable energy include China, Japan, Russia, Canada, and the USA (IRENA, 2022).

- The top 10 trends in renewable energy, namely Advanced Photovoltaics, AI & Big Data, Distributed Energy and Storage Systems, Hydro Power, Wind Energy, Bio Energy, Grid Integration, Green Hydrogen, Advanced Robotics, and Blockchain, will impact start-ups and scale-ups in 2022.
- Most APEC economies have renewable energy start-ups that share common characteristics, including providing solutions to problems, understanding customer needs, having a strong core team, knowing what to do to succeed, and knowing how to work with customers and investors.

Mr. Arief Noerhidayat – Comestoarra Bentarra Noesantarra.

- The Earth's rising temperature is mainly caused by several factors such as waste management problems, urban transportation, fossil fuel-based power plants, and illegal activities. Waste management is a significant contributor to the problem as it releases methane gas from dumping organic waste and biomass residues, which is 28 times more potent than carbon dioxide.
- Indonesia produces 33.171.983,20 tons of waste per year, with wet organic waste and biomass residues dominating 40.3% of the total. To tackle this problem, Comestoarra focuses on waste management through its community-based waste management program called TOSS. It processes the wet organic waste and biomass residues into RDF, which requires several processes and special treatments before using it as fuel.
- In addition to waste management, energy transition, creating a circular economy, and strengthening SMEs are crucial challenges that need to be resolved by 2060. This involves reducing urban pollution and emissions by creating more green spaces, establishing infrastructure to support the electric vehicle ecosystem, electric public transportation, and renewable energy.
- One way to initiate the road to energy transition is by maximizing the use of fossil/co-firing 10% of fuel power plants to absorb solid renewable fuel using proper methodology and technology. By doing so, Indonesia can solve its waste management problem by producing green energy that can contribute to the energy transition.

- Co-firing program is the bridging to energy transition and net zero emission. Referring to International Renewable Energy Agency (2020) and United States Environment Protection Agency (2021), processing 1 ton organic waste and biomass residues to solid renewable fuel per day moreover use it as material of co-firing in coal fired power plant, We can reduce 2.000 CO2Eq/year. The government has target 10 million tons of pellets for cofiring program in 2023-2024 and potentially can reduce 54 million ton CO2eq per year. To be noticed, co-firing is not related with deforestation
- In 2021, Comestoarra.com was appointed as the consultant to realize the commercialization of co-firing in the Ropa coal power plant. Ropa coal-fired power plant in Ende District is the pioneer in creating a commercialization contract of co-firing in Indonesia.
- Comestoarra's TOSS programs have a portfolio of projects that have been massively implemented in communities and villages, aimed at segregating inorganic waste and processing organic waste and biomass residues directly at the source. It will minimize the transportation of waste to landfills and provide rural and remote areas of Indonesia that need biomass stoves and solid renewable fuel for cooking.
- Comestoarra proposes a distributed hybrid renewable technology that combines gasification to convert RDF into synthetic gas, existing diesel engines, photovoltaic or existing renewable energy technologies, and batteries to maintain the sustainability of electricity and contribute to the target of 23% of renewable energy implementation by 2025.

Moderator: Nindito Adisuryo

Green Funding: Unlocking Private Finance for Clean Energy Start-Up in Member APEC Economies.

Presentation by Mr. Budi Mertoekusumo – Badan Pengelola Dana Lingkungan Hidup (BDPLH)/ Indonesia Environment Fund (IEF)

- Badan Pengelola Dana Lingkungan Hidup (BPDLH) / Indonesia Environment Fund (IEF) is a Public Service Agency that works with 10 Ministries in Indonesia and is fully funded by the government of the Republic of Indonesia. Its objective is to coordinate and synergize environmental actions and ensure effective fund disbursement.

- IEF aims to improve the environment and community resilience with four outcomes: reducing greenhouse gas emissions, improving environmental quality, enhancing community and economic resilience, and improving disaster and climate resilience.
- To achieve these outcomes, IEF runs five thematic programs: sustainable forest, land-use, and ecosystem management; renewable energy, low-emission transportation, and low-emission urban development; pollution and waste management, green industry, and circular economy; climate adaptation and disaster risk management; and improved health, food, and water security.
- IEF funds programs related to energy under the Ministry of Energy and Mineral Resources (MEMR) for approximately USD 1.5 million. IEF serves as a bridge between donors and philanthropies and carefully disburses funds to potential projects, monitoring and reporting on all disbursed funds to ensure proper utilization. IEF regularly seeks potential projects in specific industries or areas.
- IEF is launching a new program to support the financing of green investments and financing structures for the private sector in Indonesia. Dana Investasi Infrastruktur (DINFRA) will be managed by IEF, acting as a sponsor and facilitator and operated by OJK Asset Management Company.
- IEF is responsible for pipeline building and investment preparation, engaging with local and international experts to choose potential projects for the investment committee; chairing the investment committee in partnership with professional technical, financial, and legal experts for Financial Due Diligence (FDD) & Legal Due Diligence (LDD); and coordinating project monitoring and compliance reporting to investors funded by DINFRA.
- DINFRA's long-term goal is to invest in five thematic areas: renewables (consisting of solar, hydro, geothermal, and others); forest, land-use, and ecosystem (FOLU); blue economy; health, water, and food security; and waste and pollution management and circular economy.

