

IATSS Research Project H2649

Development of the road map to realize
low carbon transport system in Asian cities

IATSS is

International Association for Transportation Safety and Sciences

Introduction

Mission of Research Project H2649 is to development of the road map to realize low carbon transport system in Asian cities.

Based on the outcomes from S6 Asia Low Carbon Project designated by Ministry of Environment in Japan, we are going to study how realize such low carbon society in Khonkaen.

Especially, we would like to know acceptability for such low carbon society and change of life style after low carbon society realized.



Visions and Roadmap of Low-Carbon Transport Development in Asia

S6-5 Estimation of CO₂ Emission Reduction for Urban Transport

Atsushi FUKUDA, IATSS(Nihon University)

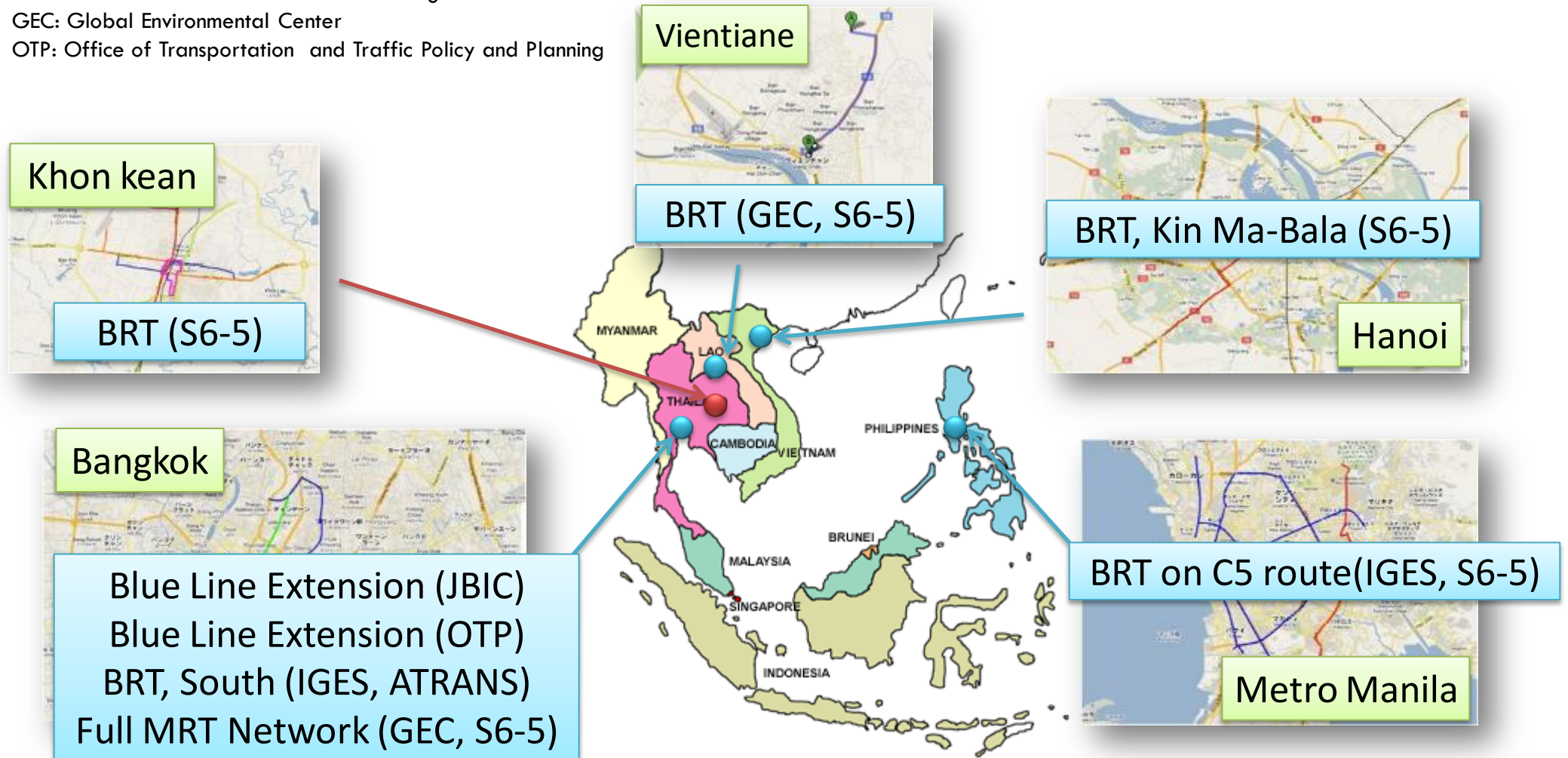
Our Targeted Cities

S-6-5 Research on Realization of Measures for Low Carbon Transport System in Asia under S-6 Research Project on Establishing of Methodology to Evaluate Middle to Long Term Environmental Policy Options toward Asian Low-Carbon Society by Ministry of Environment, Japan

