ESTIMATION OF CO_2 EMISSION REDUCTION BY INTRODUCTION OF BUS RAPID TRANSIT SYSTEM IN KHON KAEN

--Members— Midori Shiina
Kosuke Sasamoto
Shintaro Morioka
Kazuhito Saito

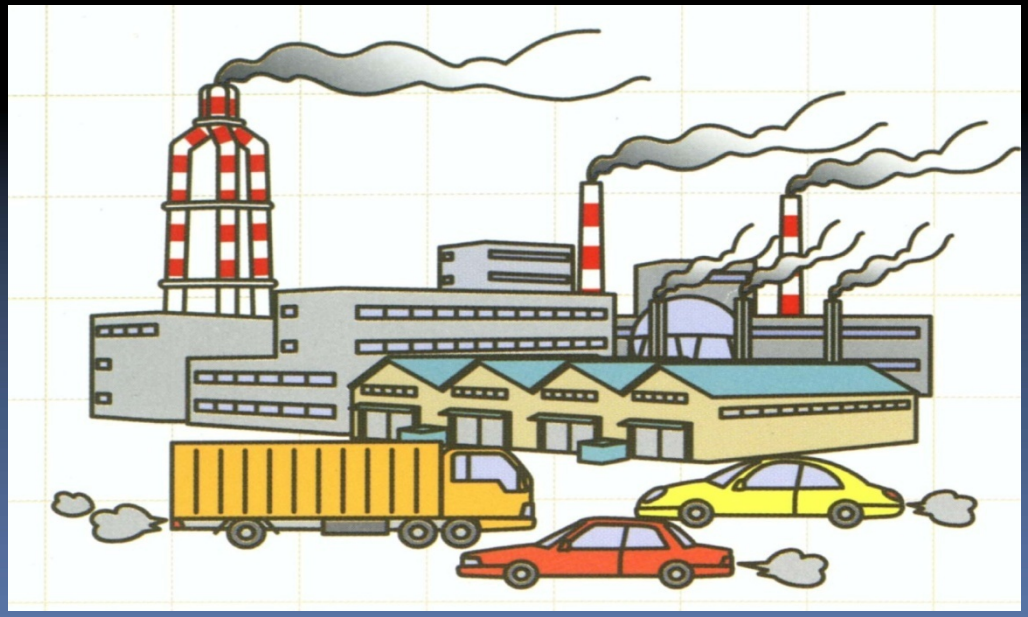
Peachaya Pitaksit
Kornkij Praditpolpanich
Atsushi Fukuda
Tuenjai Fukuda
Mikiharu Arimura
Thaned Satiennam
Tippichai Atit
Makoto Okamura
Ryota Tani
Hidenori Ikeshita
Matt Srinarawat

1.Introduction

Global warming

- Rapid increase of greenhouse gas :GHG

- Reduction of CO_2 emission since transport sector

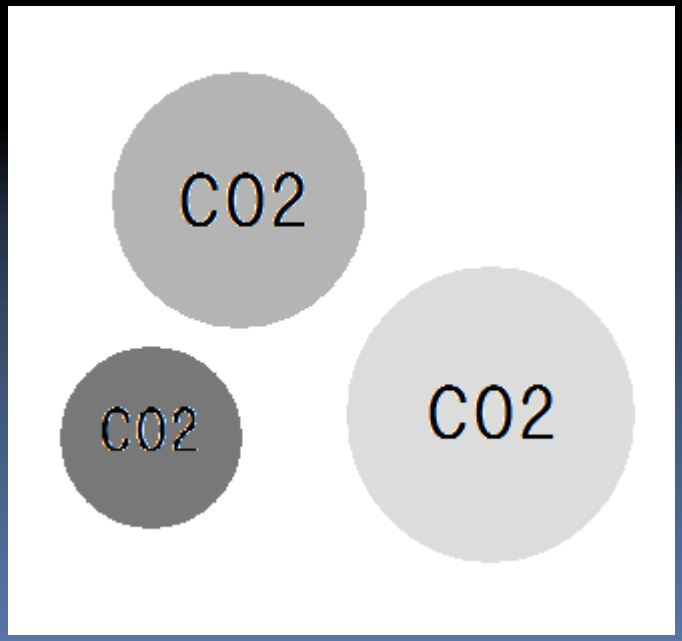


1.Introduction

- Traffic congestion
- Increase amount of CO_2 emission

=

Rapid motorization in developing countries



2. Study Area and the BRT project

2.1 Outline of BRT Project in Khon Kaen City

- 〈The 1st Phase〉

Construct the main lines

(RED line , Yellow line, Pink line)

