

Khon Kaen Province: On the Way to Low Carbon Society

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AIM Workshop

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Objective

To develop low carbon scenarios for Khon Kaen province to support its vision of Low Carbon Society Model for the Greater Mekong Sub-region (GMS)

Scope and Methodology

What to do?....



Framework/Survey

Study Boundary

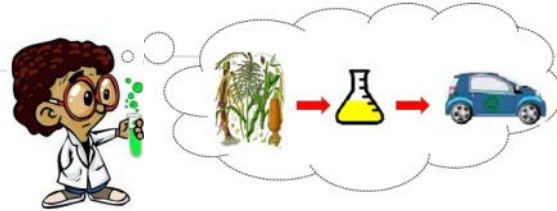


Data collection

- Energy
- Waste
- LULUCF



Review

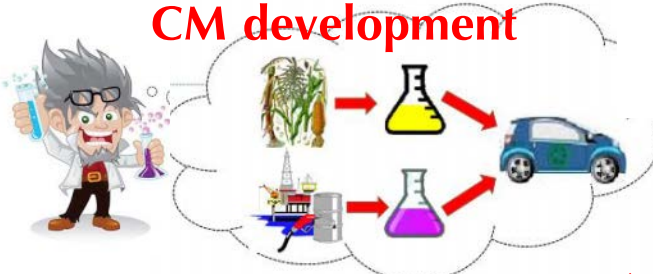


Estimate base year emission

Yr 2005



Yr 2030, 2050
Projection to targets



CM development

(Stakeholder Workshop & Site Visit)



Implementation



Action plan



Snap shot of target years

Khon Kaen Province (KK-province)

Khon Kaen

Location

Latitudes 15°21'5" N; Longitudes 101°44'45" E

Total Land 10,885.99 km² (Forest land 2,074 km²)

Climate SW monsoon with very dry zones

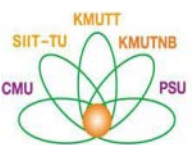
Mean Annual Temperature: 21–38°C

Average Annual Precipitation

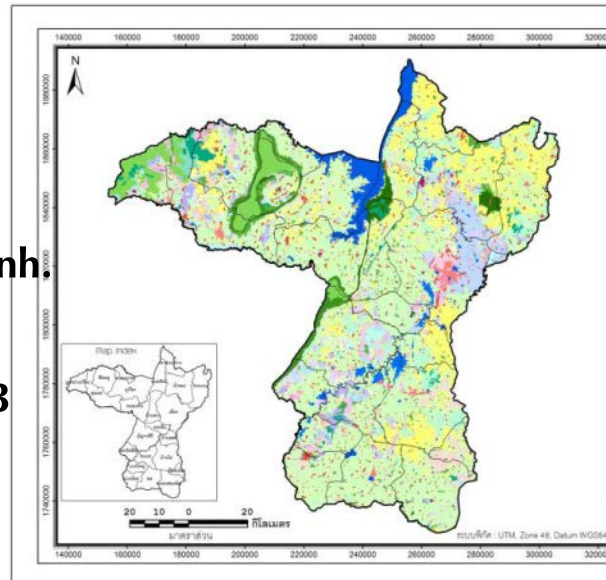
1,303 mm (131 days)

Population (2010): 1,767,601 inh.

