

Promoting Inclusive WtE Partnerships for Renewable Energy of Indonesia toward Green Transformation

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Innovative Climate Action with Technology Innovation

“For Climate Action, **Technology Innovation** is essential”

UN Climate Speech of Patricia Espinosa ('19.5)
The Executive Secretary of UNFCCC



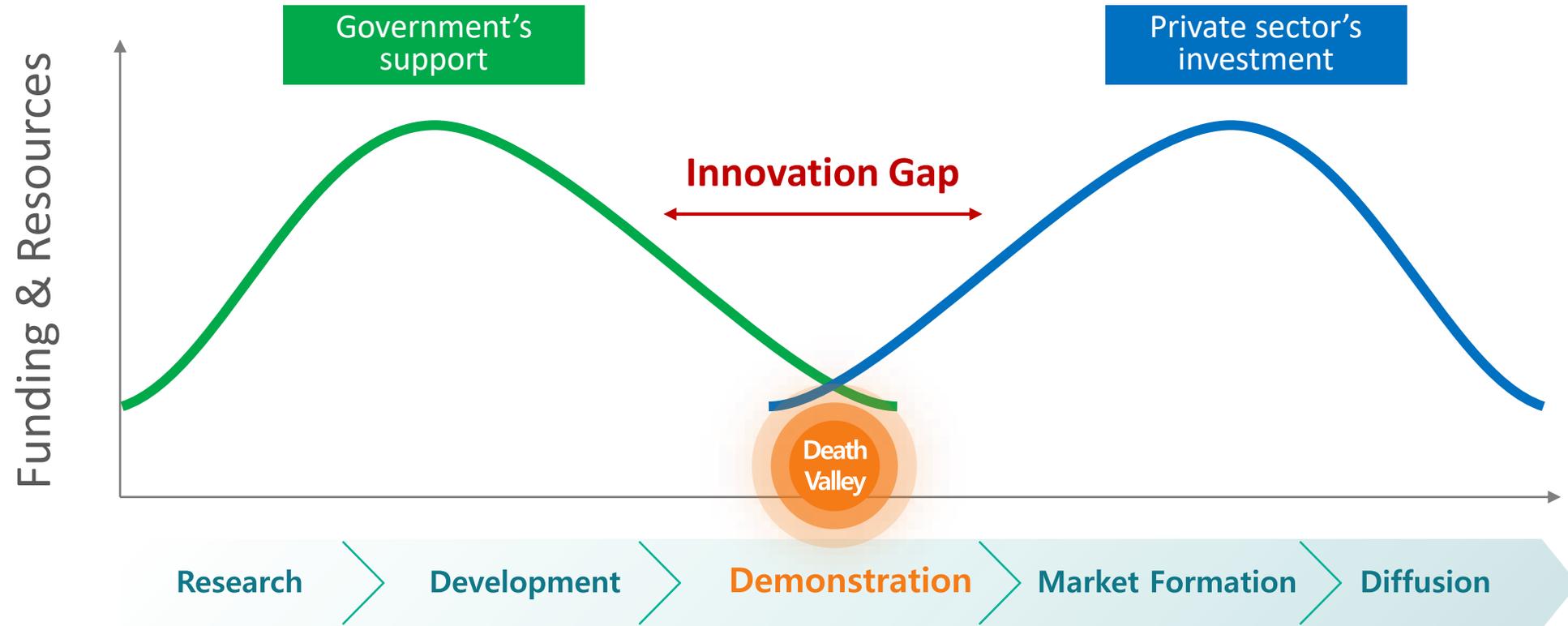
Article 10.1 of Paris Agreement ('15.12)
COP21



IPCC Special Report for Methodological and Technological Issues in Technology Transfer ('20.7)

