

LOW CARBON DEVELOPMENT SCENARIOS IN VIETNAM - CASES OF DA NANG AND HAI PHONG CITIES

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CONTENT OF PRESENTATION

- Background and Objective
- Framework of study
- Methodology
- Results of study
- Conclusions

BACKGROUND & OBJECTIVE

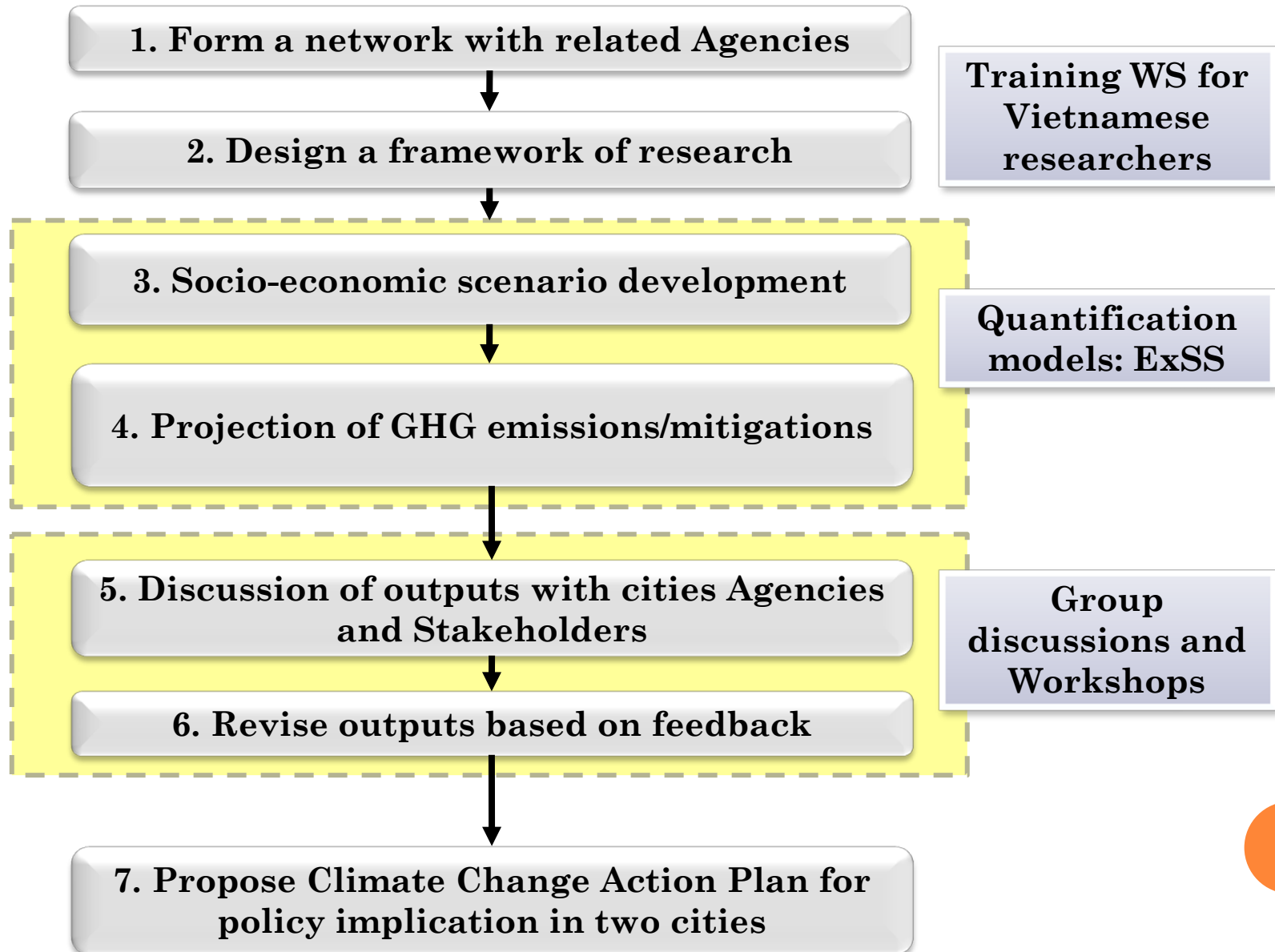
- Paris Agreement's goal:
 - to keep global temperatures rise well below 2°C
 - to pursue efforts to limit the temperature increase to 1.5°C
- requires all Parties to put forward their best efforts through “nationally determined contributions” – NDCs
- Vietnam NDC: reduce 8-25% of total emissions in 2030 compared to Business as Usual (BaU)
- While development of national level plans (NDCs) have been making progress, development of city level plans for the realization of low-carbon cities are also becoming active
- major cities in Vietnam are required to localize the initiatives of the NDC including Hai Phong and Da Nang
- Objective of the research:

