

2025 SIDS NDE Joint Programme

Energy Systems and
Business and Industry

PRESENTER

CTCN Secretariat



Energy Systems

Relevance of Energy Systems

Central to climate and development goals: Energy production and use account for the largest share of global GHG emissions. Transitioning energy systems is essential for achieving NDCs, 1.5°C pathways, and resilient development.

Critical for SIDS' unique vulnerabilities: SIDS face high dependence on imported fossil fuels, high electricity tariffs, limited generation capacity, and grid instability. Energy transition brings security, resilience, and economic co-benefits.

Enabler of cross-sectoral transformation: Energy systems drive progress in water, health, transport, agriculture/food systems, and digitalization. Integrated energy planning underpins resilient and sustainable national development.

Rapid technological innovation: Advances in renewable energy, storage, smart grids, green hydrogen, and digital tools offer SIDS new opportunities to leapfrog legacy systems and adopt distributed, climate-resilient energy solutions.



Energy Systems – Key insights

- Falling RE costs make solar, wind, and offshore solutions viable for SIDS.
- Distributed energy systems (mini-grids, microgrids) improve resilience and reduce outage risks.
- Battery energy storage technologies are now mature and increasingly affordable.
- Green hydrogen for long-term storage and heavy-duty sectors is emerging.
- Digitalization (AI-based forecasting, smart metering, digital twins) helps optimize small systems.
- Regional cooperation among SIDS can unlock joint procurement, shared standards, and pooled technical capacity.



TA Portfolio in SIDS: Energy Systems

Country	TA title	Stage
PNG	Pre-feasibility study on Ocean Energy focusing on Salinity Gradient Energy Technology and Electrochemical Ocean Thermal Energy Conversion	Implementation
Timor-Leste	Formulating a National Electricity Grid Code and Development of a Net Metering Policy in Timor-Leste	Implementation
Maldives	Feasibility study on green hydrogen potential in Maldives and development of a national roadmap for sustainable energy transition	Implementation



Examples of Future Technical Assistances

Solar-powered cold chains for agriculture and fisheries.

Energy-efficient water pumping and irrigation technologies for drought-prone SIDS.

Ocean harnessing energy technologies (salinity gradient power, etc.)

National Renewable Energy Roadmaps

Feasibility studies for green hydrogen production for backup power, port operations, and inter-island transport.

Biochar (e.g., coconut energy)

Smart meter rollout strategies and loss-reduction digital tools.

Green energy for the **shipping industry**

Battery Energy Storage optimization models, including least-cost storage sizing.



TEC Publications

Developed by the **UNFCCC Technology Executive Committee (TEC)** in partnership with the **United Nations Industrial Development Organization** & the **UNEP Copenhagen Climate Centre**, this TNA guidebook on renewable energy:

- Provides practical guidance to developing countries, with the aim of achieving net zero emission in **energy supply, energy storage, energy transmission & distribution**;
- Provides an overview of **up-to-date information on a wide range of renewable energy technology options**, as well as enabling conditions, barriers & good practices for their deployment;
- Highlights **aspects of just transition** that could be considered to promote a fair and inclusive workforce transition to meet Paris Agreement goals;
- Offers information on **technology costs & available open-source material** that could assist technology practitioners & national TNA teams in informing & assessing technology choices, in response to contextual factors & their national circumstances.



Business and Industry

Relevance of Business and Industry

- The operations of businesses and industries are intricately linked with climate change. **According to the IPCC, industry accounted for 24% of global GHG emissions in 2019, and in 2024 report an increasing trend is presented.**
- Manufacturing processes, e.g., in the cement and steel industries, are extremely energy and emissions intensive. On the other hand, operations of businesses and industries are also threatened by climate change with increasingly frequent extreme weather events damaging critical infrastructures for manufacturing and logistics.
- **Climate action in the industrial sector** is required to reduce its carbon footprint and increase climate resilience of businesses and industries.
- **Climate action does not threaten long-term economic growth**; on the contrary, climate action can stimulate economic growth by boosting human capital (healthier lifestyles and better education), natural capital (valuation through ecosystem services), technological change and increasing productivity, as well as efficiency and getting more with less.



Business and Industry – Key insights

1. Business and industry in SIDS primarily rely on expensive and imported fossil fuels, with energy consumption heavily focused on electricity generation for sectors like tourism, manufacturing, and agriculture.
2. CTCN can support SIDS with decarbonization initiatives for carbon intensive business and industry, optimizing materials flow and reducing life-cycle emissions, costs, policies.
3. Further, support such as information sharing, collaboration, and networking to exchange best practices, experience and knowledge on technology development and transfer and on endogenous capacity building activities.
4. Such collaboration could involve crosscutting themes of gender, youth, and indigenous people.



Examples of Future Technical Assistances

Develop low-carbon strategies for businesses and industries Businesses and industries receive support on identifying low-carbon pathways and developing targeted strategies.

Focus on Hard to abate Sectors (cement, steel, ammonia etc.) – Cement Sector roadmap implementation, steel sector process efficiency, waste heat recovery.

Develop low-carbon strategies: Industrial automation and 4IR (Fourth Industrial Revolution)

Small and Medium Scale Industries : To enhance endogenous capacities of innovation and adopting as well as adapting climate technologies to local needs, paying special attention to women and youth and their role in shaping and leading the green business and industry. Focus could be on agro based SMEs specifically in LDCs and SIDs.

Greening of Supply Chain to large producers
Development of strategies and visions for new source of energy, like green hydrogen etc. for fossil fuel replacement, and specific climate gases such SF6, HFCs, methane etc



TEC Publications

Integrating hard-to-abate industries in the process of preparing and implementing NDCs (2024):

- Highlights the need for transforming hard-to-abate industries.
- Encourages targeted policies for decarbonizing hard-to-abate industries through electrification and renewable energy.
- Identifies zero- and low-emission technologies.
- Emphasizes tracking progress through clear roadmaps and robust MRV systems.
- Recommends collaborative efforts among industries, governments, and financial institutions.
- Stresses the importance of international support, cooperation and knowledge sharing.