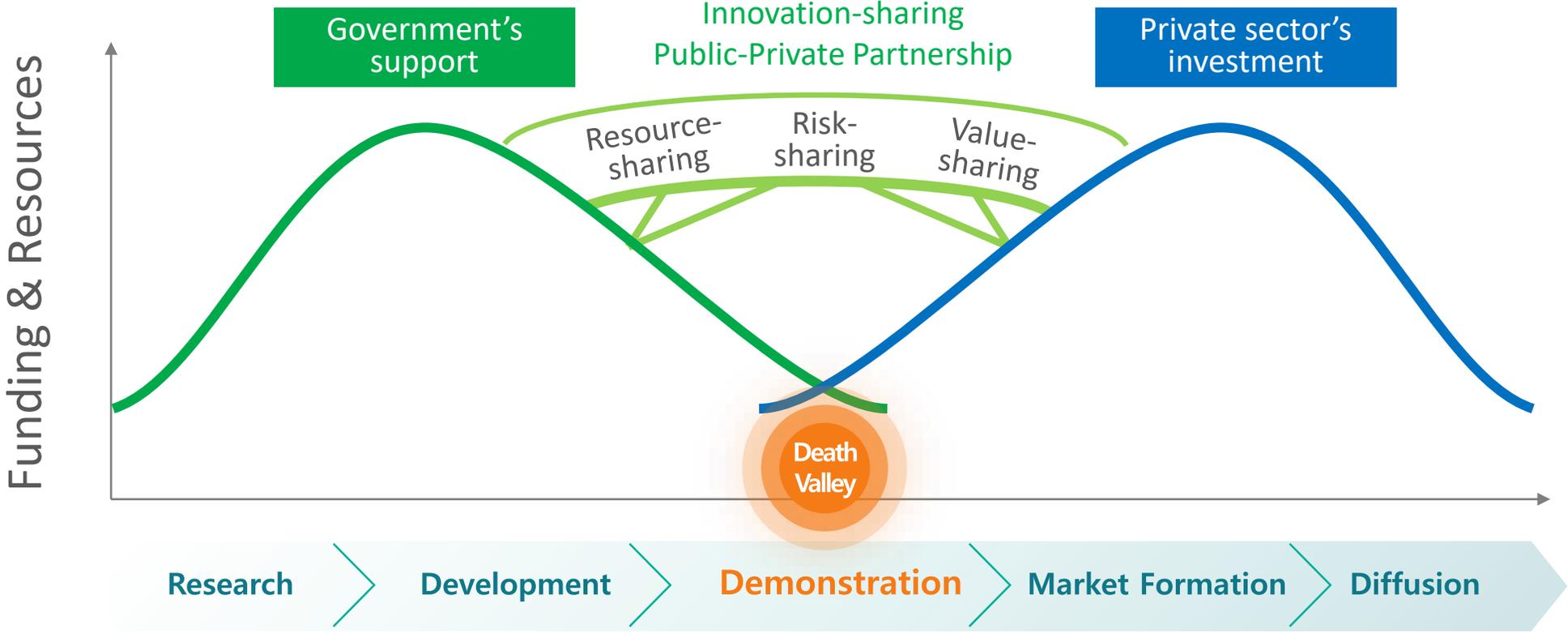


Valley of Death in Technology Innovation Sequence



Technology Deployment & Diffusion Stage

Innovation-sharing Partnership



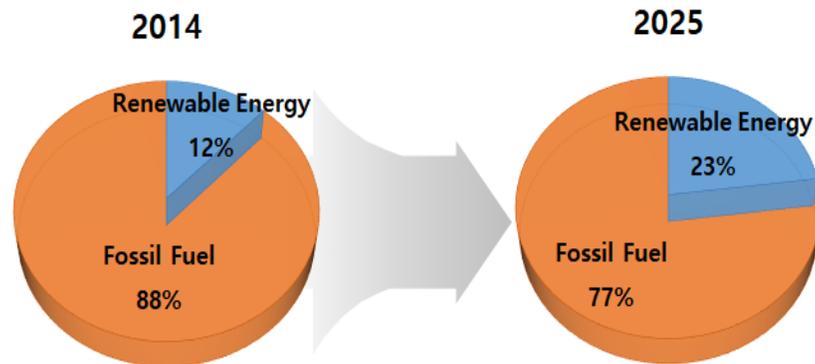
Technology Deployment & Diffusion Stage

Understanding Renewable Energy and Waste to Energy: ROI

- Indonesia is strategically promoting an **advanced waste management system** to **reduce GHG emissions, to solve sanitary problem, and to balancing electricity supply & demand**

Promoting Low-carbon Economy and Renewable Energy

- Indonesia set a target of 23% of energy mix from renewable energy sources (4.7GW) by 2025 to ensure energy security and to reduce GHG emissions (PLN RUPTL 2016-2025)
- The main sources of GHG emissions in waste sector are unsanitary landfill and illegal open burning. Therefore, acceleration of Municipal Waste to Energy Power Plant Development was introduced.