GPP (2009) 145,372 Million THB



Khon Kaen Province



Overall Statistics of KK province – in 2007

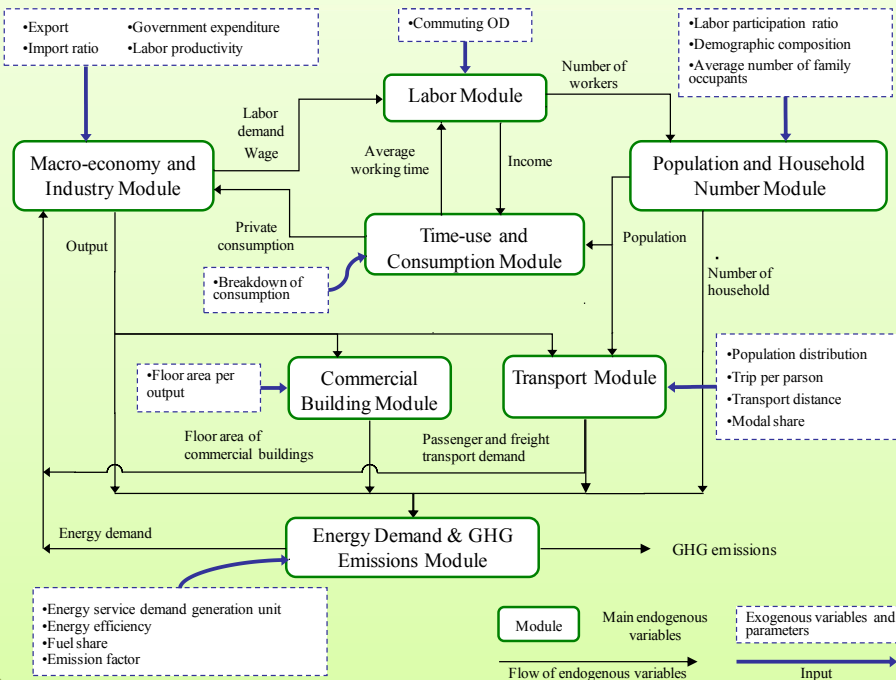
	unit	Khon Kaen Province	Thailand	Khon Kaen/ Thailand (%)
Population	PP	1,752,414	66,041,000	2.7%
GPP-GDP-Agriculture	Million ฿	12,643	848,688	1.5%
GPP-GDP-Non Agriculture	Million ฿	101,282	8,189,087	1.2%
Energy Consumption	ktoe	955.78	64,886	1.5%
Total Area	km ²	10,886	513,115	2.1%
Forest Area	km ²	1,406.98	183,446	0.8%
Agriculture Area	km ²	7,562.94	288,545	2.6%

