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**UNCTAD Sustainable Smart Port (SSP)
Assessment for Port Tema in Ghana**

Presentation By

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11TH SESSION OF MYEM ON TRANSPORT, TRADE LOGISTICS AND TRADE FACILITATION. GENEVA, SWITZERLAND (23-24 OCTOBER 2024)

UNCTAD Sustainable Smart Port (SSP) Assessment for Port Tema in Ghana



BY

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BRIEF ABOUT GHANA

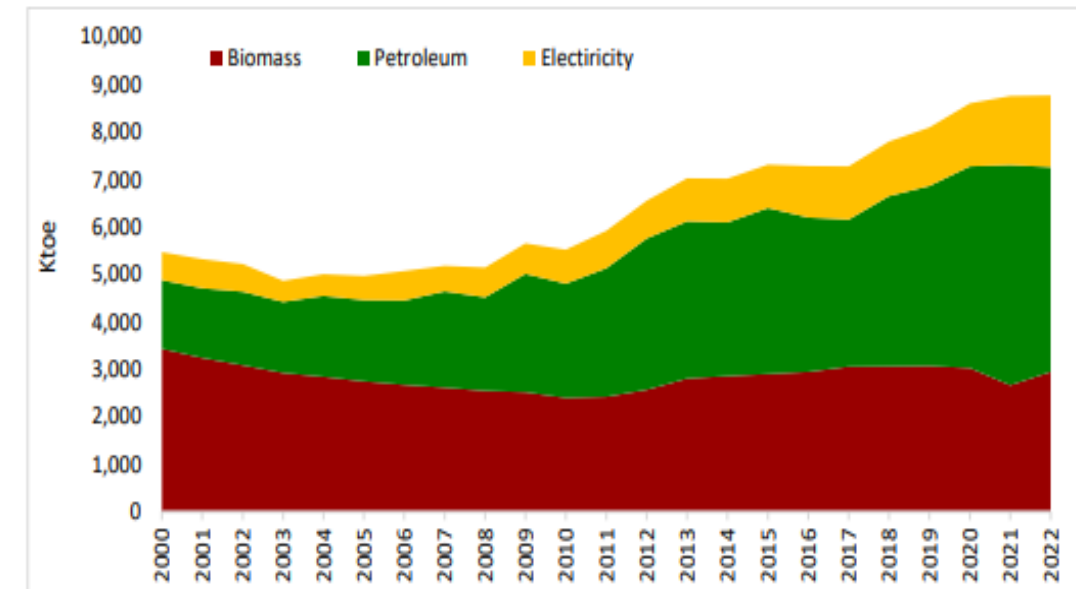
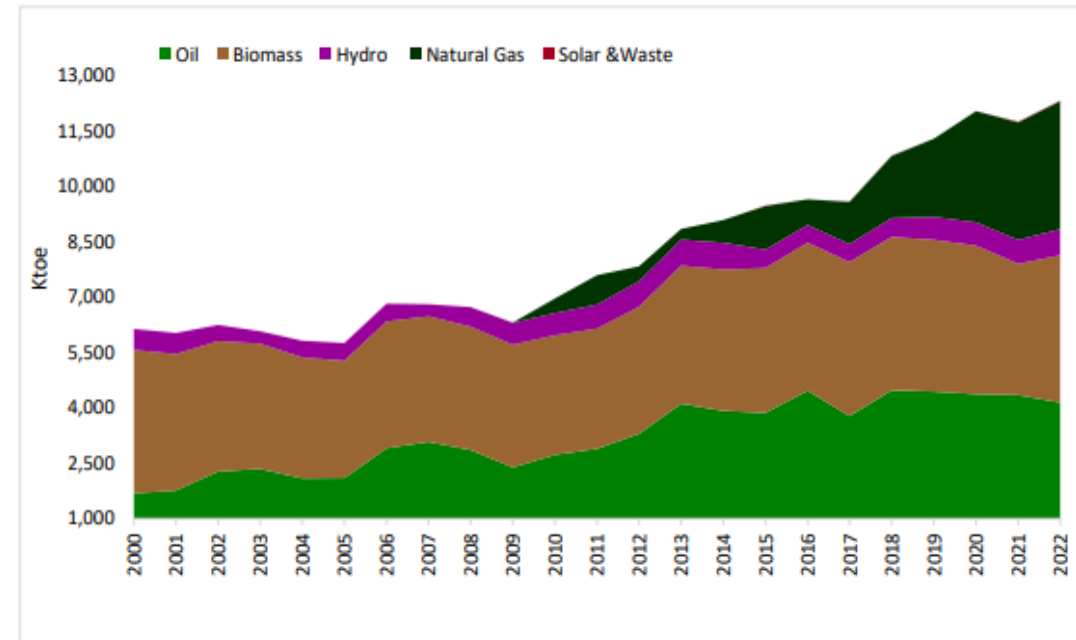
- Ghana Location
- GDP per capita for 2023 - \$2,380
- Major industries:
 - cocoa processing,
 - oil and gas production,
 - gold mining,
 - beverage production,
 - textile manufacturing,
 - construction materials,
 - light manufacturing,
 - food processing,
 - wood processing and
 - petroleum, among others.
- Two major Ports – Takoradi and Tema managed by GPHA
- Ghana's membership in (ECOWAS) facilitated trade relationships with countries in the region and globally.
- Burkina Faso, Mali and Niger depend mainly on Ghana for their imports and exports through the Tema port.