To design and support the design of Low Carbon City for Hai Phong/Da Nang cities using AIM's methodology

FRAMEWORK OF STUDY

- **Base year:** 2013 (depends on data availability)
- **Target years:** 2030 (follow targets of some development plans)
- **Sectors:** Residential, Commercial, Transport, Industry,
- **Area:** Hai Phong and Da Nang cities
- **Target GHG:** CO₂
- **Scenarios:**
 - 2030BAU: Business as Usual (no countermeasure is applied)
 - 2030CM: Countermeasure (countermeasures are applied)

METHODOLOGY



EXTENDED SNAPSHOT TOOL (ExSS)

ExSS is a static model, which describes:

- Socio-economic activity
 - Population
 - Household
 - Economic development
 - Industrial structure
 - Transport
 - Commercial building
 - etc.,
- Energy consumption
- Power generation
- Technology diffusion
- Greenhouse gas (GHG) emissions

in a future year

EXTENDED SNAPSHOT TOOL (EXSS)

ExSS estimates future GHG emissions and reductions based on two approaches.

- **Top-down approach**
- **Bottom-up approach**
- **Top-down approach** is used to estimate socio-economic activities (such as population, number of household, economic development, industrial structure and transport demand) and energy demand and GHG emissions from a macroscopic point of view.
- **Bottom-up approach** is used to assume the technology-related information (such as diffusion rate and energy saving rate) based on the projects in CCAP and to estimate GHG emission reduction and GHG absorption capacity by project.
- We improve estimation by repeating model simulation through information sharing and exchanging with Hai Phong and Da Nang cities.

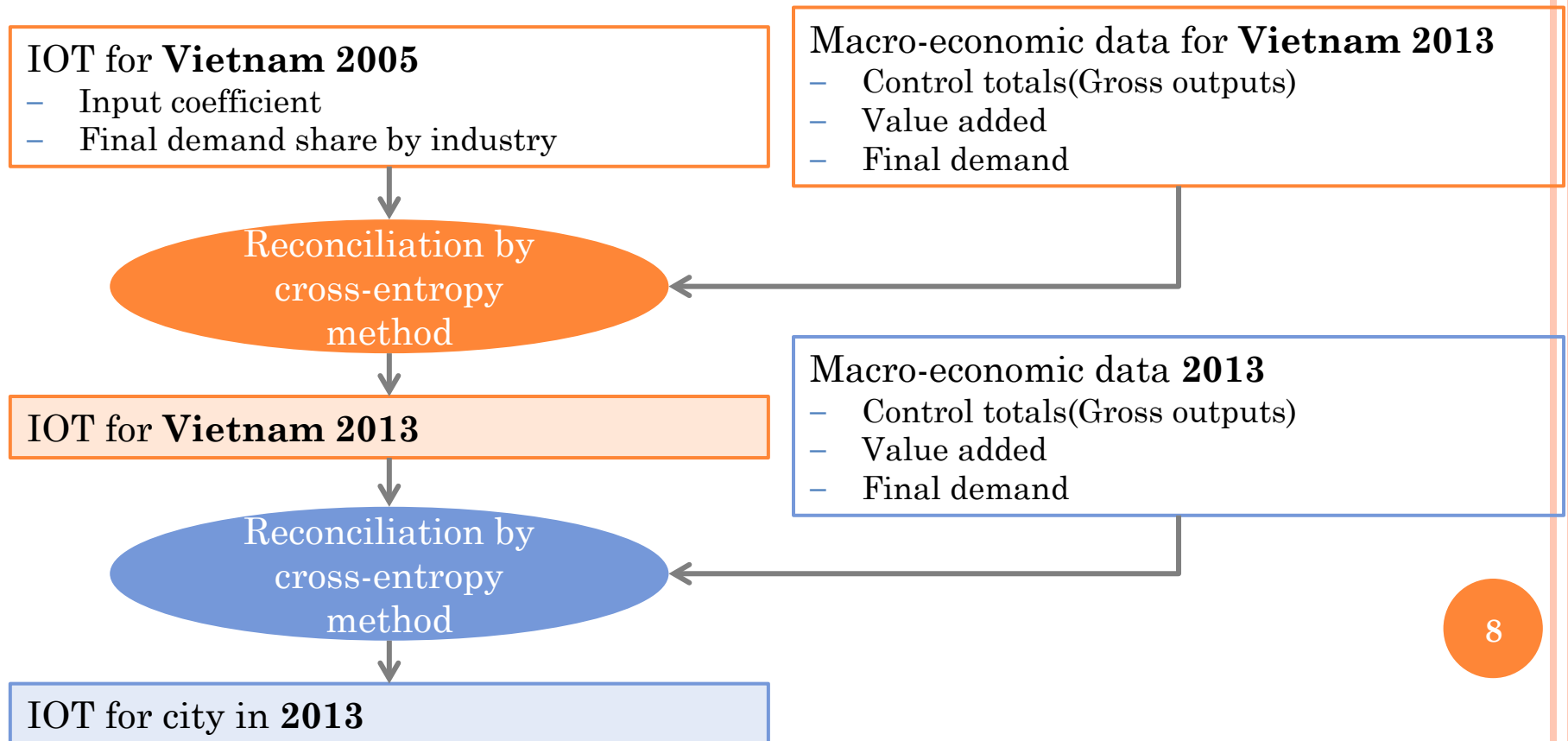
Note:

GHG: Greenhouse gas

CCAP: Climate Change Action Plan

ESTIMATION OF INPUT-OUTPUT TABLE

- Regional IOT is estimated by the cross-entropy method.
- Necessary information
 - IOT for Vietnam (national scale)
 - Control totals (Gross output) by industry
 - Value added by industry and Final demand (Consumption, Investment, Export, Import)



ESTIMATION OF ENERGY BALANCE TABLE

The Energy Balance Table (EBT) of Haiphong in 2013 is estimated based on the available on-site information of Haiphong and EBT of the whole Vietnam in 2013 (published by IEA), together with the macro-economic information of Haiphong and

Industry sector

- Electricity consumption is got from DIC.
- Energy consumptions are downscaled from national scale (industrial output)

Transport sector

- Energy consumptions are calculated based on fuel economy and transport volume.
- Energy consumption from waterway of freight is downscaled from national scale by (transport volume)

Residential sector

- Energy consumptions are calculated from electricity consumption and fuel share reported by DIC.

Commercial sector

- Electricity consumption is got from DIC.
- Energy consumptions except for electricity are downscaled from national scale by value added.

Main sources

Energy consumption in Vietnam: IEA (2015) “Energy Balances of Non-OECD countries”

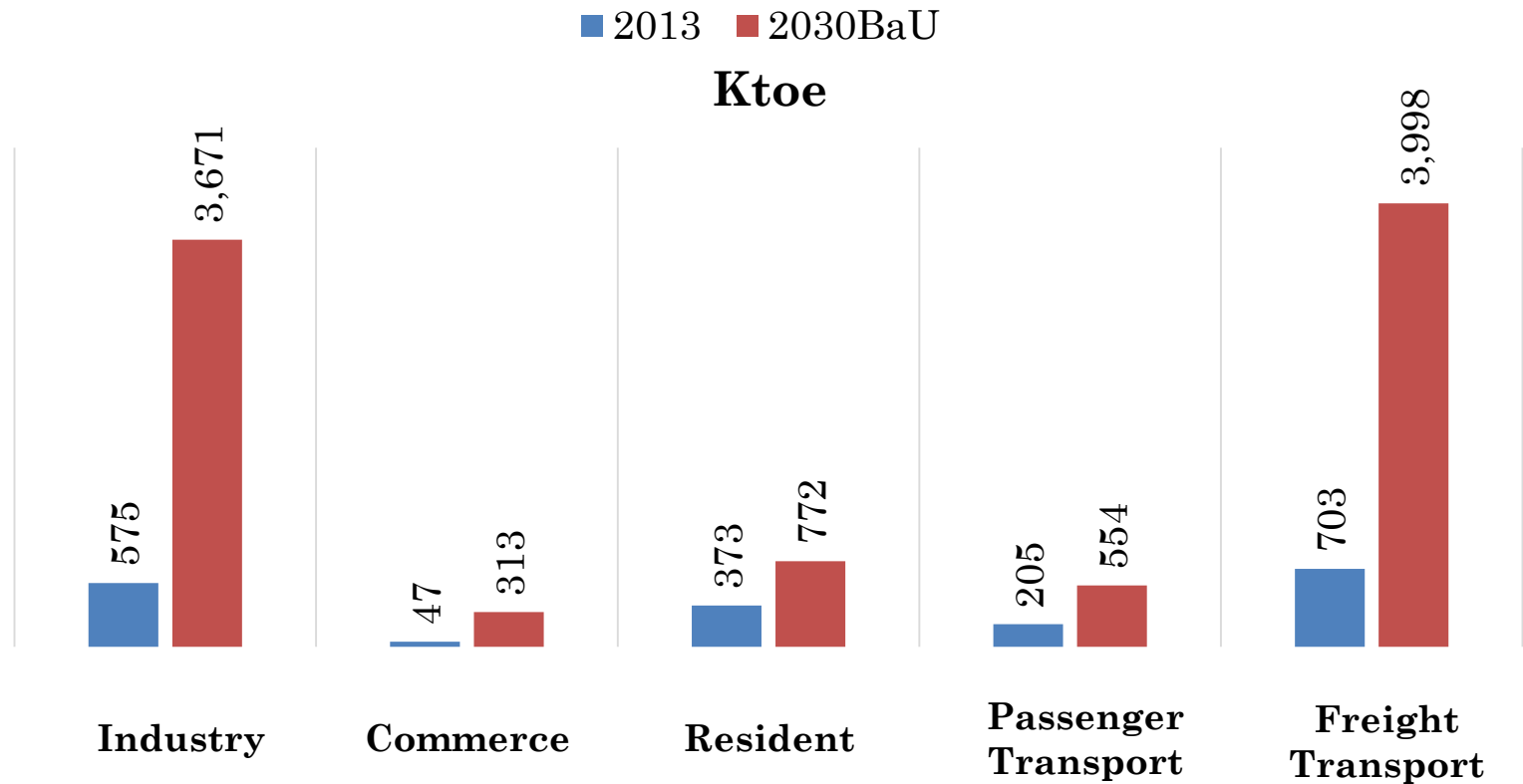
Electricity: Department of Industry and Commerce – Hai Phong (DIC)

Fuel economy: GEC (2014) “Report for Ho Chi Minh City-Osaka City Cooperation Project for Developing Low Carbon City”

