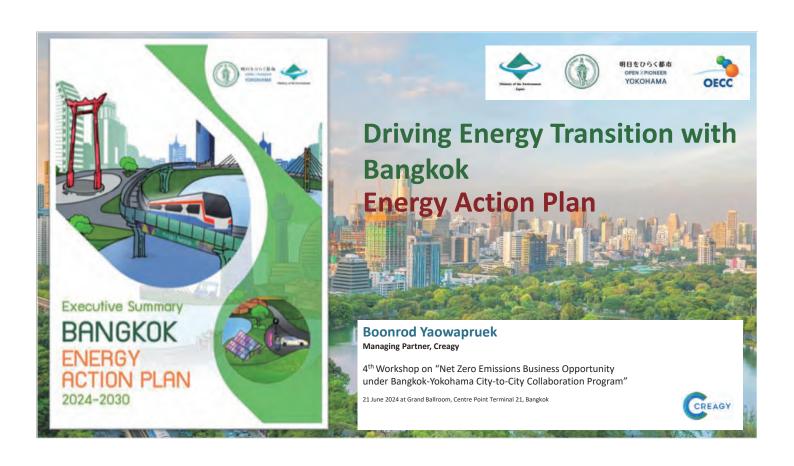
### V 資料編

別添資料1: 第4回「バンコク都・横浜市都市間連携:企業による脱炭素ビジネスの

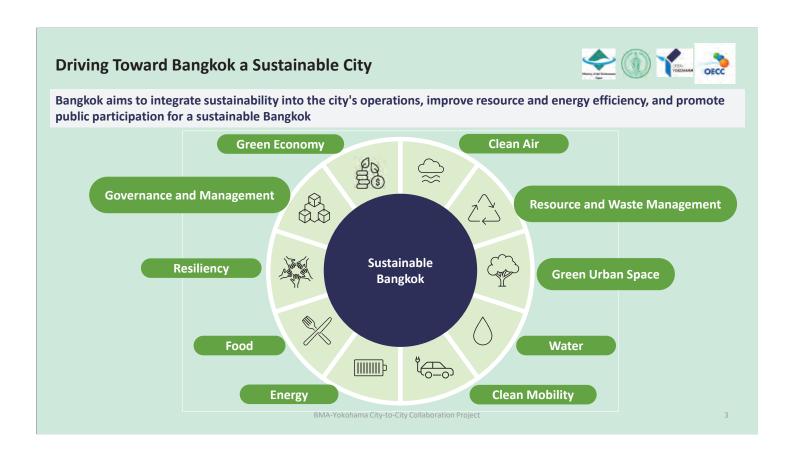
機会」ワークショップ 発表資料

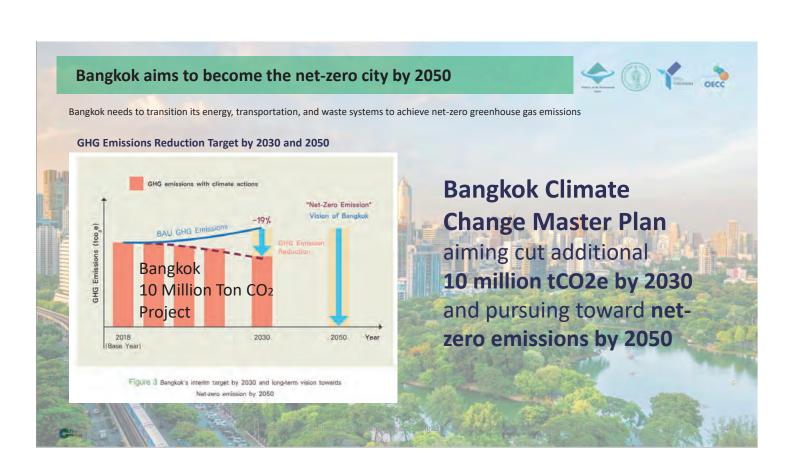


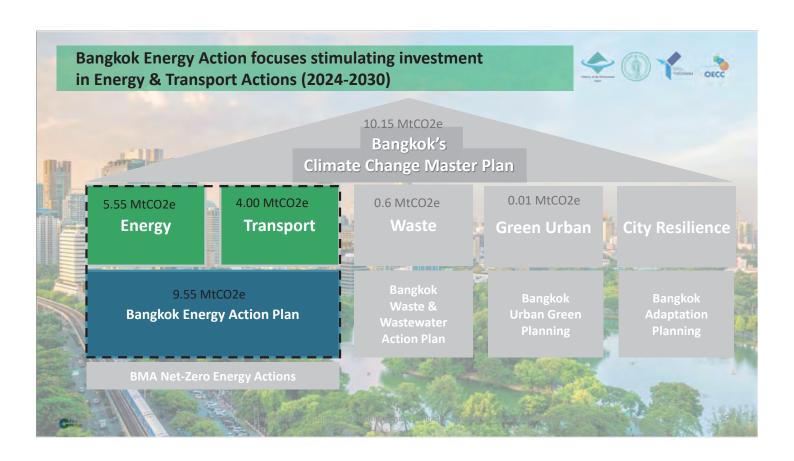
### Key Themes in 2024

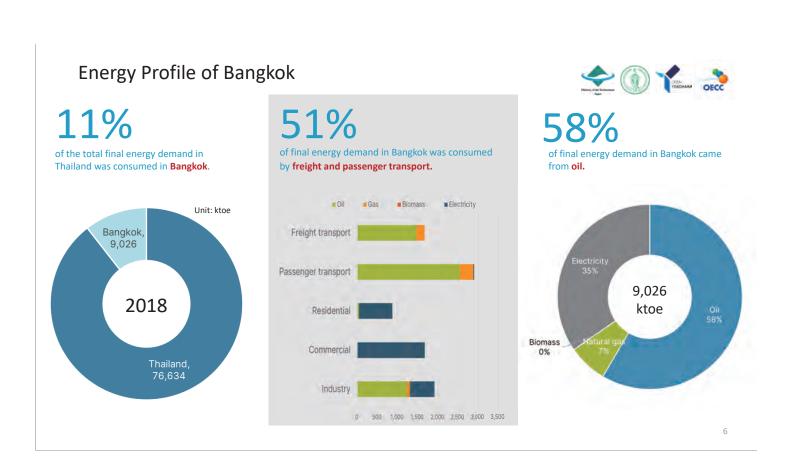
Themes directly affecting business











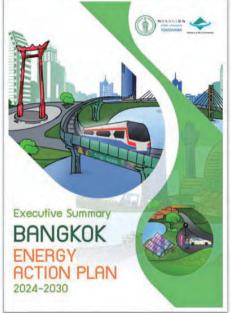
### The Bangkok Energy Action Plan 2024 - 2030

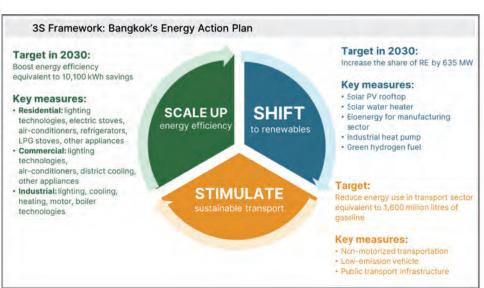












BMA-Yokohama City-to-City Collaboration Project

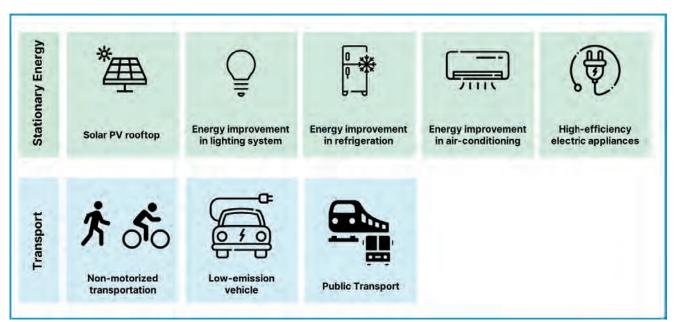
### Key Measures for Energy Actions in Bangkok











BMA-Yokohama City-to-City Collaboration Project

### Bangkok Energy Action Plan 2024 - 2030

Annual implementation targets for reducing GHG emissions in the energy and transportation sectors under the 3S strategy (electricity and energy usage units)