Methodology

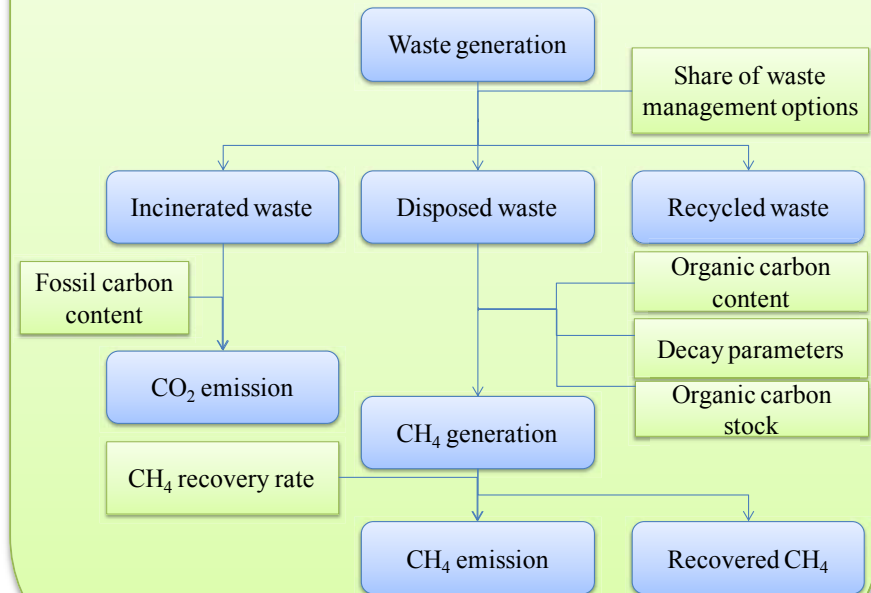
Concept of GHG emissions estimation

$$\text{Emission} = \text{Activity data} \times \text{Emission factor}$$

ExSS for Energy Consumption Activities



ExSS for Waste Management Activities



Data Collection

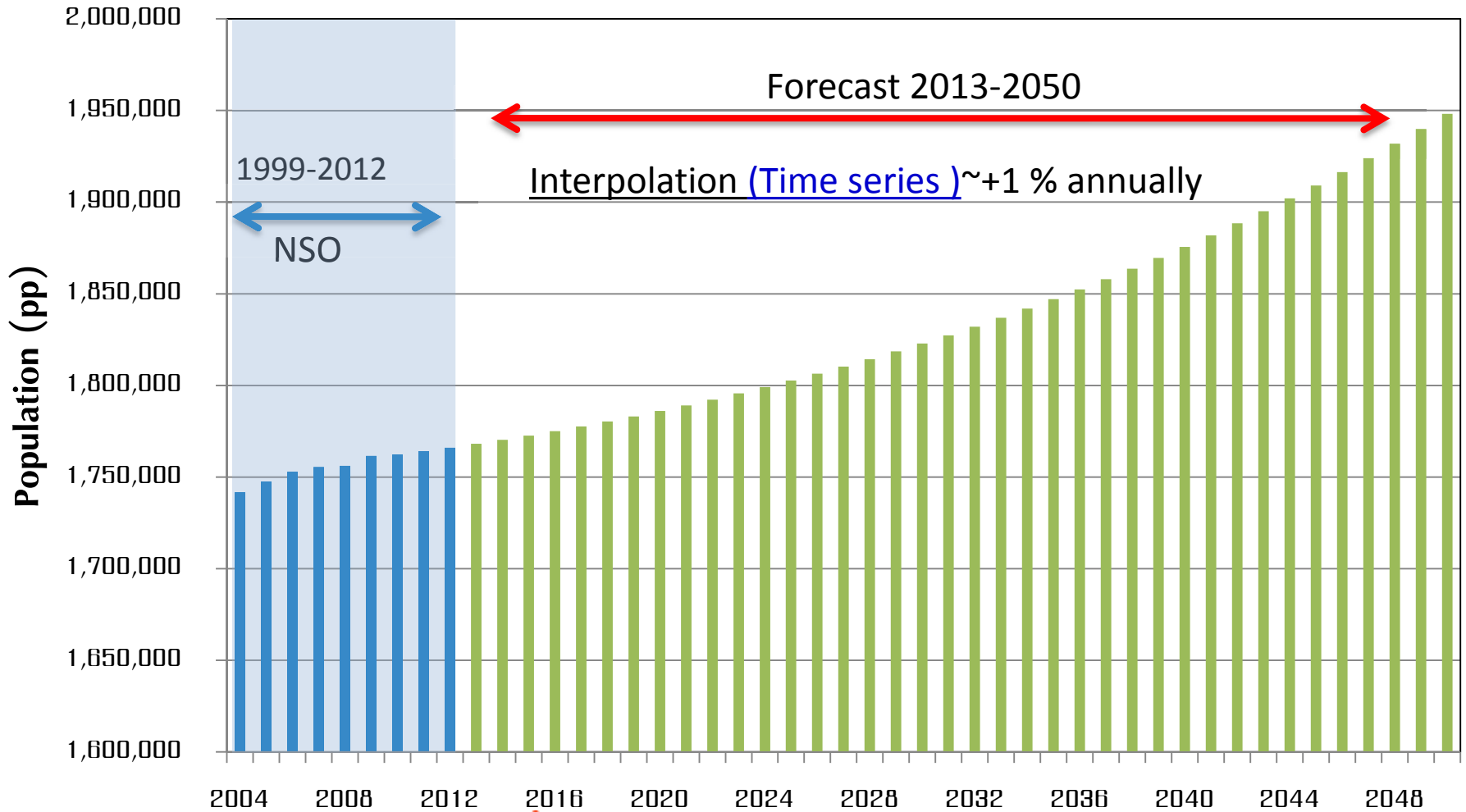
Data	Source
Demographic & Economic	
- Number of KK-population	National Statistical Office (NSO)
- Input-Output Table (I-O)	National Economic and Social Development Board (NESDB)
- Gross KK-Provincial Product	National Economic and Social Development Board (NESDB)
Energy-Consumption Activities	
- Electricity Consumption	Provincial Electricity Authority (PEA)
- Oil Consumption	Department of Energy Business
- Transport Behavior	Office of Transport Policy (Khon Kaen master plan)
- Building Floor Area	Land Development Department (LDD)
- Number of Industry	Department of Industrial Work

Data Collection

Data	Source
Waste Management Activities	
- Waste Generation Rate	Regional Environmental Office 10 (REO 10)
- Waste Collection Efficiency	Regional Environmental Office 10 (REO 10)
- Waste Composition	Regional Environmental Office 10 (REO 10)
- Waste Recycle Rate	Regional Environmental Office 10 (REO 10)
LULUCF Activities	
- Number of Livestocks	Office of Agricultural Economic (OAE)
- Manure Management System	IPCC GHG 2006
- Crop Land	Office of Agricultural Economic (OAE)
- Forest Land	Land Development Department (LDD)
- Amount of Fertilization	Office of Agricultural Economic (OAE)

