

# Updating mitigation scenarios for HCMC's CCAP

Yuki Ochi, Tran Thanh Tu, Dao Canh Tung, Nguyen Tung Lam

SPI-NAMA AIM team

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# Background

JICA SPI-NAMA project:

- Technical works to support implementation of mitigation policy taking HCMC as the pilot site;
- Response to HCMC's needs for preparation for future national guidance: Updating the CCAP with quantitative mitigation targets and MRV-able actions;



Source: <https://qhkt.hochiminhcity.gov.vn/>

# Framework Setting

- 2016 is suitable for the base year because of data availability.
- 2030 is the target year corresponding to INDC.
- Start with energy-related CO<sub>2</sub>.

<b>Base year</b>	2016
<b>Target year</b>	2030
<b>Target GHG</b>	CO <sub>2</sub>
<b>Target activities</b>	<b>Energy related activity</b> Industry, Transport, Commercial, Residential
<b>No. of scenarios</b>	<b>BaU (Business as Usual) Scenario</b> <ul style="list-style-type: none"><li>- Socioeconomic development based on future plan of the region</li><li>- Without implementation of LCS policy in future</li></ul> <b>LCS Scenario</b> <ul style="list-style-type: none"><li>- Same socioeconomic development as BaU scenario</li><li>- With implementation of LCS policy in future</li></ul>

# Data Preparation

Two kinds of data on current status and future projection are needed.

## Data for estimating current status

- Population
- No. of household
- Input-Output (IO) table
- Transport volume (Passenger & Freight)
- Energy balance table (demand & supply)

It is difficult to collect all data in many cases, especially an IO table and an energy balance table.

We can estimate the data based on available information.

### Reference source

- Statistics of the region and nation (Statistical yearbook, SNA, etc.)
- Information from line departments
- Previous research
- Report from international organization (e.g. IEA World Energy Balance)

\*1 Energy service:  
Services supplied by energy use  
(Air conditioner supplies cooling/heating service)