Year	2024	2025	2026	2027	2028	2029	2030
Strategy1: SCALE UP ENERGY EFFICIENCY							
Promotion of energy efficiency by replacing high-efficiency equipment (million unit)	1,050	2,069	3,162	4,193	6,188	8,201	10,112
Residential sector	520	1,040	1,579	2,105	3,121	4,074	5,002
Commercial sector	278	557	853	1,138	1,670	2,139	2,675
Industrial sector	251	472	730	950	1,397	1,987	2,436
Strategy 2: SHIFT TO RENEWABLES							
Installation of solar PV rooftop (MW)	60	120	200	280	370	518	63
Residential sector	30	60	110	160	210	310	42
Commercial sector	10	20	30	40	60	84	84
Industrial sector	20	40	60	80	100	124	124
Strategy 3: STIMULATE SUSTAINABLE TRANSPORT							
Promotion of sustainable transport (million liter)	160	321	481	641	962	1,283	1,603
Promoting public transport	-	-	-	-	-	266	563
Promoting the use of low-emission vehicles	148	295	443	590	885	914	914
Non-motorized transportation	13	26	38	51	77	103	128
Bangkok Energy Action Plan 2024 -2030						CREAGY	9

### Bangkok Energy Action Plan 2024 - 2030

Example of Programs		Self Investment			Third Party Investment		Partnership Investment		
		Loan	Bond	Leasing	Energy Service Performance contracts	On bill Financing	вот	вто	воот
Measures implemented directly by BMA									
<ul> <li>The improvement and installation of high-efficiency air conditioning in the BMA building</li> </ul>	✓	0	0	0	✓	✓			
<ul> <li>The installation of solar PV rooftop in the BMA building</li> </ul>	✓	0	0	0	✓	✓			
The conversion of BMA's waste collection trucks into electric vehicles	✓	0	0	0			✓	✓	✓
Measures undertaken by BMA to facilitate an enabling environment for priva	te sectors								
<ul> <li>Supporting the transition from conventional motorcycles to electric motorcycles.</li> </ul>	✓						✓	✓	✓
<ul> <li>Creating enabling environment for accessing funding sources</li> </ul>	✓								
<ul> <li>Creating enabling environment for technology access</li> </ul>	✓								
Capacity development for green jobs	✓								
Energy and transport GHG emission reduction campaign	✓								
<ul> <li>Awareness raising campaign for GHG emission reduction ion energy and transport sectors</li> </ul>	✓								
Measures implemented directly by private sectors									
The improvement energy efficiency in the private sector building	✓	✓	✓	✓	✓	✓			
<ul> <li>The installation of solar PV rooftop in the private sector building</li> </ul>	✓	✓	✓	✓	✓	√			
The conversion to electric vehicles	✓	✓	✓	✓	✓	✓			
Remark: √ Financing options which can be implemented immediately									
<ul> <li>Financing options which requires additional study or still be subject to certa</li> </ul>	in regulations.								

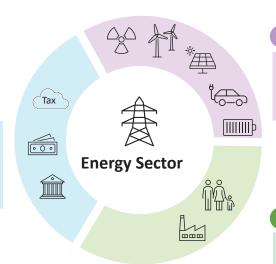
### 3 Driving Forces Accelerating Energy Transition





### **Policy & Legal**

- National Energy Plan (NEP)
- · Electricity regulations
- Carbon Tax
- Net-metering program
- Climate Change Act



### Technology

- Energy efficiency
- Renewable energy
- ΕV
- Electrification
- Green hydrogen
- Carbon Capture (CCS,
- CCUS) • Biomass
- Nuclear

### **Demand**

- Decarbonization
- Renewable
- **Energy Efficiency**
- Electrification

11

### The success of the Bangkok Energy Action Plan depends on many elements and needs collaboration











Bangkok's Energy Action Plan Ionitoring & Evaluation BMA will act as a link between Bangkok's ambition and higherlevel government's targets

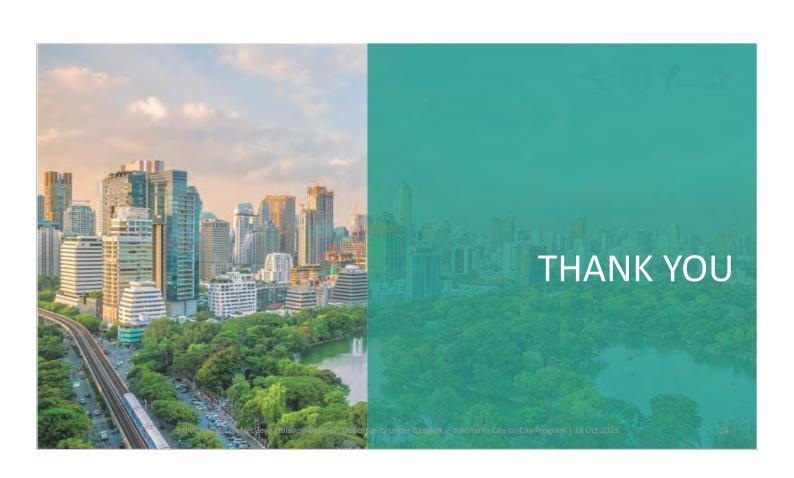
Implementing EAP require Bangkok to work with other government agencies  $% \label{eq:controller}%$ to align policies, programs and funding.

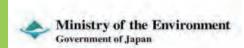
> Implementing energy solutions provides many opportunities for partnership & collaboration in the transition to behavior change and investment

> > 12















# Leading by examples with BMA's climate actions

Dr. Manaswee Arayasiri,
Department of Public Works, BMA, Thailand

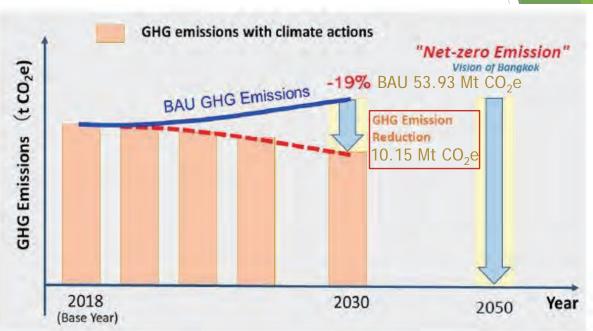
The 4<sup>th</sup> Workshop on
"Net Zero Emissions Business Opportunity
under Bangkok-Yokohama City-to-City Collaboration Program"

21 June 2024

Grand Ballroom, Floor C, Grande Centre Point Terminal 21 hotel Bangkok, Thailand

# Bangkok Masterplan on Climate Change 2021-2030





# Bangkok Master Plan on Climate Change 2021-2030



### **Energy Efficiency and Alternative Energy**

Mitigation measures for residential, commercial, public building and industrial sectors

### 1. Energy efficiency

Renovation and new installation of high energy efficiency equipment include:

- LED lighting
- High efficiency Air Condition System
- Building Energy Management System (BEMS)

### 2. Alternative energy

- Installation of Solar PV rooftop

### **BMA Net Zero Policy**





BMA Net Zero Policy is one of 216 policies of Dr. Chadchart Sittipunt, Bangkok Governor to set BMA as a good example model for low carbon organization by using 3 principles (C-R-O) includes;

- 1. C-Calculate is calculation of GHG emission from BMA properties includes
- Buildings such as city hall, district offices, hospitals, schools etc.
- Vehicles such as passenger car, garbage truck etc.

### **BMA Net Zero Policy**





- 2.R-Reduce is reduction of GHG emission from BMA properties includes
- Installation of Solar PV Rooftop on the roof of BMA buildings
- Using high efficiency air condition system and LED lighting in BMA buildings
- Driving and promotion to change old ICE vehicles to new electric vehicles and improve structure facilities such as walk way, bicycle way and EV bus feeder to support rail public transport.

