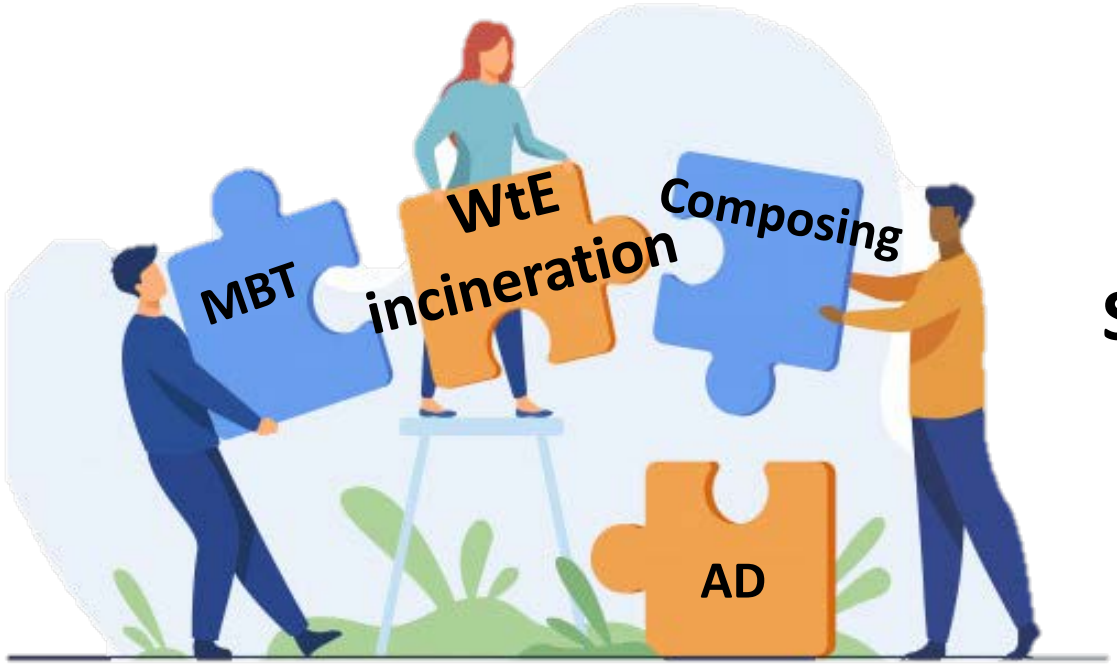
Framework for CCET guideline series on intermediate MSW treatment technologies and the pre-conditions for sustainable WtE incineration facilities



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Webinar on "the CCET guideline series on intermediate municipal solid waste treatment technologies, Waste-to-Energy Incineration"
28 October 2020, 13:00 – 14:30 (JST)

IGES
Institute for Global Environmental Strategies

Outline

1. Framework of CCET guideline series on intermediate MSW treatment technologies
2. Introduction of WtE incineration guideline
   - ① Overview of WtE incineration technology
   - ② Pre-conditions for sustainable WtE incineration facilities
   - ③ Main technology and discussion points with plant manufacturers (Nishiyama)

1. Framework: Drafting & Peer review

Literature review

Drafting

CCET guideline series on intermediate MSW treatment technologies

WtE incineration	Composting	MBT	AD
•IGES •Okayama University •Chuo University & Chulalongkom University	• NIES • IGES	• NIES • IGES	• Waseda University • IGES