Clean Energy Finance and Investment Mobilization

Presentation by Adithyani Putri – Founder and Executive Director, Yayasan Indonesia Cerah.

- Clean energy investment is on the rise despite the pandemic and global energy crisis. However, in emerging APEC economies, particularly Indonesia, more work needs to be done related to financing and investment to catch up with advanced economies and achieve the target of net zero by 2060 or sooner.
- In 2021, energy investment surpassed USD 750 billion, with a significant increase in electrification for transportation. The transport sector offers numerous opportunities for start-ups in Indonesia.
- To achieve the net zero target, investment must triple by 2025, then double by 2030, especially in emerging economies. However, the annual growth rate of investment in APEC economies currently only stands at around 3-4%, whereas it needs to grow at a minimum rate of 25% per year within the decade. Significantly boosting financing and investment in clean energy is essential.
- While there has been a significant rise in sustainable finance and investment in recent years, concentrated in advanced economies, Asian banks, specifically in Indonesia, have overwhelmingly invested in fossil fuels. International banks are divesting from fossil fuels, but Indonesian banks still consider renewable energy investment risky. Efforts are being made to persuade Indonesian banks to divest from fossil fuels and invest in renewable energy.
- Policy plays a crucial role in driving clean energy and investment. Start-ups need to introduce their business to policymakers to send the right signals and prompt changes in regulations and legislation to support clean energy finance and investment. The net zero target for Indonesia by 2060, according to the G20's political agreement, requires a complex policy ecosystem involving several ministries.
- Policy also plays a role in setting up the ecosystem for sustainable financing. Green taxonomy in Indonesia needs to evolve from its current iteration, resembling that in ASEAN, from a three-system (green, yellow, red) to a binary system. This is important because banks are still in the early phase of understanding sustainability and green investment.

- Presidential Regulation 112/2022 has addressed tariff questions, clarified mandates regarding local content, and licensed and permits, but implementing regulations are needed to resolve remaining issues.
- In order to accelerate the growth of the clean energy economy in Indonesia, innovative financial instruments should be developed and tailored according to the maturity of the market and technology. Badan Pengelola Dana Lingkungan Hidup (BPDLH) / Indonesia Environmental Fund (IEF) could be used as a way to lower the risk for start-ups in financing and investment.
- Additionally, Indonesia has successfully raised financing through Green Sukuk, but it is important to ensure that the funds are effectively disbursed to clean energy projects. While Indonesia's finance and investment in clean energy has seen some growth, there is still room for improvement. The energy transition partnership is expected to usher in a new era of financing for the clean energy sector.

Clean Energy Start Up Mentoring as a Way to Open Up Networking
Presentation by Mr. I Made Aditya – Secretary General, AESI

- There has been a significant improvement in energy investment capacity, particularly in battery storage investments, which have increased significantly from 2014-2020. In 2020, there was a sharp increase, with the top 10 fund recipients being start-ups.
- Business diversification is an important strategy for growth, as demonstrated by European oil and gas majors like Total Energies. Total Energies has invested heavily in clean energy sectors, with a portfolio of 100 GW by 2030, as part of its objective to be a part of the clean energy transition process. Start-ups can learn from Total Energies' example, particularly in terms of acquisition of various start-ups, partnerships with start-ups in projects and business development, and participation in clean energy mentorship and competition programs.
- There are several barriers to investment in clean energy sector deployment, including technological, policy, market and economy, regulatory, political, and social barriers.
- One example of diversification is solar PV solution, which has various applications, including power plants, agriculture, industrial and service sector buildings, private houses, Building Integrated Photovoltaics (BIPV), and others.

- Indonesia has a regulation called net-metering, which allows for the export of surplus energy produced by rooftop solar panels to the grid. Start-ups can bring innovative solutions to the market and overcome specific requirements that some policies may apply to the clean energy sector. Indonesia has abundant solar energy potential, which is expected to increase significantly by 23.3% until 2050, more than other energy resources in Southeast Asia.
- The deployment of solar PV in Indonesia is influenced by several factors, including capacity building, the existence of three sub-regions (Sumatra, Java-Bali, and other parts of Indonesia), and 13 power dispatch modeling zones.
- The power market in Indonesia is currently dominated by coal power plants, but it is projected to experience disruption in the period of 2030-2050 due to the increase in solar PV installation. This positive disruption will involve start-ups, as most of the activity injecting solar PV energy into the grid will be done by startup companies.
- Indonesia's Electrical Company (PLN) has a solar PV project plan that aims to increase solar energy by 4.6 GW by 2030. Collaboration among companies in the chain is needed to achieve the target. Large companies are expected to directly support the solar PV sector in Indonesia, while around 92 wealthy entrepreneurs and 52 institutions interested in renewable energy sectors are funding start-ups to operate in the business. They are members of Asosiasi Energi Surya Indonesia (AESI).
- Since its establishment in 2017, the number of AESI members has increased by 45.8%. One of the main reasons why companies join AESI is to network and build their capacity. Joining this association can be particularly beneficial for start-ups, as it allows for collaboration with other members and reinforces the development of renewable energy.
- For example, Bali has seen a significant increase in solar PV rooftop installations in residential areas from 2015 to 2022, with a peak capacity of 3.4MW. Start-ups such as BTI Energy and Ineco Solar have played a major role in driving this growth, along with other start-ups in the industry.
- The renewable energy sector is constantly evolving, with changing regulations and dynamic market conditions. Start-ups can navigate this landscape by collaborating with incubation acceleration programs, participating in mentoring sessions with the

Ministry, and seeking support from organizations or institutions that help start-ups survive and thrive in this sector.

