別添２：**Thematic Track Sessions**

**Thematic Track 1: Tripling Renewable Energy Capacity by 2030**

The renewable energy race is speeding up, particularly in the power sector. There is increasing demand for renewable energy to be the fuel source of choice for all sectors and all uses. At the 28th Conference of Parties to the Paris Agreement (COP28) in December 2023, approximately 123 countries pledged to triple renewable energy capacity worldwide by 2030. However, in many developing countries, renewable energy capacity remains a scarce resource, especially for heating and cooling. The renewable energy sources being considered range from hydropower, wind, solar, geothermal, ocean, sustainable biomass and biofuels. Yet, each country has specific characteristics and needs that require a combination of solutions including energy storage and imports from neighboring countries. Decision-makers across Asia and the Pacific need to consider questions such as: Which sectors should be prioritized for renewable energy to cost-effectively deliver the greatest greenhouse gas emissions reduction in our country? How can we collectively accelerate investments in renewable energy capacity? What is needed to increase private sector participation and financing in renewable energy in developing and emerging markets? The four main areas of discussion in this Thematic Track will include:

1. **Renewable Energy for Power:** Some countries are blessed with significant renewable energy resources and with considerable potential to be developed. Yet private sector participation and financing remains limited, and large, complex projects can take a long time to materialize. How can governments accelerate private sector investments in renewable energy capacity in the power sector? What are the challenges, opportunities and key policies needed to facilitate project approvals? How can renewable energy resources be shared across borders?
2. **Offshore Wind, Floating Solar and Other Ocean Technologies:** Many countries inAsia and the Pacific are dependent on oceans for their economic growth. Yet, one free resource remains unexplored – marine energy. Offshore wind and floating solar projects are being developed and implemented in several countries in the region. There is a unique opportunity to examine multifunctional approaches to better manage coastal and marine areas and exclusive economic zones, while harnessing their renewable energy resources.What does a multifunctional approach involve? How are countries planning and implementing marine renewable energy projects? What are the challenges and risks? How can we ensure strong cross government collaboration on marine renewable energy related projects? How are ports, ships and transmission lines being upgraded to meet this demand? How are innovative projects being structured and financed by the private sector?
3. **Variable Renewable Energy and Battery Storage:** With increasing variable renewable energy generation, governments and state-owned electricity companies have shown concern about the impact on electricity grids and the need for large-scale storage including battery storage. Some developing member countries have opted to curtail renewable energy, even if it is only a small share of overall power generation. How can this challenge be resolved – what are the policies changes needed and how can private sector support such efforts? What is the role of energy storage and what regulations are needed to trigger greater investments from the private sector? What are the different types of energy storage solutions and how are these being deployed in the region? What will be the role of distributed renewable energy solutions and energy storage?
4. **Renewable Energy for Transport, Agriculture and Other Sectors:** To achieve net-zero it is essential that all sectors make use of renewable energy including transport, water supply, agriculture, data centers, and many others. How are renewable energy solutions being deployed and financed across these sectors? How is the private sector being engaged to deliver and operate renewable energy projects for state-owned transport and water sectors? What is the role of utilities in delivering renewable energy solutions in these sectors? What are the different renewable energy fuels being considered for transport (e.g. biogas, bioethanol, biodiesel)? What investments are being made by the private sector in sustainable aviation fuel? Is there a future for biofuels and which should be the priority uses in transportation including in agriculture?

**Thematic Track 2: Doubling Progress in Energy Efficiency by 2030**

All countries have large amounts of an untapped and cost-effective fuel resource – energy efficiency. At COP28, countries pledged to double the global average annual rate of energy efficiency improvements by 2030. In Asia and the Pacific, progress on energy efficiency remains slow, with a few exceptions such as India, the People’s Republic of China and Singapore. How critical are government policies in increasing public and private sector investment in energy efficiency? What are the priority policies needed to create an enabling environment and de-risk projects? How can the private sector, including financial intermediaries and energy service companies, be key players in the energy efficiency market? The four main areas of discussion in this Thematic Track will include:

1. **Energy Efficiency Policies:** There are proven successful energy efficiency policies that can be implemented today with immediate large-scale impacts at low cost. What has been the impact and achievements of minimum energy performance standards and labelling, building codes, fuel economy standards, energy management systems, energy efficiency revolving funds, public procurement, taxation and others? How are energy efficiency policies being quickly deployed in developing countries? Which countries in Asia and the Pacific have been leading on energy efficiency policies, and where did they start? How have these policies resulted in increased investment by the private sector?
2. **Energy Efficiency in Buildings:** Today, buildings account for one-third of global energy consumption and emissions and likely to increase substantially with growing urbanization. New construction will account for the majority of building energy use across the region in the next decade; but at the same time, the opportunity for investment in green building retrofits is billions of dollars per year across the region. What are the policies needed to ensure that existing buildings are upgraded and modernized to reduce the need for energy for electricity, heating and/or cooling? What can governments do to incentivize investment in new green and affordable buildings by the private sector? How can local governments play a leading role to ensure compliance with building codes? How can the private sector support the government to reduce energy consumed by buildings including embodied carbon in cement?
3. **Energy Efficient Heating and Cooling:** Heating and cooling of enclosed spaces and of water account for the majority of energy use worldwide, particularly in buildings, industry and cities. And fossil fuels are the dominant source of fuel supplying essential heating and cooling in Asia and the Pacific. Air conditioning has become one of the main drivers for growing electricity demand in South Asia and Southeast Asia. In Central Asia, many of the heating supply and distribution systems are old, inefficient, and in urgent need of modernization. However, the heating tariffs are subsidized and do not reflect actual production costs. What are governments doing to address these challenges and promote the efficient use of heating and cooling, including through district heating, solar thermal and heat pumps? How are national cooling action plans and strategies being deployed in the region? What are the best available technologies to deliver more efficient cooling and heating to buildings, industries and cities in the region? What has been the role of private sector in investing and providing energy services to support more efficient heating and/or cooling systems? What approaches have governments been using to raise consumer awareness on energy efficiency in heating and cooling?
4. **Energy Efficiency in Transport and Cities:** Currently half the global population live in cities. Cities account for two-thirds of global energy consumption and 70% of annual global carbon emissions. With increasing urbanization, the amount of energy used by transportation, buildings and cities is expected to increase considerably in Asia and the Pacific region, where most of the housing is yet to be built. How can cities plan for a climate resilient future with energy efficiency at its core? What is the role of local governments in delivering energy efficiency investments across all sectors? How can cities embed energy efficiency in transport, water, buildings, street lighting and other sectors? How can energy efficiency investments be done by the private sector in cities with limited resources?

**Thematic Track 3: Delivering Electricity Transmission and Distribution for the Future**

The energy system across Asia and the Pacific is undergoing a major transformation towards full electrification. This transformation will require major systematic upgrades and expansion of electricity transmission and grids – on the same scale of investment as required for renewable energy – in order to meet the goals of the Paris Agreement. However, the electricity grid is now becoming a major bottleneck resulting in some renewable energy projects being delayed or cancelled due to the inability to connect these projects. According to the International Energy Agency (IEA), globally, at least 3 terawatts of renewable power projects are waiting for a grid connection – this is equivalent to five times the solar photovoltaic and wind capacity added in 2022. It is essential to accelerate the construction of electricity transmission and distribution lines to keep with the pace of renewable energy demand. Based on experience in other countries with large amounts of renewable energy capacity, up-front planning can be critical. The four main areas of discussion in this Thematic Track will include:

1. **Governance and Optimal Planning of Electricity Transmission and Distribution Infrastructure:** Countries have tried different approaches to develop their electricity transmission and distribution grids. With fast growing renewable energy capacity spread across many regions, the process has become more complex. Nevertheless, some developing countries have been able to solve the challenges by deploying well designed approaches to market-based trading and regular industry engagement. What are the successful case studies? What are the resources and legal framework needed? What is the role of vertically integrated electricity companies, transmission and/or distribution companies? How can independent power producers be involved in planning stages? How can planning improve private sector investment decisions?
2. **Upgrade and Expansion of Electricity Transmission and Distribution Grids:** Several existing electricity transmission and distribution grids urgently need: i) capacity upgrades due to rising demand for power, and ii) a substantial reduction in system losses, by replacing existing old and inefficient equipment with high-efficient transformers, substations and cables. In grid expansion projects, it is essential to plan for sufficient future capacity to minimize the number of upgrades, particularly in countries where land acquisition is a challenge. With the rising number of droughts and floods, there is also a need to ensure that all projects are climate resilient by adopting best available technologies. What are the latest technologies available and why should governments consider investment compared to standard technologies? How are countries involving the private sector in upgrade and expansion of electricity transmission and distribution grids, including new transmission lines to renewable energy zones?
3. **Smart Grids, Digitalization and Electric Vehicle Charging:** Electricity distribution grids in urban areas will have to change dramatically to suit the increasing demand for electric cooking, distributed renewable energy, electric heat pumps and electric vehicle. How can electricity distribution companies plan for rapidly increasing power demand in dense urban areas? What is the role of demand-side management, including power pools, smart metering and time-of-use pricing? How are smart grids being deployed in the region and what is the role of local governments and private sector?
4. **Regional Power Grids:** With the increasing electrification of the energy system, and the need for renewable energy resources, cross-border transmission lines will be essential to help countries with limited resources and seasonal differences in renewable energy power supply. While progress remains political and slow moving, it is promising that recently, several projects have been announced, some of which are led by the private sector. What is the status of cross-border power integration in the region including Central Asia, Southeast Asia and South Asia? What challenges remain? How are the agreements being structured? What are the upcoming investment needs?