- 〈The 2nd Phase〉

Construct the remaining lines

(Blue line , Green line)

- 〈The 3rd Phase〉

Maintenance the BRT system

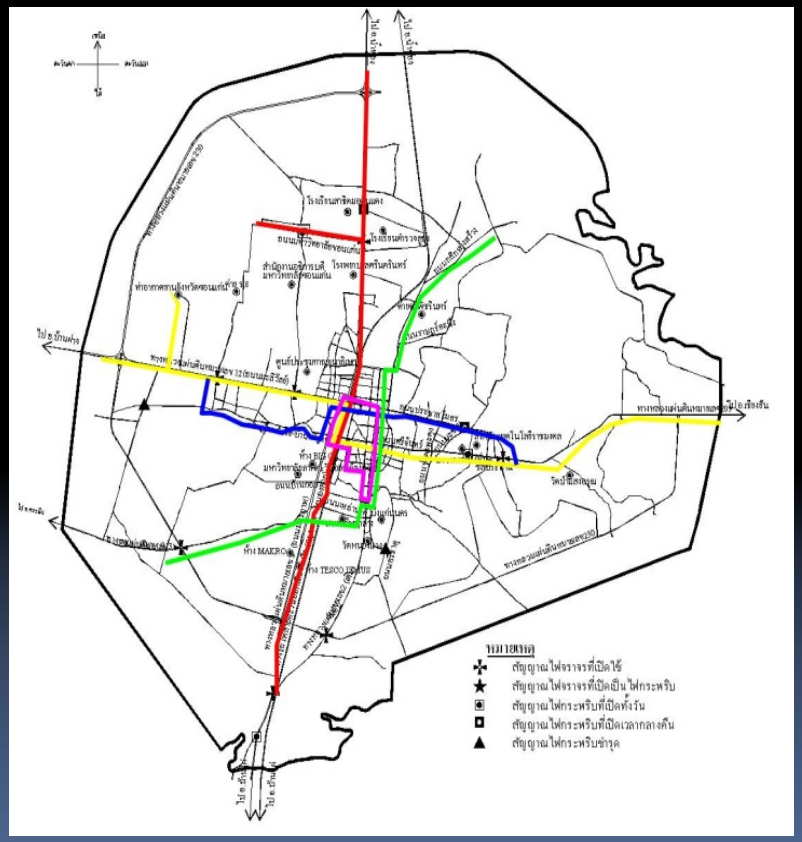


Fig.1　BRT routes

2.2 explanation of JICA STRADA

- JICA STRADA was developed to calculate traffic demand , model construction ,evaluation and so on.
- To get User equilibrium assignment from population , OD table and so on with JICA STRADA. So, we can calculate CO_2 emission from the result of assignment.

3.Analysis of traffic situation

3.1 Methodology

Ⅰ： Analyze existing traffic condition on whole network by JICA STRADA and identified congested sections