- In the AESI's 2021-2024 priority programs, there are three main areas of focus: institutional strengthening, capacity building and strengthening, and synergy between AESI members; domestic integrated solar PV industry development; and creating jobs and business opportunities through the development of entrepreneurship and solar energy SMEs, specifically through the "1000 Solarpreneur" program.

Day 2

Opening Remarks

Mark Newton – USAID, Deputy Director Environment Office

- Entrepreneurship has a significant role in supporting energy transition plans in Indonesia. Start-ups offer technologies and solutions that improve the accessibility, affordability, flexibility, and sustainability of energy services, enabling governments to fulfill their duties more effectively and efficiently. The United States supports the Indonesian government in this endeavor.
- In 2014, the leaders of the Asia-Pacific Economic Cooperation (APEC) agreed to double the share of renewable energy in their energy mix by 2030. The APEC energy working group identified advancing clean energy and a low-carbon community as one of its key goals in the APEC strategic plan. This aligns with the top priority of the United States government to mobilize collective action to address climate change, and USAID is committed to strengthening its partnerships with global allies to tackle the climate crisis urgently.
- USAID's assistance is designed to help workers prepare for climate-friendly careers, thus contributing to the development of a sustainable and resilient energy sector. By working together, governments, entrepreneurs, and communities can accelerate the transition to a cleaner, more sustainable energy system, creating a brighter future for all.

Coaching and Discussion.

Moderator: Robi Ginting - USAID Sinar

Coaching on Developing Clean Energy Startup, Market, and Financing

- Clean technology entrepreneurship and energy investment including lessons learned and best practice.
- ESG Practices for Clean Energy Start-up: an introduction on how start-ups can thrive and achieve sustainable growth in the current market

Presentation by Fabian Wigand – Senior Director Energy - Tetra Tech.

- The Glasgow Financial Alliance for Net Zero, which consists of 450 institutions, has committed to aligning $130 trillion of financial assets with net-zero goals. Investments in climate tech start-ups and R&D cycles are at an all-time high, and breakthrough technologies that are not yet commercialized will need to contribute about half of the emissions cuts needed to reach net-zero by 2050. Cost reduction is crucial for bringing these technologies to scale.
- A McKinsey sustainability forecast identified 11 high-potential value pools in the energy market that could generate anywhere from $9 trillion to more than $12 trillion in yearly revenues by 2030. However, start-ups in economies without established ecosystems face difficulties accessing international investors and new markets, and limited access to local funding further complicates matters. Energy markets are often less liberalized, and fossil fuels are subsidized, which limits market access and competitiveness for clean energy investments. Start-ups with more innovative or hardware-intensive products and services often require higher capital needs.
- There are five fundamental areas that clean energy start-ups should focus on, including demonstrating the climate and social impact of their products and ensuring product-market fit. Governments can support clean energy start-ups by providing market access, supporting incubators and early seed investments, and working with development partners to provide capacity building and tools. Startup competitions and incubators can also help to attract investor attention and grant funding.
- ESG (Environmental, Social, and Governance) metrics are increasingly important for investors when analyzing risks and opportunities. Start-ups can build ESG procedures from the start, unlike established companies, and ESG can help

accelerate the search for product-market fit. However, start-ups face challenges such as lack of resources and limited methodologies, and the pressure to prioritize growth over ESG can be high. Nonetheless, VCs are increasingly pushing for ESG considerations in start-ups.

- Overall, the increasing focus on clean energy and ESG metrics provides opportunities for start-ups to innovate and contribute to a sustainable future, but challenges must also be addressed to ensure their success.

Nada Zuhaira - Sustainable Business & Net Zero Analyst – WRI

- The World Resources Institute (WRI) Indonesia, an independent Indonesian foundation established in 2014 and affiliated with the global environmental research organization, the World Resources Institute (WRI). The WRI turns big environmental ideas into action, promoting the nexus of environment, economic opportunity, and human well-being.
- The Paris Agreement, signed at the 2015 UN Conference of Parties (COP 21), was the first legally binding global agreement to limit climate change. Its goal was to limit global warming to "well below 2 C," but the IPCC published a special report in 2018, indicating that if the temperature rises above 1.5 C, the consequences would be catastrophic. Hence, at the 2021 UN COP 26, the world agreed to limit warming to "1.5 C" compared to pre-industrial levels.
- A half-degree rise in temperature can have a significant impact, affecting up to 200 more people and leading to water scarcity, wildfires, and other issues. The world's greenhouse gas emissions are primarily divided into five sectors which are energy, industrial processes, agriculture, forest and land use, and waste, with energy accounting for over 70% of emissions worldwide. In 2030, energy-related activities, such as mining, electricity, manufacturing, construction, and transportation, are projected to cause 58% of the emissions.
- The industrial value chain contributes 74.5% of all emissions, while the remainder is individual emissions mainly resulting from a lack of alternative products with lower emissions. Therefore, all emissions are linked to our daily lifestyle and consumption choices. Reducing emissions starting from the industry will be the most effective

approach because it is the largest contributor to emissions and can shape sustainable consumption and production patterns in the long run.