**Thematic Track 4: Financing New and Innovative Clean Energy Solutions in Hard-to-Abate Sectors**

The industrial sector accounts for about 37% of energy use and 25% of energy-related carbon dioxide emissions worldwide. In Asia and the Pacific, industrial energy demand is growing rapidly and predominantly relying on fossil fuels. The International Energy Agency indicates that to reach net-zero emissions, the industrial sector will need to invest in a range of solutions including hydrogen, carbon, capture, utilization and storage (CCUS), direct electrification, advanced digital solutions, material efficiency and other innovative technologies and approaches. To achieve net-zero, the industrial sector will need to make significant investments into clean energy systems in a short-time period. The four main areas of discussion in this Thematic Track will include:

1. **Green Hydrogen for Industrial Decarbonization:** Green hydrogen and its derivative zero- and low-carbon fuels have the potential to become vital low-carbon energy carriers in hard-to-abate sectors such as cement, iron, steel, chemicals and aluminum as well as international shipping. Globally, researchers, policymakers and investors have high expectations. However, green hydrogen, green ammonia, green methanol and other synthetic fuels remain a scarce and costly resource. Experts indicate that green hydrogen and its derivatives should be directed to hard to electrify sectors, such as the fertilizer industry and energy intensive industries. Furthermore, with high demand for green hydrogen, electrolyzer manufacturing will need to ramp up significantly. There are also new types of electrolyzers being developed to produce hydrogen.How should governments plan for a green hydrogen market? What are the latest developments in green hydrogen and electrolyzer technologies? How can governments and the private sector use green hydrogen to create green industrial clusters? What are the challenges in transport and storage of green hydrogen? What innovative business models and financing approaches are being used to support new projects in the industrial sector?
2. **Carbon Removal Financing and Technologies for the Industrial Sector:** Carbon, Capture, Utilization and Storage (CCUS) is a mature, complex suite of technologies that have yet to achieve commercial viability at scale. Challenges include the lack of enabling environment, the complexity of the technologies and use cases, and environmental-social-governance (ESG) related issues. The result has been that CCUS in practice has not matched the climate abatement contributions that were projected for it a couple of decades back. However, most climate experts contend that the world will not be able to achieve its emission reductions efforts unless CCUS is widely deployed, particularly in energy-intensive industries. If this critical technology is not successfully scaled up, even if all else is achieved, the world will overshoot the carbon budget threshold to contain global warming to 1.5 degrees Celsius. The good news is that other carbon removal solutions are emerging. What are the latest developments in financing of carbon removal technologies? What is the role of governments and private sector to stimulate investment in alternative carbon solutions? How critical will carbon pricing be?
3. **Energy Efficiency and Renewable Energy in the Industrial Sector:** The decarbonization of heating in energy intensive industries is progressing at a very slow pace. Furthermore, about 70% of short-term industrial energy efficiency savings are in light industry, and small and medium-sized enterprises (SMEs). The rapidly growing industrial sector in the Asia and Pacific region is highly dependent on fossil fuels, and this is driving considerable increases in greenhouse gas emissions. Only a limited number of renewable energy solutions are being considered at scale for deployment in hard-to-abate industries, and these include geothermal, heat pumps, solar thermal and biogas. There is a unique opportunity to help developing countries set strong regulatory frameworks and leapfrog to clean and efficient energy solutions. What is needed to unlock greater investments in the energy efficiency in the industrial sector? What are the key regulations and incentives needed to un-lock greater investment? What is the role of local financial institutions, and how are they supporting energy efficiency in industrial SMEs? What are the latest developments, case studies and business models for renewable energy solutions in the industrial sector? How can governments engage with the private sector to finance renewable energy heating projects in the industrial sector? What approaches is industry considering in order to decarbonize heating?
4. **Advanced Digital Solutions for Industrial Decarbonization:** The industrial sector has a been a major investor in the use of new technologies including advanced digital technologies, machine learning, automation, and, more recently, generative artificial intelligence (AI). The use of digital technologies has led to improved productivity, and lower operating costs. Yet, their application also has an immense potential to supercharge energy savings and decarbonization efforts across the sector. A recent [study](https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/cloud-powered-technologies-for-sustainability) by McKinsey found that innovative digital technologies and generative AI can not only significantly accelerate the implementation of nearly half of key initiatives essential to reach net zero by 2050, but can also substantially contribute to reducing their cost with the potential of hundreds of millions of dollars in savings per year. However, as with any new upcoming technology, there is need for research and development, testing and piloting, and ultimately, regulation. How can AI benefit the sector and what are the upcoming opportunities for private sector investment? Where is it being applied today and what are the challenges and risks? How are cyber security risks being addressed? How can governments support demonstration and deployment of new and innovative solutions? What financial assistance is required? What are some other upcoming advanced digital technologies in the energy sector, and how are projects that apply these technologies being financed?