Willingness to Advanced Waste Management System

- Policies to encourage recycling and Waste-to-Energy technology for reducing GHG emissions and boosting local economy
- Although the Indonesian government has committed to waste management, the improvement is limited due to the lack of technical expertise and low technology commercialization with low profitability



Understanding Renewable Energy and Waste to Energy: ROI

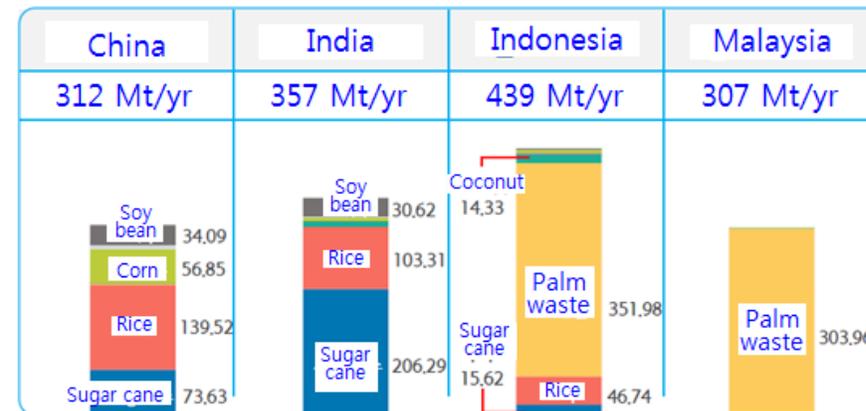
- Indonesia is facing a serious environmental damage and economic sanctions due to **indiscriminate development of biomass industry**



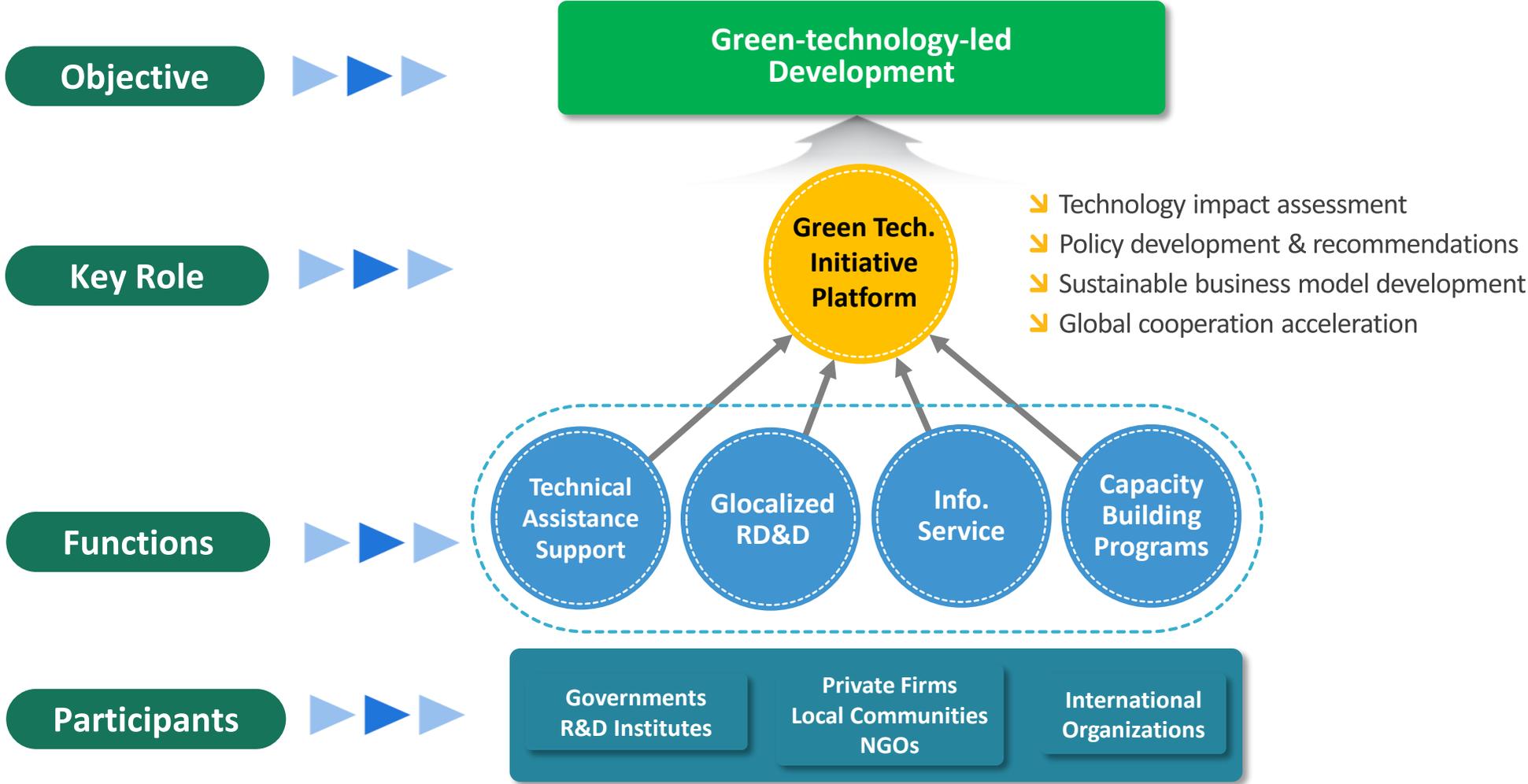
Biomass residues



Inventory of biomass waste



Green Technology Partnership Initiative (GTPI)