- To address the current challenges, such as different terms and scattered strategies related to climate action, WRI, CDP, WWF, and the UN have come up with the global corporate's climate equation: Net Zero by SBTi. The Science Based Targets Initiative (SBTi) certification guides companies on how much and how quickly they need to reduce GHG emissions to align with the 1.5C scenario, ensuring internationally accountable and standardized Net Zero transformation processes backed by science. Net zero is the business's highest possible climate ambition, prioritizing emission abatement over removal.
- The impact on companies is that they go through science-based decarbonization progress, counting emissions, creating reduction targets and strategies, and publicly reporting their progress to maintain accountability and avoid greenwashing. Companies adjust their business models to seize opportunities in the low-carbon transition and avoid the cost of inaction and technology lock-in. Companies become pioneers in anticipating regulatory developments and reach optimal transformation phases.

Tatwadhika Siddhartha - Net Zero Specialist - WRI

- The GHG Protocol Governance – Accounting and Reporting Principles provide guidelines for companies to ensure that their GHG inventory accurately reflects their emissions (and removals, if applicable) and serves the decision-making needs of both internal and external users. The principles include the following:
  a) Relevance: The GHG inventory should reflect the GHG emissions (and removals, if applicable) of the company and be relevant to the decision-making needs of users.
  b) Completeness: The company should account for and report on all GHG emissions (and removals, if applicable) from sources, sinks, and activities within the inventory boundary, and disclose and justify any specific exclusions.
  c) Consistency: Consistent methodologies should be used to allow for meaningful performance tracking of GHG emissions (and removals, if applicable) over time,

and any changes to the data, inventory boundary, methods, or other relevant factors should be transparently documented in the time series.

d) Transparency: All relevant issues should be addressed in a factual and coherent manner, based on a clear audit trail. Any relevant assumptions should be disclosed, and appropriate references to the accounting and calculation methodologies and data sources used should be made.

e) Accuracy: The quantification of GHG emissions (and removals, if applicable) should be neither over nor under actual emissions (and removals, if applicable), and uncertainties should be reduced as far as practicable. Sufficient accuracy should be achieved to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

- The GHG Protocol Corporate Standard divides a company's emissions into direct and indirect emissions. Direct emissions are emissions from sources that are owned or controlled by the reporting company, while indirect emissions are emissions that are a consequence of the activities of the reporting company but occur at sources owned or controlled by another company.
- The organization's Scope 1 and 2 activities that it controls must be included in the carbon footprint. Scope 1 includes direct emissions from stationary combustion, mobile combustion, process emissions, and fugitive emissions. Scope 2 includes indirect emissions from purchased electricity, heat, and cooling that are consumed and controlled by the organization. These guidelines can help companies to accurately report their GHG emissions and make informed decisions to reduce their environmental impact.
- The GHG Protocol Scope 2 guidance provides two methods for calculating indirect emissions from purchased electricity, known as "dual reporting." The first method is the market-based approach, which accounts for emissions based on the specific energy contracts a company uses to buy electricity. This method reflects a company's purchasing choices and encourages the procurement of low-carbon energy sources. The second method is the location-based approach, which uses the average energy generation emission factor in a defined geographic region to account for emissions. This method reflects the impact of the company on the grid and encourages

engagement with local utilities to promote clean energy. Companies can choose which method(s) to use and are encouraged to disclose their chosen method(s) and the reasoning behind their choice(s) for transparency and comparability purposes.

Coaching

Presentation Tatwadhika Siddhartha - Net Zero Specialist - WRI

- To build an emission inventory, the GHG Protocol outlines four basic steps to calculate your carbon footprint. The first step is to set the reporting period and base year. The reporting period refers to the time period for which you are calculating your GHG emission inventory, while the base year is the baseline from which you will track your performance over time.
- Next, you must identify emission sources by categorizing sources within the organization's boundaries. This includes stationary combustion, mobile combustion, process emissions, or fugitive emissions. Direct emission sources are categorized under Scope 1, while indirect emissions from the consumption of purchased electricity are categorized under Scope 2.
- The third step is to select a calculation approach. The most common approach is to apply documented emission factors, which reflect the amount of emissions from a measure of an activity. However, calculation approaches may differ depending on the activity type and data availability.
- Finally, you must collect data and choose emission factors. Supplier-specific or source emission factors are used to provide the highest accuracy. These sources may include government databases such as NEA, EMA, or NCCS.
- Couching involves conducting GHG accounting by analyzing various study cases. The materials for these study cases will be attached in the APPENDIX for reference.

Day 3

How Governments Support Clean Energy Start-Ups

Moderator: Nindito Adisuryo

Sripeni Inten Cahyani - Technical Advisor on Electricity, Ministry of Energy and Mineral Resources