Industrial output: Haiphong Statistical Yearbook, Vietnam Statistical Yearbook

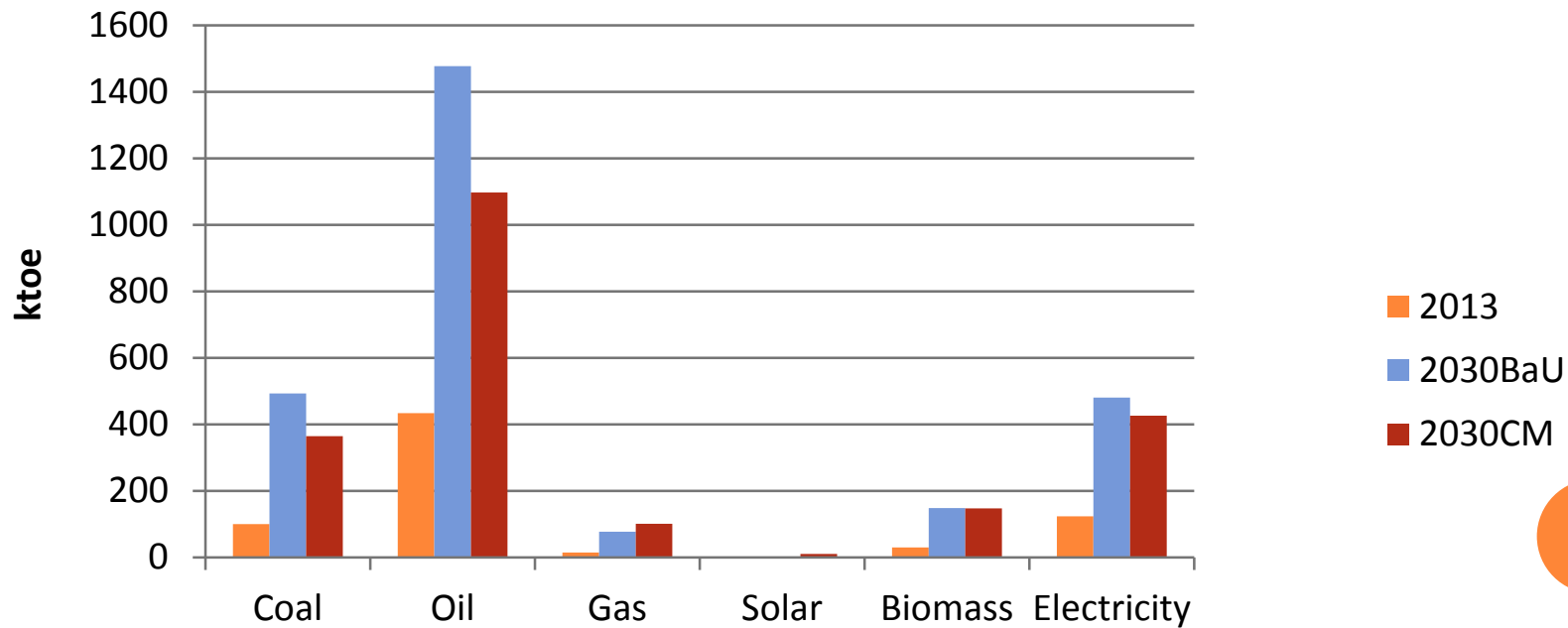
Value added: Haiphong Statistical Yearbook, Vietnam Statistical Yearbook

HAI PHONG ENERGY DEMAND 2030



DA NANG ENERGY CONSUMPTION

	2013	%	2030BaU	%	2030CM	%	BaU/2013	CM/BaU
Total	702	100.0	3,432	100.0	2,884	100.0	4.89	0.84
By sector								
Agriculture	1	0.1	3	0.1	3	0.1	5.39	1.00
Industry	205	29.2	1,268	37.0	1,088	37.7	6.18	0.86
Commercial	22	3.2	154	4.5	136	4.7	6.91	0.88
Residential	77	11.0	188	5.5	156	5.4	2.43	0.83
Passenger transport	185	26.3	623	18.1	526	18.2	3.37	0.84