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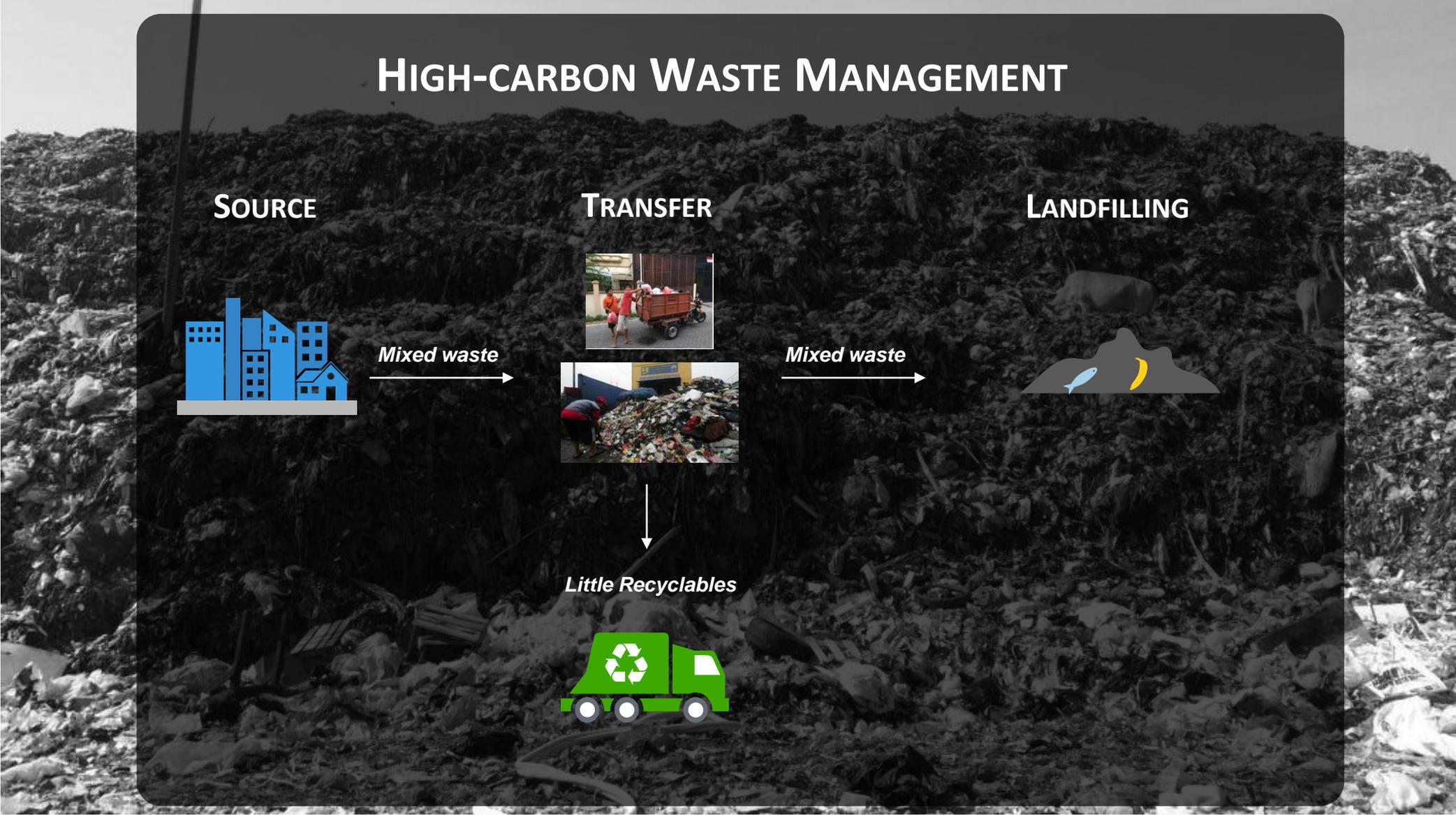
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Design the climate technology innovation under **HOLISTIC Viewpoints**

All of hidden interactions between problems and causes should be clarified in holistic viewpoint



