Multi-year Expert Meeting on Transport, Trade Logistics and Trade Facilitation
11th Session

Maritime Transport in Times of Polycrisis

23-24 October 2024, Geneva

Strengths, weaknesses, opportunities, and threats (SWOT+) in the path of making Tanger Med advance in its ability to: use, produce and/or distribute renewable energy and improve energy efficiency

Presentation By

Hicham Kharoufi

Tanger Med Port Authority

Multi-Year Expert Meeting on Transport, Trade Logistics and Trade Facilitation
11th session 24/10/2024 - UNCTAD Geneva, Switzerland

Strengths, weaknesses, opportunities, and threats (SWOT+) in the path of making Tanger Med advance in its ability to: use, produce and/or distribute renewable energy and improve energy efficiency

1. Introduction

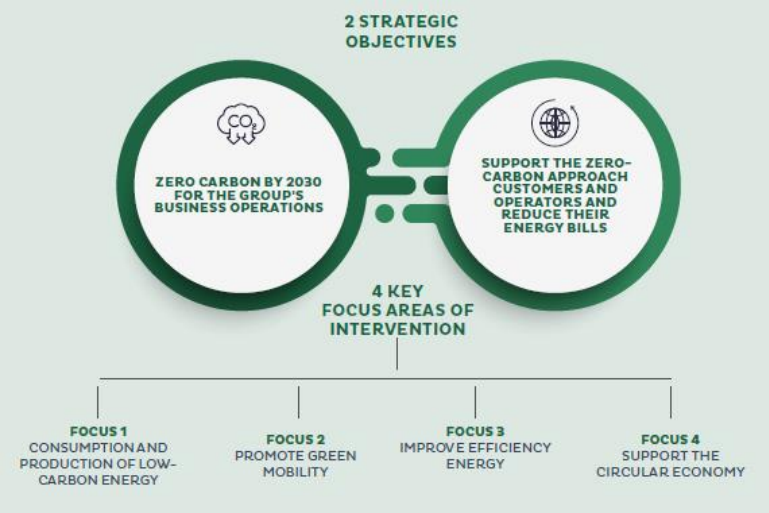
- **Tanger Med Overview**: Tanger Med, one of the largest ports in the Mediterranean and Africa, has a key role in global logistics. The port handles substantial volumes of cargo, making it strategically important for international shipping and logistics. As part of its commitment to sustainability and operational efficiency, the port is increasingly adopting renewable energy solutions and eco-friendly measures.

- **Importance of Renewable Energy and Efficiency**: In the maritime industry, ports are focusing on reducing greenhouse gas emissions, decarbonizing operations, and improving energy efficiency. This aligns with global efforts to combat climate change and transition to cleaner energy. Ports are large consumers of energy, and incorporating renewable energy can significantly reduce carbon emissions, operational costs, and dependency on fossil fuels. Improving energy efficiency contributes to the port's sustainability and aligns with global decarbonization goals.
- **Objective**: This analysis aims to explore Tanger Med's Strengths, Weaknesses, Opportunities, and Threats in the context of its renewable energy and energy efficiency strategies, while also outlining actionable steps (SWOT+) to ensure continuous improvement.

2. Corporate social responsibility (CSR) and Energy transition in TANGER MED

CSR actions are perfectly in line with the global framework of the Sustainable Development Goals (SDGs) and contribute to the influence and positioning of Tangier Med, a logistics hub and industrial competitiveness platform of international dimension.

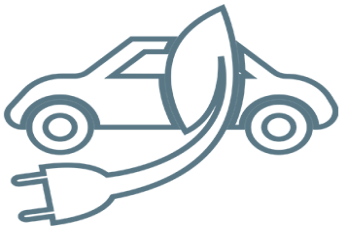
Committed to the national strategy of reducing dependence on fossil fuels, Tanger Med Group is contributing on its own scale to the reduction of greenhouse gas emissions, in line with national and international efforts to address the climate emergency. To support this approach, Tanger Med Group has defined an energy strategy that aims to achieve 100% zero carbon by 2030 through the implementation of 4 strategic focus areas and 2 levers to accelerate the energy transition.