GHANA'S ENERGY SITUATION

Trend of Total Energy Supply

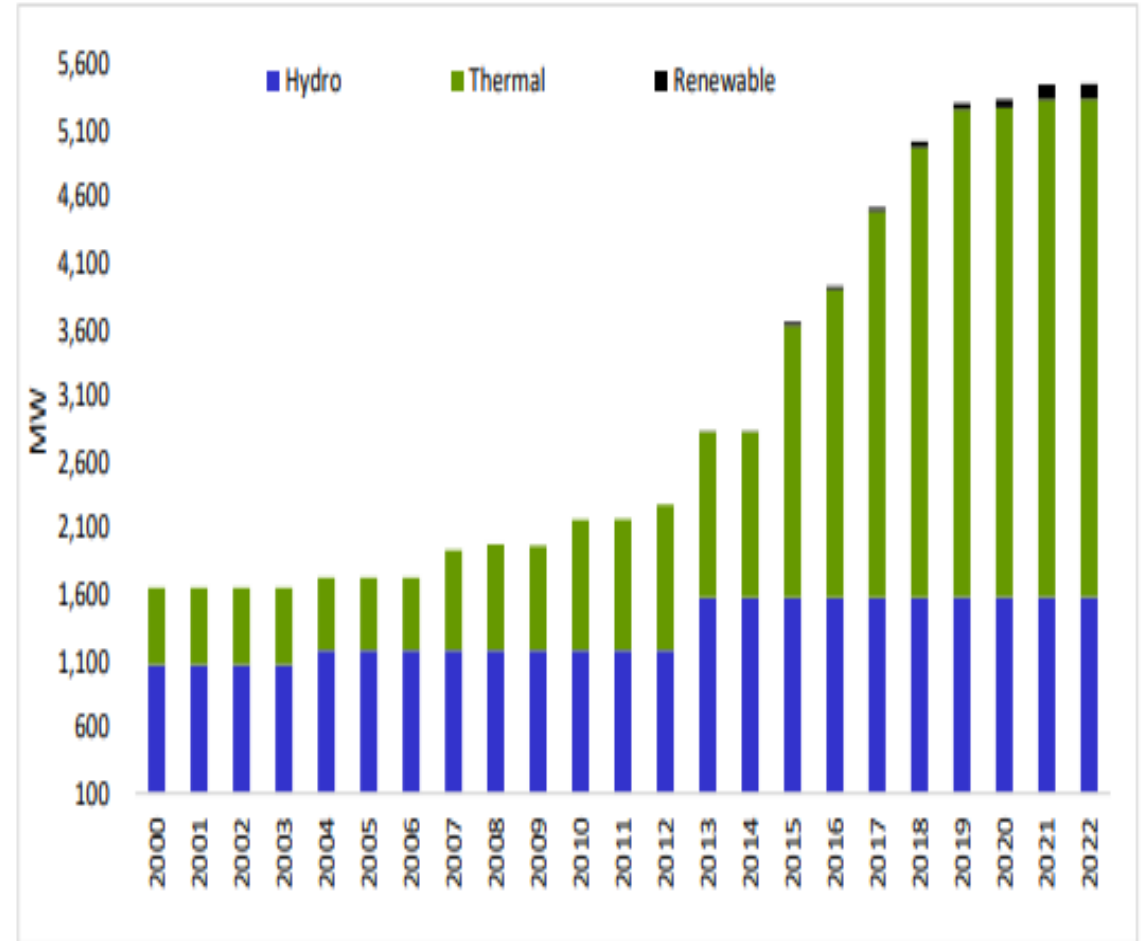
- Major sources of energy 2022
 - ❖ oil (33.6%), natural gas (28.2%),
 - ❖ biomass (32.4%), and hydro (5.7%).
 - ❖ Solar energy accounted for less than 1% of the total energy supply.
- Natural gas has experienced a significant increase in its share of the total energy supply, rising from 5.6% in 2010 to 28.2% in 2022.