Example of Holistic Approach for Technology Innovation: WtE



Example of Holistic Approach for Technology Innovation: WtE



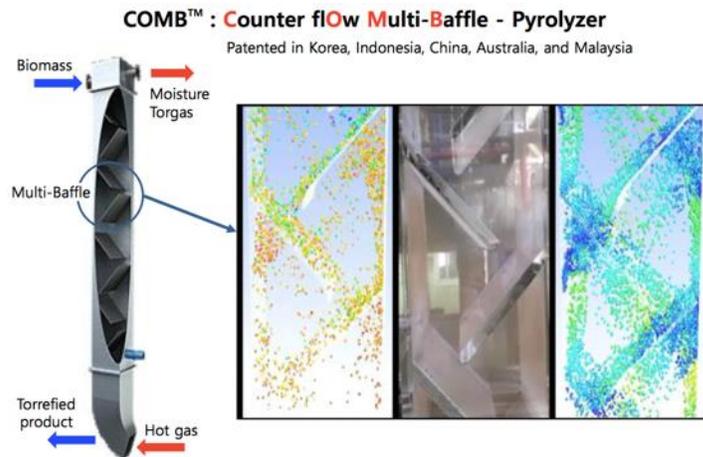
Example of Holistic Approach for Technology Innovation: WtE

Arm	Definition	Entity in charge		Needs	Supporting Entities
		Current	Future		
A	Source separation of food waste	None	Citizens	Awareness-building	Municipality, Aid group
B	Transportation from sources to food waste recycling facility	None	Municipality	Vehicles	Municipality
C	Food waste recycling facility	None	SOE	Facility, Experts, Customers	Aid group
D	Transportation from source to Transfer-3R	TPS-3R Operator	Municipality	Vehicles	Municipality
E-1	Installation	MPWH	MPWH	Facility upgrading with advanced sorting system	MPWH Aid group
E-2	Operation	Local Community	SOE	Experts	Aid group
F	Transportation from Transfer-3R to recycling vendors	Vendors	Vendors		
G	Recycling facility	Vendors	Vendors & SOE	Post-processing facility	Aid group
H	Transportation from TPS-3R to TPA	Municipality	Municipality	Vehicles	Municipality
I	Waste-to-Energy facility	None	SPC	Facility, Experts	PPP scheme
J	Landfill reclamation	None	SPC	Mining and sorting facilities, experts	PPP scheme

SOE : Special Operations Executive

Circular Economy: Biomass-to-Energy(Terrefaction and Gasification, BTE)

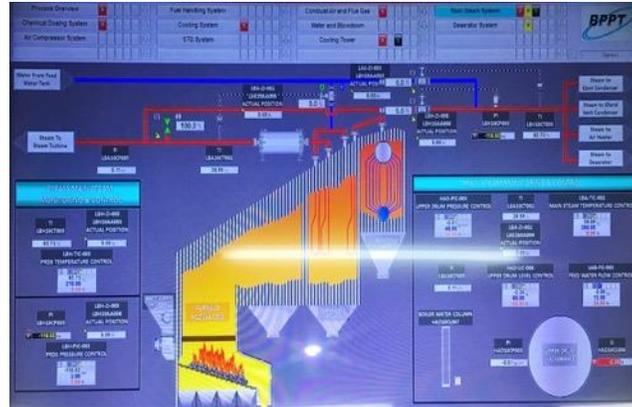
Project Name	<ul style="list-style-type: none"> Production of clean fuel with biomass waste (RD&D, CB, IS) 	
Period / Budget	<ul style="list-style-type: none"> 2019 ~ 2023 (5 years) / 550 k USD (NRF) 	
Location	<ul style="list-style-type: none"> Lampung, Indonesia 	
Technologies	<ul style="list-style-type: none"> Torrefaction and gasification 	
Components	<ul style="list-style-type: none"> Long-term performance evaluation with pilot testing in Lampung Development of business models and technical guidelines Capacity building for Research partners and governmental officers 	
Implementing Entities	<ul style="list-style-type: none"> Korea: GTCK, KIER(Korea Institute of Energy Research) Indonesia: Lampung University, BPPT 	



	 Wood chip	 Wood chip	 Torrefied pellet	 Coal
Moisture (%)	30 – 55	7 – 10	1 – 5	10 – 15
LHV (MJ/kg, db)	7 – 12	15 – 17	18 – 24	23 – 28
Bulk density (kg/L)	0.20 – 0.30	0.55 – 0.65	0.65 – 0.75	0.80 – 0.85
Energy density (GJ/m ³)	1.4 – 3.6	8 – 11	12 – 19	18 – 24
Hygroscopic property	Hydrophilic	Hydrophilic	Hydrophobic	Hydrophobic
Biological degradation	Fast	Moderate	Slow	None
Milling requirement	Special	Special	Standard	Standard
Transport cost	High	Medium	Low	Low