### **BMA Net Zero Policy**





- 3. O-Offset is promotion of carbon absorption project includes
- Increase green area, public park or mangrove forest
- "1 million trees planted in the city" Governor project
- "15 minutes park" Governor project

### Enforcement of Building Energy Code law to New or Retrofitted building



▶ Announcement of Building Control Committee B.E. 2566 (A.D.2023) enforcement new or retrofitted building which have gross floor area > 2,000 square meters in 9 types include, Education, Office, Theatre, Shopping center, Entertainment, Assembly building, Hotel, Hospital, Condominium, must design follow BEC criteria of building energy code law of Ministry of energy



# Enforcement of Building Energy Code law to New or Retrofitted building



Building Type	Energy Consumption under Each Level of Energy Saving Capability (kWh/m²/y)						
2000000000	Reference	BEC	HEPS	Econ	ZEB		
Office building	219	171	141	82	57		
Department store	308	231	194	146	112		
Retail & wholesale business facility	370	298	266	161	126		
Hotel	271	199	160	116	97		
Condominium	256	211	198	132	95		
Medical center	244	195	168	115	81		
Educational institution	102	85	72	58	39		
Other general buildings	182	134	110	66	53		

% Saving

~ 20-25%

~ 30-35%

~ 60-65%

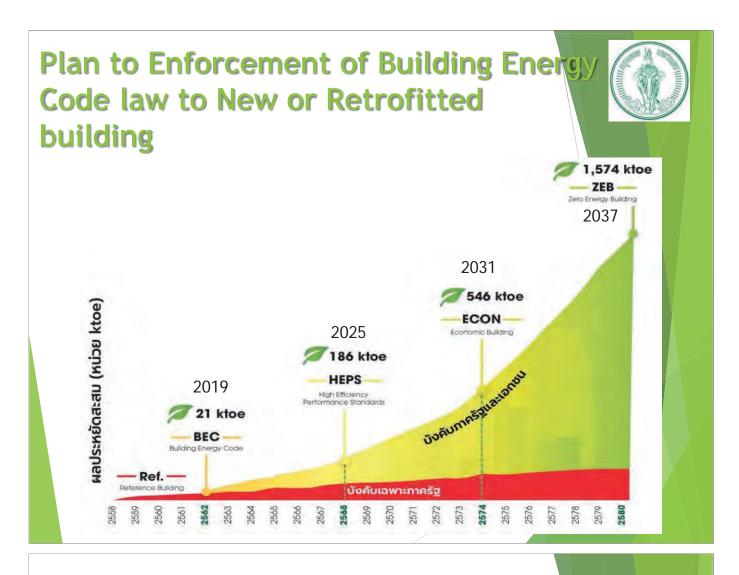
~ > 70%

Ref: EEDP 2013 Derived from Modeling each building type under each level of Energy Saving Capability

BEC = Building Energy Code

HEPS = High Efficiency Performance Standard

Econ = Economic Building ZEB = Zero Energy Building



# Development of BMA Building Design followed plan to enforcement of Building Energy Code law



2019

<u>Design to meet BEC Criteria</u>

11-story Ward Building

Ladkrabang hospital
(Floor area 23,763 sq.m.)

BEC Award 2019

Good Level (30% SAVING)



2024

Design to meet HEPS Criteria

15-story Pathumwan District Office Building (Floor area 19,831 sq.m.)

Total energy consumption approx. 141 kWh/m²/y

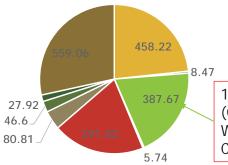
1st building to apply all Mitigation measures of Bangkok Master Plan on Climate Change 2021-2030 in Building design

- 1. Energy efficiency
  - LED lighting
  - High efficiency Air Condition System
  - Building Energy Management System (BEMS)
- 2. Alternative energy
  - Installation of Solar PV rooftop

# BMA Environment Budget in Fiscal year 2024



Budget (Million US Dollars)



19.72% of Total Budget (City environment management Which was not specific to Climate Change Management)

- Organization Management
- Security
- Environment (Increasing Green Area, Solid Waste, Wastewater and Air Pollution Management)
- Economic and Commerce
- Inflastructure Development
- Public Health
- Social Development
- Education
- District Public Services

# Key barrier/challenge of Climate Financing Scheme in Bangkok



Limit budget: Need to find the balance between city development (social economic, infrastructure, public health etc.) and climate change management.

**BMA Income** 

T 1.C

- City Tax and fees

- Budget from Royal Thai Government **↓** 

**BMA Expense** 

Climate Change
Management
2<sup>nd</sup> Priority
(Long term effect)

City Development 1st Priority

- Carbon tax, Green Loan and Green Bond policies are difficult to be applied by BMA, because it need to amend many of laws and regulations.
- Grants provided by domestic and international green and energy conservation funds are limited.
- Business model is the solution to develop climate change management projects of BMA by public enterprise and private sector.

### **On-site Private wire PPA Business Model Diagram**





Onsite Solar PV Rooftop (MEA investment)

Solar electricity via private wire in the building (MEA investment)

**BMA Buildings** (Consumer)

Operation and Maintenance Cost

PPA payment (Discount Electricity bill for Solar electricity use) (UTILITY)

**MEA** 

BMA = Bangkok Metropolitan Administration MEA = Metropolitan Electricity Authority

PPA = Power Purchase Agreement

MEA is public enterprise can use Green Bond issuance as a climate financing scheme to raise capital for Solar PV Rooftop project development.



BMA and MEA signed MOU for co-development of smart city projects and co-development of renewable energy and energy conservation projects on 30 May 2024 at Bangkok City Hall (Sao Chingcha).

### References

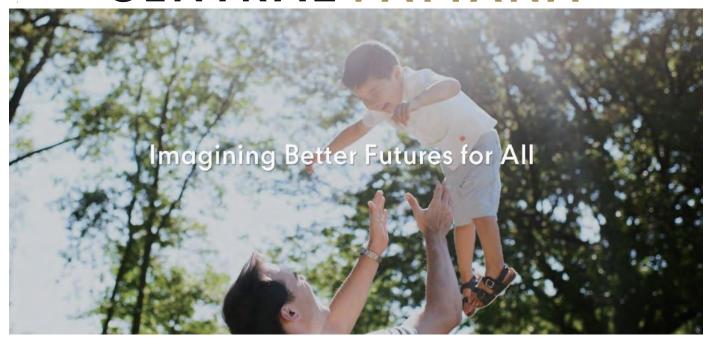


- 1. Bangkok Master Plan on Climate Change 2021-2030, Department of Environment Bangkok Metropolitan Administration (2022)
- 2. https://www.thansettakij.com/sustainable/zero-carbon/563133
- 3.Mr.Prakob Eamsaad, Department of Alternative energy development and efficiency Ministry of Energy "Current situation of ZEB in Thailand", Workshop for dissemination and promotion of ZEB and ZEB family concept 9-10 October 2019, Bangkok, Thailand, arranged by The Association for Overseas Technical Cooperation and Sustainable Partnerships [AOTS] https://www.aots.jp/application/files/8615/7017/2439/File\_03.pdf
- 4.https://bec.dede.go.th/requirements-of-the-law/
- 5. BEC AWARDS, Department of Alternative energy development and efficiency Ministry of Energy https://2e-

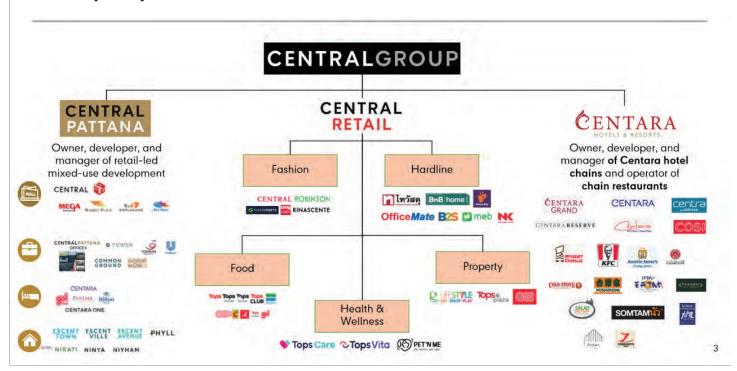
building.dede.go.th/content/%E0%B9%80%E0%B8%81%E0%B8%B5%E0%B9%88%E0%B8%A2%E0%B8%A7%E0%B8%81%E0%B8%B1%E0%B8%9A-bec-awards

- 6. Topic: Open draft of the BMA budget fiscal year 2024 <a href="https://www.prachachat.net/general/news-1365432">https://www.prachachat.net/general/news-1365432</a> issued date 16 August 2023
- 7. Clean energy business model manual, C40 cities (2018)

### **CENTRAL PATTANA**



### **Company Overview**







© Central Pattana 2020

### **Green Space**

 4 Low carbon eca-friendly malls in pipeline





### Solar rooftop

- 1st Solar Rooftop in 2010
- Expected installation
   30 branches by 2024

### Waste

- Reduce more than 22,000 tons of landfill waste
- Expanding 16 out of 42 malls roll out in-mall recycle stations and road shows



CENTRAL PATTANA SUSTAINABILITY



### **EV** charging

 100% In-mall EV Charging station by 2023

#### Water

- Reduce Reuse Recycle
- Water Recycle System at 19 Branches

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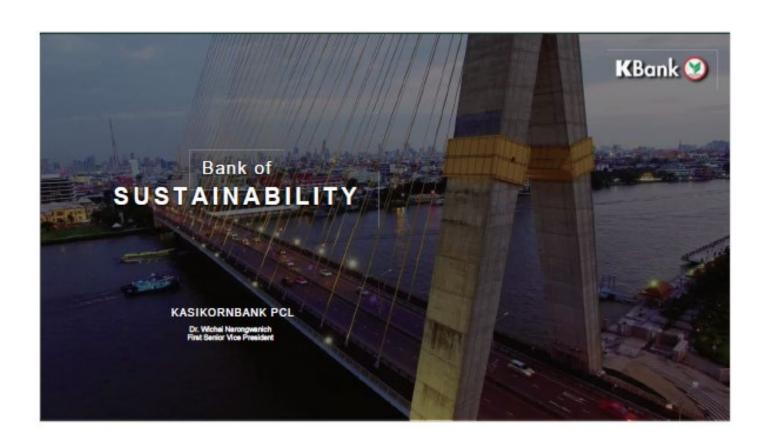