## Information for future projection

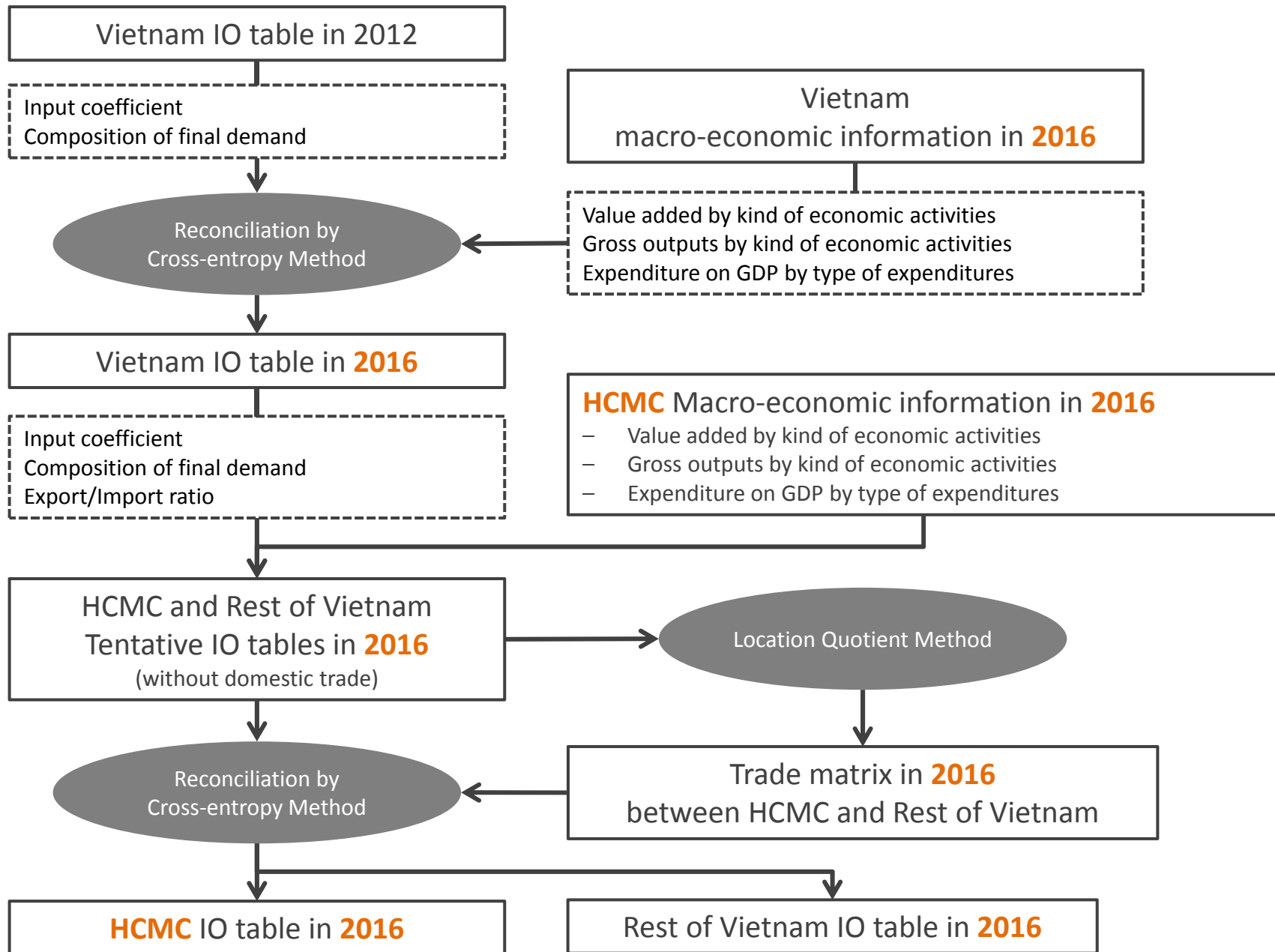
- Population projection
- No. of persons per household  
It is expected that household size becomes smaller in parallel with economic growth
- Economic growth projection/target
- Transport planning  
(No. of trips, Modal share)
- Change in energy service<sup>\*1</sup> demand  
It is expected that energy service demand per driving force<sup>\*2</sup> increases depending on economic growth.  
For example, people will use more electric devices if their incomes are increased.
- Energy mix in electric power supply

### Reference source

- Masterplans, strategies, targets of the region and nation
- Trend of similar cities and nations

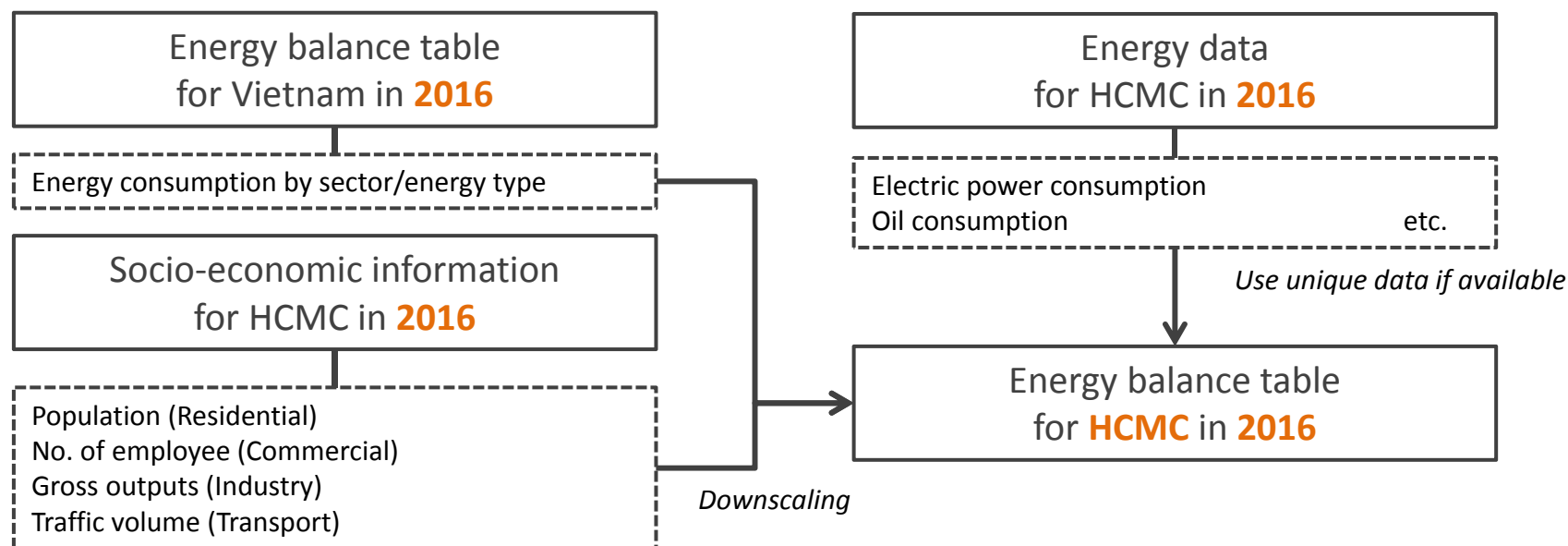
\*2 Driving force:  
Socio-economic factors originating energy service demand  
(Usage of air conditioner increases as No. of households increase)