Ⅱ： Develop OD table and temporary set up BRT roads on JICA STRADA

Ⅲ： Calculate CO_2 emission and Compare with with case and without case

Ⅳ： Estimate about reduction of CO_2 emission by the BRT project

3.2 Preparation of dada

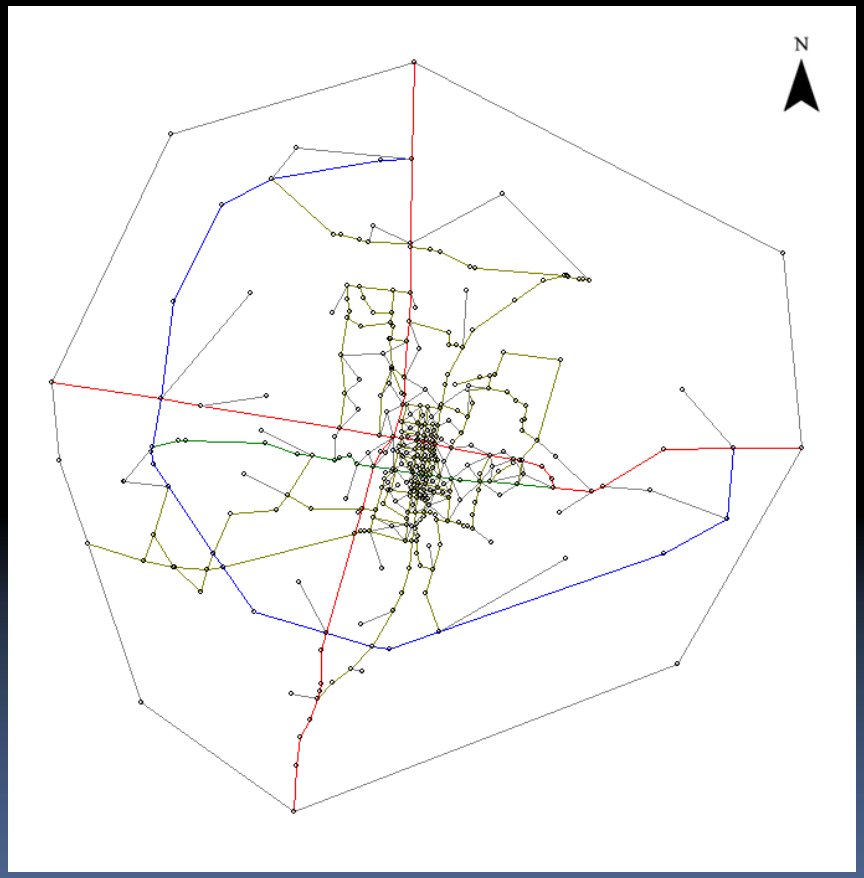


Fig.2 Khon Kaen city network

Transfer link :
7baths

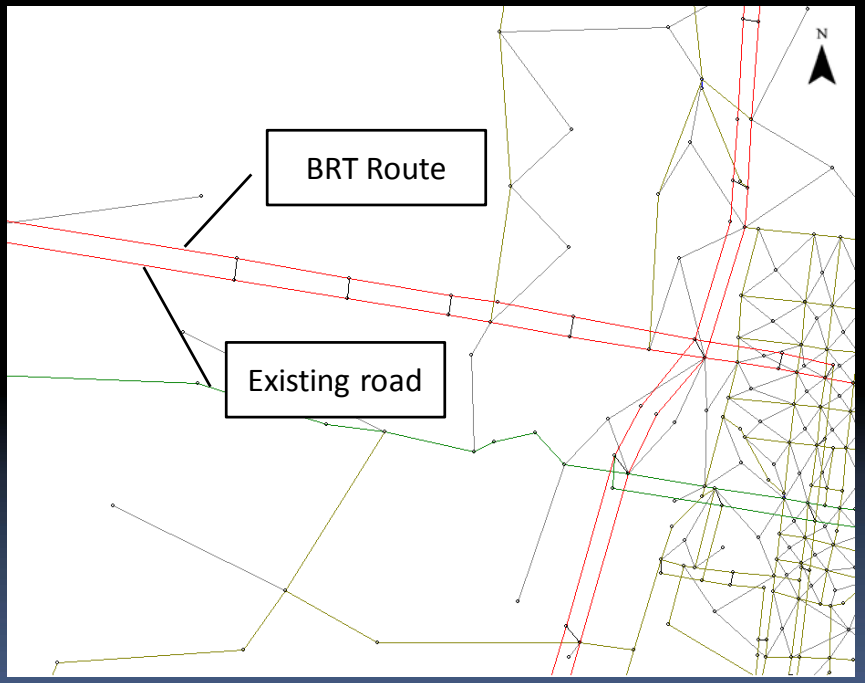
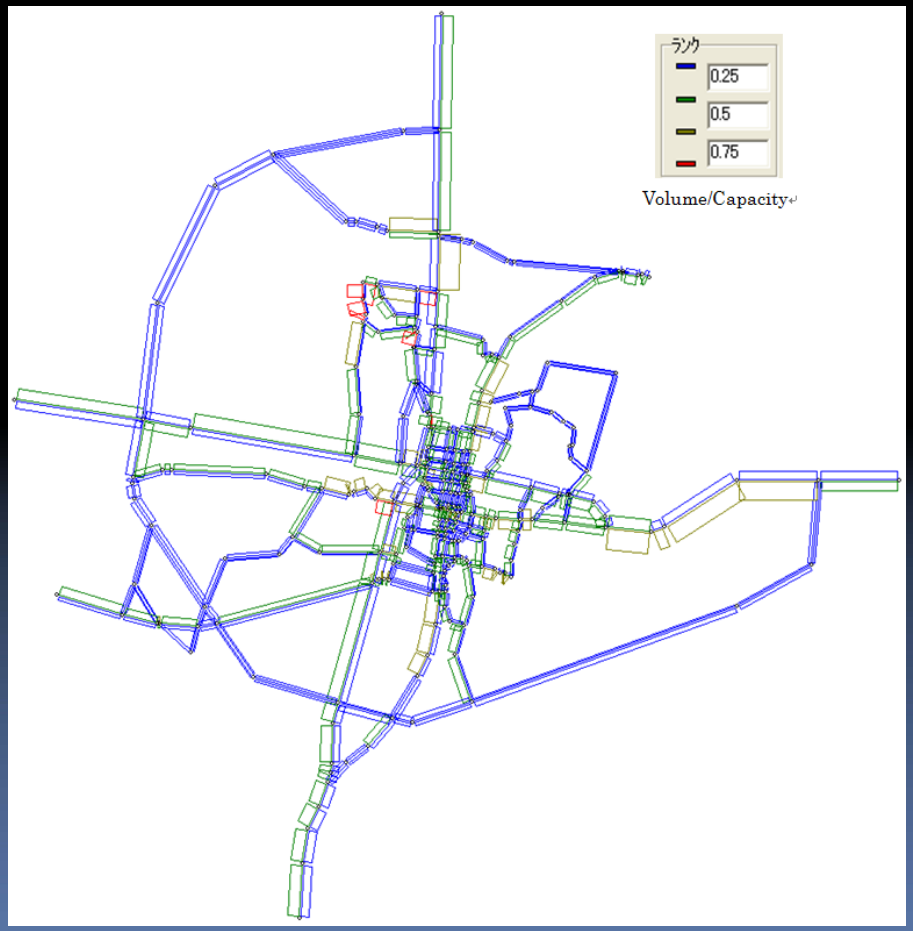