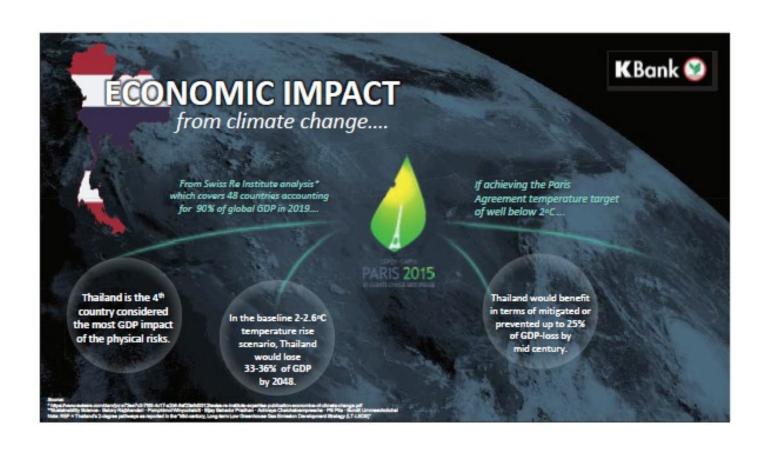


#### **Forestation**

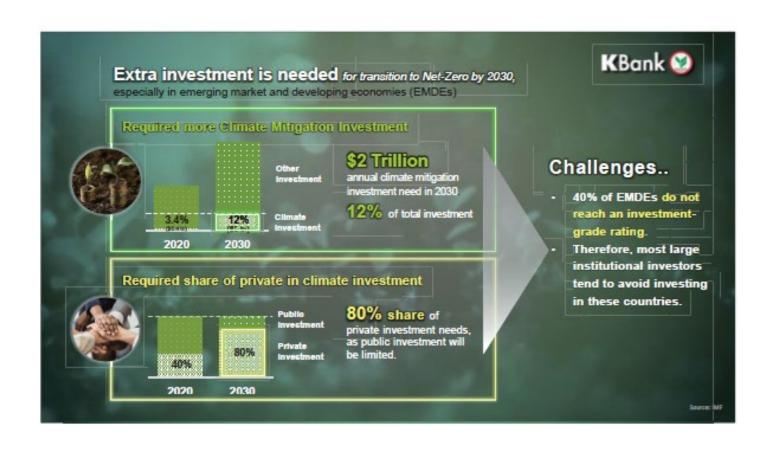
- 1 million trees by 2050
- Planting 200,000 trees in 2023
- Carbon absorption 7,000 tons iin 10 years

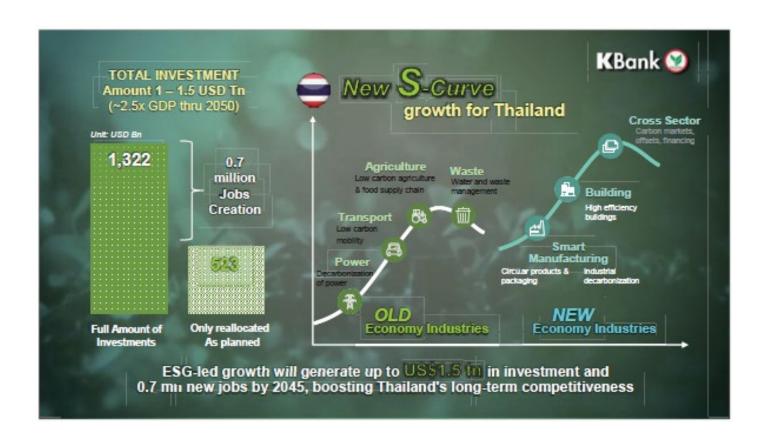
#### CENTRALPATTANA The Sustainable Ecosystem for All The Sustainable Ecosystem for Local Wealth In 5 Years > 1.8 M Jingjai Farmers' Market in 18 shopping cer Space for SMEs & Local Products Central WestVille Retail **NON-TENANT PARTNERS** 1st ever Low Carbon Mall Shop Eat Low carbon material Offset for embodied emission Green Partnership TENANT MOU with SCGBLC Develop Framework pathway to CENTRAL Work Net Zero building and Recycled 7,000 Tons of Concrete pile **Green Partnership** PATTANA Drive energy saving & waste management Partner with GC 1st year = 46 brands 1,000 shops Launch YOUTURN at FoodVille Reduce 719 MWh, 63 Tons of waste to recycle plastic to produce Stay Play furniture and use in Central Westville. Recycle PET bottles to produce Recycle Stations and Green Stores led to 1,772 tons of plastic bottles rPET and FoodVille buys back (or around 118 billion plastic bottles) (Nestle Purelife) to serve circulated back in recycle system customers















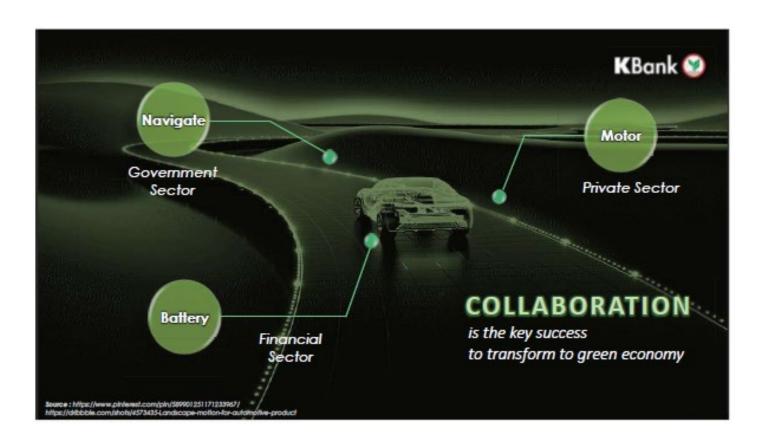
















### **International Supports on Climate Actions**

### Suzuki Kazuya, Chief representative of JICA Thailand Office

21 June 2024

Japan International Cooperation Agency



### Japan International Cooperation Agency at a glance

- Implementation body of ODA of the govt. of Japan
- JICA's guiding vision "Leading the world with trust."

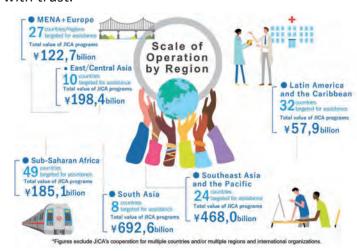


96 Overseas offices (as of July 1,2020)

developing countries and regions that received assistance (during fiscal year 2019)

### ■ 50 years in Thailand

- 1954 First cooperation in Thailand
- 1974 Established Thailand office
- JICA Major Assistance Schemes
  - Technical Cooperation
  - ODA Loans
  - Grant Aids
  - Public Private Partnership (PPP)





### **JICA Cooperation in Thailand**

The cooperation with Thailand started by accepting **21 trainees in 1954**.

This year marks the **70th anniversary**.