- **4 key focus areas of intervention:**

1. Supply of green electricity to all users of the Tanger Med ecosystem.
   Decarbonized energy supply: To achieve carbon neutrality, Tanger Med is committed to producing electricity from renewable resources by developing local photovoltaic and wind power plants at the Port and in Industrial platform. In this context, Tanger Med has already initiated an energy transition process for its buildings, with photovoltaic production on roofs (TMPC and others) with a total capacity of 1.9 MW.

2. Transition to sustainable mobility, by putting 100% electric service vehicles on the road at the Tanger Med Port Complex and setting up a suitable infrastructure to support the transition to sustainable hydrogen.
   Sustainable mobility: Tanger Med Group is committed to actions in favor of sustainable mobility in order to meet the new environmental challenges of renewable energy. As part of this approach, Tanger Med Port Complex has integrated electric vehicles into its fleet since 2021, with the aim of having a fleet of 100% electric service vehicles.



3. **Energy efficiency,** to control energy demand and optimize energy consumption in the Tanger Med area. The port is also committed to reducing the energy consumption of its industrial-port complex. As a result, the Group's public lighting consumption has been reduced by 55% thanks to the widespread use of LED lighting in the port complex and in the industrial platform. Within this framework, Tanger Med Utilities plans to finance, build, and manage on behalf of its customers, photovoltaic parks with a total capacity of 11 Mw for the first phase of the project.

4. Establishment of an ecosystem conducive to a circular economy, allowing the recovery and optimization of waste and wastewater while preserving the environment.
   Circular economy is in turn of great importance throughout the ecosystem, through the implementation of a collective waste management strategy for the industrial platform and Tanger Med Port Complex as well as the eco-responsible management of water. In this context, TMU has processed more than 2000 tons of waste at Tanger Med Port Complex and 355 tons of vessel waste in 2021.

- **2 acceleration levers:**
  - Accelerating the energy transition of the Tanger Med ecosystem, through the implementation of integrated expertise and innovative solutions with Tanger Med's industrial partners.
  - Support for innovation, through experimentation and research into new clean energy solutions.

3. Strengths (+ Strategies)

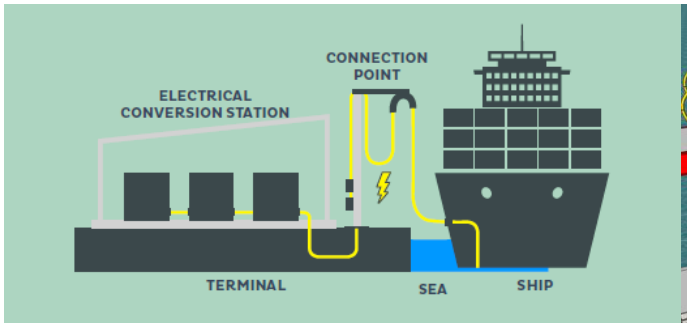
- **Strategic Location**: As a key maritime hub, Tanger Med has excellent access to major shipping lanes connecting Europe, Africa, and Asia, making it ideal for renewable energy distribution and logistics.
  - **Action**: Leverage this advantage by positioning the port as a renewable energy export hub, particularly for green hydrogen and offshore wind energy.
- **Government Support & Policy Alignment**: Morocco is one of the leading countries in renewable energy adoption, aiming for 52% of its electricity generation to come from renewables by 2030. The government's support for renewable energy projects is an advantage for Tanger Med, which could benefit from tax incentives, subsidies, and international partnerships.
  - **Action**: Capitalize on government subsidies and international climate financing to accelerate renewable energy initiatives.

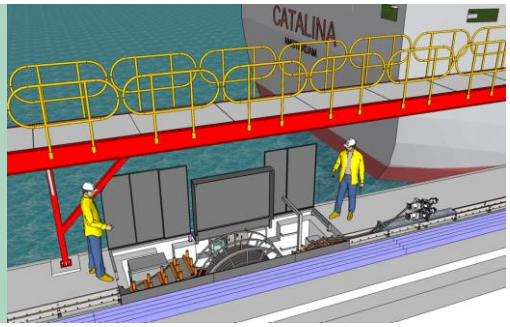
- **Existing Renewable Energy Projects**:
    - **Solar Panels**: Solar installations on port buildings and warehouses contribute to reducing the port's carbon footprint by generating clean electricity.