- **Trend in Final Energy Consumption by Fuel**
- The total final energy consumption grew by 56% from 5,470 ktoe in 2000 to 8,537 ktoe in 2022
- Electricity consumption, increased by 155% from 592 ktoe in 2000 to 1,509 ktoe in 2022. Electricity in 2022 accounted for only 17% of total energy consumption.
- Petroleum consumption tripled from 1,445 ktoe in 2000 to 4,318 ktoe in 2022.
- Biomass however declined by 14% from 3,432 ktoe in 2000 to 2,940 ktoe in 2022.

Installed Electricity Generating Capacity (2000-2022)

- Total generation increased from 1,652MW in 2000 to 5,454MW in 2022
- Thermal generation increased from 990MW, 3,758MW by 2022
- Contribution of non-hydro renewables, though negligible, had an amazing growth rate increasing from 2.5MW in 2016 to 112MW in 2022.
- The electricity generated in 2022 was made of:
 - 8,192 GWh (35.4%) from hydro sources,
 - 14,810 GWh (63.9%) from thermal sources,
 - and 162 GWh (0.7%) from non-hydro renewable sources.



Policy Initiatives

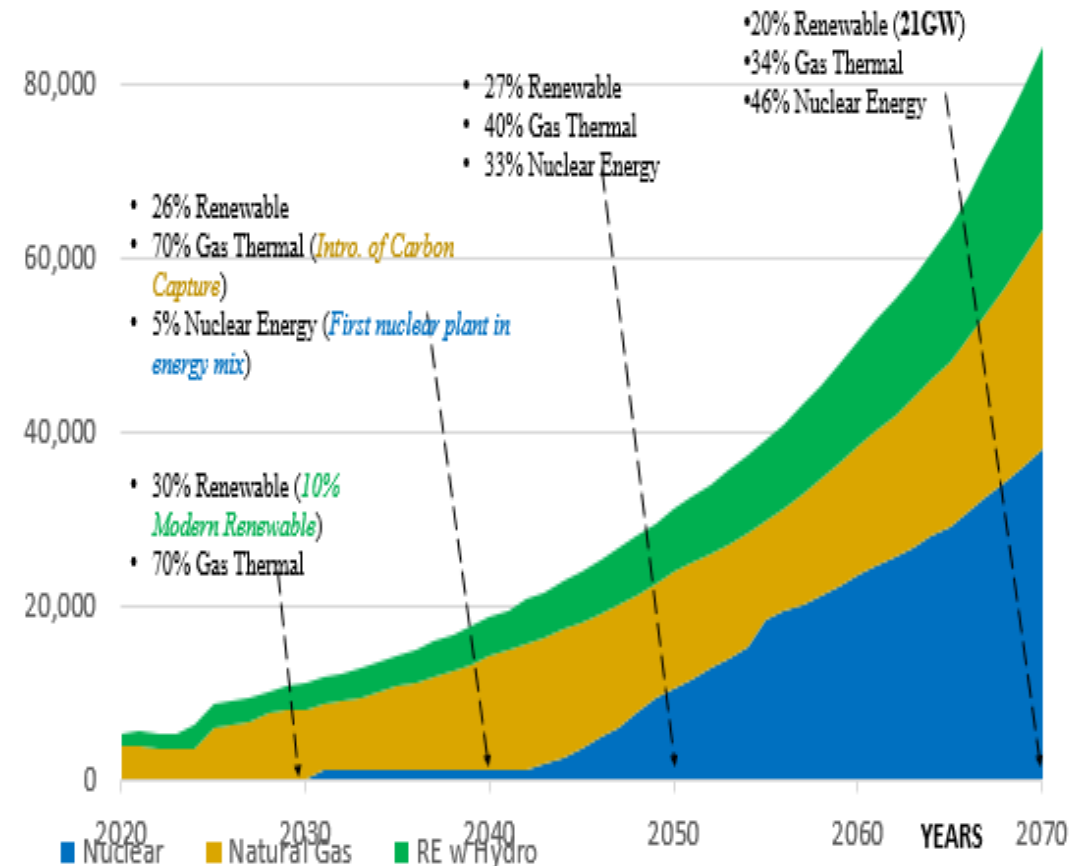
- Issues and Options in the Energy Sector (1986)
- National Electrification Scheme (1989)
- Vision 2020 (1995)
- Energy Commission Act 1997
- Public Utility and Regulatory Commission Act 1997
- Ghana Poverty Reduction Strategy (2003)