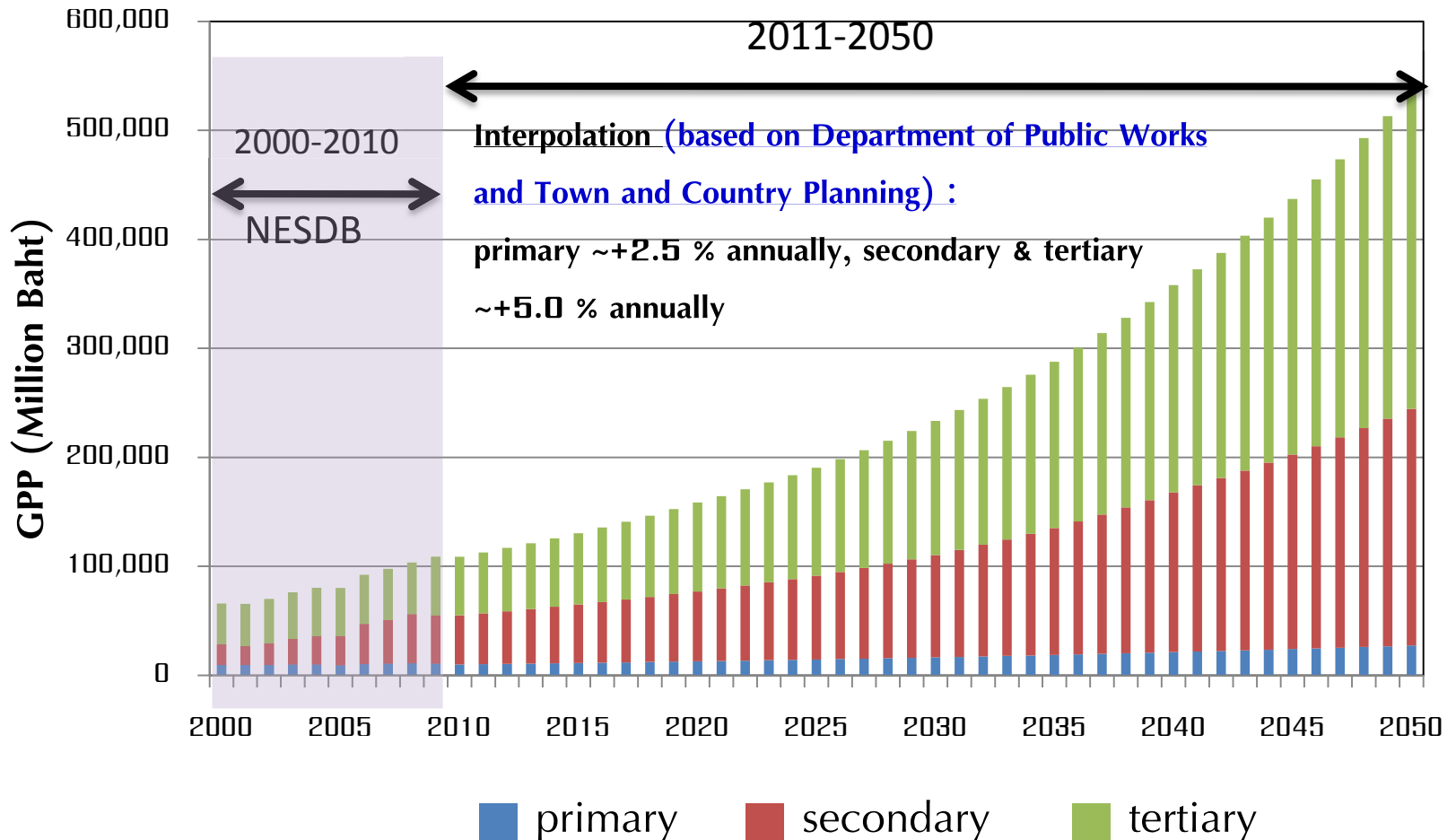
GHG Emission Projection – Population

a) Population Forecast