    - **Wind Energy**: The port could tap into Morocco's substantial wind energy resources, especially with the nearby Tangier wind farms.

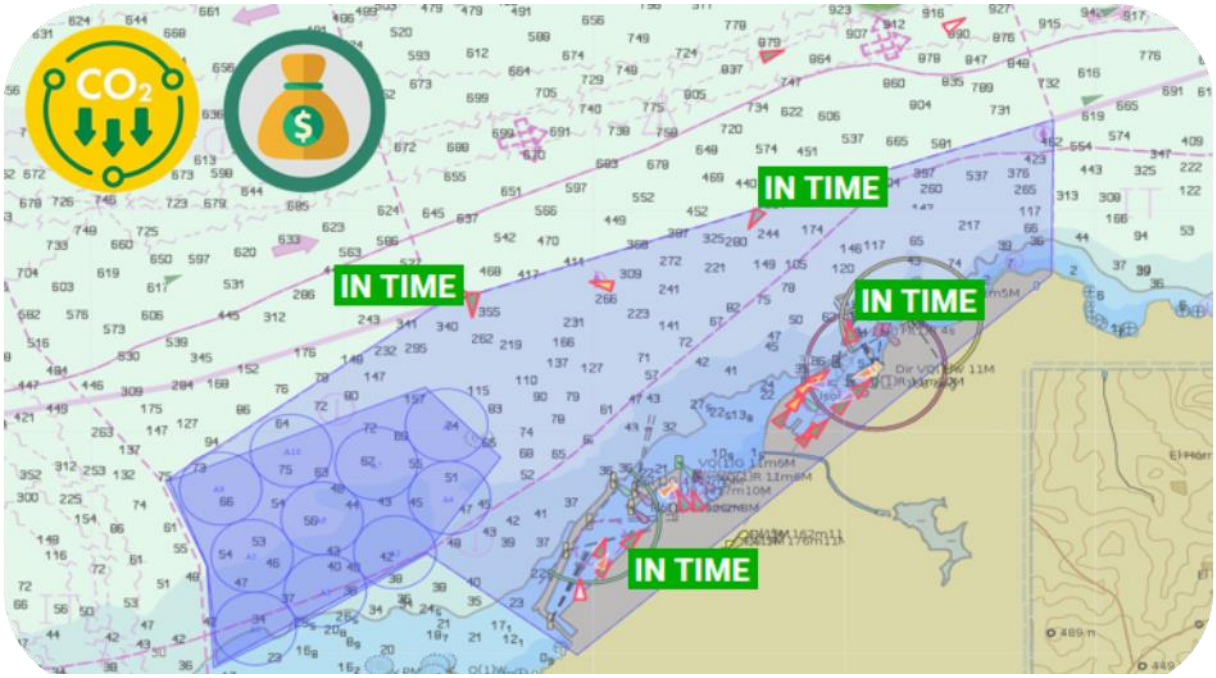
    - **Action**: Expand the use of solar panels across more facilities and integrate them with energy storage systems to ensure continuous green energy supply, even during peak demand.

- **Commitment to Decarbonization and energy efficiency**: Tanger Med is committed to reducing its carbon footprint and becoming a low-carbon port. The port has implemented energy-saving measures such as LED public lighting systems, energy-efficient cranes, and smart grid technology. These reduce energy consumption and help Tanger Med achieve its sustainability targets. Through initiatives like electrification of port operations and the use of hybrid vehicles, the port is making tangible progress in decarbonizing its activities:
    - **Shore Power Supply (SPS - Cold Ironing)**: Tanger Med has invested in Shore Power systems that allow vessels to plug into the local grid while docked, significantly reducing emissions from ships that would otherwise use onboard diesel generators. Reducing vessels CO2 emissions while at berth (a ship at berth for 12hrs requires a consumption of approximately 3 MW saving up to 26 TCO2 emissions)