Circular Economy: Policy Assistance for Waste Pretreatment for High-efficiency WtE

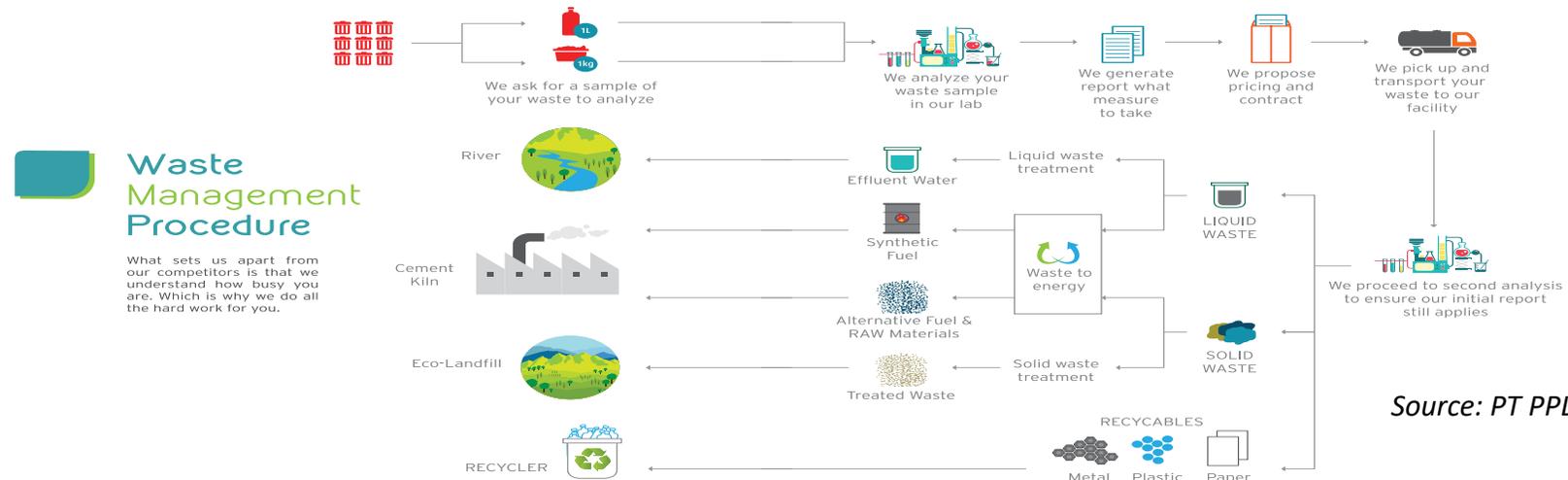
Project Name	<ul style="list-style-type: none"> Advanced Waste Pretreatment for High-efficiency WtE (CB, RD&D, IS)
Period / Budget	<ul style="list-style-type: none"> 2019 ~ 2023 (5 years) / HDEC, KEITI with Cooperation of BRIN
Location	<ul style="list-style-type: none"> Bantargebang, Indonesia
Technologies	<ul style="list-style-type: none"> Mechanical Biological Treatment (MBT) of Municipal Solid Waste
Components	<ul style="list-style-type: none"> Optimization of process operation parameters with bench and pilot testing Development of national technical guidelines and risk allocation schemes Capacity building for researchers, engineering partners and governmental officers
Implementing Entities	<ul style="list-style-type: none"> Korea: GTCK, AYU(Anyang University), HDEC, KEITI Indonesia: BPPT



Circular Economy: Hazardous Waste Treatment



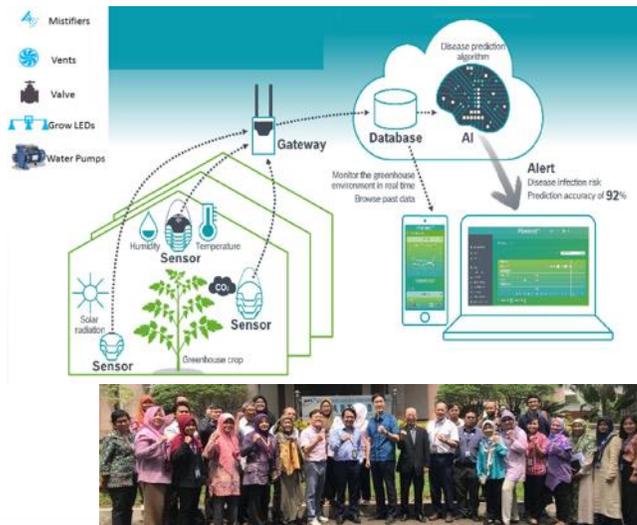
Project Name	<ul style="list-style-type: none"> Opportunity Study for Advancement of Industrial Hazardous Waste Management Solution
Period / Budget	<ul style="list-style-type: none"> 2019 (0.5 year) / 20K USD (NRF)
Location	<ul style="list-style-type: none"> Indonesia
Technologies	<ul style="list-style-type: none"> Chemical & thermal treatment of solid waste
Components	<ul style="list-style-type: none"> Survey of institutional setups of hazardous waste managements in Indonesia Concept development of technical applications and their business models Recommendations of commercial projects and their risk hedging strategies
Implementing Entities	<ul style="list-style-type: none"> Korea: EMSUS Indonesia: PT Emsus Global Indonesia