Peer review

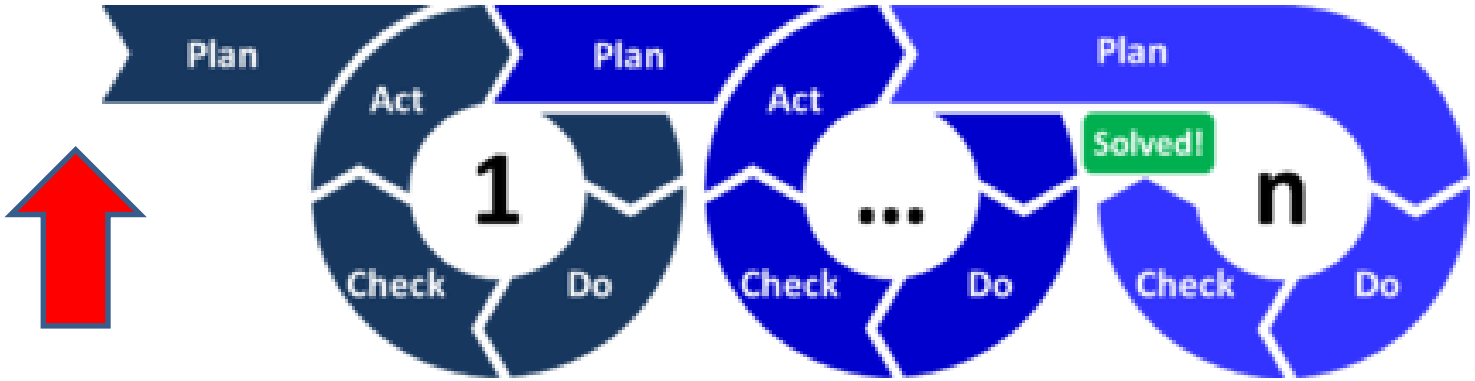
- Members of the Japan Society of Material Cycles Waste Management (JSMCWM)
- UNEP IETC
- International stakeholders

1. Framework: Background

- Sustainable waste management is a key drivers for achieving CE, Paris Agreement, and the SDGs.
- Waste management is more **complex in developing countries**. There is compelling evidence that it is **ineffective to transpose** complicated and high-cost technology designed for developed countries to developing countries.
- With the rapid increase in the volume of waste, especially in urban areas, the **importance of intermediate treatment facilities** is increasing.
- There is an urgent need to provide **proper information** to assist local policymakers/implementers to have a clear and holistic view about each technology and localise each technology based on the local context.

1. Framework: Target & purpose

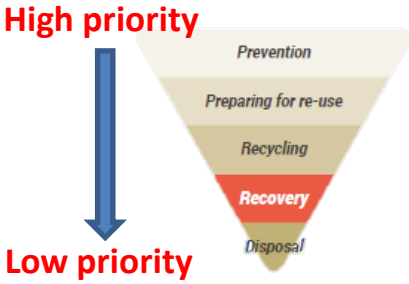
- The **main target audience** are decision-makers and policymakers at the national and city levels in Asian developing countries who are considering to introduce appropriate technology for improving waste management.
- The **main purpose** is to help them form a clear picture of what each technology entails, and then identify desirable options at a glance.