Freight transport	212	30.2	1,196	34.9	975	33.8	5.64	0.82



CLIMATE CHANGE ACTIONS

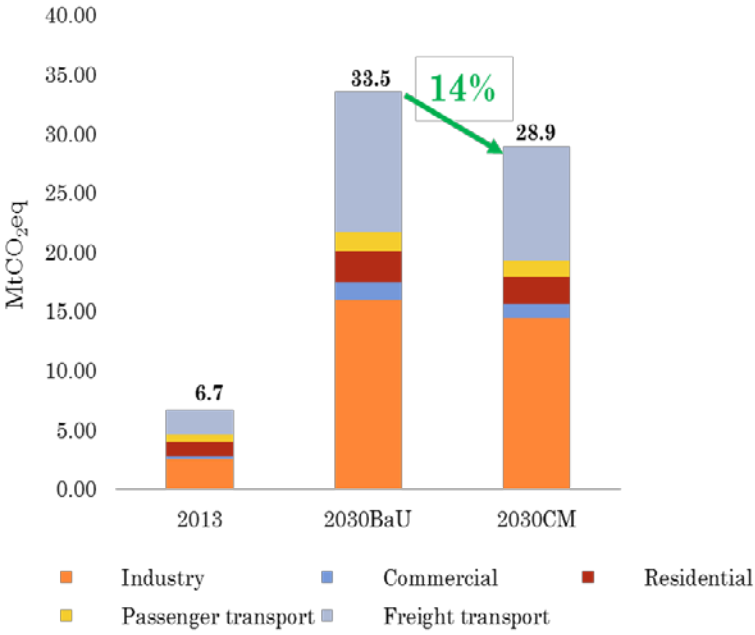
Hai Phong

	Industry	Commercial	Residential	Passenger Transport	Freight Transport	Total (ktCO2eq)
Action 1. Green Industry Promotion of energy efficient equipment and fuel shift	1,477					1,477
Action 2. Green Building Diffusion of low-energy building (EMS, Insulation, Fuel shift)		199	63			262
Action 3. Energy Efficiency Promotion of energy efficient device/appliance		130	233			363
Action 4. Clean Transport Energy efficient vehicle and modal shift				284	2,257	2,541

