

6A1 Solid Waste Disposal on Land

GHG mitigation options	Management / System	Material efficiency and recycling	Renewable energy	
Target (CH4 reduction)	Reduce CH4 for solid waste disposal on land			
Drivers	Regulation on environment and national agenda			
Capacity gap and barrier	Lack of feedstock with high cost			
Technology options and Research questions	<p style="text-align: center; color: red;">Waste management and utilization</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Long-term</p> <ul style="list-style-type: none"> - Pneumatic Waste Conveyance System (PWCS) - RFID Tracking System - Bin-fill Wireless Sensor - Semi-Aerobic Landfill </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Short-term</p> <ul style="list-style-type: none"> - Optimisation of truck collection routes - Mechanical Biological Treatment (MBT) - Managed Anaerobic Landfill </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Current</p> <ul style="list-style-type: none"> - Unmanaged Deep and Shallow Anaerobic Landfill - Daily collection by truck and crew using fixed routes and regular schedules - Storage of mixed waste prior to collection </div> <div style="border: 1px solid gray; padding: 2px;"> <p>Research questions</p> <ul style="list-style-type: none"> - How to minimise manpower and fuel consumption - How to minimise environmental impacts </div>	<p style="text-align: center; color: red;">Reduce, Reuse, Recycling</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Long-term</p> <ul style="list-style-type: none"> - Multiple-tiered sorting facilities - Hydrothermal carbonisation (HTC) of Food Waste to Hydro-Char - Plastic Waste to CNT and PHA - Paper Waste to Cellulose Aerogels and Pro-fibre </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Short-term</p> <ul style="list-style-type: none"> - Materials Recovery Facilities (MRF) - Anaerobic Digestion of Food Waste </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Current</p> <ul style="list-style-type: none"> - Manual sorting of recyclables - Biological Conversion of organic waste </div> <div style="border: 1px solid gray; padding: 2px;"> <p>Research questions</p> <ul style="list-style-type: none"> - How to increase public participation in recycling - How to increase automation of MRFs with higher productivity and recovery yield - How to promote recycling of specific waste streams (e.g. plastics, food waste) </div>	<p style="text-align: center; color: red;">Waste-to-energy</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Long-term</p> <ul style="list-style-type: none"> - Enzymatic Conversion of Food Waste to bio-ethanol - Paper Waste to Butanol </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Short-term</p> <ul style="list-style-type: none"> - Compressed Biogas (CBG) - Plastic Waste to Fuel - Bioreactor Landfill </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Current</p> <ul style="list-style-type: none"> - Landfill Gas (LFG) to electricity - Direct use of Landfill Gas - Used tyre to Fuel </div> <div style="border: 1px solid gray; padding: 2px;"> <p>Research questions</p> <ul style="list-style-type: none"> - How to lower the carbon and other gaseous emissions from WTE plants - How to adopt cost effective treatment technologies with higher resource and energy recovery - How to Develop alternative thermal treatment technologies to produce high value products </div>	<p style="text-align: center; color: red;">RDF</p> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Long-term</p> <ul style="list-style-type: none"> - On-site in an integrated thermal conversion device, which could include grate or fluidised bed combustion, gasification or pyrolysis </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Short-term</p> <ul style="list-style-type: none"> - RDF from industrial wastes - Co-incinerated in Cement industry, Paper industry and Power industry </div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> <p>Current</p> <ul style="list-style-type: none"> - RDF from MSW (RDF1-7) - Off-site at a remote facility employing grate or fluidised bed combustion, gasification or pyrolysis - Co-combustion in coal fired boilers - Co-incineration in cement kilns - Co-gasification with coal or biomass </div> <div style="border: 1px solid gray; padding: 2px;"> <p>Research questions</p> <ul style="list-style-type: none"> - How to reduce cost of waste sorting for RDF - How to manage the logistics of RDF distribution to users - What is business model and structure of market system - What is the potential source of waste - How to minimise environmental impacts </div>
Current technology support	<p>Institution and capacity building:</p> <ul style="list-style-type: none"> - PCD: R&D and training for waste management and utilization and also 3R - DEQP: R&D activities and project development for waste management (E-learning and Zero Waste) - ONEP: R&D and training for waste management database system - REO: support R&D and waste management activities to local municipalities in its regional - DEDE: R&D activities, Training center and project implementation for RE - University: SUT, CMU, MSU, SNRU 			
Resources	<p>Institution:</p> <ul style="list-style-type: none"> - Strengthen capability of the exiting organization/agency for expand their function for technical service and R&D activities. - Set up centers of excellences for government agencies and research universities in each single technology, and linkage with the industries, communities and local municipalities. 	<p>Financing:</p> <ul style="list-style-type: none"> - Cluster national R&D budget and funding according to priorities. - Encourage R&D agencies to apply for international funding. - Establish low carbon funds and develop mechanism of in-and-out flow principle, e.g. carbon tax collection to support R&D of clean technologies. 	<p>Capacity building:</p> <ul style="list-style-type: none"> - Strengthen international relations and research network to enhance R&D activities, e.g. training, exchange programmes, research projects and etc at all level. - Strengthen R&D activities in academia, esp. graduated school, and enhance linkage to government agencies, industries, communities and local municipalities. - Develop accessible database for experts, publications, patents and intellectual properties. 	
Reference	<p>DEDE - การผลิตก๊าซชีวภาพในรูปแบบต่างๆ</p> <p>DEDE - คู่มือการพัฒนาและการลงทุนผลิตพลังงานทดแทน ชุดที่ 6 พลังงานขยะ</p> <p>NEA - Solid Waste Management Technology Roadmap</p>			