IGES: Institute of Global Environment Strategies

GEC: Global Environmental Center

OTP: Office of Transportation and Traffic Policy and Planning



(2) Estimation of CO2 emission reduction for urban transport

*Prof. Atsushi FUKUDA, Nihon University

*Dr. Tetsushiro ISHIZAKA, Nihon University

Dr. Tuenjai FUKUDA, Nihon University & ATRANS

Thailand: Bangkok, Khon Kean

Dr. Varamete VICHIANAN, Kasetsart University

Dr. Sittha JAENSIRISAK, Ubon Ratchatani University

Dr. Thanead SATHIENAM, Khon Kean University

Dr. Paramete LUATHEP, Prince of Songkla University

Dr. Nuwong Chollacoop, MTEC

Land Use

Policy

BRT & Access Mode, Emission

VKT & Demand Forecasting

Energy & Vehicle Technology



(4) Institution and operation of public transport

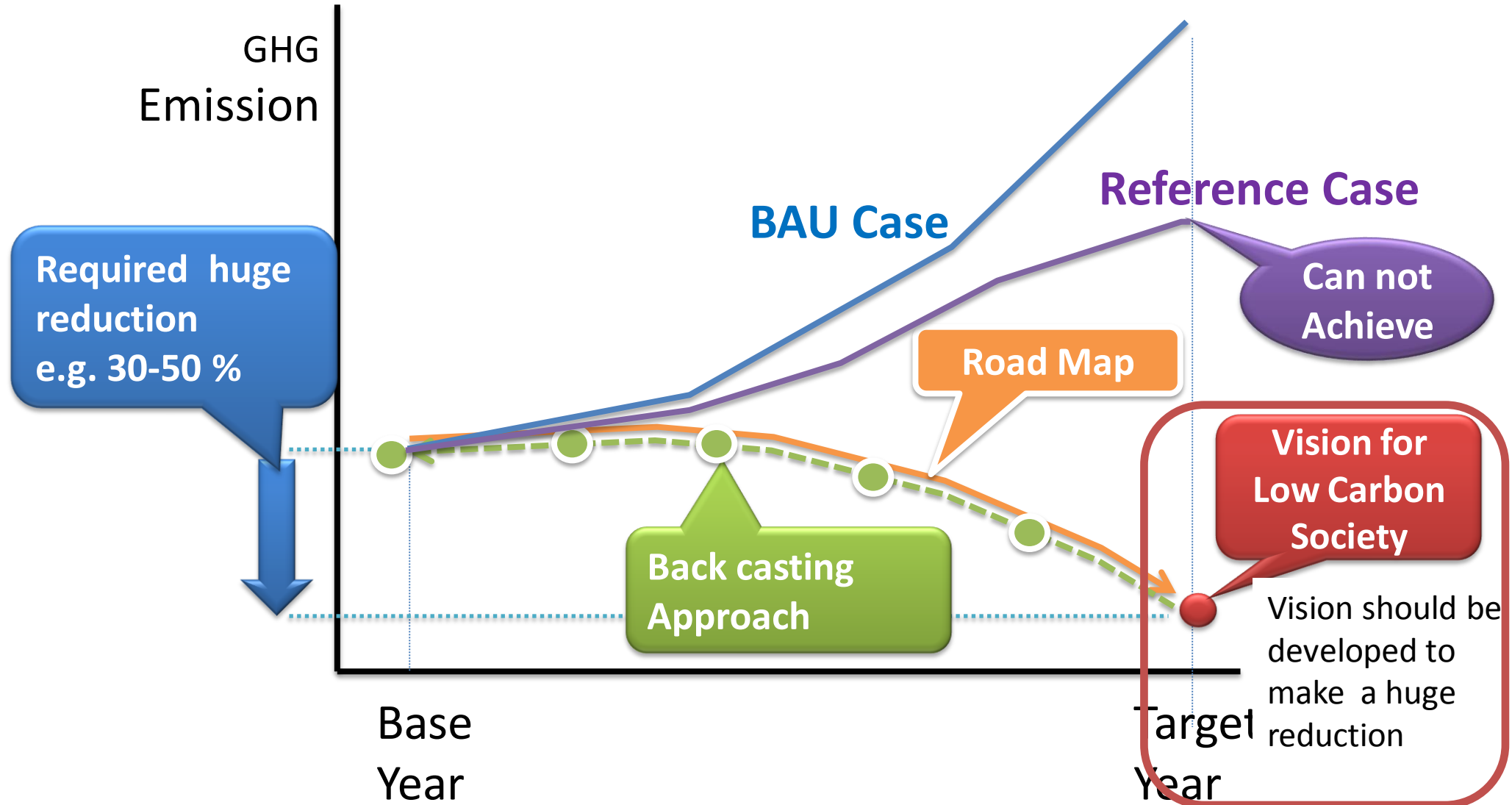
*Prof. Fumihiko NAKAMURA, Yokohama National University