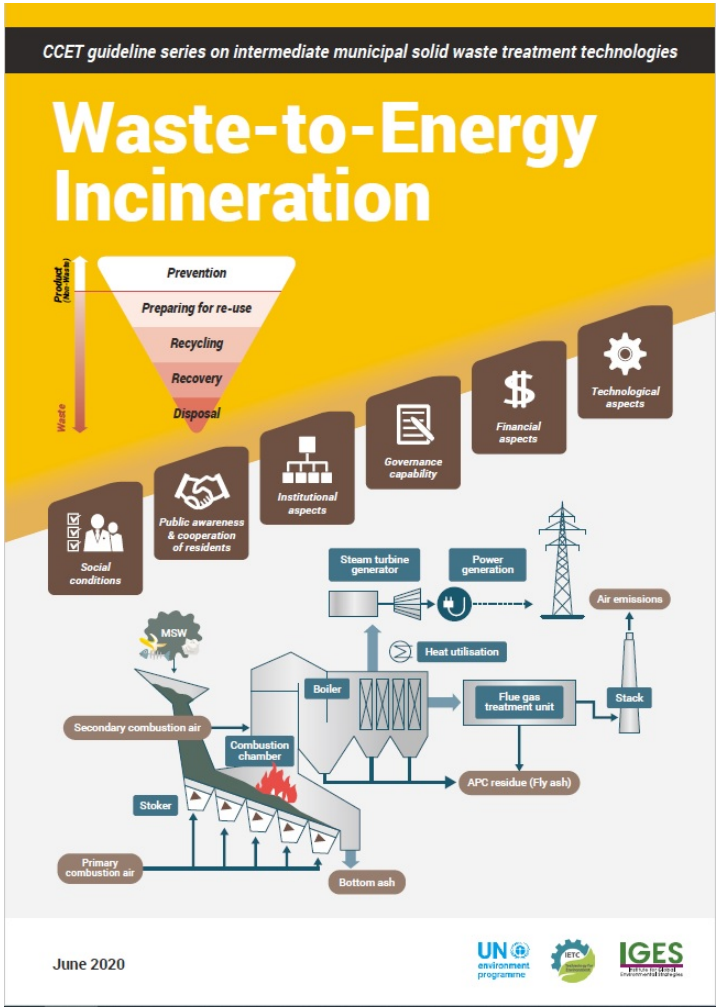


Use this guideline to check key issues at the beginning of the planning stage

1. Framework: Highlights

- Developed from a "**resource perspective**" based on 3R concept and waste hierarchy
- Addressed the **'soft' aspects** for each technology
- Supported by **case studies**