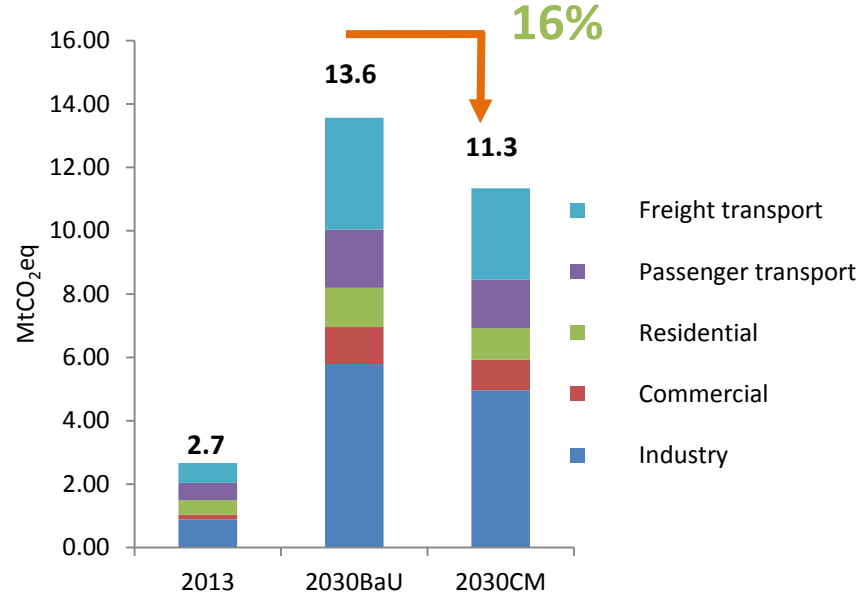
Da Nang

Action 1. Smart Industry Promotion of energy efficient equipment and fuel shift	829					829
Action 2. Smart Building Diffusion of low-energy building (EMS, Insulation, Fuel shift)		55	51			106
Action 3. Energy Efficiency Promotion of energy efficient device/appliance		118	180			298
Action 4. Smart Transport Energy efficient vehicle and modal shift				301	653	954
Action 5. Green Energy deployment of renewable electricity		34	5			39

GHG EMISSIONS AND REDUCTIONS



HAI PHONG



DA NANG



LOW CARBON PROJECTS FOR HAI PHONG

Action	Project	Sector	Emission reduction (ktCO ₂ e)
1 Green Industry	1-01 Energy savings in factory	Industry	601.9
	1-02 Installation high energy efficiency facilities (such as compressors and motors)	Industry	93.4
	1-03 Regional energy supply system	Industry	514.8
	1-04 Improvement of kiln and furnace technology	Industry	266.6
Total			1,476.8
2 Green Building	2-01 Installation of insulated glasses to commercial buildings	Commercial	19.5
	2-02 Installation of insulated glasses to households	Residential	35.5
	2-03 Introduction of incentive to low energy buildings	Commercial	3.5
	2-04 Introduction of insulating material to houses	Residential	13.4
	2-05 Energy efficiency technology applied to buildings	Commercial	9.7
	2-06 Introduction of solar water heater to commercial buildings	Commercial	44.5
	2-07 Introduction of solar water heater to households	Residential	102.4
	2-08 Introduction of photovoltaic power generation to commercial buildings	Commercial	29.2
	2-09 Introduction of photovoltaic power generation to households	Residential	4.2
Total			262.0
3 Energy Efficiency	3-01 Energy savings in commercial facilities	Commercial	35.4
	3-02 Conversion of street lights to LED lighting	Commercial	3.2
	3-03 High efficiency lighting in commercial buildings	Commercial	43.0
	3-04 High efficiency lighting in households	Residential	36.4
	3-05 High efficiency air conditioners (such as air conditioners with inverter controllers) in commercial buildings	Commercial	22.7
	3-06 High efficiency air conditioners (such as air conditioners with inverter controllers) in commercial households	Residential	48.8
	3-07 Promotion of energy-efficient appliances (refrigerator and other appliances)	Residential	172.2
	3-08 Promotion of energy-efficient appliances (cooking appliances)	Residential	1.1
Total			362.8
4 Clean Transport	4-01 Promotion of eco-driving with digital tachographs	Transport	169.7
	4-02 Smart traffic management	Transport	5.4
	4-03 Expansion of frequencies and routes of bus transportation	Transport	7.6
	4-04 Development of Bus Rapid Transit (BRT)	Transport	3.8
	4-05 Introduction of EV buses	Transport	7.8
	4-06 Introduction of electric motorbikes	Transport	39.9
	4-07 Promotion of energy-efficient vehicles (cars for passenger)	Transport	160.2
	4-08 Promotion of energy-efficient vehicles (motorbikes)	Transport	87.0
	4-09 Promotion of energy-efficient vehicles (trucks)	Transport	2,060.1
Total			2,541.3
Total			4,642.9