- Indonesia Electrical Company (PLN) has licenses for 56 substations in the Indonesia Electricity System, with 22 subsystems at various levels of maturity. Five of these subsystems require high attention, while the rest operate normally.
- Infrastructure challenges in the eastern Indonesia region have made electricity costs expensive, creating opportunities for start-ups to develop renewable energy, especially solar PV panels. The Indonesian government has identified the renewable energy potential in each province and area and is promoting co-firing programs with coal power plants. This offers business opportunities for start-ups to enter the market.
- The Renewable Energy-Based Economic Development (REBED) program has four principles: utilizing local renewable energy, increasing local economic development, implementing small-scale power plants for low demand, and providing off-grid/remote/isolated areas with electricity. Start-ups can empower local communities by increasing their capability through this program. The goals of REBED are to provide access to electricity in rural areas without electricity.
- The government is supporting REBED by implementing a conversion program, which involves converting oil diesel power plants to VRE (Variable Renewable Energy). Indonesia has 2,500 diesel power plants with a total capacity of 2.5 GW, providing start-ups with an opportunity to enter the business by converting these power plants into renewable energy power plants.
- Balancing supply and demand is a key success factor for the Co-firing program with biomass or waste. Nine business schemes and ecosystem management practices must be in place to make this program successful. These practices include feedstock management, logistic feedstock, supporting industry, joint operation management, managerial capability, local SoE capability, funding/investment, operation and maintenance management, and contractual terms.
- The government of the Republic of Indonesia supports the renewable energy sector through Presidential Decree 112/2022 of Acceleration of Renewable Energy Development for Electricity Provision. The decree provides a framework for renewable energy-based electricity provision, which includes Renewable Energy Development based on the Rencana Usaha Penyediaan Tenaga Listrik (RUPTL). The RUPTL takes into account the target of the renewable energy mix, supply-

demand balance, and the economic value of power plants. The decree also includes provisions for price and procurement of renewable energy power plants, as well as the utilization of domestic products.

WRAP UP SESSION

Moderator: Fathah Zuhri – Pijar Foundation

- **Best Practice from the Most Innovative and Promising Clean Energy Start Up in APEC Member Economies**

Thailand Delegation

- Between 2019 and 2021, energy consumption in Thailand decreased due to the pandemic. As of 2021, renewable energy (RE) accounted for approximately 15% of energy consumption, with biomass and solar contributing the most at 32% and 25%, respectively. To achieve its carbon neutrality target between 2065-2070, the Thai government has established a policy direction that includes increasing the proportion of RE in new power generation to 50% by 2040, increasing the proportion of electric vehicles to 30% by 2030, increasing energy efficiency by 30% through the use of new technology and innovation, and implementing an energy transition process using the 4D+1E strategy.
- The 4D+1E strategy is a comprehensive plan for the development of the energy sector, which consists of five key elements. The first element, Digitalization, aims to enhance the transmission system by implementing a "Smart Grid." The second element, Decarbonization, focuses on promoting the production and utilization of solar and bioenergy to reduce carbon emissions. The third element, Decentralization, aims to support peer-to-peer power trading by enabling electricity conveying through on-grid/off-grid systems. The fourth element, Deregulation, seeks to create an energy innovation development platform called the "Sandbox" Project and promote the concept of "Energy start-up." The final element, Electrification, aims to extend the electric vehicle network and promote its usage.
- The Thailand government has implemented various initiatives to promote renewable energy. These initiatives include applying a carbon tax, providing investment subsidies for renewable energy projects, announcing proper power purchasing schemes (Feed-in tariff), strengthening the renewable energy stakeholders' network, promoting energy crop plantations for use as fuel for power and heat, conducting research and development on renewable energy technology and innovation,

providing capacity building on renewable energy and disseminating renewable energy information to the public, considering biofuels blending ratios (Gasohol E20 and Biodiesel B10), and promoting other alternative fuels like bio jet and hydrogen.

- Thailand has also implemented the Bio-Circular-Green (BCG) Economy Model, which supports industries that use bio materials with zero waste production circulation and natural methodologies. The expected outcomes of this model include increasing domestic GDP to 4.3 trillion THB within five years, supporting the local economy (particularly the agricultural sector), and achieving Sustainable Development Goals (SDGs).

- **Closing Remarks**

  Sripeni Inten Cahyani, Technical Advisor on Electricity, Ministry of Energy and Mineral Resources

  Through this workshop, our goal is to create a supportive ecosystem that enables clean energy start-ups to thrive and make significant contributions to the development of renewable energy. The forum has successfully facilitated the exchange of views and experiences on how clean energy start-ups can expand their market reach and achieve business growth. This is essential to enhance the sustainability of green job opportunities, accelerate the transition to low-carbon and non-polluting energy generation, and create a better ecosystem for clean energy start-ups. This partnership was announced through the leaders' declaration at the G20 Summit.

  As the development of green energy sources increases, the installation and operational costs of renewable energy sources are decreasing. This situation provides an opportunity for clean energy start-ups to grow their businesses and capture a larger market share. To support start-ups in the clean energy sector, several measures can be taken, including providing technical and financial assistance to clean energy start-ups, enhancing expertise, skills, and capacity in the field of renewable energy technology, improving technology and commercial readiness of renewable technology, developing technology business and markets to improve competitiveness and scale up renewable energy development, and empowering gender and vulnerable communities during times of crisis and transition through sustainability efforts so that no one is left behind.

IV. Briefings on Discussions at the Workshop

In this session, participants were actively participating in the discussion.

Q&A / Discussion

- **Session 1**

  During the discussion, the moderator posed a question on the best approach to starting a business and implementing ideas in the clean energy sector - whether it is better to do it alone or through collaboration.

  Mr. Arief responded that having a strong passion for running the business is crucial to attract investors to join the venture. Ms. Tjut Devi added that collaboration is also important, as it provides a platform for combining passion and expertise to effectively sell ideas in the market. Ultimately, a combination of both passion and collaboration can help increase the chances of success in the clean energy sector.