*Dr. Toshiyuki OKAMURA, Toyo University

*Dr. Kumiko NAKAMICHI, Tokyo Institute of Technology

*Dr. Mariko FUTAMURA, Tokyo Woman's Christian University

Establishment of Future Vision for Low Carbon Transport System

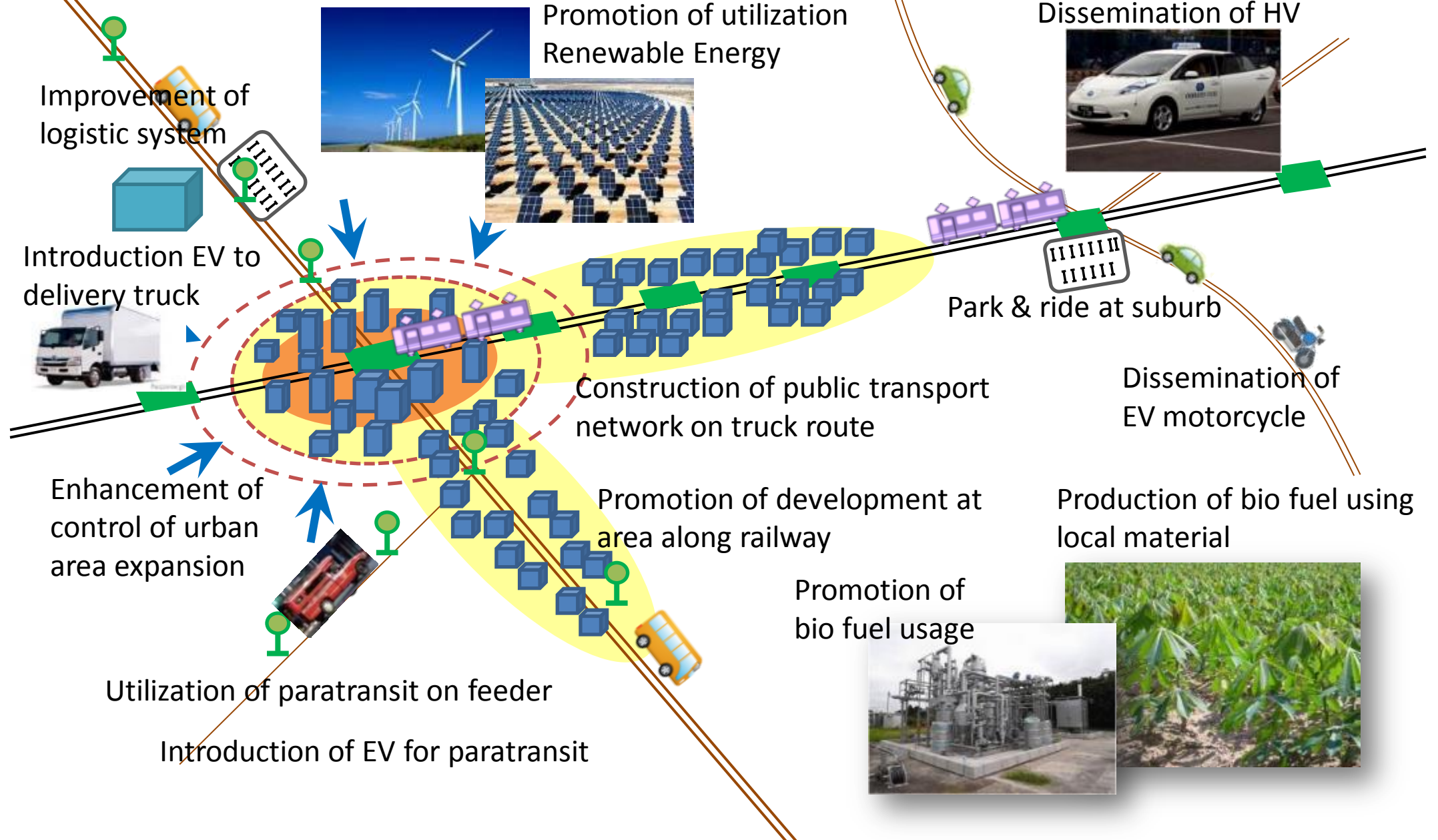


Selected Countermeasures and Policies for Leapfrog Development in Urban Area based on CUTE Matrix