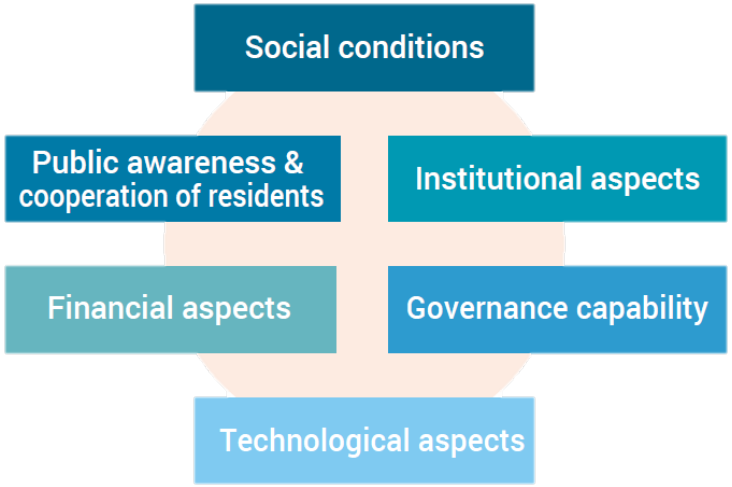
1. Framework: Structure & how to use

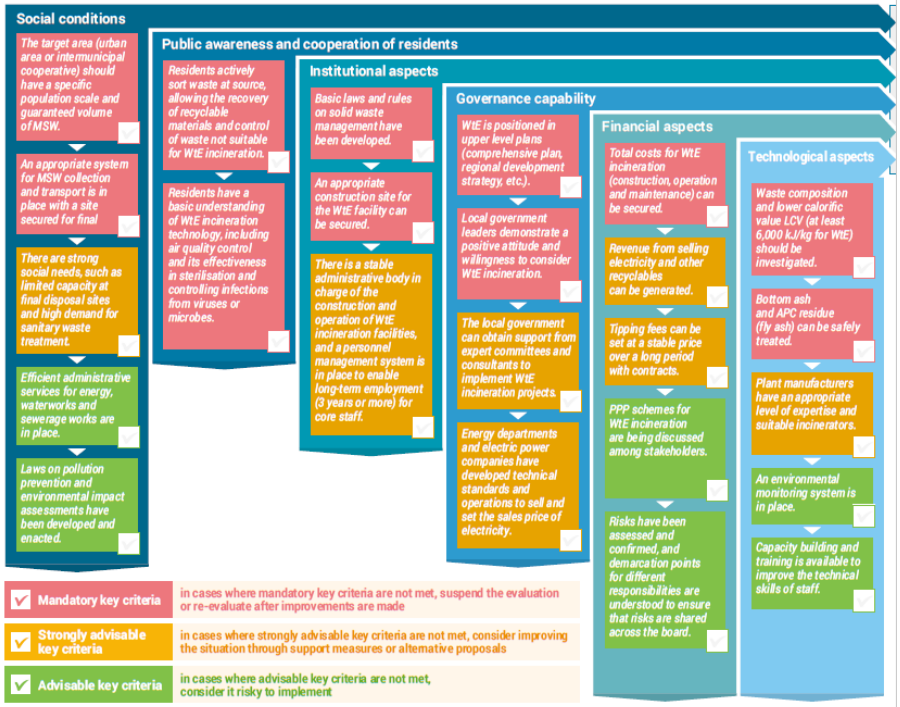
Chapter 1 Introduction

To quickly gain a general overview about each technology including its main advantages, disadvantages, requirements from multi aspects

	Advantage	Disadvantage	Requirement
Technology			
Environment			
GHGs			
Economic			
Resource			
Social …			