- Growth and Poverty Reduction Strategy (2006)
- National Renewable Energy Strategy (2003)
- ECOWAS White Paper on Access to Energy Services (2006)
- ECOWAS Regional Bioenergy Strategy
- Strategic National Energy Plan (2006/2020)
- Ghana Shared Growth and Development Agenda I & II (2009/2014))
- National Energy Policy (2010)
- Energy Sector Strategy and Development Plan (2010)
- Renewable Energy Act, 2011 (Act 832)
- Sustainable Energy for All Action Plan / Agenda of Ghana (2012/2016)
- Mini-grid Electrification Policy (2016)
- Bioenergy Policy

Policy Incentives to scale up RE deployment

- Ghana's Intended National Determined Contribution 2018
- Energy Sector Levies Act
- Import Duty Exemption. Renewable Energy equipment exempted from import Duties
- Value Added Tax (VAT) exemption
- Corporate Tax Reduction for Renewable Energy Companies
- National Renewable Energy Development Fund
- Feed-in-Tariff (FITS): guaranteed price for RE
- National Energy Transition Framework
- Renewable Energy Amendment Act 2020 (Act 1045)
- Bui Power Authority Amendment Act 2020 (Act 1046)
- National Energy Policy 2021 (updated)
- Net Metering scheme that allows households to generate and sell excess energy to the grid
- **Why is RE deployment still low despite all these policy incentives**