- Yen loan commitments: 2.429 trillion yen (7<sup>th</sup> largest)
- Technical cooperation: 244.37 billion yen (3rd largest)
- Grant aid: 170.7 billion yen
- Japan Overseas Cooperation Volunteers: 1,096



(As of the end of Japanese FY 2022)

Source: JICA Annual Report Data Book 2023













3



### Contributions to Bangkok Area over 70 years of cooperation



14 Bridges of

Bridges over Chao Phraya River out of 20 in BKK Metropolitan Area



20 % of

Expressway distance under EXAT among 8 highways in BMA



85% of

Passengers using International Airports (Don Mueang & Suvarnabhumi Airports)



**53** % of

Total volume traded in Thailand's container ports in 2022 (Laem Chabang Port)



25% of

Mass Rapid Transit distance in BKK (MRT Purple, Blue, Red Lines)



70 % of

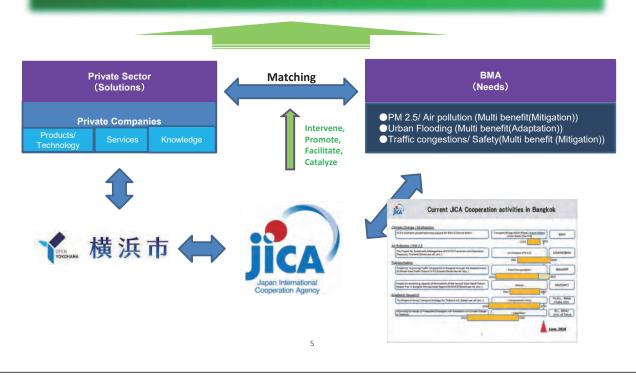
O Water production for BKK From facilities where Yen Loan was used

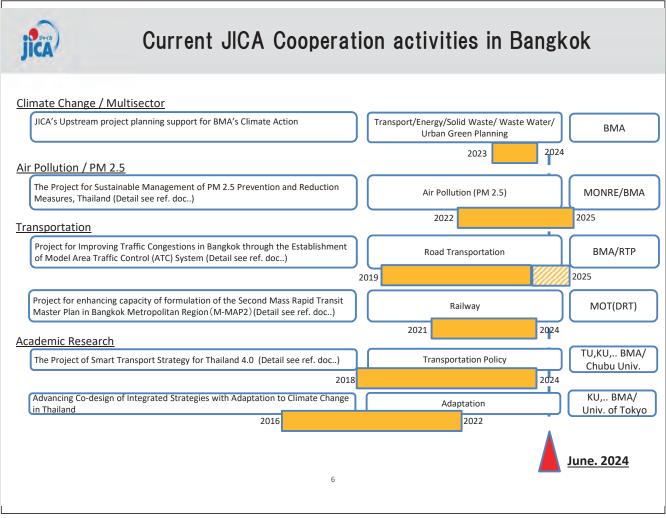
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### JICA can contribute to realize "Livable city Bangkok"

### "Livable city Bangkok"





### Transportation, Urban and Regional Development



In response to issues such as improving traffic congestion caused by the concentration in Bangkok which is expected to continue, it is important to expand public transportation, develop TODs, and realize smart cities. In rural areas, it is necessary to make efforts to create inclusive cities in light of the declining and aging populations and to correct the disparity between urban and rural areas.

#### Redline

Opened in November 2021

Project Expenses

Total cost : 332.1 billion yen Amount of loans : 268 billion yen

To connect the suburbs to the central (26.3 km) by Japanese vehicles

### M-MAP2

TC

Loan

 To support the railway demand forecasting and formulation M-MAP2 (Metropolitan Urban Railway Master Plan).

### Sustainable regional revitalization

TC

For the issues such as depopulation and aging in rural areas, Japan and Thailand will share their own knowledge to co-create practical strategies, policies, and systems related to regional revitalization.



 Resolving issues for sustainable urban and regional development.





### The Project for Improving Traffic Congestions in Bangkok Through Area Traffic Control (ATC) System

#### ◆ Overall goal

The area covered by ATC system is expanded and traffic congestion and environment condition in the area are improved.

### **♦** Project Purpose

ATC system is established in the pilot project area and traffic congestion in the area is improved.

◆ Project Period : From April 2019 to February 2024 (Further extension for about 1 year has been agreed upon.)

#### ◆ Main Achievements

✓ POC of ATC system, which has bee successfully completed by September 2023, demonstrates effectiveness of the system with the result of <u>traffic</u> <u>congestion</u> (queue length) reduction by 20-30%.

✓ The POC also shows possibility that the ATC system can be effectively operated by using queue length data detected by probe instead of those detected by roadside sensors.

### **♦** Future Plan

✓ Signal system Master Plan, which seeks future expansion to an ATC system from "adaptive control signals" that are currently being installed by BMA, will be formulated.

√ Further close consultation between BMA and JICA experts on when and how to upgrade is necessary.



From Spot Control

Optimal traffic signal timing by area control utilizing real-time traffic data

Traffic Control



Japan International Cooperation Agency

# SATREPS Disease of largesty Pathening

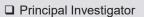
### The Project of Smart Transport Strategy for Thailand 4.0

Project period: June 2018 - March 2024

Overall Goal: Leap-frog strategy based on the concept of "Smart Transport Strategies" which dually achieves the citizens' QOL and a low-carbon society is disseminated.

### Project Purposes:

- A methodology to evaluate the policy packages for realising the concept of "Smart Transport Strategies" which dually achieves the citizens' QOL and a low-carbon society is developed.
- "Sukhumvit Model", a policy package for the Sukhumvit area to realise the concept of Smart Transport Strategies, is proposed as an application of the methodology.



### Prof. THANARUK Theeramunkong

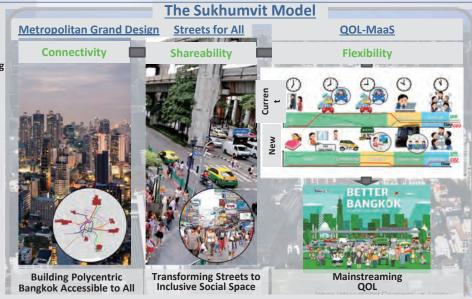


Head, Intelligent Informatics and Service Innovation Research Center Thammasat University

Prof. HAYASHI Yoshitsugu



Center for Sustainable Development and Global Smart City, Chubu University



Digital Earth System: Seamless Visualization Platform for Urban and Transport Planning

SATREPS
Discos and Futuring Research Arthunising to Education Services and Control of Co

### **ADAP-T**(Advancing Co-design of Integrated Strategies with Adaptation to Climate Change in Thailand) Project

Project period : May 2016 – May 2022

☐ Principal Investigator



Associate Prof. Thanya Kiatiwat Kasetsart University



Prof.OKI TaikanI The University of Tokyo



### **Project Purpose**

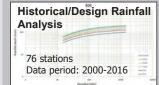
### Resilient and sustainable solutions for climate change are developed by:

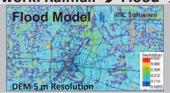
- 1)Knowledge base for climate change is established
- 2) Appropriate adaptation measures for select themes under 6 water-related sectors are identified
- 3)Adaptation options are co-designed as consolidated information for Thai Government to utilize for climate change response

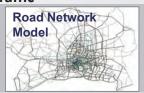
### The impact of urban flooding to transportation was analyzed

- Analysis of precipitation patterns and evaluation of vulnerability and adaptability options based on a rainfall-inundation model
- $f \square$  Road flooding risk map (visualization of vulnerable areas)
- ☐ Analysis on cost-effective adaptation measures for reducing flooding depths

### Simulation framework: Rainfall → Flood → Traffic







The research results of the ADAP-T should be beneficial for actual planning and implementation of urban flood risk reduction by BMA.

The Science and Technology Implementation-Type Technical Cooperation Project for Flood Risk Reduction in Bangkok Metropolitan Area (based on the results of ADAP-T) is proposed.

10



### **Development on Alternative Upgraded Bio-Diesel** H-FAME (Partially Hydrogenated FAME) or Premium FAME

Project period: 2010 - 2016

### **Project Purpose**

Reducing CO<sub>2</sub> Emissions with Vehicle Biofuel Made from Nonedible Vegetable Oil

### **Overview of the Project**

- ☐ Using Non-food biomass as a biofuel feedstock that does not compete with food crops
- Demonstrating automobile compatibility of high quality biodiesel through on-road tests

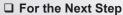


- Succeeded in developing upgraded bio-diesel which shows a very high thermal and oxidative stability (possibly used as B100 fuel and promising as a carbon neutral bio-diesel with ICE system)
- Meets with all of FAME standards (No new standards needed)
- Successfully finished/proved : On-road durability test in Thailand by using a B20 fuel (20 vol% of H-FAME and 80 vol% EURO 4 petroleum diesel).

#### □ Co-benefit for

- Palm farmers
- Current FAME manufacturers
- Automobile Industry(stabler oxidation than EURO 5 petroleum diesel)
- End use customers (affordable price)

Smooth transition can be realized by minimizing impact on existing economy and fully utilizing existing infrastructures



Upscale demonstration is desired in cooperation with private sectors

H-FAME

◆Verification of automotive compatibility of H-FAME has successfully completed with on-road test for 50,000km.

Japan International Cooperation Agency

### The project for promotion of Energy Efficiency by introducing ZEB, ZEH and Heat Pumps in Thailand





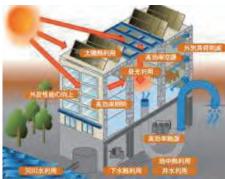


Energy efficiency in Thailand will be improved by establishing the policy and technologies for ZEB/ZEH and introducing heat pumps in industry, commercial, and residential sector.

### **Project Purpose**

Energy conservation capacity to promote Zero-Energy Building (ZEB) / Zero-Energy House(ZEH) and heat pump is strengthened.