# Procedure for Estimating HCMC IO Table



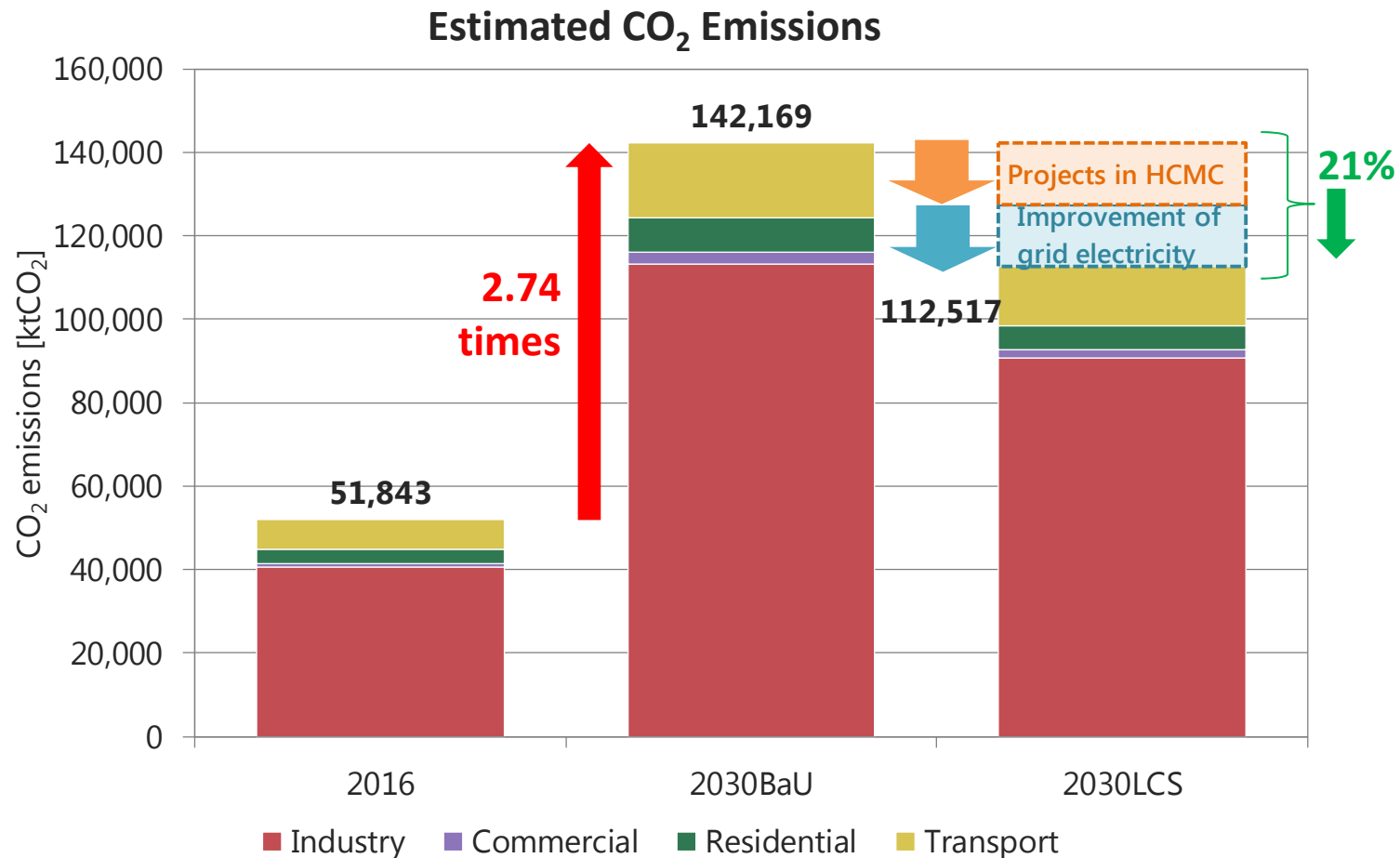
# Procedure for Estimating HCMC Energy Balance