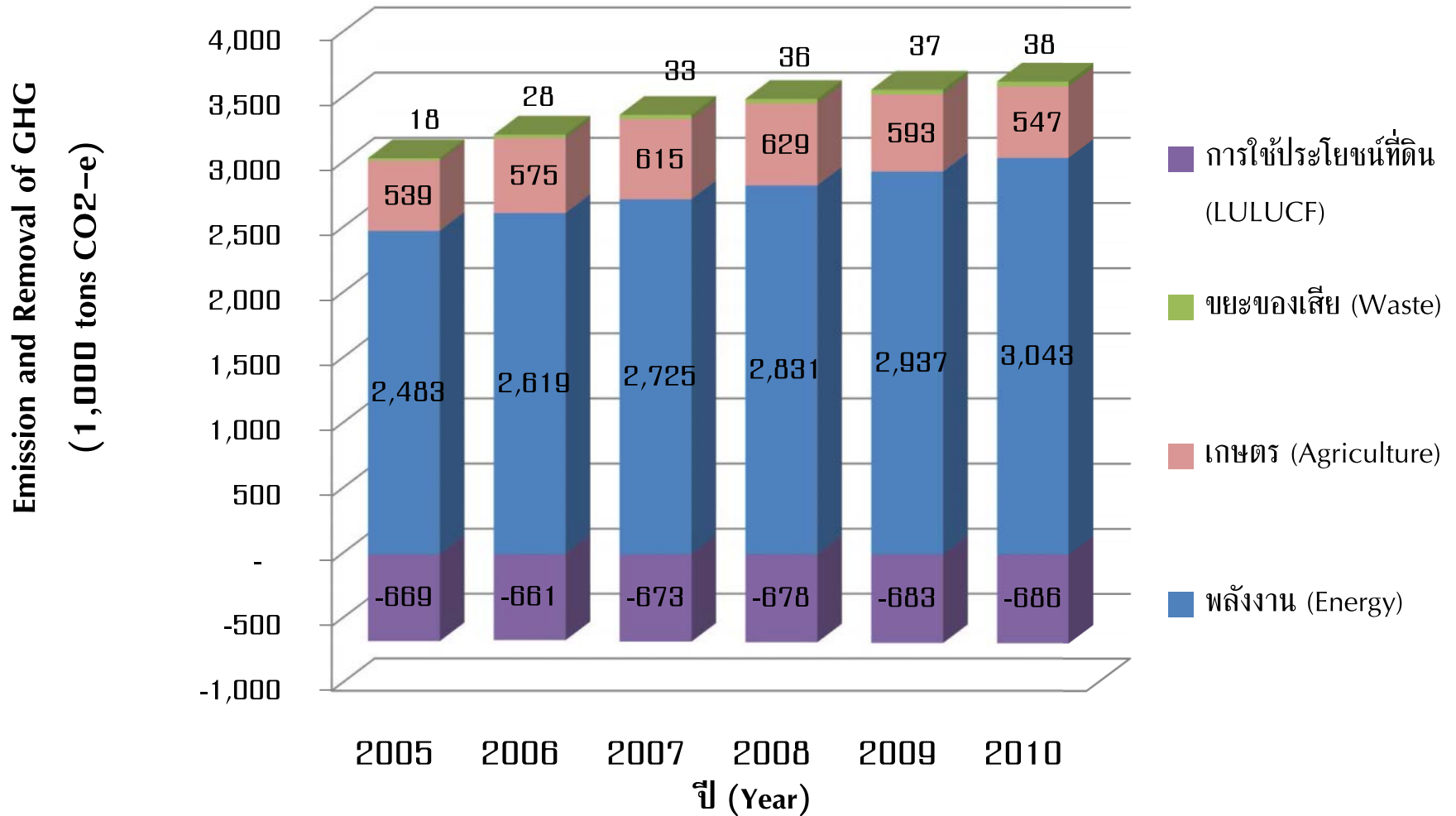


GHG Emission Projection – GPP

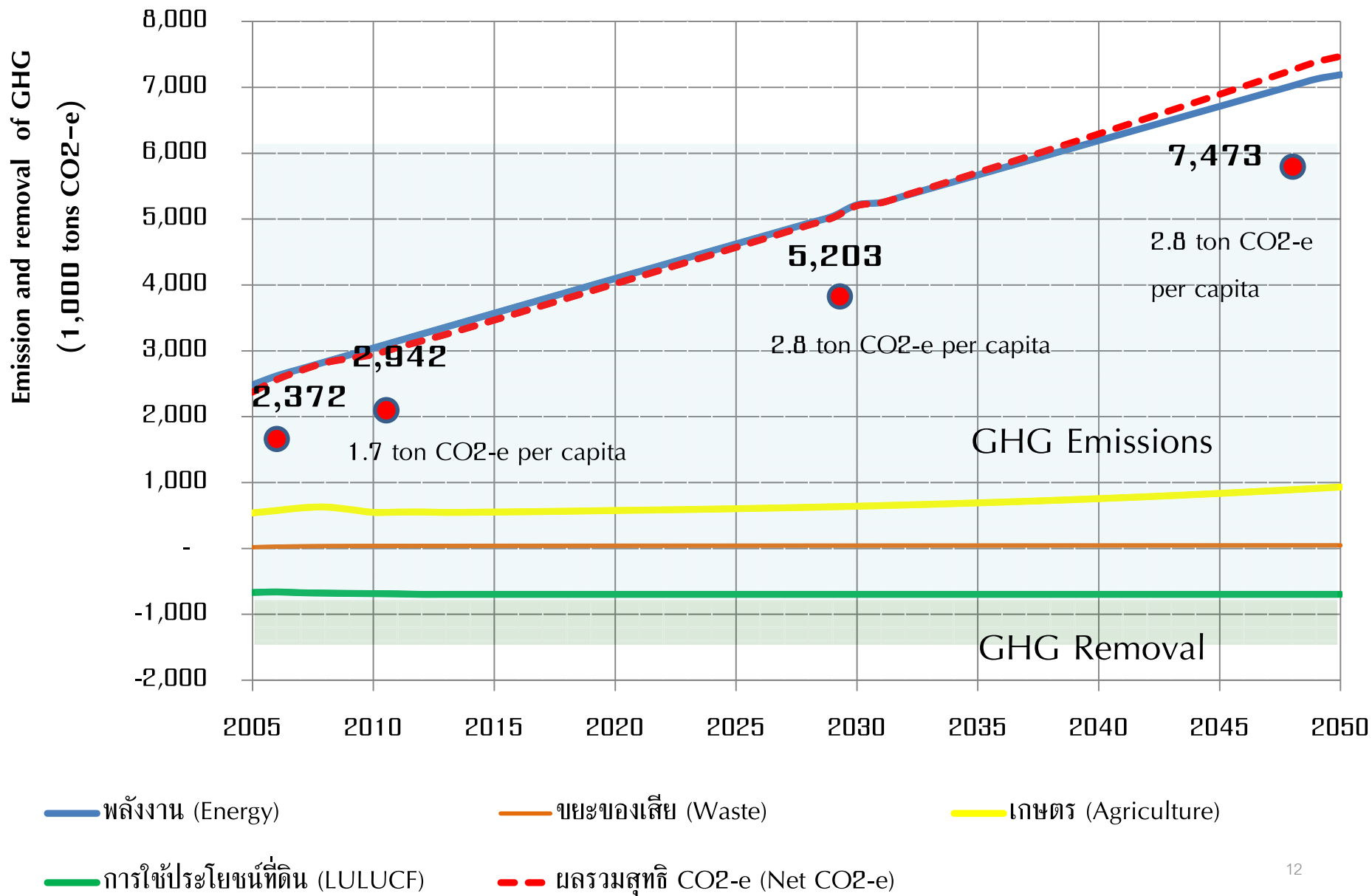