  The participant inquired about the current challenges faced by start-ups, including tax burdens and difficulty in securing funding. They also asked how these challenges may impact the clean energy sector, and how the investment climate for clean energy start-ups compares to that of the broader startup ecosystem.

  Ms. Tjut Devi responded by emphasizing the importance of a strong underlying force, including the vision, mission, and objectives of the startup, for its success and growth. She also noted that obtaining investment is challenging for start-ups in Indonesia, not just those in the clean energy sector. Ms. Tjut Devi advised that those considering entering the field should be prepared for the difficulties ahead and have a strong commitment to their mission.

  The participant posed a question to Mr. Arief and Ms. Tjut Devi about the challenges clean energy start-ups face in growing their business amid supply and demand issues and energy insecurity.

  Mr. Arief acknowledged that the clean energy sector presents technical and social challenges, but cited the example of the hybrid system developed by Comestoarra and

Toss. He noted that the system was designed with input from experts across different institutions to address any issues that arose during development.

Ms. Tjut Devi emphasized the importance of seeking out diverse perspectives and references from similar situations in other economies. She added that to effectively address the challenges in Indonesia's clean energy sector, it is critical to have a thorough understanding of the unique characteristics of the local context.

- **Session 2**

The participant posed several questions to the panelists regarding the renewable energy sector in Indonesia. Firstly, the participant asked Mr. Budi about the types of funding that the Indonesian Energy Fund (IEF) disburses to start-ups, such as bonds, equity, or other forms of financing. The participant also inquired about IEF's target amount of funding to disburse and whether IEF actively seeks out potential start-ups to fund. Secondly, the participant asked Ms. Putri about whether Cerah, as an organization advocating for clean energy, is actively lobbying the government to implement more business-friendly policies to support the growth of renewable energy start-ups. Lastly, the participant directed a question to Mr. Made about the business strategy for solar PV, given the current surplus of electricity supply in Indonesia.

Mr. Budi explained that the Indonesian Energy Fund (IEF) can disburse funding in various forms, including equity, grant, hybrid, or convertible. However, IEF does not actively seek potential start-ups to fund, but rather disseminates information about available funding opportunities and coordinates with donors. IEF ensures that funding does not have negative impacts, particularly for SMEs, with whom they have partnerships.

Ms. Adithyani highlighted Cerah's three advocacy fronts, which include green taxonomy, fossil fuel asset retirement, and power sector reformation. While advocating for more incentives for clean energy start-ups is not currently possible, Cerah focuses on advocating for benchmark prices for renewable energy. This can help start-ups stay viable in the business.

Mr. Made mentioned the role of the Indonesia Solar Association (ISA) in advising the Ministry of Energy and Mineral Resources on the maximum capacity of solar PV that can be installed in residential and commercial facilities. ISA seeks to create a balance between self-consumption and exports to ensure that energy produced is within limits. This strategy helps start-ups in the solar PV sector navigate the current surplus of

electricity supply.

The participant asked how Cerah encourages banks to invest in renewable energy start-ups, given the perception that this sector is not currently profitable.
In response, Ms. Adithyani explained that Cerah collaborates with other think-tanks and NGOs to focus their resources and energy on two main areas. The first is to raise the cost of doing business for the fossil fuel industry by advocating for the removal of all hidden subsidies in the supply chain. This will make renewable energy more competitive and attractive to investors. The second area of focus is to engage policymakers in supporting the transition from fossil fuels to renewables. This includes advocating for policies that encourage early retirement of fossil fuel assets and the integration of more renewables into the energy grid. By creating a more supportive policy environment, Cerah hopes to increase investor confidence in renewable energy start-ups and encourage banks to invest in this sector.

The participant asked how start-ups can navigate the bureaucracy and contribute to the development of clean energy, particularly solar PV, in Indonesia.
Ms. Inten suggested that the government is very supportive of solar PV, and that one approach for start-ups to enter the industry is through partnering with an existing industrial or private company. This can simplify the process for start-ups and provide a positive addition to their portfolio.

The participant inquired about the existence of collaboration programs between ministries to facilitate renewable energy start-ups in partnering with local stakeholders.
Ms. Inten explained that there is currently no formal collaboration program among ministries for start-ups to collaborate with local partners in the renewable energy sector. However, the government has implemented several programs to support start-ups and the development of renewable energy in villages, such as the Desa Energi Pemuda program and the Akar Desa program, which involve young generations and start-ups. The government provides a budget of IDR 1 million to each village for these programs, which could be an opportunity for start-ups to collaborate with local partners and communities.

- **Session 3**

  Participants asked if there was a way for developing economies to also be able to bring non-commercial renewable energy to market when they also experienced barriers to reducing the cost of the technology itself.

  In developing economies, there is a highly engaged workforce, especially among the younger generation, who are coming up with new and innovative solutions. However, the key challenge is to do more with less funding than institutions in more developed economies. Despite this challenge, there is a positive trend of renewable energy scaling up in developing economies, with ambitious energy plans being implemented. This allows for more project scalability and application opportunities within local economies. Governments can support this process by encouraging new developers and service providers to participate in the market, which promotes learning and the ability to test out new ideas from ideation to pilot stages.

  The participants inquired about the appropriate methodology for measuring domestic emissions and raised concerns that using GHG accounting could potentially result in double counting.