- Final consumption part of the energy balance table for HCMC is estimated based on the energy balance table for whole Vietnam.
- Regarding sectors and energy type where we cannot collect any energy consumption data for HCMC, we estimate them by downscaling of the national energy balance table.
- Ratios of Socio-economic information such as population, gross output and traffic volume between HCMC and Vietnam are used to downscaling.



# CO<sub>2</sub> Emissions in 2030

- If there are no low carbon measures in the BaU scenario, CO<sub>2</sub> emission in 2030 will become **2.7 times** as large as that in 2016.
- In the LCS scenario, **CO<sub>2</sub> emission can be reduced by 21%** compared with the BaU scenario through both HCMC's actions and improvement of national grid electricity.
  - **NDC of Vietnam:** By 2030 Viet Nam will reduce GHG emissions by **8%** compared to BAU. The contribution could be increased to **25%** if international support is received.



# CO<sub>2</sub> Emission Reduction Potential

## Low Carbon Actions and Their Reduction Potentials

	Industry	Commercial	Residential	Transport	Total
<b>Action 1. Green Energy</b> Deployment of renewable electricity	81	46	21		<b>148</b>
<b>Action 2. Sustainable Economy</b> Diffusion of low-energy offices and efficient factories	10,026	460			<b>10,485</b>
<b>Action 3. Smart &amp; Eco-friendly Lifestyle</b> Promotion of low-energy home and appliance			614		<b>614</b>
<b>Action 4. Clean &amp; Smart Transport</b> Energy efficient vehicle and modal shift				3,516	<b>3,516</b>
<b>Total of Action by HCMC</b>	<b>10,107</b>	<b>506</b>	<b>635</b>	<b>3,516</b>	<b>14,764</b>
<b>Improvement of CO<sub>2</sub> emission factor of electricity</b> Change of energy mix and reduction of transmission loss	12,504	398	1,747	239	<b>14,888</b>
<b>Total</b>	<b>22,610</b>	<b>904</b>	<b>2,382</b>	<b>3,755</b>	<b>29,652</b>