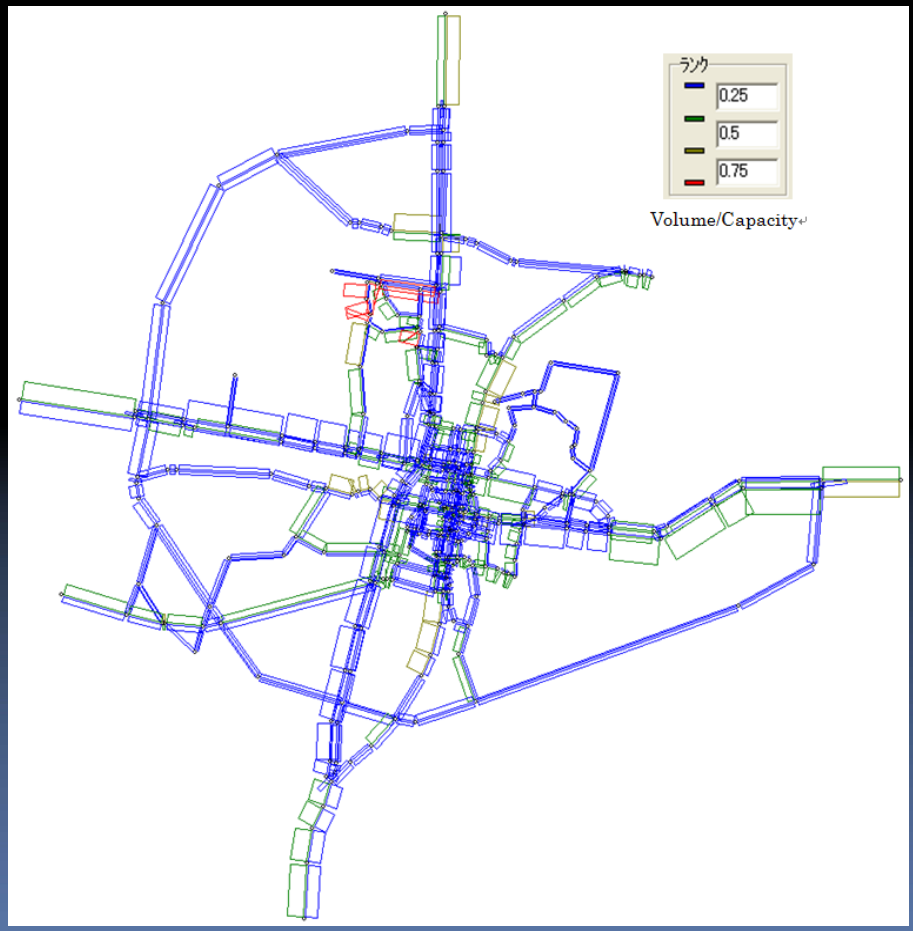
Fig.3 Network including BRT route

3.3 Comparison of traffic volume (

- Without case

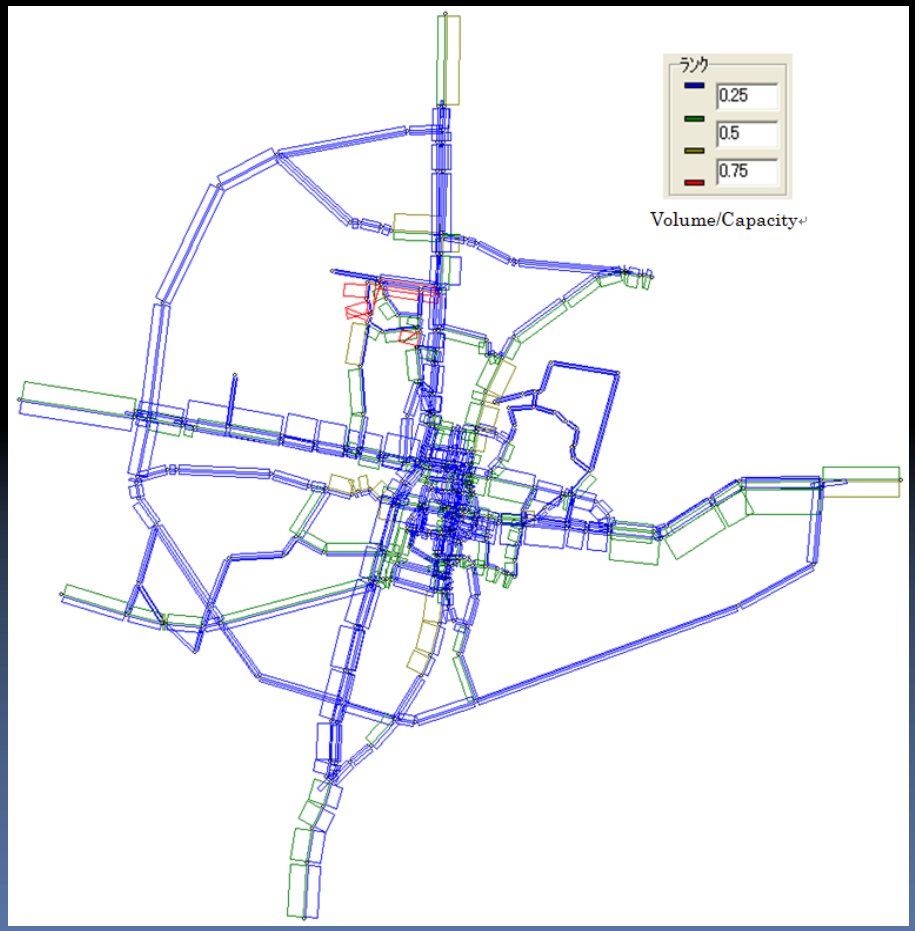


- With case (3 lines)

