WASTE TO ENERGY FACILITIES AT REGIONAL WASTE MANAGEMENT CENTRES

TECHNOLOGY DESCRIPTION

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A waste to energy (WTE) facility that combusts waste to produce electricity. The traditional waste-to-energy process uses steam to turn a turbine to generate electricity. The steam is generated by burning the municipal solid waste (MSW). It is thus similar to conventional thermal power generation, but replaces traditional fuels (gas, coal) with waste.

The WTE facilities are considered to be environmentally friendly however, the facilities produce ash in the form of fly ash and bottom ash. Fly ash is considered as air pollutants and there are environmental control mechanisms such as scrubber utilized to minimize the impacts of the air pollutants. The bottom ash is used for different purposes such as preparation of aggregate for road construction projects.

WTE facility utilizes waste which would otherwise be dumped in landfills. The waste are sorted by removing entities which can be recycled or are hazardous in nature. The waste are incinerated in a contolled environment at a specialized furnace. The heat generated from incineration of waste is used to turn a turbine thus generating electricity. The emission such as fly-ash are treated using special filters to reduce air pollutants.

CURRENT TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

Technology Readiness Levels (TRL)

TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)

Commercial Readiness Index

Level 2 - Multiple commercial applications

CLIMATE RATIONALE OF THE TECHNOLOGY

WTE facilities is expected to contribute to GHG emission reduction in the following ways;

- WTE facilities displace waste from landfills which is a significant source of methane gas.
- Energy generated from WTE facilities will displace fossil fuels based electricity generation.

- By processing waste locally, WTE facilities are expected to reduce the need to transport waste thus reducing GHG emissions from waste transport.
- GHG emission from open burning of waste will be reduced.

AMBITION OF THE TECHNOLOGY

SCALE FOR IMPLEMENTATION AND TIME-LINE

WTE facilities are yet to be established and become operational in the Maldives. The main ambition of the TAP is to operationalize 2 WTE facilities which are currently in the planning stage.

Two WTE plants are planned one for Greater Male' Region and one for southern most atoll of the Maldives.

- 8MW waste to energy plant to be installed at Thilafushi as solution for regional waste management.
- 1.5MW waste to energy plant installed at Addu City as solution for regional waste management.

The WTE in the southernmost atoll of the Maldives (Addu City) will be operational in near future as construction works has been almost completed. The following Figure is photograph of the WTE plant under construction in Addu City.

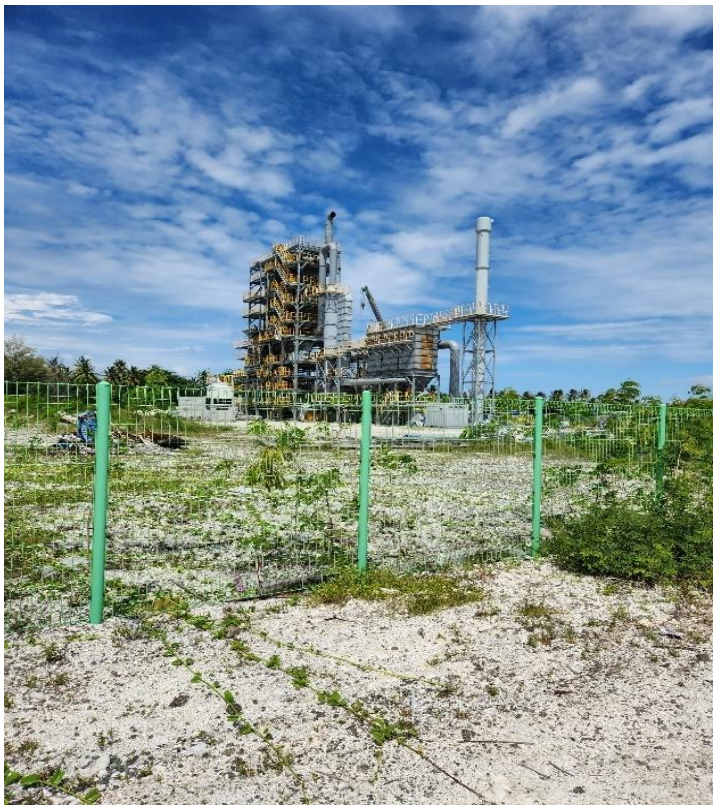

Figure 02: The WTE currently being constructed in Addu City
(Photo credit: Author of this report)

AMBITION FOR TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

Technology Readiness Level

TRL 9 – actual system proven in operational environment

Commercial Readiness Index

Level 6 - "Bankable" grade asset class

EXPECTED IMPACTS OF THE TECHNOLOGY

The expected impacts of the Waste to Energy Facilities are positive and negative impacts; The main position impacts include

- According to Biennial Transparency Report (2024), the total power generated from the WTE facilities in the Maldives by 2027 is expected to be 14.5 MW.
- Reduction of dependency on fossil fuels for electricity generation thus reducing GHG emission.
- Increase job opportunities particularly for the operators of WTE facilities
- Provide an effective solution for land scarce country like Maldives.

The negative impacts of WTE facilities include;

- WTE facilities are expected to release air pollutants such as WtE plants release air pollutants, including particulate matter, nitrogen oxides, sulfur dioxide, and heavy metals.
- WTE facilities are expected to release toxic substances like dioxins
- Bottom Ash generated from WTE facilities needs proper disposal.
- WTE facilities has the potential to discourage recycling and reusing initiatives.

POLICY ACTIONS FOR TECHNOLOGY IMPLEMENTATION

EXISTING POLICIES IN RELATION TO THE TECHNOLOGY

- Waste Management Act (24/2022)
- Maldives Energy Act (18/2021)
- Utility Regulatory Authority Act (26/2020)
- Maldives Energy Policy (2015)

- Maldives Climate Change Policy Framework (2015)
- Maldives Nationally Determined Contribution (2020)
- Maldives SREP investment plan 2013 – 2017

PROPOSED POLICIES TO ENHANCE TECHNOLOGY IMPLEMENTATION

The main proposed policies for enhancement of WTE facilities include;

1. Formulation of the regulation which deals with WTE facilities under Waste Management Act (24/2022)

COSTS RELATED TO THE IMPLEMENTATION OF POLICIES

- The main cost for implementing the above-mentioned policy includes Formulation of the regulation which deals with WTE facilities under Waste Management Act (24/2022). The study is expected to cost 25,000 USD.

USEFUL INFORMATION

CONTACT DETAILS

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LINKS TO TNA REPORTS

Technology Needs Assessment (TNA) Report and Barrier Analysis and Enabling Framework (BAEF) Report

https://tech-action.unepccc.org/country/maldives/

Maldives Biennial Transparency Report

https://www.environment.gov.mv/v2/en/news/30245