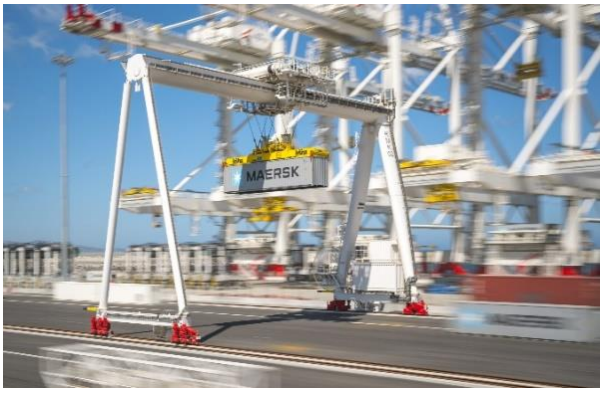




- **Just-In-Time (JIT) Arrivals & Port Call Optimization**: Through real-time communication systems, the port optimizes vessel arrival times, reducing idle time and cutting fuel consumption.

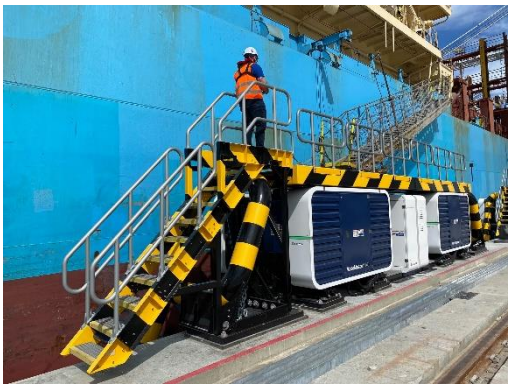


- **Electrified cargo handling equipments**: all container terminals cranes are electric, but for RTGs they are on diesel oil, and we have one terminal having electrical RMGs.



- **Reefer cooling technologies (smart grid):** some container terminals already have reefer cooling technologies; others are working on it: the reefers of some major carriers are monitored remotely by the shipping line (online management); the control of energy use is automatically set to optimize consumption.

- **CAVOTEC Automoor System**: This automated mooring system reduces the time needed to dock and undock vessels, improving operational efficiency while minimizing emissions during port calls.



- **ShoreTension**: Tanger Med has implemented ShoreTension, an advanced mooring system that provides constant tension on the mooring lines, reducing the need for engine use while docked. This system increases safety and efficiency during vessel berthing, particularly in harsh weather conditions, and reduces the wear on mooring lines. Energy and Emission Reduction: The ShoreTension system supports the port's decarbonization efforts by reducing the need for vessel engines to maintain position, thereby lowering fuel consumption and greenhouse gas emissions.

- **EcoPort Label:** Tanger Med Port has been awarded the EcoPorts label by the European Sea Ports Organisation (ESPO), marking it as the first African port to achieve this distinction and join the EcoPorts network. This label is granted to ports that meet high environmental standards, reinforcing Tanger Med's commitment to sustainability. This achievement, along with Tanger Med's ISO 14001 certification for its environmental management system, underscores the port's proactive approach to sustainable development in line with international standards. The port authority (TMPA) is now preparing to be certified ISO 50001 for Energy Management.

- **Action**: Scale up these technologies and further integrate Just-In-Time systems with advanced digital platforms to enhance coordination between port stakeholders and vessels for even greater fuel efficiency.