NATIONAL ENERGY TRANSITION FRAMEWORK AND INVESTMENT PLAN

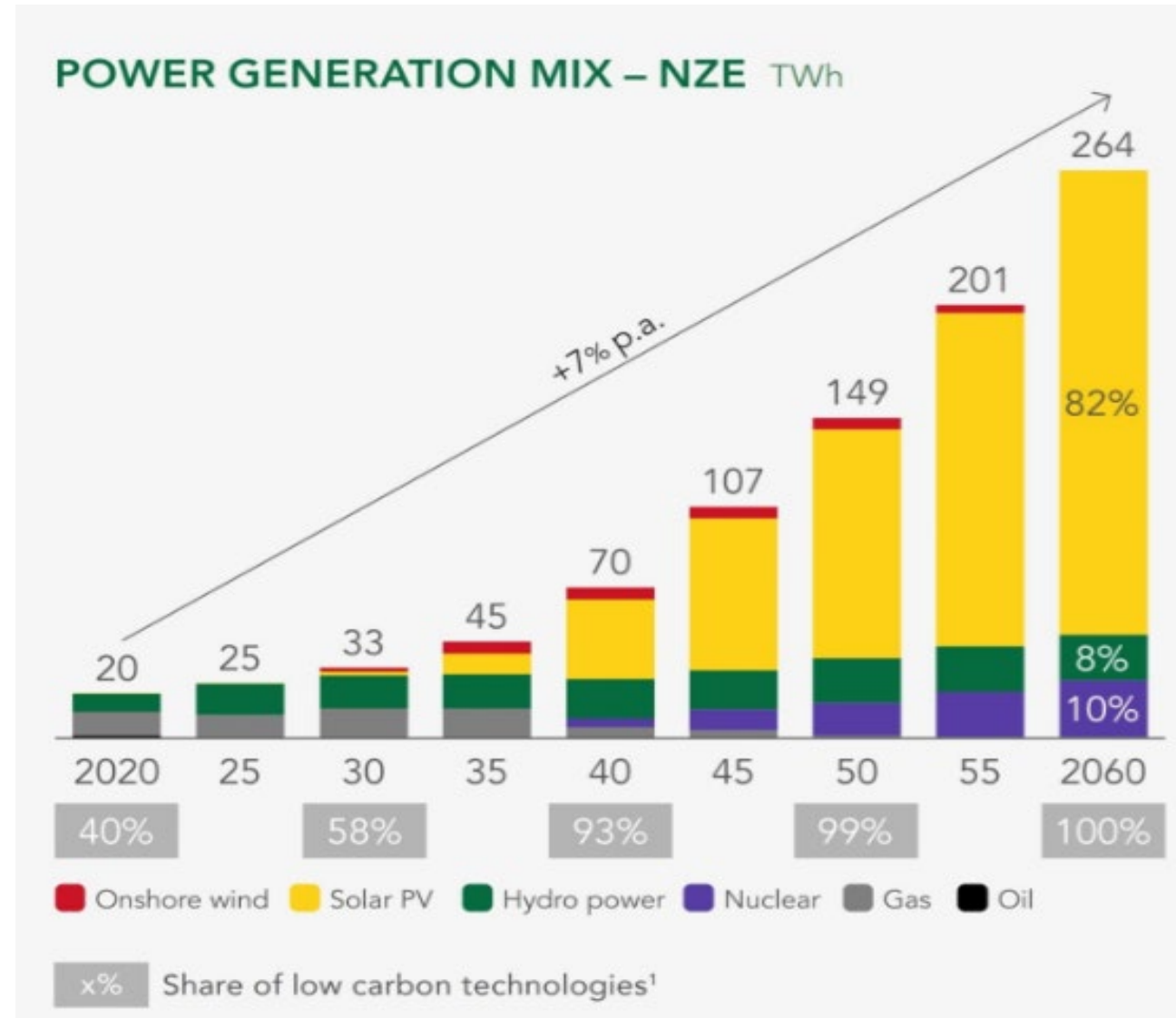
- Climate change issues is top of the national development agenda
- Ghana is a signatory and committed to the Paris agreement to cut down greenhouse emission.
- Energy sector is one of the high-emitting sectors. Mitigation and adaptation measures are outlined in Ghana's National determined Contributions
- Ghana developed a National Energy Transition Framework with a target to achieve net zero emission by 2070.
- This framework document was launched by President Nana Akufo-Addo at the 26th UN Climate Conference in November 2021 in Glasgow, Scotland.
- The graph summarizes the targets set out to achieve net zero energy transition by 2070 as outlined:



Projected Energy Mix in The Power Sector Under the Energy Transition Framework

National Energy Transition Investment Plan and Targets

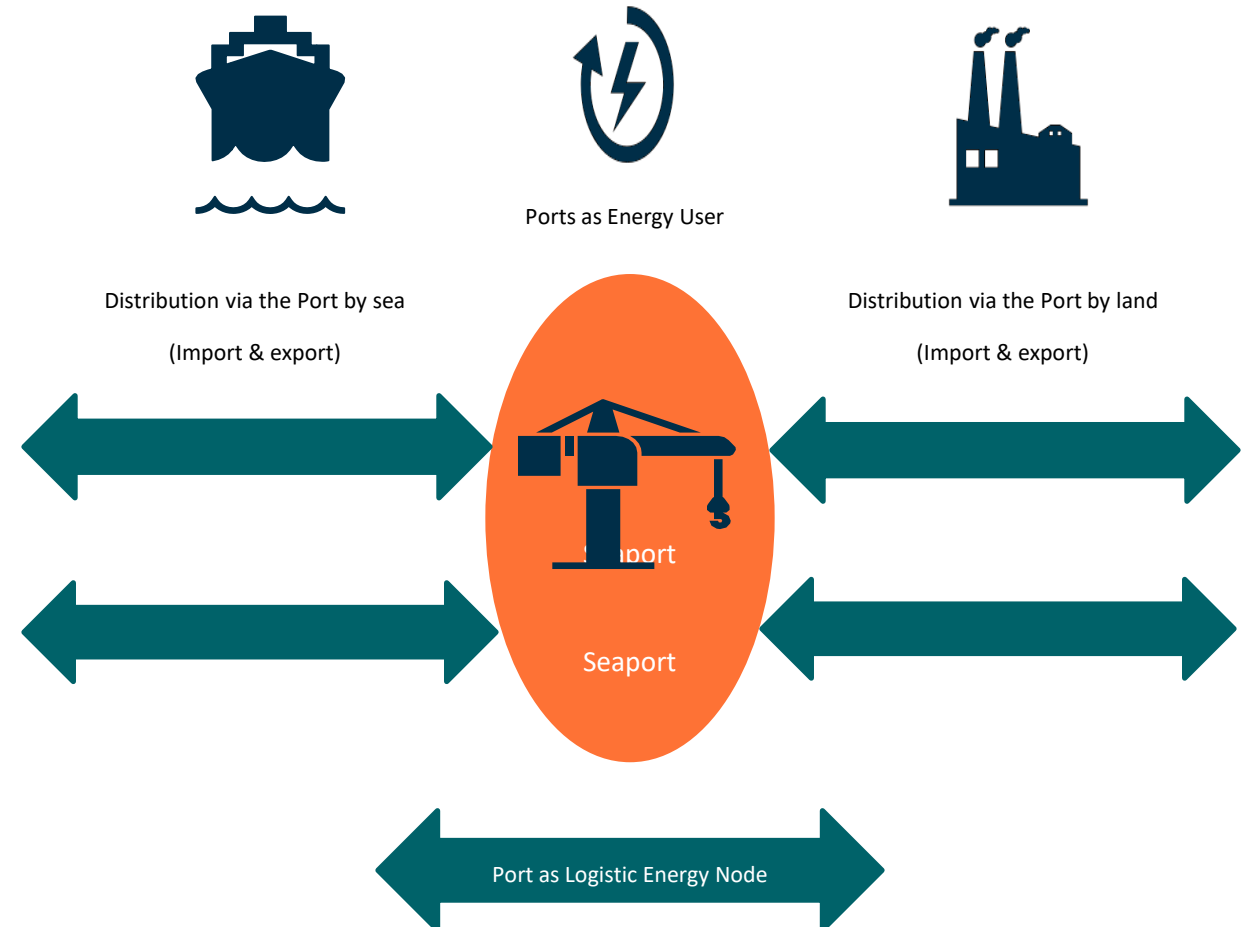
- Ghana Energy Transition and Investment Plan was unveiled during the UN General Assembly in September 2023
- The plan which was said to be built on Ghana's Energy Transition framework, however had a target of achieving net zero carbon emission by 2060 with solar PV accounting for 82% of total power generation mix.
- However, the targets set for the power generation mix are entirely different.
- Achievement of 82% from solar PV is doubtful as solar radiation in Ghana has a maximum of 6-7 sunshine hours a day. The sun is not available for 24 hours a day in Ghana.



PORT & TRANSPORT CONTEXT IN GHANA

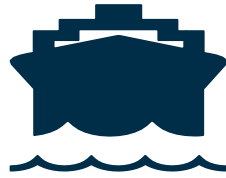
- Ghana has two major ports operated by the Ghana Ports & Harbour Authority (GPHA) in Tema and Takoradi.
- The port of Takoradi is Ghana's main oil and gas hub and also handles export cargo from Ghana.
- The port of Tema, located close to Accra, is the largest and the most efficient port in West Africa with regards to imports and transshipment to Mali, Niger and Burkina Faso.
- This port handled about 20 million tonnes of cargo and 1.2 million TEU in 2022.
- The throughput in the port of Tema is about 70% of the international maritime trade in Ghana.