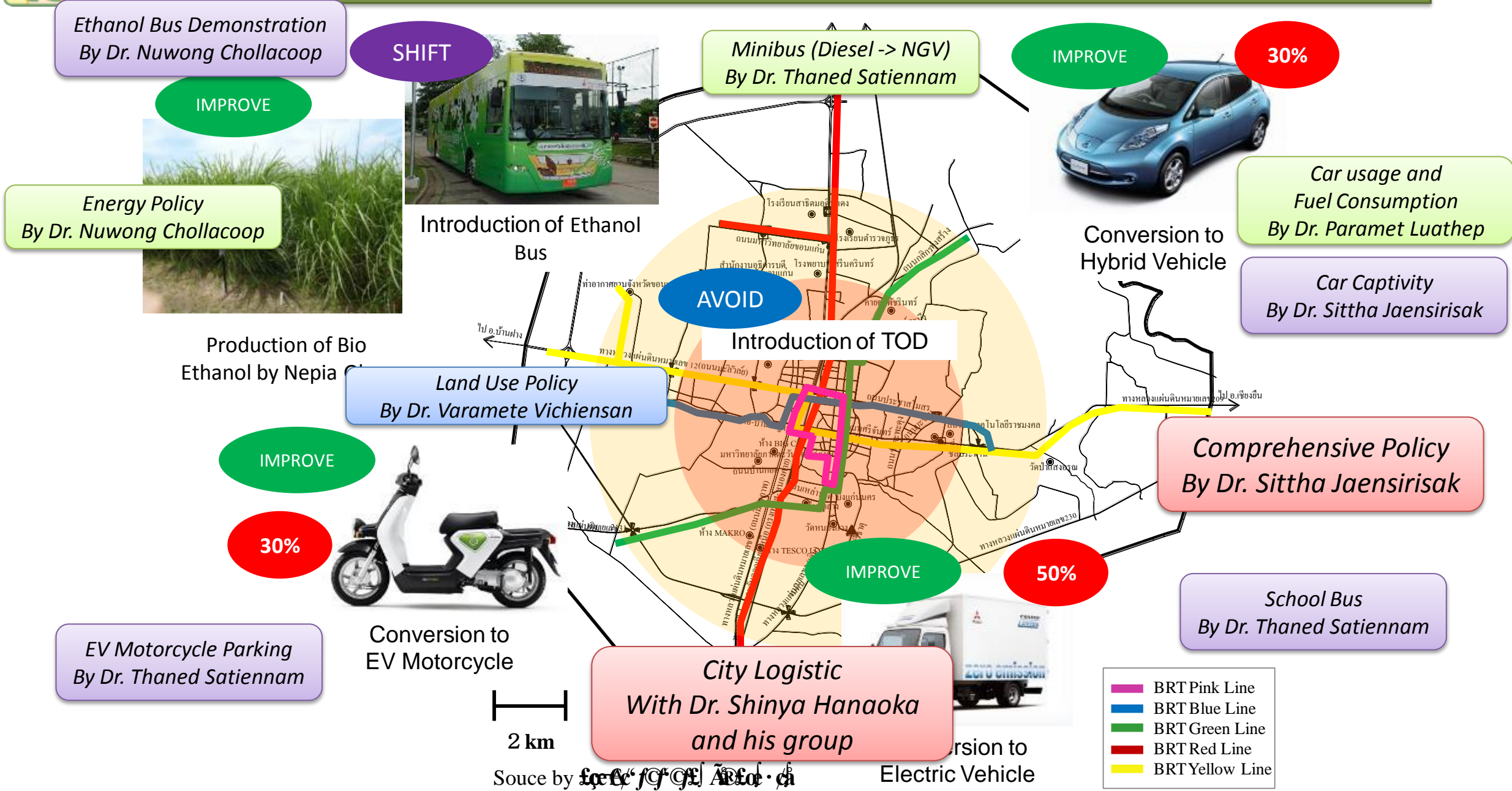
CUTE matrix was developed for the project of Clean Urban Transport for Europe

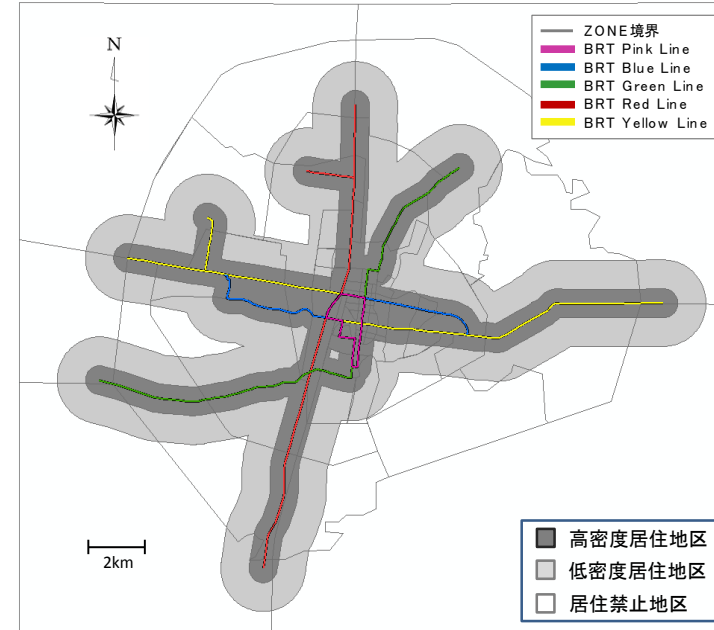
| Strategy Approach | AVOID | SHIFT | IMPROVE |
|----------------------|--|--|--|
| Technology | <div>Transit oriented development (TOD)</div> <div>Multipolar development</div> <div>Efficiency logistic</div> | <div>Introduction of rail •BRT</div> <div>Utilization of paratransit</div> <div>Introduction of new personal mobility</div> | <div>Dissemination of HV & PHV</div> <div>Utilization of local energy</div> <div>Dissemination of EV & FCV</div> <div>Smart grid</div> |
| Regulation | <div>Control of urban area expansion</div> | <div>Separation of trunk & feeder bus route</div> <div>Parking control</div> <div>Regulation of inflow of automobile</div> | <div>CO2 Emission Standard</div> |
| Information | <div>Net shopping</div> <div>Tele-working</div> <div>Increment of non-commuting demand</div> | <div>Coordinated management for public transport operation</div> | |
| Economics | <div>Subsidy and taxation for settlement</div> | <div>Park &ride</div> <div>Coordinated price system for public transport</div> | |