Environment-friendly Farming: Climate Smart Agriculture



Project Name	<ul style="list-style-type: none"> Climate Smart Agriculture Development (TA, CB, RD&D)
Period / Budget	<ul style="list-style-type: none"> 2023 ~ 2025 (3 years) / KIST with Cooperation of BRIN
Location	<ul style="list-style-type: none"> TBD, Indonesia
Technologies	<ul style="list-style-type: none"> Integrated smart farming solution 2.0
Components	<ul style="list-style-type: none"> Development of opportunity study and roadmap Pilot scale demonstration and optimization of key unit technologies Capacity building for research partners and governmental officers
Implementing Entities	<ul style="list-style-type: none"> Korea: KIST, GTCK Indonesia: BPPT, Bali Tourism Institute

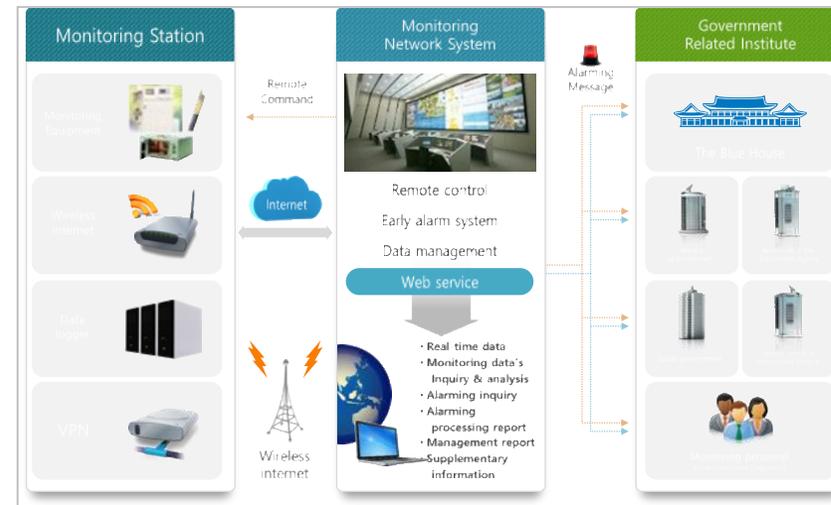
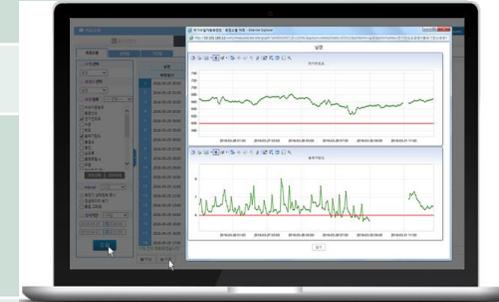


CTCN CLIMATE TECHNOLOGY CENTER & NETWORK		CTCN Technical Assistance Request Submission Form
Requesting country or countries:	Indonesia	
Request title:	Technical Practices for Climate Smart Agriculture (CSA) Dissemination in Indonesia	
NDE:	Organisation: Directorate General of Climate Change, Ministry of Environment and Forestry Contact person: Ms. Nur Maniqatun Position: Director General Email: nurmaniqatun@gmail.com Telephone: +62 21 3511400 Address: Mangrove Wonorejo Building Block 7 12 th floor, Jl. Jend. Gatot Subroto, Senayan, Jakarta, post code 10270, P.O. BOX 650	
Request Applicant:	Organisation: Agency for Assessment and Application of Technology Contact Person: Dr. Ir. Dudi Iskandar M. For. Sc. Position: Director of Centre for Agricultural Production Technology Email: duidi@bppt.go.id Address: LAPTIAB Building, Kawasan PUSPIPTEK, Tangerang Selatan, Banten 15343	
Climate objective:	<input type="checkbox"/> Adaptation to climate change <input type="checkbox"/> Mitigation of climate change <input checked="" type="checkbox"/> Combination of adaptation and mitigation of climate change	
Geographical scope:	<input type="checkbox"/> Community level <input type="checkbox"/> Sub-national <input checked="" type="checkbox"/> National <input type="checkbox"/> Multi-country If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).	
Problem statement related to climate change (up to one page):	Agricultural production accounts for 12.9 per cent of Indonesia's gross domestic product and 43.3 per cent of total employment (the e-BPS-Statistics Indonesia, 2008). In other hand this sector is also contributes to the climate change. Data from the World Bank showed agriculture sector emitted 50.12 % of global greenhouse gas emissions. (IPCC, 2014). In 2015, Indonesia was the fourth biggest emitter of greenhouse gases in the world (www.carbonbrief.org). Moreover, land use included agriculture sector was the highest contributor of greenhouse gas emission in Indonesia. While playing a large role in contributing to climate change, agriculture and land-use in Indonesia are also extremely vulnerable to climate change due to limited adaptation capacity. Indonesia as an	