# Projects and their Emission Reduction

Action	Project	Sector	Emission reduction (ktCO <sub>2</sub> e)	
<b>1 Green Energy</b>	1-01	Introduction of photovoltaic power generation (Buildings)	Commercial	15.7
	1-02	Introduction of photovoltaic power generation (Factories)	Industry	37.7
	1-03	Introduction of photovoltaic power generation (Households)	Residential	9.4
	1-04	Introduction of Wind Power Generation	Commercial	4.1
	1-05	Introduction of Small-scale Hydropower Generation (at water distribution stations, canals)	Commercial	0.5
	1-06	Introduction of Solar Water Heater (Buildings)	Commercial	34.2
	1-07	Introduction of Solar Water Heater (Households)	Residential	46.4
<b>Total</b>			<b>148.0</b>	
<b>2 Sustainable Economy</b>	2-01	Energy saving support scheme such as ESCO (Energy Saving Company) project for industries	Industry	4,967.9
	2-02	Energy saving support scheme such as ESCO (Energy Saving Company) project for commercial buildings	Commercial	77.8
	2-03	Introduction of low carbon furnaces	Industry	3,688.4
	2-04	Introduction of energy efficient boilers	Industry	503.2
	2-05	Introduction of energy efficient motors	Industry	815.3
	2-06	Waste Heat Recovery in Factories	Industry	198.0
	2-07	Installation of High Efficiency Lighting in Buildings	Commercial	48.5
	2-08	Installation of High Efficiency Air Conditioner in Buildings	Commercial	35.7
	2-09	Installation of Heat Pump Water Heater in Buildings	Commercial	61.1
	2-10	Introduction of Building Energy Efficiency Standards	Commercial	30.0
	2-11	Implementation of Energy Management in Buildings	Commercial	31.6
	2-12	Promotion of Energy Saving Behaviours in Workplaces	Commercial	27.8
<b>Total</b>			<b>10,485.3</b>	