Typical Image of Future Vision for Urban Area in 2030

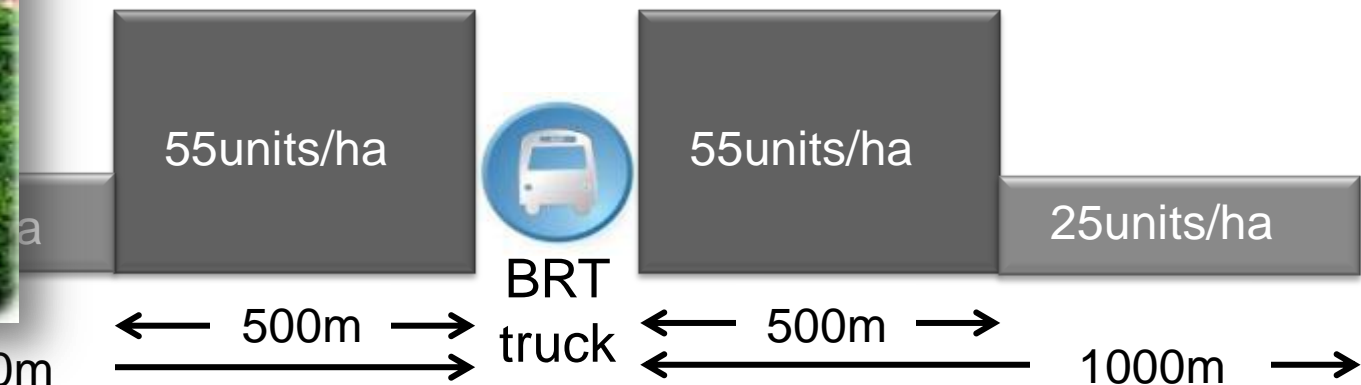


Establishment of Future Vision for Khon Kaen





Ideal TOD density proposed by Calthorpe

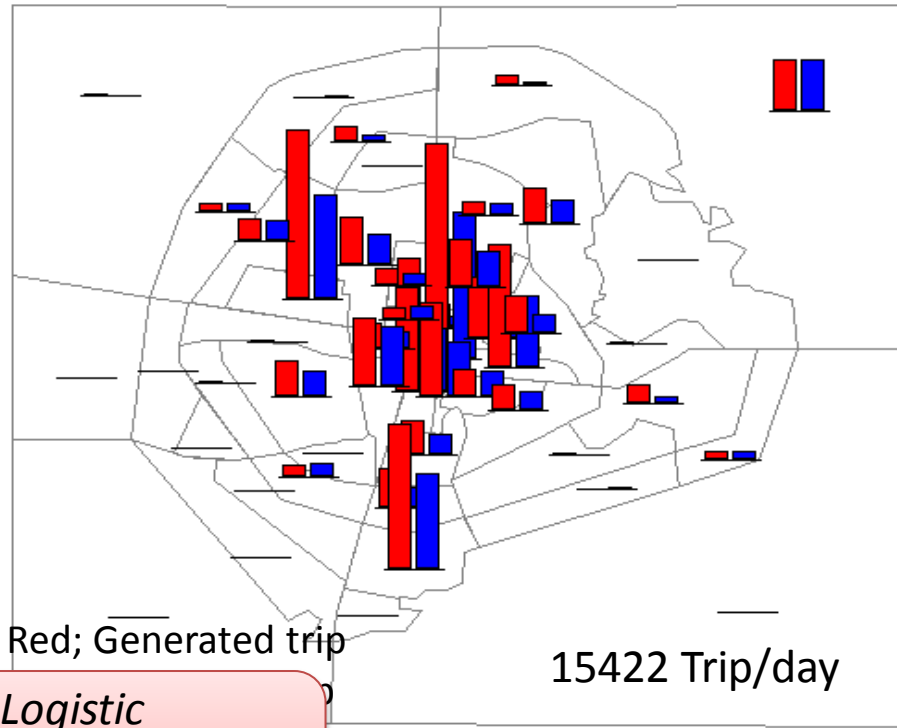


Consideration of City Logistics

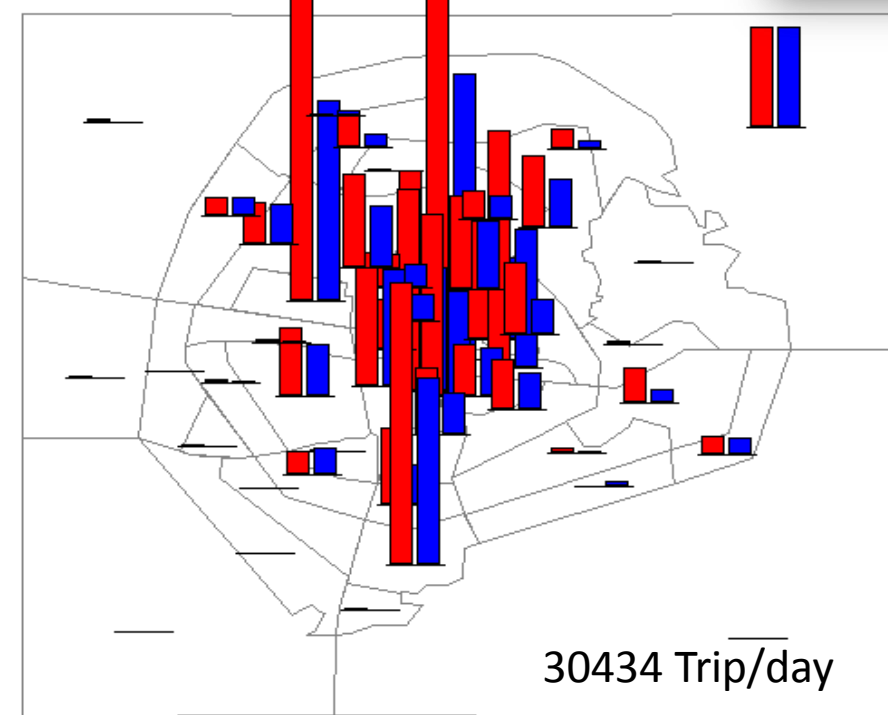
- Interview with 131 enterprises out of 4568 in Khon kaen.