b) GPP Forecast



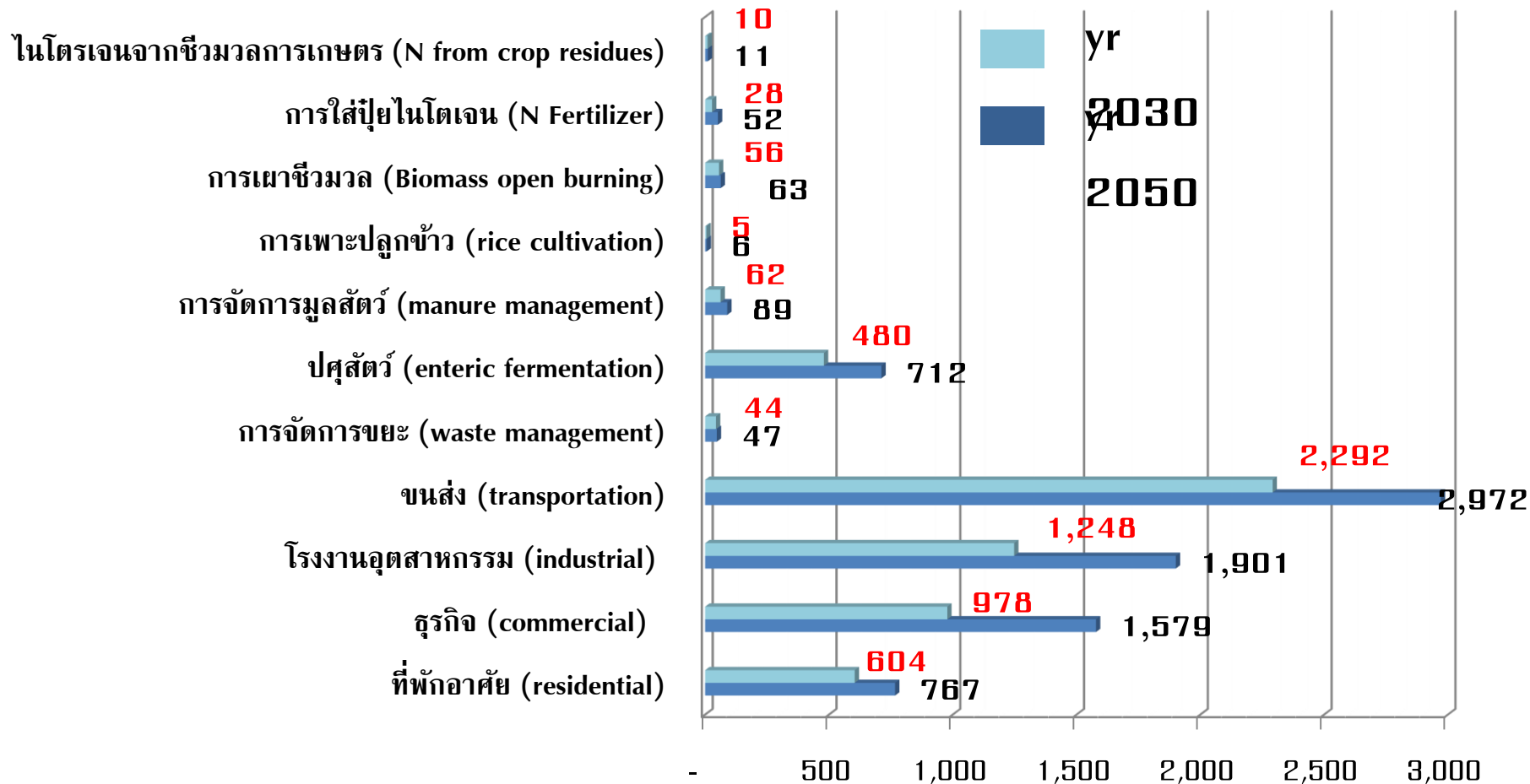
(a) Situation of GHG Emissions and Removal in KK–province