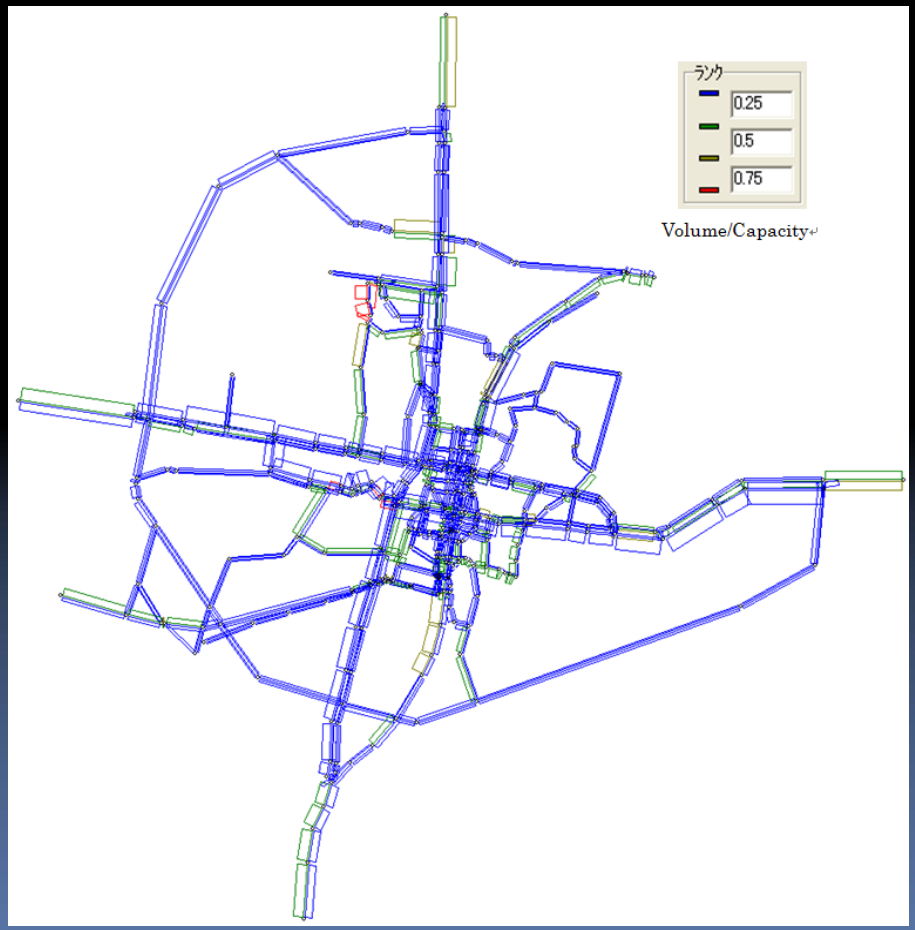


3.3 Comparison of traffic volume (2

- With case (3 lines)



- With case (5 lines)



4.Analysis of CO_2 emission

4.1 Calculation of CO_2 emissions

- CO_2 emission =

  Distance × Emission Factor × Traffic Volume

- Emission Factor = $aV^2 + bV + c$

  a , b , c: Coefficients (These are shown in following Table 1.)