► 2012



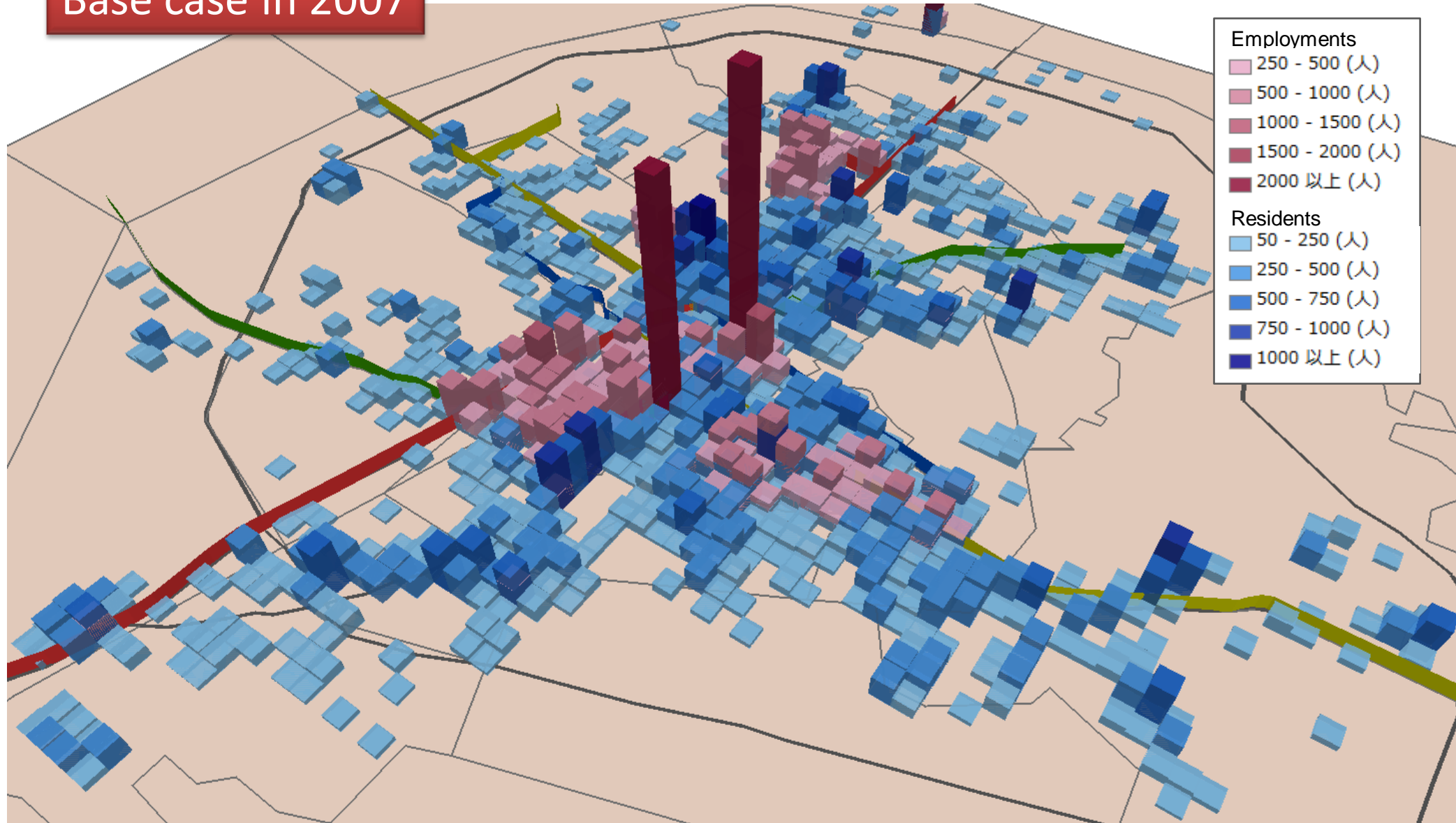
► 2030



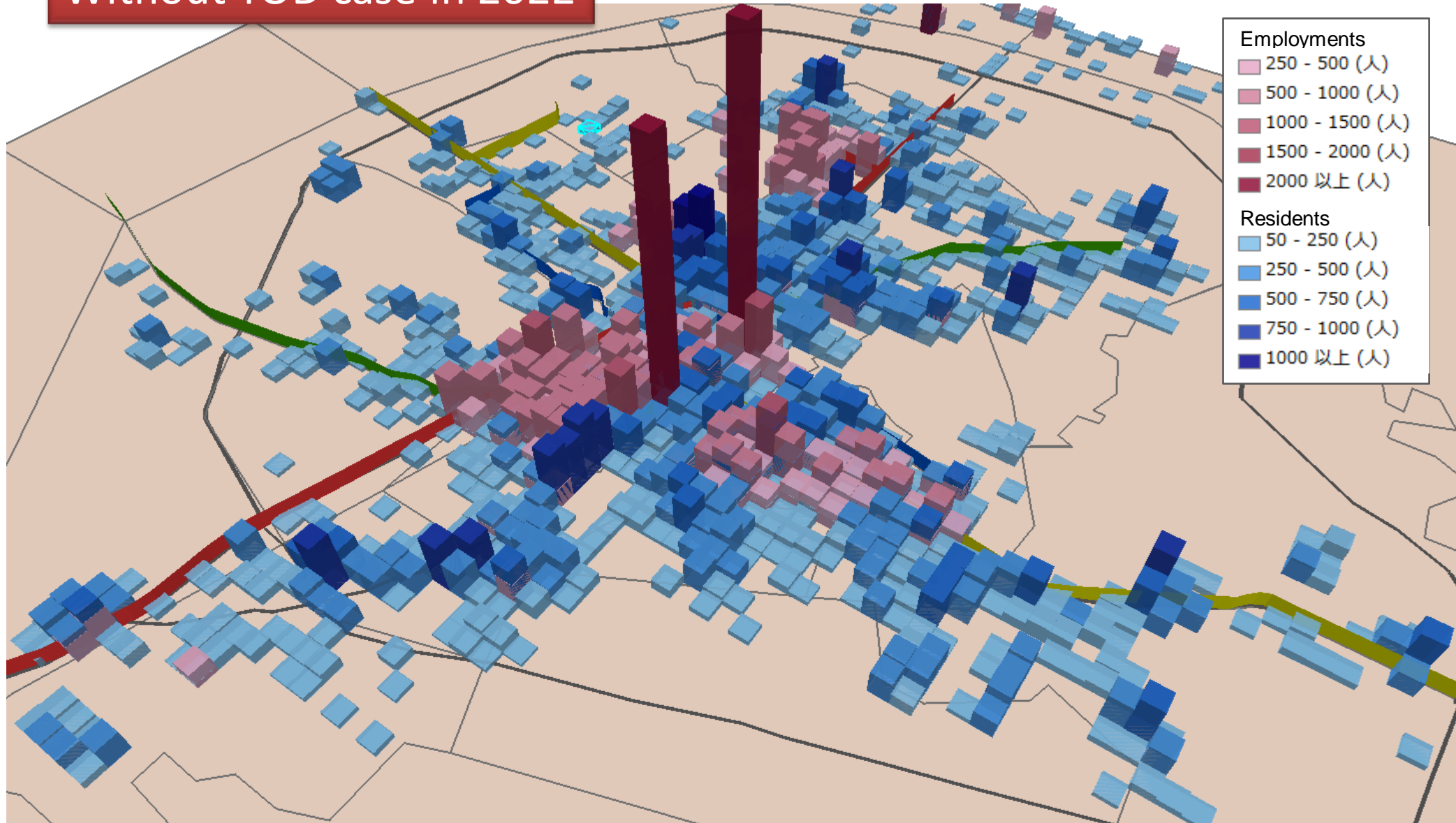
*City Logistic
With S6-5(3) by Dr. Shinya
Hanaoka and his group*

Existing Situation in Khon Kean

Base case in 2007



Without TOD case in 2022



Future Condition in Khon Kean

Avoid

Shift

Improve

With TOD case in 2022

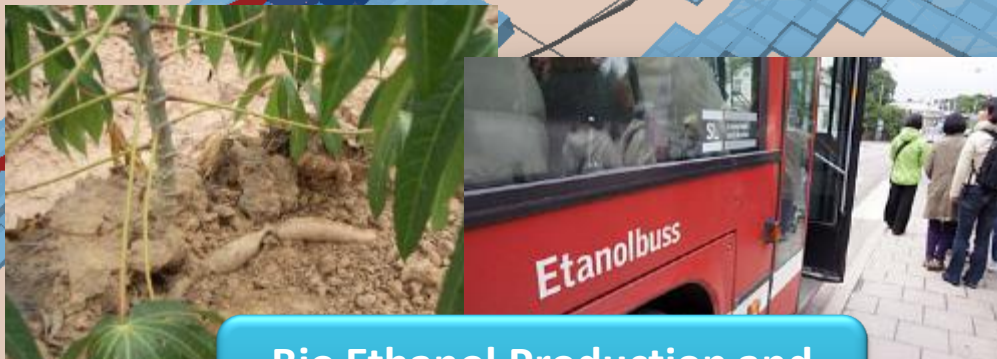


Leverage
Advanced
Technologies

Hierarchical
Compact City



Seamless &
Hierarchical
Transportation System



Bio Ethanol Production and
Ethanol Bus Introduction

Introduce Ethanol Bus for BRT Ethanol Production

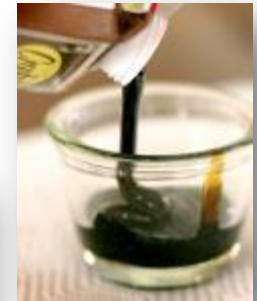
Improve

1. Estimated required ethanol $\Rightarrow 5,850[\text{kl}]$
2. Required cassava to produce ethanol $\Rightarrow 35,100[\text{t}]$
3. Area under cultivation of sugarcane $\Rightarrow 1,533[\text{ha}]$
(It is equivalent with 188% of campus of Khon Kean U.)
4. Amount of GHG from Diesel Bus $\Rightarrow 8,556 [\text{t CO}_2 \text{ eq/year}]$
5. Amount of GHG from ethanol production process $\Rightarrow 5,639 [\text{t CO}_2 \text{ eq/year}]$
6. Net GHG reduction (CN) $\Rightarrow 2,917 [\text{t CO}_2 \text{ eq/year}]$
(34%)