4. Weaknesses (+ Mitigations)

- **High Initial Costs for Green Technologies**:
    - **High Capital Costs**: Renewable energy infrastructure (such as large-scale solar plants, wind farms, and battery storage) requires significant upfront investment. Tanger Med may face challenges in securing the necessary funding, especially for large-scale decarbonization projects.
    - **Mitigation**: Pursue international funding from green bonds, climate funds, or EU-backed financial programs aimed at decarbonizing the maritime industry. Engage private-sector partnerships for co-investment in renewable energy infrastructure.
- **Grid Infrastructure and Integration Issues**:
    - Renewable energy integration into existing electrical grids can be complicated, especially in ports that require reliable, continuous power for critical operations. Balancing intermittent sources like solar and wind with the port's energy demand may require costly grid upgrades.
    - **Mitigation**: Invest in smart grid technology and energy storage systems that can balance supply and demand fluctuations, ensuring stable energy delivery even when renewable sources are unavailable.
- **Technological and Operational Knowledge Gap**:
    - The adoption of cutting-edge systems like CAVOTEC, ShoreTension and Shore Power requires specialized maintenance and technical expertise. Not all technologies are mature enough for seamless integration into port operations.
    - The successful implementation of renewable energy projects and energy efficiency measures requires a skilled workforce with specialized knowledge in emerging technologies. There might be a gap in the availability of local experts for operating and maintaining advanced systems.
    - **Mitigation**: Implement training programs for port personnel to build expertise in operating and maintaining advanced renewable technologies. Collaborate with international experts and manufacturers for capacity-building.
- **Uncertainty in Alternative Fuels**:
    - While there is growing interest in **methanol and LNG (liquefied natural gas)** as alternative fuels, the maritime industry is still in the process of evaluating their long-term efficiency and environmental impact. **Investing in bunkering facilities for these fuels** could be premature, given the uncertainty surrounding their widespread adoption. The market has yet to standardize the use of these fuels, which makes large investments risky.

5. Opportunities (+ Actions)

- **Just-In-Time (JIT) Arrivals & Port Call Optimization**:
    - Tanger Med has invested in **Just-In-Time (JIT) arrivals and port call optimization**, ensuring vessels spend minimal time at anchor or idle in the port. This reduces overall fuel consumption and emissions, contributing to the port's green objectives. Expanding these systems can further enhance energy efficiency.
- **Expansion of Renewable Energy Projects**:
    - **Solar and Wind Potential**: With abundant sunlight and wind resources, Tanger Med has the potential to expand its renewable energy generation, especially through larger solar installations and participation in wind farm projects.
    - **Floating solar park:** The construction of a floating photovoltaic solar farm on the Oued Rmel dam reservoir is an ongoing project, with a production capacity of 13 MW, the future floating solar park will supply green electricity to Tanger Med port complex as part of the company's decarbonization program. The technology of floating photovoltaic panels avoids water losses through evaporation, which can reach up to 30% of the volume of water in reservoirs (dams or agricultural basins). The Oued Rmel dam also supplies drinking water to the port complex.

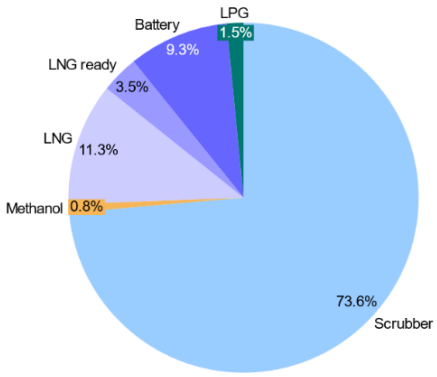
    - **Action**: Partner with renewable energy developers to build large-scale solar farms and offshore wind energy infrastructure, further reducing dependency on fossil fuels.
- **Green Hydrogen Production**: Morocco is positioning itself as a future hub for green hydrogen production. Tanger Med could become a key player in the supply chain, serving as a transportation and distribution center for hydrogen exports to Europe.
    - **Action**: Start pilot projects for green hydrogen production and integrate them into the port's operations. Develop facilities for green hydrogen storage and transportation, linking to Europe's future hydrogen network.
- **Technology Innovation**:
    - **Smart Ports**: The growing digitalization of port operations offers opportunities for enhanced efficiency through AI, IoT, and smart logistics systems.
    - **Action**: Continue to invest in digital solutions for port call optimization and Just-In-Time arrivals. Implement AI-driven energy management systems that optimize energy consumption in real time.

- **Collaboration and International Partnerships**:
    - International organizations are focusing on decarbonizing maritime and port operations, presenting opportunities for collaboration.
    - **Action**: Tanger Med could collaborate with international organizations such as the World Bank, EU funding mechanisms, and energy transition-focused bodies to secure financing and technical expertise. Partnerships with companies that are leaders in green technology could help accelerate the adoption of renewable energy solutions.
- **Green Port Certification**:
    - Ports that meet strict environmental standards can gain recognition as "green port". Achieving this certification could enhance Tanger Med's reputation as a sustainable logistics hub, attracting eco-conscious global partners.
    - **Action**: Work towards obtaining Green Port certification by implementing sustainable practices such as carbon tracking, waste management, and circular economy initiatives.