  The domestic emission accounting methodology, developed by the Intergovernmental Panel on Climate Change (IPCC), differs from the corporate emission accounting methodology developed by the GHG Protocol. Both methodologies have principles to avoid double counting of emissions. When setting domestic emission reduction targets, it is important to use the domestic methodology, which can then be broken down into five sectors: energy, industrial processes, agriculture, forest and land use, and waste. The corporate methodology is appropriate for individual organizations to report their emissions.

  Therefore, using the appropriate domestic emission accounting methodology is crucial to measure an economy's emissions accurately and avoid double counting. Additionally, it is important to note that the corporate emission accounting should be used for individual organizations' emissions reporting, and the domestic methodology should be used for measuring the emissions of a whole economy.

- **Session 4.**

  Participant inquired about the importance of primary data from sensors in calculating carbon footprint.

  The speaker emphasized the significance of real-time primary data based on sensors but noted that this is still uncommon worldwide. Additionally, some companies are hesitant to release confidential data related to their emission.

  Participants expressed concerns about the accuracy of carbon emission reports and the need for third-party audits to verify their credibility.

  The speaker explained that while there is a global auditor to check the accuracy of data submitted to SBTi, there are currently no ground rules in place for ensuring accuracy. As long as the GHG protocol guidelines are followed, the results are generally accepted.

  Participant inquired about the realistic emission reduction target for the company, especially in Indonesia.

  The speaker explained that when it comes to formalizing realistic emission reduction targets for companies, it needs to be adjusted based on data collection abilities, emission calculations, methodology, and other factors.

  Participant inquired about the utilization of the secondary data for GHG Accounting. He also expressed his concern on the Indonesian ecosystem for the implementation of GHG accounting.

  Regarding the use of secondary data in calculating emissions, the speaker confirmed that it is possible to use secondary data. Finally, in response to a question about whether the Indonesian ecosystem is integrated enough to calculate emissions, the speaker expressed optimism, citing government targets for energy transition and enterprises taking responsibility for creating sustainable products as positive signs.

- **Wrap Up Session**

Mr. Nguyen Anh Tuan – Viet Nam

Thailand have BCG Model that already approved by APEC leader. What is Thailand next step to make BCG as a guidance for other economies? In Viet Nam, the startup in RE is growing fast, but the chance for SMEs contribute in this sector is difficult as it required big capital, technology and long-term financial support so only big company can survive. Regarding the SMEs, Viet Nam has two programs to support SMES, namely give funds to SMEs to improve their business with low rate and establish Entrepreneur Association that help SMEs to consult their new idea and innovation and help SMEs to expand their market share and business unit.

Ms. Jenjira Gulpanich and Tantita Jungprasertchai - Thailand

As for Thailand's BCG Model, the government is actively promoting it as a blueprint for economic development in the economy. Thailand has already shared the model with other economies and has signed an agreement with Japan to cooperate in implementing the BCG Model. Additionally, Thailand has also established a BCG Center for Economic and Social Development to support the implementation of the model in Thailand and other economies.

Mr. Bebi - Indonesia

Mr. Bebi suggested that Thailand should share their target for carbon neutrality at the Asian Taxonomy Forum. This is because there is currently a discussion about the threshold in the energy sector required to achieve the target by 2050. It is important for Thailand to share their target as they have not yet done so, and this may cause issues since the target they have stated for achieving carbon neutrality (2065-2070) is different from the Asian target for achieving it by 2050. Sharing their target would help align their efforts with the rest of the region and promote more coordinated action towards achieving carbon neutrality.

Mr. Fano Alfian Ardyansyah - Indonesia

As a founder of Ailesh, Mr. Fano explained that Ailesh offers three approaches to drive sustainability: redefining existing business processes through data collection, assessment, audit, and evaluation; developing transformation plans and process designs for sustainability implementation; and providing customized sustainability solutions based on renewable energy, circularity, and digital transformation goals.

Indonesia is an economy with a large renewable energy potential of more than 400GWe, but its current utilization rate is only 12.8%. Clean energy start-ups in Indonesia face numerous challenges, particularly in fundraising and investment. The APEC Forum provides an excellent opportunity for Indonesia to collaborate with other economies and learn from their experiences and case studies. The forum can facilitate business matchmaking and investment opportunities with investors and technology partners and develop pilot projects. Additionally, the forum can help APEC economies share their incentives for renewable and sustainability initiatives and provide workshops and coaching to prepare and develop startup proposals. The forum can also conduct business matching forums with local governments and stakeholders to develop Science-Based Target Initiatives together and prepare for future trends in the clean energy sector. Aires introduces Environmental Social Governance (ESG) initiatives and Science-Based Target Initiatives (SBTi) to scale up their project and seize new opportunities.

Automa – Indonesia

Automa is a startup that specializes in carbon counting, logistics, and supply chain. By utilizing real-time data from IoT, it can calculate the carbon footprint of operations. However, there is currently a gap between incentives and disincentives for carbon tax, which has not been clearly defined, causing Indonesian corporations, especially SMEs, to not properly implement carbon footprint accounting. Start-ups need to be creative in persuading corporations to conduct carbon footprint accounting and not just view it as a cost center. Additionally, the lack of transparency in regulations regarding carbon credits poses a challenge in achieving the 2030 goal.

Indonesian Participants

Arief, an Indonesian participant, emphasized the importance of collaboration between start-ups and stakeholders in Indonesia. Such collaboration could give start-ups a competitive advantage and support the development of remote and rural areas.