Chapter 2 Pre-conditions and pre-check flow



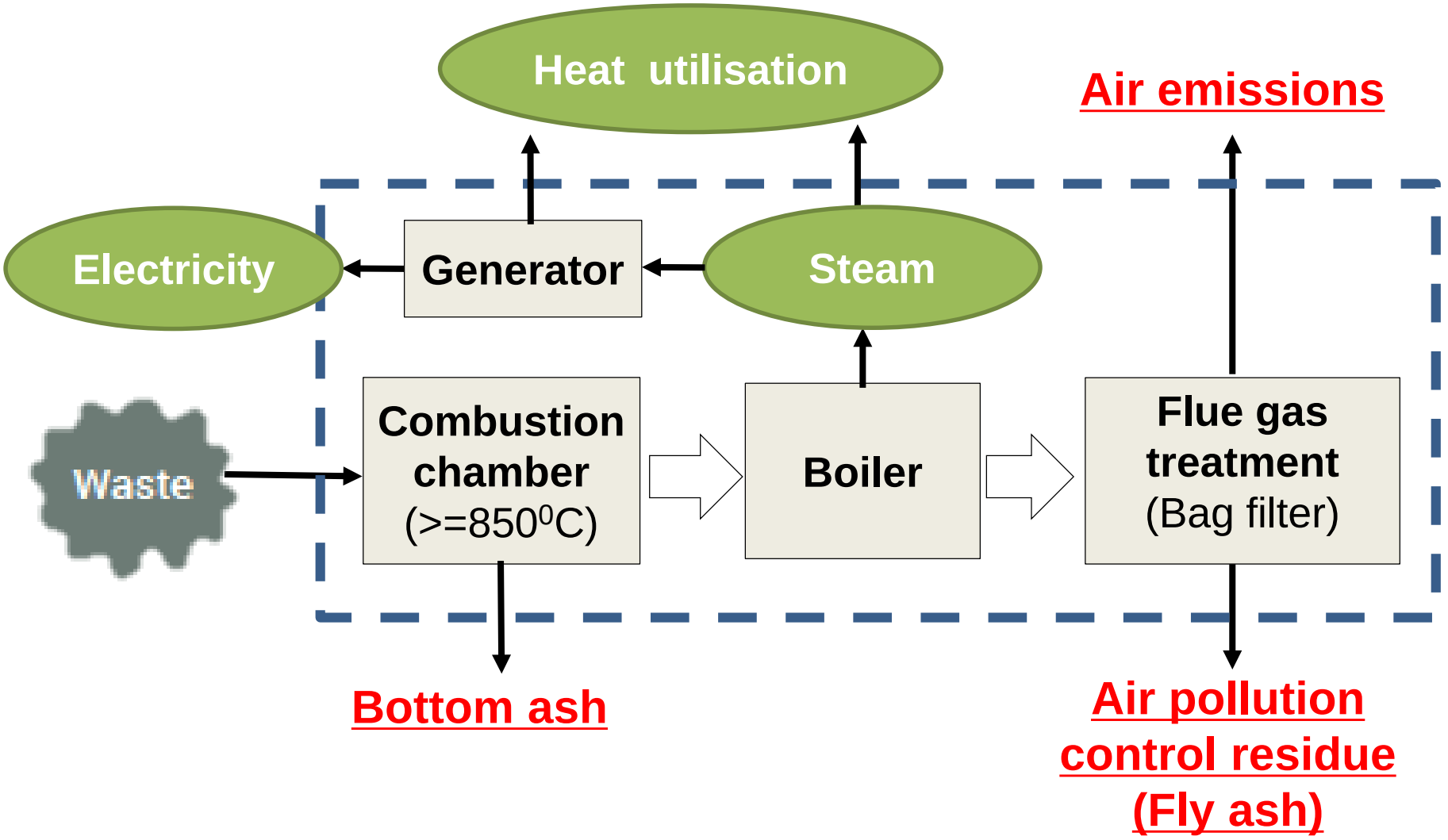


Chapter 3 Main technology

Chapter 4 Case studies

2. WtE incineration ① Overview

Typical flow chart of Waste-to-Energy plant



2. WtE incineration ① Overview

Advantages of WtE incineration:

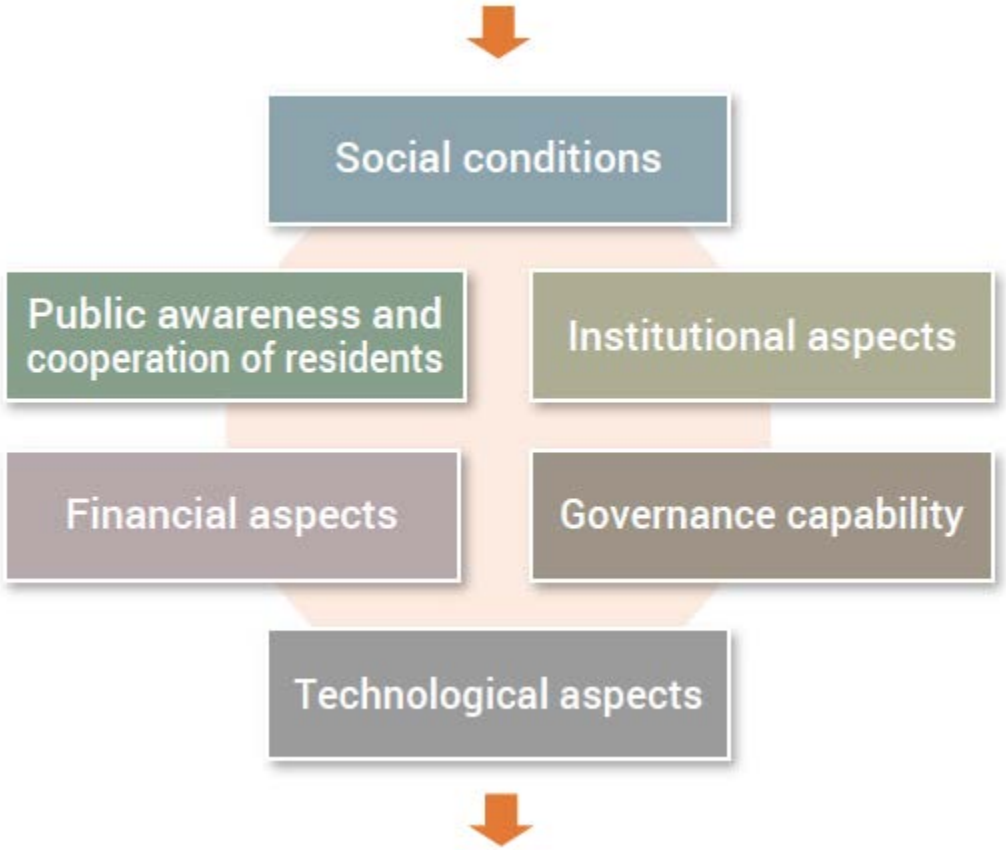
- **Waste volume reduction**
- **Disease/infection control**
- **Added benefit** to produce energy
- **GHGs emissions reduction** by offsetting the need for energy from fossil fuel and reduce methane generated from landfills when used as an alternative to landfill