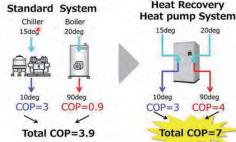




### Heat pump

- -The Key technology for decarbonization
- ✓ Heat pumps are technologies that collect heat from thermal source such as the atmosphere and use it as an energy in hot water supply equipment.
- ✓ It is possible to efficiently generate thermal energy with a small amount of electrical energy.

  Heat Recovery



COP (Coefficient of Performance, or energy consumption efficiency) indicates how much capacity (kW) can be extracted per 1 kW of power consumption. The higher the value, the better the energy-saving performance.





### Third Country Training Program Renewable Energy Technologies and Knowledge Transfer for Strengthening and achieving ASEAN's Sustainable Development

2023 - 2024

#### Partner organization:







National Science and Technology Development Agency

Thailand International Cooperation Agency













13 operation Agency



To transfer the knowledge and share experiences of renewable energy technologies to ASEAN members for their strength and achievement on sustainable development goals

#### **Training Course outline**

- ☐ To enhance the understanding on related policy and implementation, technologies and practices of processing, standardization, and commercial application of renewable energy
- To encourage researchers to gain more understanding on sustainability assessment of renewable energy and its utilization in environmental and sustainable contexts





## Third Country Training Program Energy Resilience Assessment: Towards Climate Adaptable Energy Systems 2023 - 2025

Partner organization:



National Energy Technology Center (ENTEC), National Science and Technology Development Agency (NSTDA)



Thailand International Cooperation Agency















Cooperation Agency

#### **Project Purpose:**

- To disseminate knowledge on energy resilience concept and provide hands-on training on energy resilience assessment
- 2) To facilitate pilot energy resilience assessments in ASEAN countries, in particular CLMV countries.
- To facilitate the development of energy resilience assessment hubs of knowledge in interested ASEAN countries.

#### Contents

- •Climate change and energy infrastructure
- •Related national and regional policy landscape
- Energy resilience concept
- •Energy resilience assessment
- ASEAN ERA Guideline
- Case studies
- Hands-on training
- Tabletop exercise
- Site visit
- Country report presentations

## jica)

**Third Country Training Program** 

Training Program on The ASEAN Inclusive Program for ambitious climate action through international market-based approaches (Planned)

#### Overall Goal

To enhance competence and develop capacity of officials and personnels in Thailand and the Southeast Asia region in climate change management, as well as providing a knowledge-sharing platform for senior executives and leaders from across different sectors in Thailand to share their experiences and connects with each other.

### Training Subjects (Draft):

- (1) Introduction to Carbon Pricing and Carbon Project Developments
- (2) International Collaboration towards NDC Achievement
- (3) Engagement Policy and Implications of Participation
- (4) Article 6 Projects for Transformative Climate Action
- (5) Transfer Authorization, Registration, and Corresponding Adjustments
- (6) Governance, Regulatory Framework and Institutional Set
- (7) Reporting to the UNFCCC
- ☐ ASEAN Carbon Pricing Conference
- ✓ Prior to the implementation of this training project, the ASEAN Carbon Pricing Conference was held in Bangkok, last November jointly organized by TGO, JICA etc. to discuss the future of carbon pricing.
- ✓ The importance of ASEAN-Japan cooperation toward a regional carbon market was reaffirmed at the conference.



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## SATREPS = •

## The Project for Data Driven Dynamic Transport Management in Emerging Metropolis for Climate Change Mitigation

#### **Project Objectives**

To develop a visualizable analysis and evaluation method that fuses diverse observation data in the Bangkok metropolitan area to provide practitioners with a <u>dynamic and high-resolution understanding of congestion and greenhouse gas emissions from road traffic in the city.</u> This will enable the prediction of changes in traffic behavior and the associated effects on urban road traffic congestion and emission reductions for district-level road traffic control and urban traffic management measures.

#### Main focus

Smooth road traffic

(reduce the number of starts /stops, increase speed)

- Traffic control (signal control, etc.)
- Traffic control (parking, control by vehicle type etc.)
- TDM (e.g., congestion charging measures)

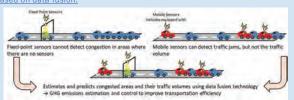
Its relatively high social implementability and significant impact on economic and social activities



#### Research Topics

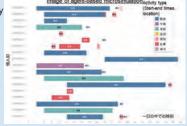
1. Advanced Traffic Condition Estimation Methodology Using Data Fusion Techniques

Estimates and predicts when, where, and to what extent traffic is congested based on data fusion.



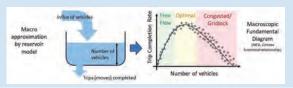
2. Evaluation of Transportation Management Policies by Activity Microsimulation

Microsimulation to Describe People's "Daily Movement and Activity Patterns Creation of a platform



3. Development of an urban-scale macro-analysis method of traffic conditions

Development of a method for analyzing the relationship between traffic throughput and congestion propagation patterns for the entire regional road network



4. Proposal and Application of Microscopic Traffic Control Methodology

Compute signal control with sensor information and simulation to assist officers



Principal Investigator: Professor Daisuke Fukuda Department of Civil Engineering, Graduate School of Engineering, The University of Tokyo

## Bangkok E-Bus Project



#### **Outline**

This project aims to displace internal combustion engine buses in the city, supporting the use of clean public transport in Thailand as a whole by financing Energy Absolute Public Company Limited's manufacture, including sell of E-buses for their introduction to Bangkok, thereby contributing to a reduction in air and noise pollution as well as greenhouse gas emissions.

- Total 1,200 buses
- Signed Loan Agreement on December, 2023

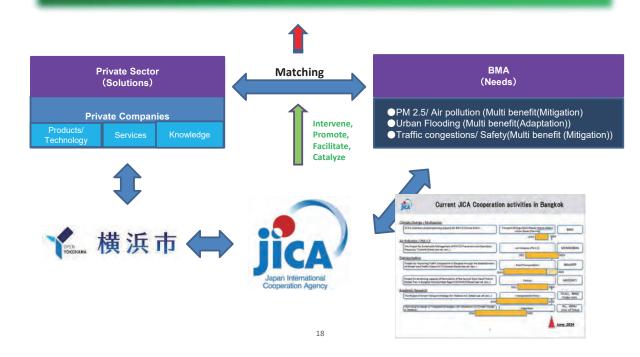


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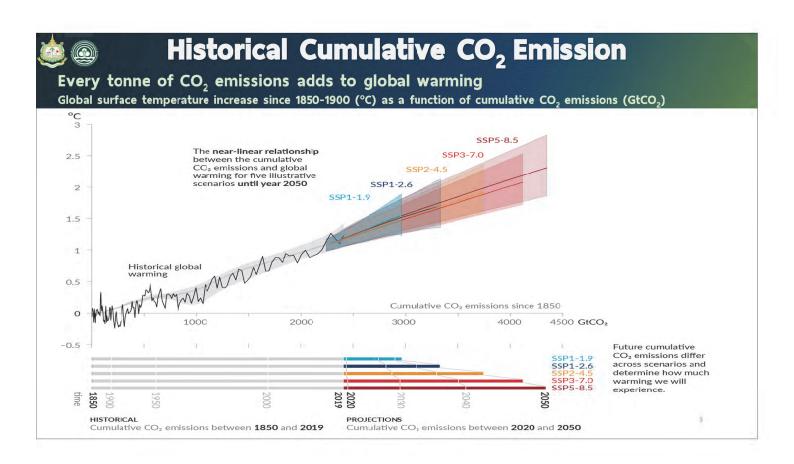
JICA can contribute to realize "Livable city Bangkok"

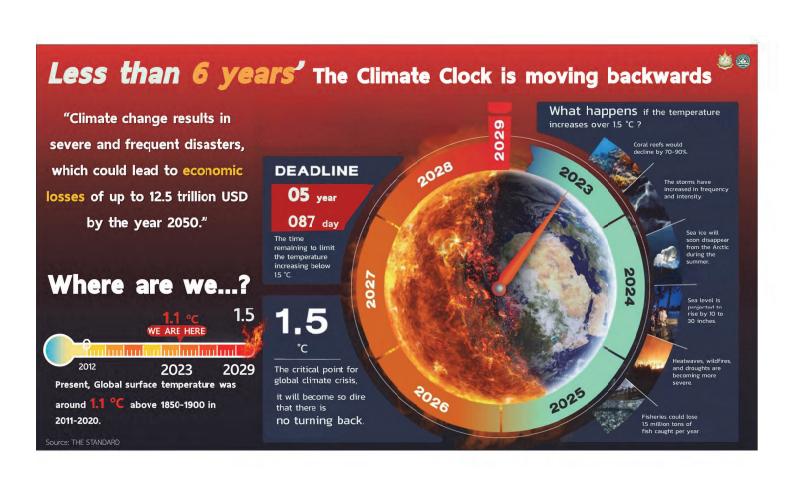
## "Livable city Bangkok"