Role of The Port in The Energy Sector



Current Energy use at the Tema Port

Maritime



Fuel Oil & Diesel

- Heavy Fuel Oil (HFO)
- Marine Gas Oil (MGO)
- Marine Diesel Oil (MDO)
- Liquefied natural gas (LNG)

Seaport



Electricity

- Hydropower
- Petroleum
- Natural Gas
- Renewable Sources

Port Hinterland



Road Transport

- Gasoline
- Diesel

Ideal Energy Requirement for Sustainable Smart Port in Tema

Maritime

- Biodiesel
- Methanol/ (LNG)
- Biomethane/ bio-LNG
- E-Methane/e-LNG.
- Green/blue hydrogen
- E-ammonia/Blue ammonia

Seaport

- Electricity
- Renewable Sources
- Hydropower
- Natural Gas
- Hydrogen
- Nuclear

Port Hinterland

Road Transport

- Electricity
- Evs / Electric power trains
- Methanol /Methane (LNG)
- Hydrogen

ONGOING INITIATIVES AT THE TEMA PORT LINKED TO SDG GOALS

- GPHA is committed to the attainment of the sustainable goals and has been implementing various initiatives to combat climate change at the Tema Port.
- GPHA is indeed collaborating with International Maritime Organization (IMO) to explore alternative fuel and technology options aimed to reduce greenhouse gas emissions and promote sustainable maritime practices.
- Indeed, most the activities at the Tema port can be linked to the 17 SDG goals.

SDGs RELATED CLIMATE ACTIONS AT TEMA PORT

- Tree Planting as carbon sink
- Electric powered cranes to reduce the use of fossil fuel cranes
- Implementing Sulphur Cap program fuel below 0.5% S.
- Replacing R-22 with R410A Refrigerant Gases
- Replacing Marine Craft with ACERT Engines (Advanced Combustion Emission Reduction Technology)
- Sourcing Renewable Energy
- Replacing existing Fluorescent Tubes with Energy saving Lamps
- Beach Cleaning /Litter Fishing
- Port Community engagement
- Implementing ISO Standards.

SIGNIFICANT OUTCOME OF THE CLIMATE CHANGE INTERVENTION AT TEMA PORT

- Annual electricity consumption has increased by 61% from 45.64GWh in 2022 to 73.45GWh in 2023
- Fossil fuel mainly diesel oil on the other hand has decreased by 9.3% from 5.4million liters in 2022 to 4.9 million liters in 2023
- This reduction when translated into greenhouse gas reduction is significant and therefore need to be assessed under the SSP project together with the other climate change initiatives.
- Clearly, conversion or replacement of fossil fuel equipment to electric powered equipment with emphasis on clean energy sources energy efficiency is the sure way to go.
- Already electricity use at the Tema port is mainly from Transition fuels: 64% Natural Gas, 35% hydro and 1% solar.
- **The Question?**
- **Considering the objective of SSP project to increase the share of renewable energy use at the Tema Port, will intermittent solar and wind power be able to energize the modern electric powered cranes and other equipment being introduced at the Port?**
- **What will be the technical and economic challenges to overcome to make this a reality?**
- **What are the Strengths, Weakness, Opportunities and Threats with the introduction of Renewable Energy and energy Efficiency options?**

WAY FORWARD AFTER SSP ASSESSMENT PROJECT

- The SSP Assessment Project will seek to establish and find answers to the questions
- The output of the SSP Project will be a useful tool for mobilizing funds to transform Tema Port to be a Sustainable Smart Port
- UNCTAD is well positioned to support Ghana identify Soft funding options for this great transformation.
- Bui Power Authority is collaborating with GPHA to seek climate funds to implement a pilot project to establish the technical and economic viability of promoting solar and wind power at the port.

In collaboration With UNCTAD under the SSP Project,
Tema Port can be transformed to be the Sustainable
Smart Port to address most of the 17 UN SDG



THANK YOU

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