Disadvantages of WtE incineration:

- **High-cost** to construct and operate, insufficient income from energy sales and waste disposal to cover all costs
- **Minimum amount of feedstock** required for stable operation, which is a major disincentive for waste prevention
- **Risk to human health** when fly/bottom ash is not properly treated/disposed

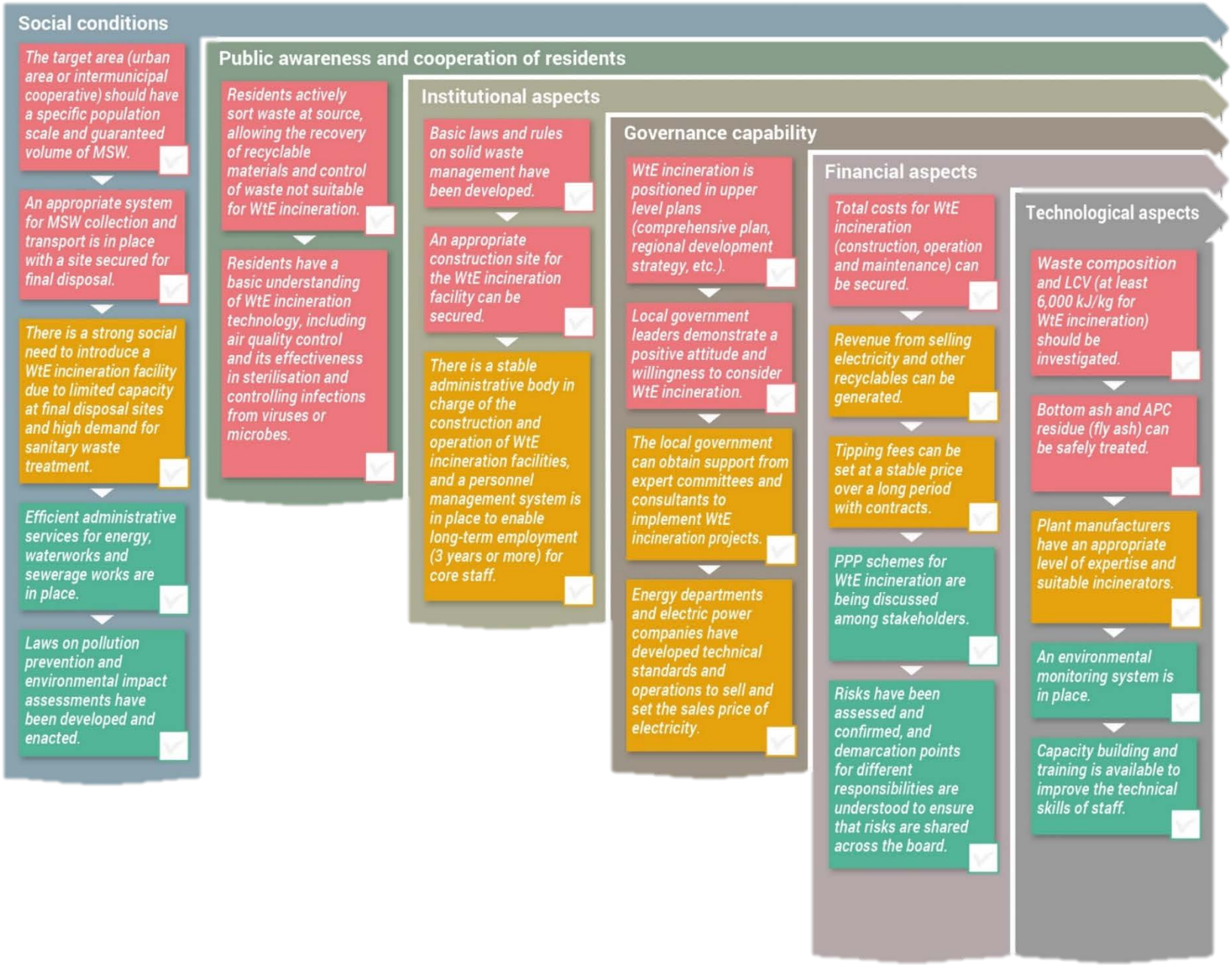
2. WtE incineration ② Pre-conditions

6 Key aspects to check at the planning stage when selecting appropriate technology



Feasibility study and business planning for introducing appropriate technology

2. WtE incineration ② Pre-check flow



Pre-check flow - Social conditions

The target area should have a specific poulation scale and guaranteed volume of MSW (>= 100,000 tonnes/year). ✔

▽

An appropriate system for MSW collection and transport is in place with a site secured for final disposal. ✔

▽

There is a strong social need to introduce a WtE incineration facility due to limited capacity at final disposal sites and high demand for sanitary waste treatment. ✔

▽

Efficient administrative services for energy, waterworks and sewerage works are in place. ✔

▽

Laws on pollution prevention and environmental impact assessments have been developed and enacted. ✔

Pre-check flow - Public awareness & cooperation of residents

Residents actively sort waste at source, allowing the recovery of recyclable materials and control of waste not suitable for WtE incineration. ✔

Residents have a basic understanding of WtE incineration technology, including air quality control and its effectiveness in sterilisation and controlling infections from viruses or microbes. ✔

Pre-check flow – Institutional aspects

Basic laws and rules on solid waste management have been developed. ✔

▽

An appropriate construction site for the WtE incineration facility can be secured. ✔

▽

There is a stable administrative body in charge of the construction and operation of WtE incineration facilities, and a personnel management system is in place to enable long-term employment (3 years or more) for core staff. ✔

Pre-check flow – Governance capability

WtE incineration is positioned in upper level plans (comprehensive plan, regional development strategy, etc.). ✔

▽

Local government leaders demonstrate a positive attitude and willingness to consider WtE incineration. ✔

▽

The local government can obtain support from expert committees and consultants to implement WtE incineration projects. ✔

▽

Energy departments and electric power companies have developed technical standards and operations to sell and set the sales price of electricity. ✔

Pre-check flow - Financial aspects

Total costs for WtE incineration (construction, operation and maintenance) can be secured. ✓

▽

Revenue from selling electricity and other recyclables can be generated. ✓

▽

Tipping fees can be set at a stable price over a long period with contracts. ✓

▽

PPP schemes for WtE incineration are being discussed among stakeholders. ✓

▽

Risks have been assessed and confirmed, and demarcation points for different responsibilities are understood to ensure that risks are shared across the board. ✓

Pre-check flow - Technological aspects

Waste composition and LCV (at least 6,000 kJ/kg for WtE incineration) should be investigated. ✓

▽

Bottom ash and APC residue (fly ash) can be safely treated. ✓

▽

Plant manufacturers have an appropriate level of expertise and suitable incinerators. ✓

▽

An environmental monitoring system is in place. ✓

▽

Capacity building and training is available to improve the technical skills of staff. ✓