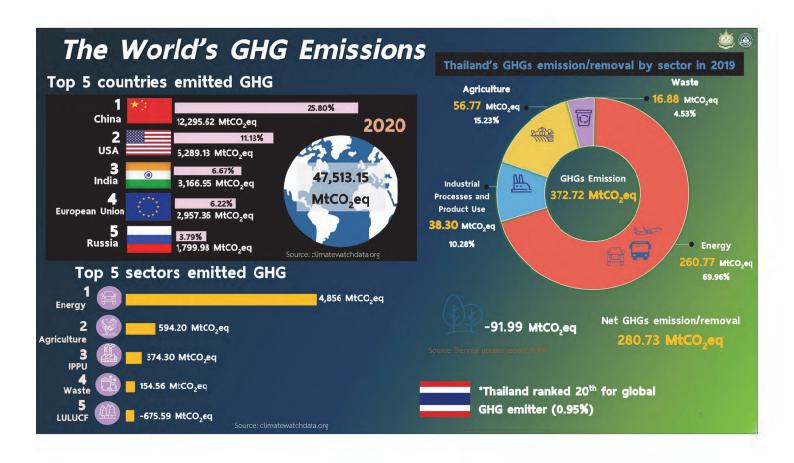


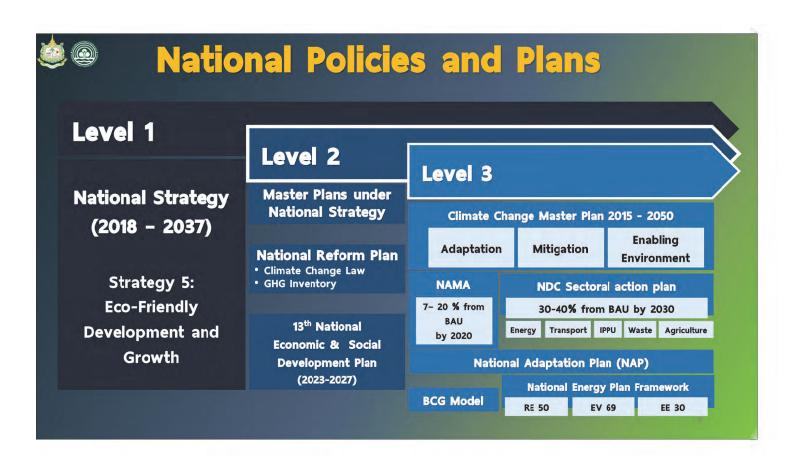


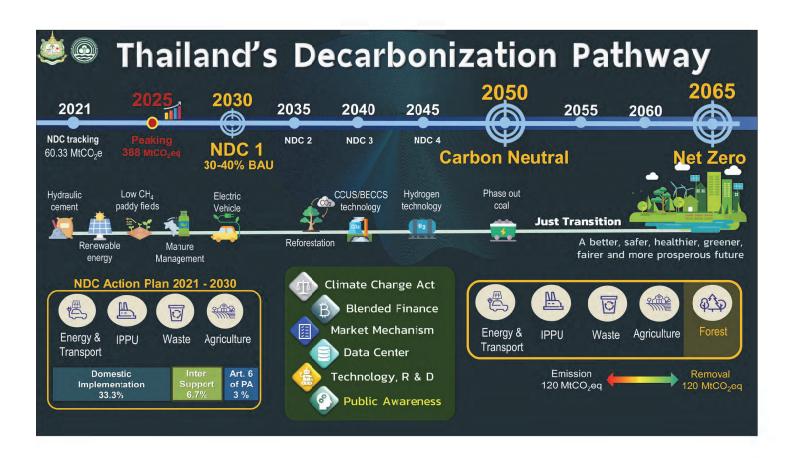


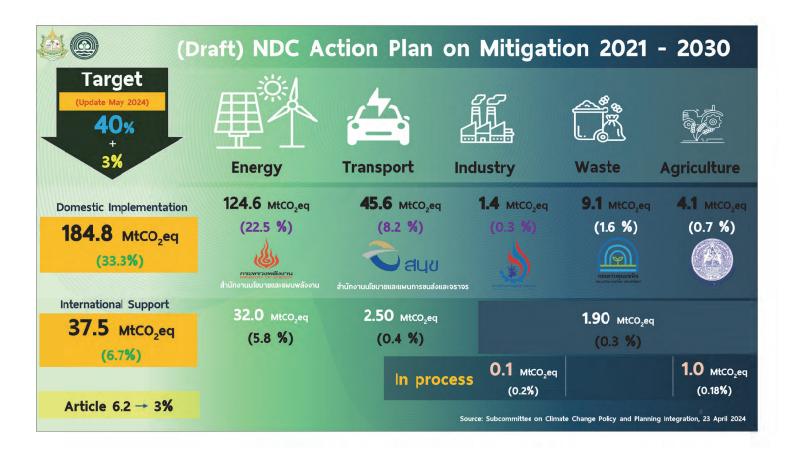


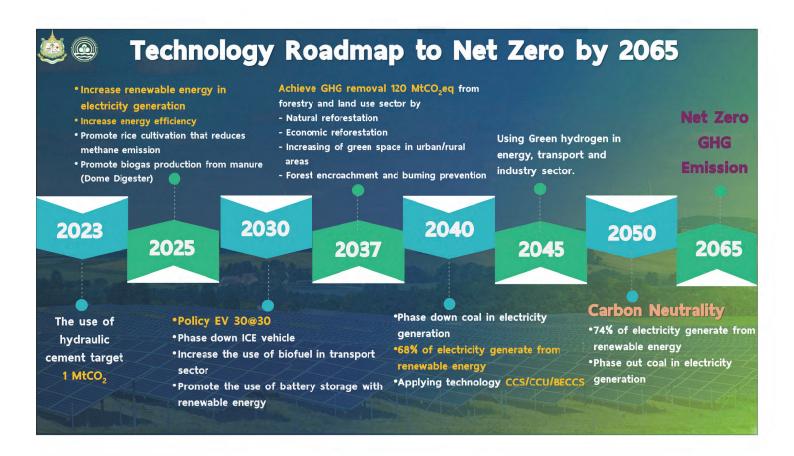


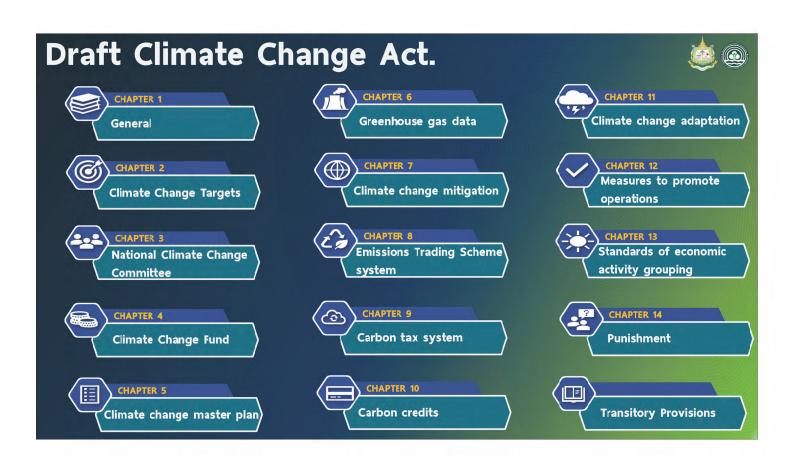






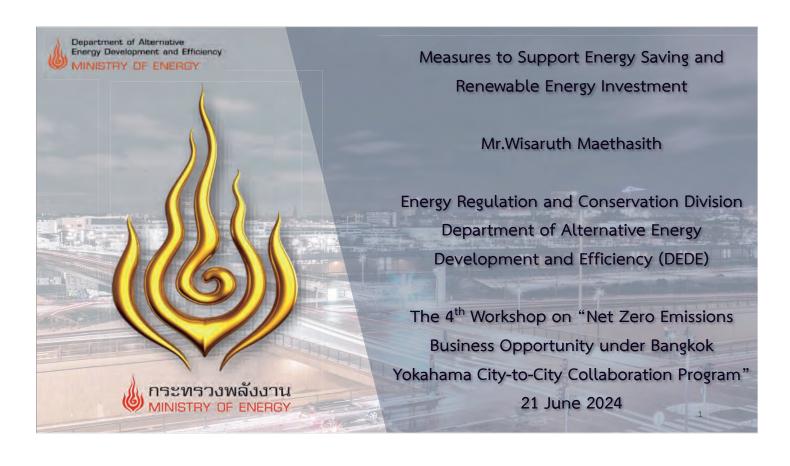














## Energy Efficiency Plan - New Revision

## **EEP 2018**

- Target: reduce Energy Intensity (FEC/GDP) by 30% by 2037, base year of 2010 (8.54 -> 5.98 ktoe/MBaht)
- Equivalent to a reduction of 49,064 ktoe/year from the Business as Usual (EI)
- Assumption: GDP Growth of 3.8% p.a.