(a) Situation of GHG Emissions and Removal in KK–province



(a) Situation of GHG Emissions and Removal in KK–province



GHG emissions (1,000 tons CO₂-e)

KK – LCS Related Strategies & Activities

4 strategies of KK related on LCC Development

Strategy 1: Green City

Strategy 2: Clean City

Strategy 3: City of Energy Care

Strategy 4: Living Sustainable City

KK – LCS Related Strategies & Activities

Strategy 1: Green City

Target

Increasing Green Space

Activities in Khon Kaen province



- To plant big tree in 0.5 km² area
- To breed tree in school by student
- To launch green campaign
- To give 9 trees to the newborn baby
- To support the backyard garden in the house
- To support the free tree to the community
- Etc.



GHG emission
mitigation analysis

Assumption

- Year 2015: Planting and continuous maintenance of big trees in 50% of degraded forest land (~100 km²)
- Year 2030: Planting & Conservation: Planting and continuous maintenance of big trees in 100% of degraded forest land (~ 200 km²)
- Year 2030-2050: Planting & Conservation: Conservative all of forest land

KK – LCS Related Strategies & Activities

Strategy 2: Clean City

Target

To become a zero waste land

Activities in Khon Kaen province

- To support using e-mail instead of paper
- To use paper-glass instead of plastic-glass for visitor
- To use own-glass for the officer
- To educate waste separation for the officer
- To provide tank separation waste
- To compete the amount of waste reduction in each department in the office
- To create the objects from the waste
- Etc.



GHG emission mitigation analysis

Assumption

- Year 2015 (Launch of Recycling campaign): increasing the recycling rate to 15% of generated waste
- Year 2030 Recycling: increasing the recycling rate to 30% of generated waste
- Year 2050 Recycling: Keeping the recycling rate at 30% of generated waste

KK-LCS Related Strategies & Activities

Strategy 3: City of Energy Care

Target

Decreasing the energy consumption

GHG emission mitigation analysis

Activities in Khon Kaen province

- To service employee by shuttle bus
- To control air condition operating time and temp.
- To provide the design of energy saving building
- To support using renewable energy
- To purchase frying oil
- Etc.

Assumption

Year 2015 (Launch of the campaign):

- **Modal shifting:** 10% reduction of private car transportation in KK-municipality
- **Fuel Switching:** 10% increase of bio-fuel in passenger and freight transportation

Year 2030:

- **Modal shifting:** 50% reduction of private car transportation in KK-municipality
- **Fuel Switching:** 50% increase of bio-fuel in passenger and freight transportation

Year 2050:

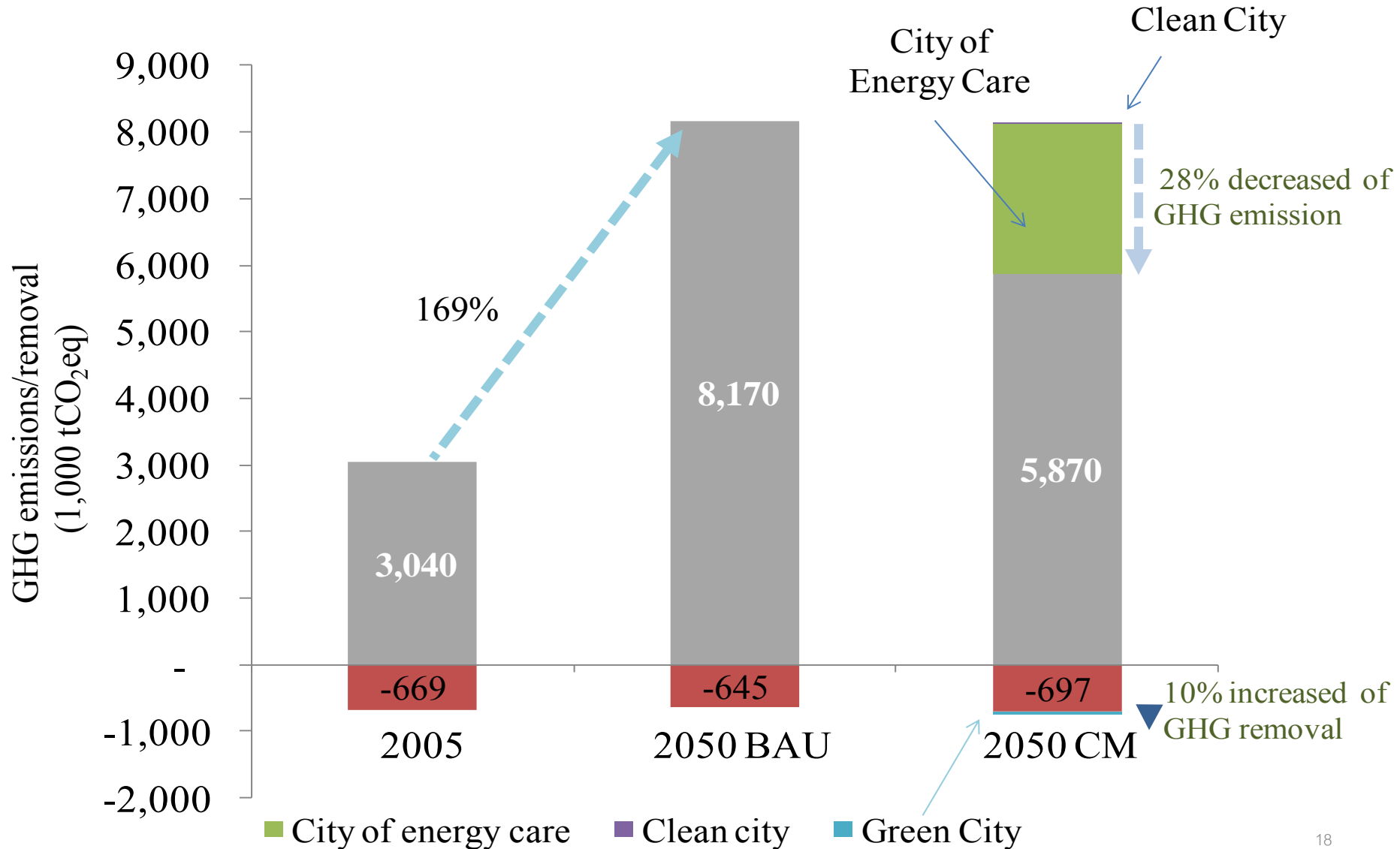
- **Modal shifting:** Keeping the share of private car transportation as year 2030
- **Fuel Switching:** Keeping the share of bio-fuel in passenger and freight transportation as year 2030



Car-pool

(b) GHG emissions and mitigations

based on **KK – LCS Related Strategies & Activities**



Stakeholder Workshop (18 June 2013)

Objective:

To disseminate and share experience on low carbon scenarios for KK-province with stakeholders to consolidate the scenarios target and to outline possible action plans.

95 Participants including local government officials, local community representatives, academics, industries, and local press-media



Deputy Mayor– KK–municipality to presents KK– low carbon activities



Representative of organizations to share low carbon activities



Participants

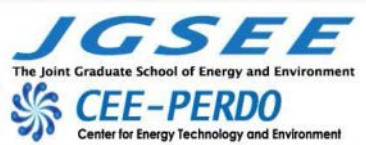
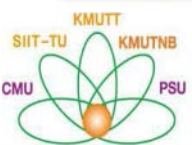
Sites Visit (19 June 2013)

To collect observations and feedback from stakeholders on existing KK-LCS related activities

@ school



@ temple



Findings from Stakeholders Workshop and Sites

Visits

KK-Strength

- Good co-operation of stakeholders to drive KK-province towards LCS
- Strong political will of both local and central government to make KK a model of LCS for the region

KK-Weakness

- Lack of quantitative records/data required for the assessment of emission reduction/mitigation potential of planned/already implemented KK – LCS related activities

KK-Next Step Forward

- KK-Municipality is strongly interested in developing a monitoring system enabling to assess the effectiveness of planned/existing KK – LCS related activities



**Regional Environmental Office 10 (REO 10),
Ministry of Natural Resources and Environment, Thailand**



Khon Kaen Municipality, Thailand