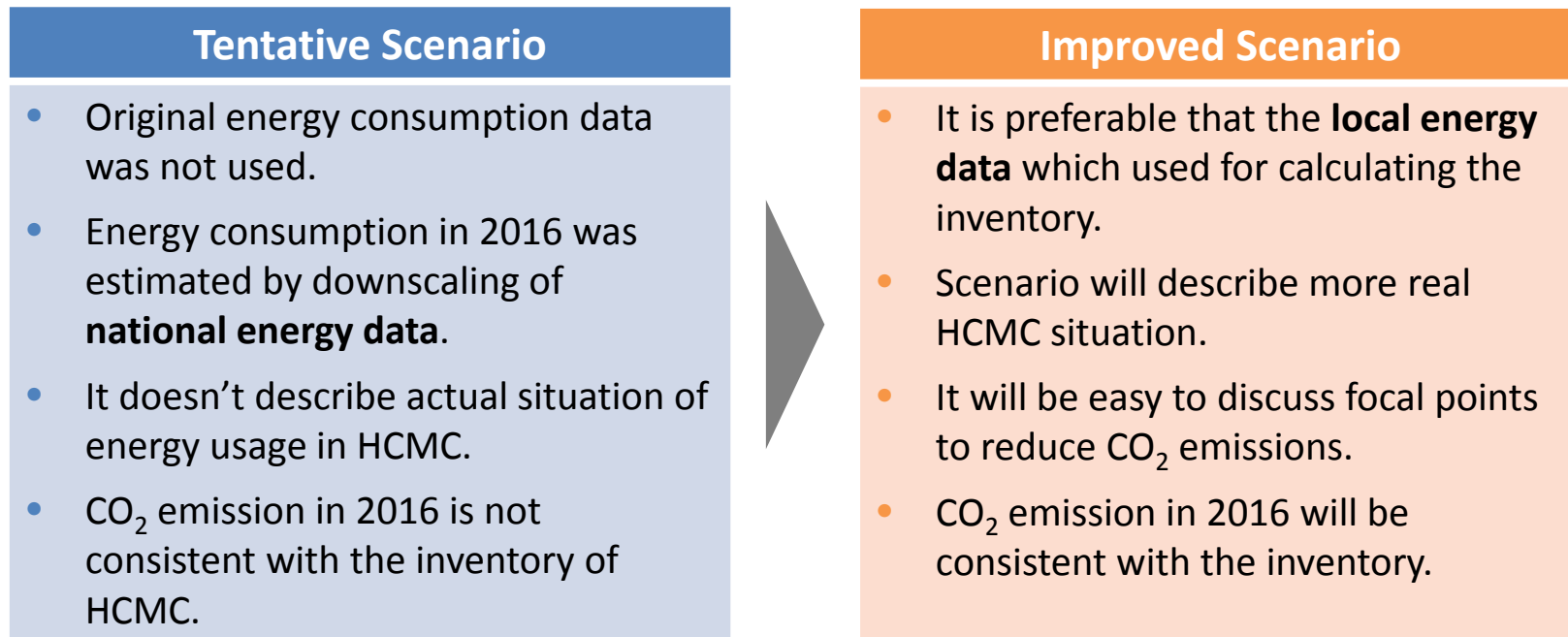
# Projects and their Emission Reduction

Action	Project	Sector	Emission reduction (ktCO <sub>2</sub> eq)
<b>3 Smart &amp; Eco-friendly Lifestyle</b>	3-01 Introduction of New Housing Energy Efficiency Standards	Residential	32.5
	3-02 Installation of Heat Pump Water Heater in Households	Residential	23.1
	3-03 Installation of High Efficiency Lighting in Households	Residential	65.0
	3-04 Installation of High Efficiency Air Conditioners in Households	Residential	114.8
	3-05 Promotion of Energy-efficient Appliances	Residential	230.8
	3-06 Implementation of Energy Management in households	Residential	95.7
	3-07 Enlightenment of Energy Conservation in Households	Residential	52.6
<b>Total</b>			<b>614.5</b>
<b>4 Clean &amp; Smart Transport</b>	4-01 Promotion of Electric Vehicle	Transport	313.6
	4-02 Promotion of Energy-efficient Vehicles (Passenger & Commercial Vehicles)	Transport	274.9
	4-03 Introduction of Electric Motorbikes	Transport	179.8
	4-04 Promotion of Energy-efficient Vehicles (Motorbikes)	Transport	81.5
	4-05 Promotion of Energy-efficient Vehicles (Trucks)	Transport	1,962.3
	4-06 Promotion of Eco-Driving with Digital Tachographs	Transport	247.7
	4-07 Introduction of CNG bus	Transport	53.2
	4-08 Introduction of EV bus	Transport	65.6
	4-09 Promotion of Traffic Flow Management	Transport	24.3
	4-10 Expansion of Frequencies and Routes of Bus Transportation	Transport	121.3
	4-11 Development of MRT	Transport	192.2
<b>Total</b>			<b>3,516.3</b>
<b>Improvement of CO<sub>2</sub> emission factor of electricity</b>			<b>14,888.2</b>
<b>Total</b>			<b>29,652.4</b>

# Refinement of the Scenario

**This is a tentative result. There are rooms to refine!**

## 1. Improve base year data



## 2. Reflect HCMC targets, visions, plans and projects

- We used general countermeasures and projects for estimating CO<sub>2</sub> emission reduction in the LCS scenario.
- It can be more useful if actual targets, visions, plans and projects related mitigation are reflected to the scenario.

# Difference between AIM scenario & Inventory 2016

- Coverage in stationary energy
  - **AIM tentative scenario** includes scope 1 & 2.
  - **HCMC Inventory** includes scope 2 & 3 emission.
- Value of scope 2 emission in stationary energy
  - The reason of the difference is used data: In AIM tentative scenario, energy consumption was estimated from national data.

## Scope 2 CO<sub>2</sub> emissions in stationary energy

Unit: ktCO<sub>2</sub>

	HCMC Inventory	AIM Tentative Result
Residential	7,944	2,433
Commercial	4,519	407
Industry	11,131	14,908
Agriculture, forestry and fishing	810	17
<b>TOTAL</b>	<b>24,404</b>	<b>17,766</b>

# Further work requirements

- Updating NDC
- Update CCAP of other cities toward the new SEDP 2030
- Roadmap of mitigation countermeasures implementation
- Socio economic impacts assessment of CCAP
- Capacity building

Thank you very much for your attention!