# EEP 2024 1

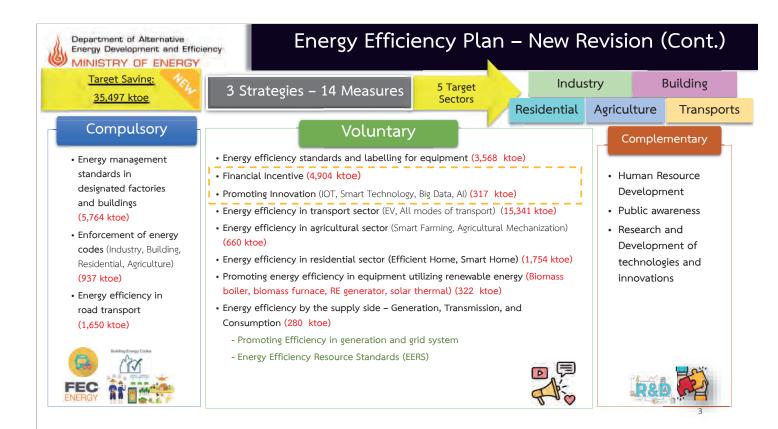
- Target: reduce Energy Intensity (FEC/GDP) by 36% by 2037, base year of 2010 (8.54 -> 5.47 ktoe/MBaht)
- Equivalent to a reduction of 35,947 ktoe/year from the Business as Usual (EI)
- Assumption: GDP Growth of 3.1% p.a.



- Target Energy Consumption Reduction of 64,340 ktoe by 2050 (El Reduction of 40%)

GDP Growth of 2.6% p.a. from 2038 - 2050

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## Financial Incentive - Subsidy Program 20 – 80

#### Measure Overview

- Subsidize equipment and machinery replacement (with approved high-efficiency ones) or innovative energy-efficient equipment
- · Subsidize for equipment and installation cost
  - 20% for Designated buildings and factories when replacing with efficient equipment and machinery
  - 30% for Designated buildings and factories when replacing with efficient equipment and machinery with approved innovative technologies
  - $\hbox{-} \textbf{30\%} \ for \ non-designated \ buildings \ and \ factories, \ community \ enterprise, \ start-ups, \ or \ agriculturers$
- · Supports up to 3 million baht per applicant
- · Payback period no longer than 7 years

#### **Examples measures**

- Installing variable speed motors used with the machine.
- \* Replacement air compressors, high efficiency
- To improve the power factor.
- \* Replacing high-performance electric motor
- Insulation
- The use of heat pumps





Source: DEDE



## Financial Incentive - Board of Investment



### **Smart and Sustainable Industry**

### Applicable Projects\*

- \* Energy-efficient equipment replacement
- Equipment replacement to utilize renewable energy
- ❖ GHG Reduction project (must be certified by TGO\*\*)
- Environmental impact reduction project

## **Energy Service Companies (ESCO)**

- Provide turnkey solutions for energy efficiency project
- Project implemented can be in the form of guaranteed saving, shared saving, or chauffrage

\*At least 1M Baht in investment (or 500k Baht for SME)

\*\*Thai Greenhouse Gas Organization

Currently being implemented

## Benefits

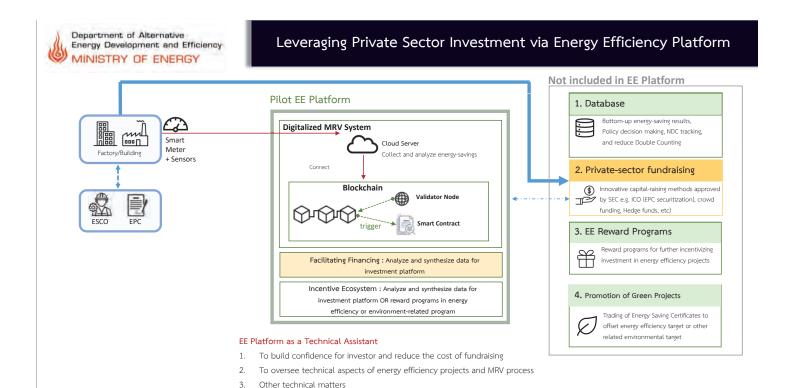
- Exemption on import duty on machinery
- 3-year corporate income tax (CIT)
   exemption 50% of the investment cost

## Benefits **E**

- Exemption on import duty on machinery
- 8-year corporate income tax (CIT)
   exemption no CIT exemption cap



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## Alternative Energy Development Plan – New Revision

### **AEDP 2018**

- Target: 30% of renewable energy in the final energy consumption
- Equivalent to 29,411 MW in RE electricity generation by 2037
- 26,901 ktoe of RE Thermal, and 4,085 ktoe of RE in transports (Ethanol, Biodiesel, Pyrolysis Oil)

# EEP 2024 164

- Target: 36% of renewable energy in the final energy consumption
- Equivalent to 73,286 MW in RE electricity generation by 2037
- 17,061 ktoe of RE Thermal, and 1,621 ktoe of RE in transports (Ethanol, Biodiesel, SAF, Hydrogen)



Target: Carbon Neutrality

- Target Energy Consumption Reduction of 64,340 ktoe by 2050 (El Reduction of 40%)
- GDP Growth of 2.6% p.a. from 2038 2050

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## Alternative Energy Development Plan (Cont.)

#### Electricity

- RE/Green electricity at an appropriate rate
- Tax incentive for RE generation
- Regulation overhaul
- Promotion of Energy Storage System
- Promotion of decentralized RE
- Promotion of off-grid RE for rural area
- RE Forecasting for grid stability
- Research on the roles of hydrogen in electricity sector
- Promotion of generation and utilization of green hydrogen

#### **Thermal**

- Promoting management of feedstock for RE supply chain
- Promoting utilization of RE feedstocks as main fuel or for co-firing (e.g. wood pellet, RDF)
- Promoting utilization of production waste for RE
- Promoting business matching for supplier and consumers of RE
- Promoting PR of successful cases and piloting innovation RE projects
- Financial incentives via soft loans/tax incentives for RE
- Promoting equipment utilizing RE e.g. biomass furnace, etc.
- Promoting financing mechanism for RE e.g. Thailand taxonomy and Green Financing
- Research on the roles of hydrogen in industrial sector
- Promotion of green hydrogen generation

#### Biofuel

- Human Resource Development
- Public awareness
- Research and Development of technologies and innovations



## Feed-in Tariff Rate (2022 - 2030)

Renewable Electricity Feed-in Tariff (FIT) Rate (2022 – 2030)					
Fuel Type	FiT (Baht/kWh)			Duration	
ruet type	*FiT <sub>F</sub>	**FiT <sub>v</sub>	FIT	Duration	
1. Biogas (Wastewater/Waste)					
All capacity	2.0724	-	2.0724	20 years	
2. Wind					
All capacity	3.1014	-	3.1014	25 years	
3. Solar Photovoltaic					
Ground-mounted – all capacity	2.1679	-	2.1679	25 years	
Ground-mounted + energy storage Capacity 10 - 90 MW	2.8331	-	2.8331	25 years	

Renewable Electricity Feed-in Tariff (FiT) Rate (2022 – 2030) Community Power Plant for Grass Root Economy Pilot Project					
Fuel Type	FiT (Baht/kWh)			Duration	
ruet Type	*FiT <sub>F</sub>	**FiT <sub>v</sub>	FiT	Duration	
1. Biomass					
Installed capacity < 3 MW	2.61	2.2382	4.8482	20 years	
Installed capacity ≥ 3 MW	2.39	1.8736	4.2636	20 years	
2. Biogas					
Waste/Wastewater portion < 25%	2.79	1.9369	4.7269	20 years	

 $^*\mathrm{Fit}_{\scriptscriptstyle F}$  (Fixed Feed-in Tariff) – constant throughout the duration of the project

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 $<sup>\</sup>rm **FiT_{\rm V}$  (Variable Feed-in Tariff) – varies throughout the duration of the project in response to inflation

<sup>\*\*\*</sup>For projects in the following provinces: Yala Pattani Narathiwat and Songkhla (Chana, Thepha, Saba Yoi, Na Thawi districts only) are entitled to additional FiT Premium rate of 0.5 Baht/kWh

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