  V: Average vehicle speed

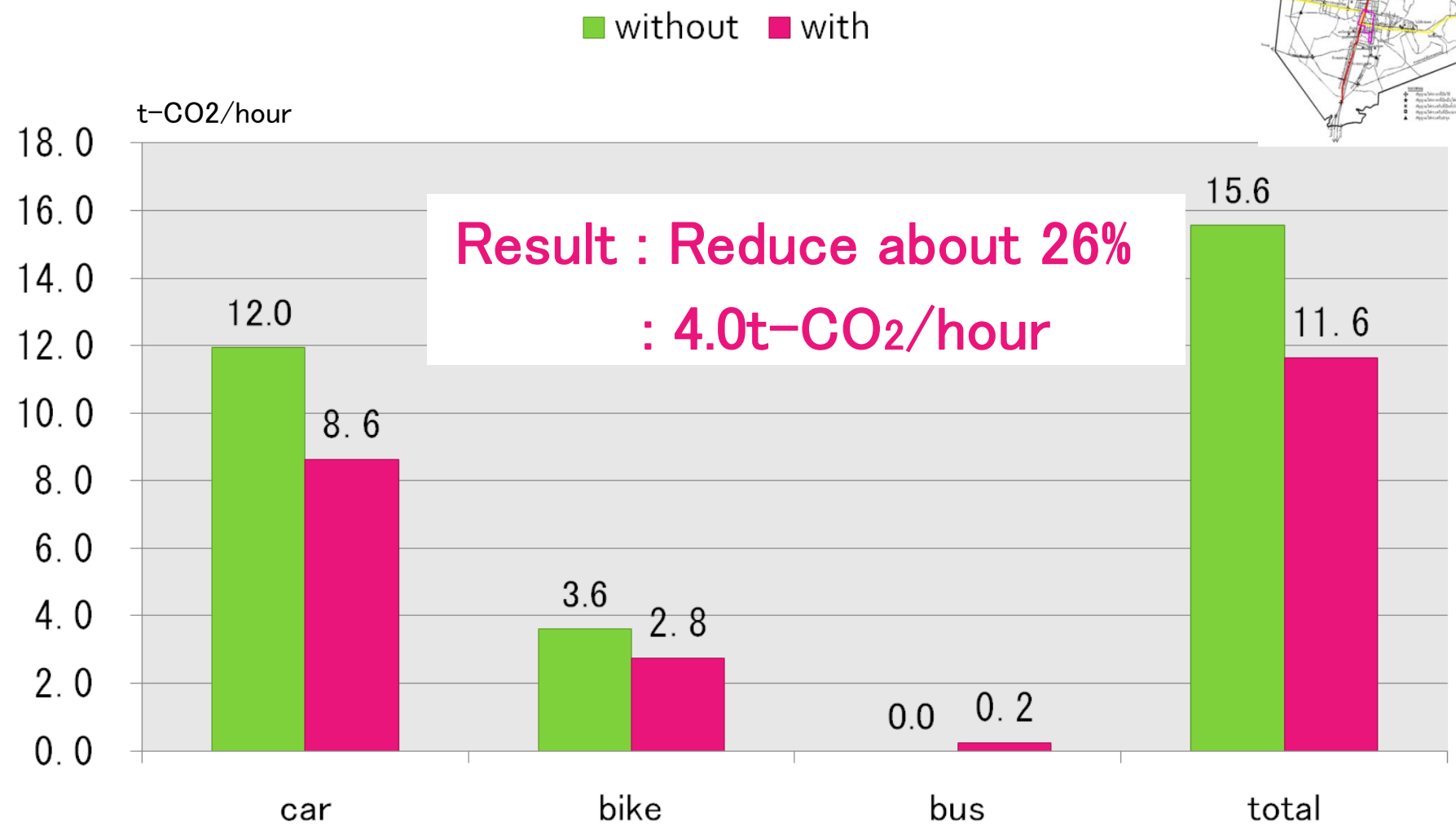
Table1 Coefficients of emission factor

	a	b	c
Passenger Car	0.0584	−7.4383	335.9
Motorcycle	0.0308	−3.6385	165.98
Bus	0.0378	−4.2744	178.78