6. Threats (+ Countermeasures)

- **Global Competition**:
    - Other major ports (e.g., Rotterdam, Singapore) are advancing rapidly in green technology adoption. Falling behind in implementing renewable solutions could reduce Tanger Med's competitive edge.
    - **Countermeasure**: Focus on creating a distinct competitive advantage by becoming a pioneer in green energy and fully integrating Shore Power systems, a step ahead of most global ports.
- **Economic and Geopolitical Instability**:
    - Tanger Med operates in a globalized environment where geopolitical tensions or economic downturns can affect trade volumes, investments, and the availability of funding for large-scale energy projects.
    - **Countermeasure**: Diversify the port's revenue streams by tapping into renewable energy markets, such as exporting green energy, and securing long-term contracts with energy buyers in Europe.
- **Regulatory and Policy Risks**:
    - Potential regulatory changes could impose stricter environmental standards or limit port activities, affecting operations.
    - **Countermeasure**: Stay ahead of regulations by adopting voluntary decarbonization measures and positioning Tanger Med as a leader in green compliance. Engage in policy dialogues to influence favorable regulations.

- **Technological Uncertainty**:
    - The rapid pace of technological development means that early investments in certain technologies could become obsolete. For example, if a more efficient energy storage solution emerges, existing battery technologies might become less competitive.
    - **Countermeasure**: Invest in scalable and flexible technologies that can evolve with future advancements, such as modular solar systems and adaptable smart grids. Build partnerships with innovative tech firms to stay at the forefront of port technology.
- **Volatility in Energy Prices**: The global energy market is subject to fluctuations in energy prices, which could impact the financial viability of renewable energy projects. Although renewable energy tends to have lower operating costs, initial investments are sensitive to market conditions.
- **Alternative Fuels Uncertainty**:
    - Although there is a push for using **methanol** and **LNG** as alternatives to traditional bunker fuel, the maritime industry is still testing these fuels' efficiency and long-term viability. Investing heavily in LNG or methanol infrastructure at this stage could be a risky proposition given the uncertainty. Waiting for clearer regulatory and industry signals may be prudent. Here after is the uptake of alternative fuels and technologies in operating ships and ships on order (%) (Source: DNV, 2022)



7. + External Factors and Sustainability

- **Global Decarbonization Trends**:
    - The maritime industry is under increasing pressure to decarbonize. International agreements such as the IMO's (International Maritime Organization) targets for reducing carbon emissions by 50% by 2050 create a favorable regulatory environment for Tanger Med's investments in renewable energy and efficiency.
- **Climate Resilience and Risk Management**:
    - As climate change accelerates, ports like Tanger Med must also consider climate adaptation strategies. These include resilience to rising sea levels, extreme weather events, and disruptions in global supply chains. Renewable energy solutions, such as distributed solar and wind, can help mitigate risks associated with energy supply disruptions.

8. Conclusion (+ Next Steps)

- **Summary**: Tanger Med is well-positioned to lead the way in integrating renewable energy and advancing energy efficiency. With the implementation of systems like Shore Power, solar panels, and CAVOTEC automoor technology, the port has a solid foundation for becoming a green logistics hub.
- **Future Outlook and Next Steps**: To secure its role as a leader in green port operations, Tanger Med should:
    1. **Expand solar and wind energy projects** and integrate energy storage systems.
    2. **Capitalize on Morocco's green hydrogen strategy**, positioning itself as a key player in hydrogen exports.
    3. **Leverage Shore Power and Just-In-Time systems** to further reduce emissions.
    4. **Pursue Green Port certification** to enhance its international standing and attract eco-conscious clients.
    5. **Collaborate internationally** to secure funding and technical expertise for decarbonization and renewable energy initiatives.

This SWOT+ approach provides a strategic, actionable roadmap for Tanger Med's advancement in renewable energy and energy efficiency.