Sustainable Water: River Waster Quality Monitoring



Project Name	▪ River Water Quality Monitoring Platform (TA, CB, RD&D)
Period / Budget	▪ 2020-2025 / 100K (Green Patrol RD&D Center), 600K (KEITI), 3.0 M USD (KOICA, MoEF)
Location	▪ TBD, Indonesia
Technologies	▪ Water Quality Monitoring System
Components	<ul style="list-style-type: none"> ▪ Field test of WQ sensors and online data collection system ▪ Development of master plan and basic design ▪ Pilot scale demonstration and optimization of key unit technologies
Implementing Entities	<ul style="list-style-type: none"> ▪ Korea: K-ECO, Green Patrol RD&D Center, GTCK ▪ Indonesia: FOERDIA, BPPT

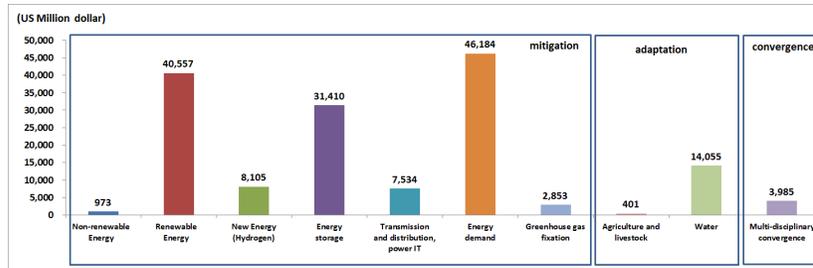


Technical Assistance(TA)



Project Name	▪ Excavation of RD&D demands for activating Joint RD&D between Indonesia and Korea
Period / Budget	▪ 2019 / 50K
Location	▪ Serpong, Indonesia and Seoul, Korea
Technologies	▪ RD&D demand analysis
Components	<ul style="list-style-type: none"> ▪ Reference survey(TNA, national plan, BPPT's research plan) and researcher interview ▪ Selection of priority RD&D projects ▪ Development of concept notes for the selected projects
Implementing Entities	<ul style="list-style-type: none"> ▪ Korea: GTCK ▪ Indonesia: BPPT

Potential demands analysis
(National development plan, Interviews)



Concept note development
to mobilize RD&D grant

구분	내용
목적	수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP)
배경	수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP)
주요 내용	<ul style="list-style-type: none"> 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP) 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP) 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP)
기대 효과	<ul style="list-style-type: none"> 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP) 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP) 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP)
기타 사항	<ul style="list-style-type: none"> 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP) 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP) 수돗대 운영 효율성 제고 및 운영 비용 절감 (KPP)

ASEAN Cooperation for Integrated MSW and Sustainable Management

Project Name	<ul style="list-style-type: none"> Platform Development of ASEAN Waste to Energy Technology Development and Technology Commercialization
Period / Budget	<ul style="list-style-type: none"> 2022-2025 / 7.7M (K-ECO, NTU, K-Eco and GTCK with Coopeation of MOFA)
Location	<ul style="list-style-type: none"> Indonesia and ASEAN Member States
Technologies	<ul style="list-style-type: none"> Integrated municipal solid waste management
Components	<ul style="list-style-type: none"> Integrated Solid Waste Management (ISWM) Policy assessment/analysis, technology standard model development and implementation plan Development of master plan and basic design ISWM Policy-technology standard model diagnostic framework building and operation ISWM project discovery and detail project implementation plan Korean-ASEAN Integrated Green Technology Platform(KAIGTP) set-up and operation ISWM conference invitation and capability building program
Implementing Entities	<ul style="list-style-type: none"> Korea: K-ECO, NTU, K-Eco and GTCK Indonesia: CMMAI, BRIN



Thank you

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