Source: MLIT,2004

4.2 CO_2 emission reductions by BRT project

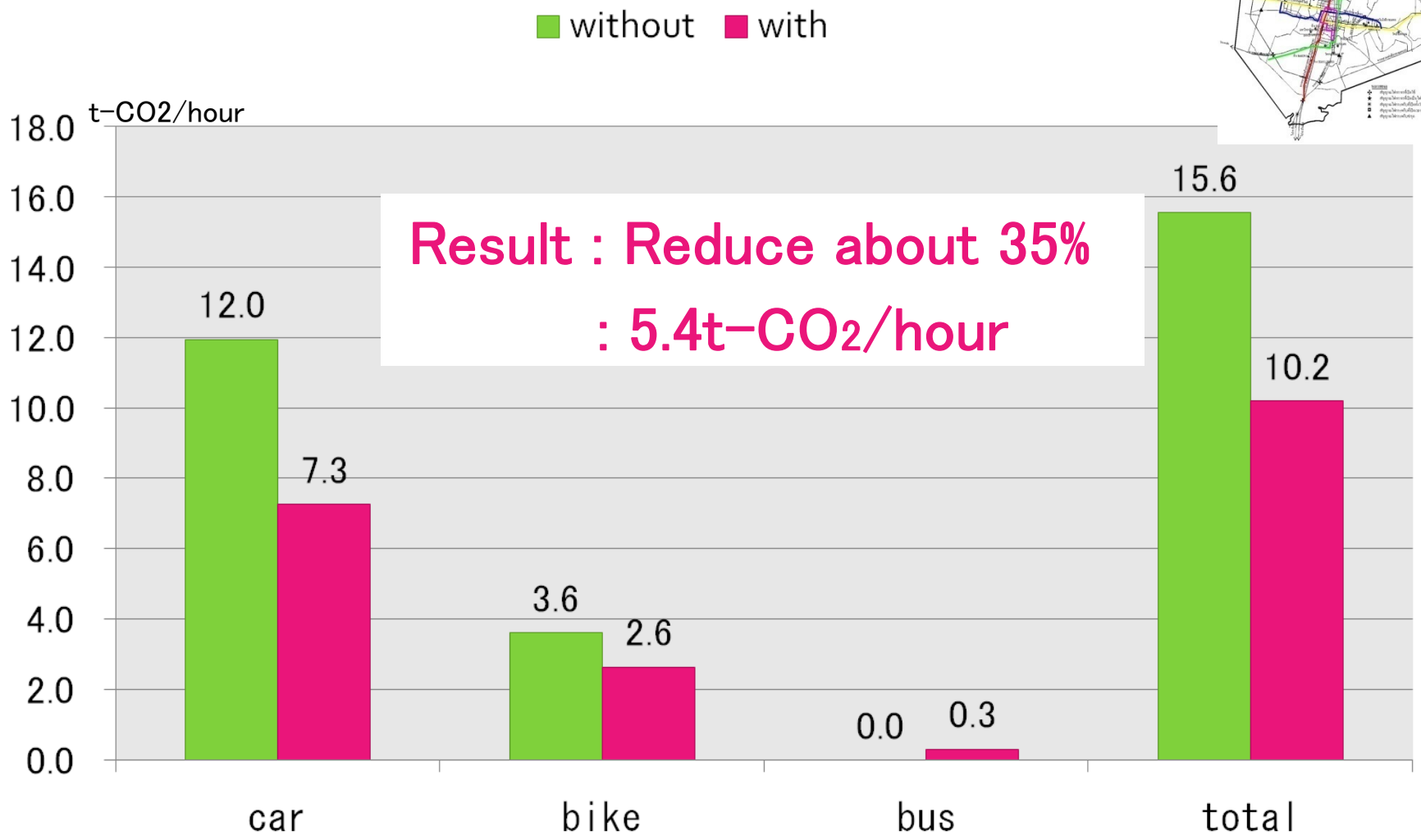
- The 1st phase (3 lines)



Result : Reduce about 26%
: 4.0t-CO_2/hour

4.2 CO_2 emission reductions by BRT project

- The 2nd phase (5 lines)



Result : Reduce about 35%
: 5.4t-CO_2/hour

5. Conclusion

BRT will help

- Alleviate traffic problem in the Khon Kaen City
- Reduce CO_2 emission from transport sector
- Reduce 5.4t-CO_2 /hour
- Reduce 35%

Next theme

- We should use the newest data

THANK YOU
FOR YOUR ATTENTION !!