The Pertamina Foundation PIC explained that Pertamina has programs in place to support start-ups and society in practicing clean energy. These programs focus on social, educational, and technical aspects and are open to collaboration with clean energy start-ups in Indonesia.

I Gede Natanegara, another participant from Indonesia, expressed that this forum is very fruitful as it provides opportunities to learn and exchange knowledge. He shared that his company has many projects in biomass, which convert methane gas to electricity.

Udayana Students, also from Indonesia, found this forum interesting and informative about the existing clean energy start-ups in Indonesia. They also appreciated how the forum facilitated the planning of actions to support the growth of clean energy start-ups in the economy.

Lastly, Retno, another participant from Indonesia, emphasized the importance of government, society and stakeholders supporting each other in the clean energy sector.

V. Summary of the Workshop

From the speaker's presentation and the productive discussion in the workshop, several key finding that could be summarized are as follow:

- The global community is facing the challenge of climate change, and policies and initiatives have been developed to address it. Green growth is becoming more prevalent, and APEC has prioritized clean and low-carbon energy development. In 2014, the leaders of the Asia-Pacific Economic Cooperation (APEC) agreed to double the share of renewable energy in their energy mix by 2030. The APEC energy working group identified advancing clean energy and a low-carbon community as one of its key goals in the APEC strategic plan.
- Policy plays a crucial role in driving clean energy and investment. Start-ups need to introduce their business to policymakers to send the right signals and prompt changes in regulations and legislation to support clean energy finance and investment. The net zero target for Indonesia by 2060, according to the G20's political agreement, requires a complex policy ecosystem involving several ministries.
- There are five fundamental areas that clean energy start-ups should focus on, including demonstrating the climate and social impact of their products and ensuring product-market fit. Governments can support clean energy start-ups by providing market access, supporting incubators and early seed investments, and working with development partners to provide capacity building and tools. Startup competitions and incubators can also help to attract investor attention and grant funding.

- To achieve the net zero target, investment must triple by 2025, then double by 2030, especially in emerging economies. However, the annual growth rate of investment in APEC economies currently only stands at around 3-4%, whereas it needs to grow at a minimum rate of 25% per year within the decade. Significantly boosting financing and investment in clean energy is essential.
- ESG (Environmental, Social, and Governance) metrics are increasingly important for investors when analyzing risks and opportunities. Start-ups can build ESG procedures from the start, unlike established companies, and ESG can help accelerate the search for product-market fit. However, start-ups face challenges such as lack of resources and limited methodologies, and the pressure to prioritize growth over ESG can be high. Nonetheless, VCs are increasingly pushing for ESG considerations in start-ups.
- Overall, the increasing focus on clean energy and ESG metrics provides opportunities for start-ups to innovate and contribute to a sustainable future, but challenges must also be addressed to ensure their success.

VI. Pre-Test and Post-Test Evaluation

The participants were suggested by the committee to take the pre-test prior to the event began and to take another post-test upon the completion of the event. Pre and post-test consisting of 10 matched true/false and multiple-choice questions were designed to test similar areas of knowledge with each question set. Test were used as comparative data to measure the level of knowledge of the participants before and after the workshop. The number of participants that managed to fulfilled both pre-test and post-test were 103 or 82.4% of the total participants. In average, the level of participants understanding after the workshop is 85.6%. The level of knowledge from all responding participants increased is 30.9%. The proposal set the target that 80% of all participants will increase their knowledge after the workshop. The test results confirmed all participants that fulfilled the post-test acquired higher score compare to their score in pre-test. Table below shows the percentage of participants with correct answers on the pre-test and post-test.

Result of Pre and Post-Test

Question	Pre-Test	Post-Test
	% Correct	% Correct
Q1	68.0%	95.1%
Q2	69.9%	92.2%
Q3	63.1%	85.4%
Q4	38.8%	89.3%
Q5	40.8%	82.5%
Q6	48.5%	85.4%
Q7	46.6%	81.6%
Q8	60.2%	82.5%
Q9	58.3%	89.3%
Q10	53.4%	72.8%
Average	**54.8%**	**85.6%**

VII. Recommendation

Several recommendations are available for RE stakeholders to consider when implementing renewable energy in their economies, such as:

- Develop policies and regulations that support and incentivize clean energy finance and investment.
- Establish a policy ecosystem involving several ministries to achieve net-zero target by 2060.
- Encourage start-ups to introduce their business to policymakers to send the right signals and prompt changes in regulations and legislation to support clean energy finance and investment.
- Provide support to start-ups in terms of mentorship, partnership, and competition programs to help them diversify their business and participate in clean energy projects.
- Encourage start-ups to do collaboration between them and create established ecosystem for easing them accessing international investors and new markets and also solve limited access to funding.

- Encourage the adoption of GHG accounting by businesses to track their greenhouse gas emissions. GHG accounting is a crucial tool that enables organizations, governments, and individuals to understand the sources and amount of greenhouse gas emissions they generate. By quantifying these emissions, it becomes possible to develop strategies to reduce them and mitigate their impact on the environment. This can help businesses to identify areas where they can improve their energy efficiency, reduce waste, and transition to cleaner energy sources, ultimately reducing their carbon footprint and contributing to global efforts to combat climate change.
- Encourage the use of co-firing plants to absorb solid renewable fuel to contribute to energy transition and solve waste management problems.