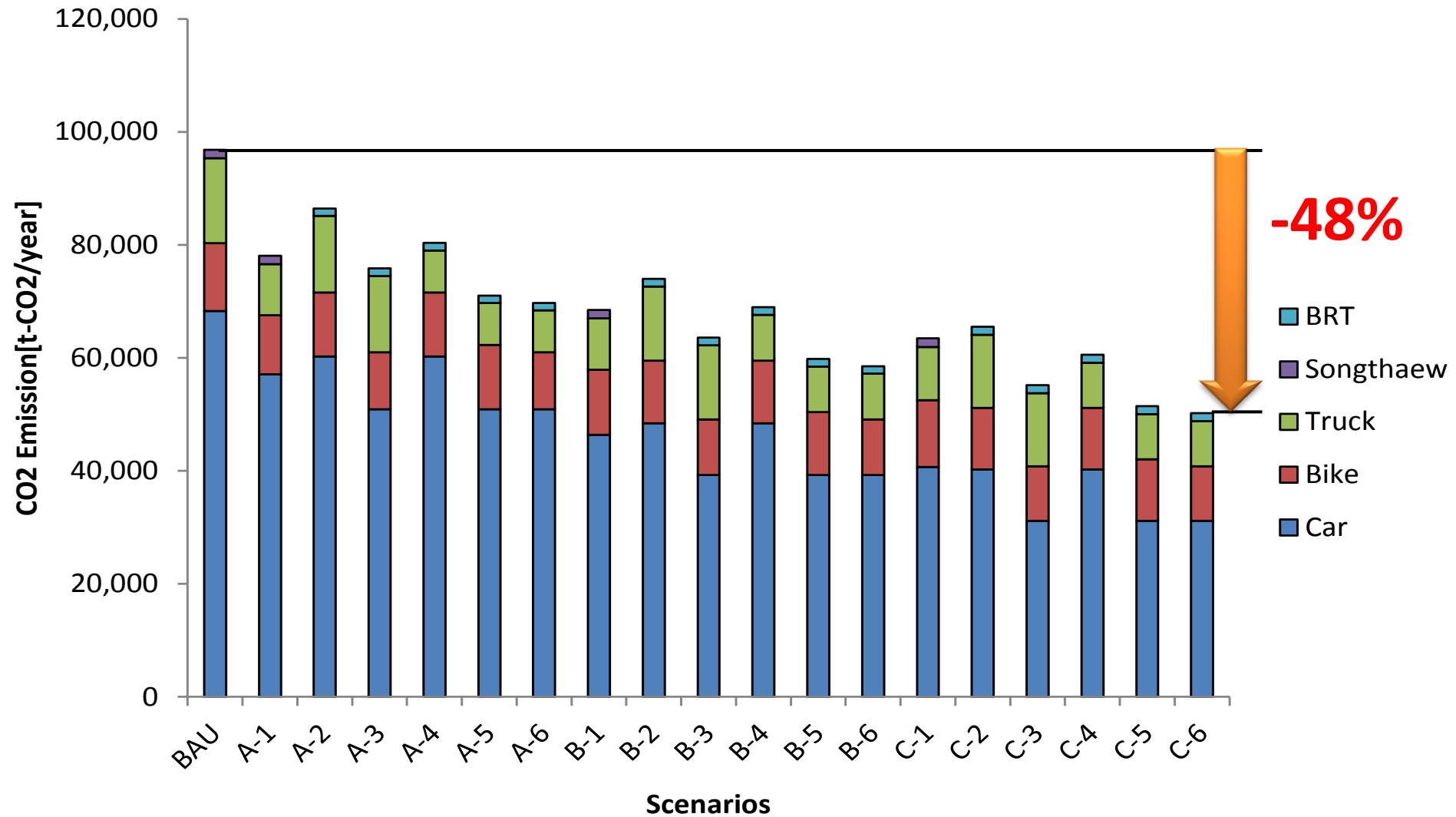
Cassava

Molasses

Napier Grass



Estimated CO2 Emission Reduction



How to feedback our outcomes to ASIAN societies

24/Aug./2011

1st Workshops on Low Carbon City with Khon Kaen Univ. and Khon Kaen City.

* Our activity was put on front page of Matichon

31/Aug./2012

2nd Workshops on Low Carbon City

27/Aug./2013

3rd Workshops on Low Carbon City with Khon Kaen Province, Khon Kaen City and Khon Kaen University



Governor of Khon Kaen Province

LCS Project Proposed to the former Khon Kaen Governor

1. Ethanol Bus Demonstration in Khon Kaen City
 - To promote low emitting energy for transportation mode to local people
 - Operating free of charge ethanol bus along main corridor of Khon Kaen City for 3 months
2. Campaign to Promote Usage of Low Emission Transport Mode
 - To promote low emitting transportation modes to local people
 - Arranging the parade of low emission transport mode, including ethanol bus, hybrid vehicle, and electric motorcycle and e-bike, by closing a part of road section during a same period of ethanol bus demonstration.





Thank you for your attention!