LOW CARBON PROJECTS FOR DA NANG

Action	Project	Sector	Emission reduction (ktCO ₂ eq)	
1 Smart Industry	1-01	ESCO (Energy Saving Company) project for industries	Industry	225.8
	1-02	Installation high energy efficiency facilities (such as compressors and motors)	Industry	204.3
	1-03	Regional energy supply system	Industry	127.1
	1-04	Improvement of kiln and furnace technology	Industry	272.0
Total			829.3	
2 Smart Building	2-01	Installation of insulated glasses to commercial buildings	Commercial	6.6
	2-02	Installation of insulated glasses to households	Residential	7.0
	2-03	Introduction of incentive to low energy buildings	Commercial	2.1
	2-04	Introduction of insulating material to houses	Residential	28.6
	2-05	Energy efficiency technology applied to buildings	Commercial	5.7
	2-06	Introduction of solar water heater to commercial buildings	Commercial	18.9
	2-07	Introduction of solar water heater to households	Residential	36.8
Total			105.7	
3 Energy Efficiency	3-01	ESCO (Energy Saving Company) project for commercial buildings	Commercial	33.1
	3-02	High efficiency lighting in public lighting	Commercial	4.3
	3-03	High efficiency lighting in commercial buildings	Commercial	50.5
	3-04	High efficiency lighting in households	Residential	36.1
	3-05	High efficiency air conditioners (such as air conditioners with inverter controllers) in commercial buildings	Commercial	37.1
	3-06	High efficiency air conditioners (such as air conditioners with inverter controllers) in households	Residential	37.2
	3-07	Promotion of energy-efficient appliances	Residential	99.7
Total			298.1	
4 Smart Transport	4-01	Promotion of eco-driving with digital tachographs	Transport	46.6
	4-02	Wide-range traffic control	Transport	4.9
	4-03	Expansion of frequencies and routes of bus transportation	Transport	10.5
	4-04	Development of Bus Rapid Transit (BRT)	Transport	5.2
	4-05	Shift to CNG bus	Transport	11.9
	4-06	Introduction of electric motorbikes	Transport	62.6
	4-07	Promotion of energy-efficient vehicles (cars for passenger)	Transport	102.5
	4-08	Promotion of energy-efficient vehicles (motorbikes)	Transport	143.5
	4-09	Promotion of energy-efficient vehicles (trucks)	Transport	566.2
Total			954.0	
5 Green Energy	5-01	Introduction of photovoltaic power generation to commercial buildings	Commercial	32.4
	5-02	Introduction of photovoltaic power generation to households	Residential	4.6
	5-03	Introduction of small-scale hydropower generation (at water distribution stations)	Commercial	1.6
Total			38.7	
Total			2,225.7	



CONCLUSIONS

- The final output is GHG emission in Hai Phong and Da Nang . Additionally, the intermediate outputs from step 3 will provide the socio-economic visions for Hai Phong and Da Nang in future.
- From the policy perspective, the distributional impact of various policies will be found which can enhance the understanding of the equity impact of those policies. This is expected to solve the conflicts or dilemmas between policy targets in Hai Phong and Da Nang such as: growth of industries and reducing energy demand, agriculture and forest conservation, food production and biofuel production, waste and resources.
- Policy makers in Hai Phong and Da Nang can refer this result to develop city's Climate Change Action Plan

**THANK YOU VERY MUCH FOR
YOUR KIND ATTENTION!**

