

**Session 3C: Prof. Dr. Atsushi Fukuda**

**Presentation entitled: Low Carbon Society Project in Khon Kaen and Vientiane**

**Biographic Data of Speaker**



Atsushi Fukuda  
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**Education:**

Ph.D., M.Eng., B.Eng. in 1982,1984,1988 from Nihon University, Japan

**Work Experience:**

2009-Present Director of Transportation Research Center, Nihon University  
2008-Present Head of Department of Transportation Engineering and Socio-technology, College of Science and Technology, Nihon University  
2005-Present Professor, Nihon University  
2001-2005 Associate Professor, Nihon University  
1992-2001 Assistant Professor, Nihon University  
1989-1991 Assistant Professor, Asia Institute of Technology (JICA Expert)  
1988-1992 Research Associate, Nihon University

**Honors and Awards:**

2009 International Activity Incentive Award, Japan Society of Civil Engineers (JSCE)  
2006 Excellent Practice Paper Award, the 3rd National Transport Conference, Ministry of Transport, Engineering Institute of Thailand, Khonkean University  
2003 Best Paper in the Decision Technologies Track Award, 36th Annual Hawaii International Conference in System Sciences  
1997 Best Presenter Award, 52th Annual Meeting of JSCE  
1988 IATSS Dissertation Award, International Association for Traffic Safety and Science

**Main Professional Experiences related ODA (within last decade):**

- 2008 - 2009 Member of Study on Environmental Action Plan by MLIT
- 2008 - 2009 Chairman for Research Committee for Study on Market Mechanism for Green House Gas Reduction for Vessel by Ocean Policy Research Foundation (committed by MLIT)
- 2008 Chairman of the Study on CDM Promotion in Construction Sector by NTT Data Management Research Institute (committed by MLIT)
- 2008 Study Member of the Project for Traffic Safety Human Resource Development in Hanoi by JICA
- 2007 - 2008 Member for Expert Meeting on International Effort for Global Environment and Energy in Transportation Sector by MLIT
- 2007 - 2008 Member for Research Committee on Carbon Offset in Transport Sector by Foundation for Promoting Personal Mobility and Ecological Transportation (committed by MLIT)
- 2007 Overseas professional judge of CDM/JI Judgment Committee, Japan Quality Assurance Organization (JQA)
- 2006 - 2007 Chairman for working group for the Future CDM Study (committed by METI)
- 2005 - 2006 Member of Advisory Committee for assistance to develop the Urban Transportation Planning Contents by JICA
- 2003 - 2006 Chairman of Advisory Committee for the Study on Promotion of Clean Development Mechanism, in Thailand (committed by MLIT)
- 2004 - 2005 Chairman of Advisory Committee for the Study on Promotion of Operational Entity for Clean Development Mechanism (committed by MLIT)
- 2003 Member of Advisory Committee for the Study on Promotion of Operational Entity for Clean Development Mechanism (committed by MLIT)
- 2002 - 2003 Chairman of Advisory Committee for Ecological Transportation Study in Costa Rica (committed by MLIT)
- 2002 Member of Study Team for Feasibility to Transfer Traffic Control Technology to Vietnam (committed by National Police Agency)
- 2002 JICA Short Term Expert for the Project to Improve Urban Development Technology in the Kingdom of Thailand by JICA
- 2002 JICA Short Time Expert for Executive Seminar on Environment and Transportation Management (EXETRAM)-V, at University of the Philippines by JICA
- 2001 - 2002 Chairman of Advisory Committee for Transportation Environmental Improvement Study in Chiang Mai City, the Kingdom of Thailand by JICA
- 2001 Chairman of Advisory Committee for Ecological Transportation Study in Bangladesh (committed by Ministry of Land, Infrastructure and Transport)
- 2001 JICA Short Time Expert for Executive Seminar on Environment and Transportation Management (EXETRAM)-III, at University of the Philippines by JICA
- 2000 Chairman of Study Team on Transportation Environmental Improvement Study in Chiang Mai City, the Kingdom of Thailand by JICA
- 2000 Chairman of Advisory Committee for Ecological Transportation Study in Bangladesh (committed by Ministry of Transport)
- 2000 JICA Short Time Expert for Executive Seminar on Environment and Transportation Management (EXETRAM) -II, at University of the Philippines by JICA
- 1998 - 1999 Member of Advisory Committee for the Study on Master Plan for Domestic Airport in the Kingdom of Thailand by JICA

**Current Main Academic Services:**

- Chairman of Engineering Education Program Evaluation Committee, JSCE
- Deputy Secretary of International Committee, JSCE ( -June/2011)
- Member of Research Planning Committee, JSCE ( -June/2011)
- Chairman of IATSS Forum Program Committee, IATSS
- Secretary of Criteria Committee, Japan Accreditation Board of Engineering Education (JABEE)
- Board Member and Secretary General of Japanese Chapter of System Dynamics Society
- Councilor of City Planning Institute of Japan
- Board Member of EASTS Japan
- Board Member of ATRANS
- International Editorial Board for Transactions on Transportation Sciences, the Czech Ministry of Transport

## **POSSIBILITY TO REALIZE LOW CARBON SOCIETY IN KHON KAEN AND VIENTIANE**

As the part of S6-5 Research on "Realization of Measures for Low Carbon Transport System in Asia" sponsored by Ministry of Environment, Japan, the approach to set up future vision for Khon Kean was developed and CO2 emission reduction was estimated based on three situations, current situation, future situation with BRT and future situation with BRT and TOD. Since CO2 emission from ordinary bus for BRT is quite huge, CO2 emission reduction is not significant. The result suggested to apply "Improve" measures such as Bio Ethanol use.

On the other hand, the authors estimate CO2 emission reduction in Vientiane as the part of the study on possibility of NAMAs in transport sector. In this study, impact of urban transportation package consisting of BRT, parking management, etc. on CO2 emission reduction was analyzed. The authors plans to develop the future vision of low-carbon society in Vientiane based on the result of this study.

S6-5 Research on Realization of Measures for Low Carbon Transport System in Asia under S6 Research Project on Establishment of Methodology to Evaluate Middle to Long-term Environmental Policy Options toward Asian Low-Carbon Society sponsored by Ministry of Environment, Japan

## Possibility to Realize Low Carbon Society in Khon Kaen and Vientiane

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S6-5 Research on Realization of Measures for Low Carbon Transport System in Asia

S6-5 (2)

Japan:

Prof. Atsushi FUKUDA : Nihon University  
Dr. Teppei OSADA : Nihon University  
Dr. Tetsushiro ISHIZAKA : Nihon University (UC-Riverside)

Thailand:

Dr. Tuenjai FUKUDA, Nihon U & ATRANS  
Dr. Varamete VICHENSAN, KU  
Dr. Sittha JAENSIRISAK, UBU  
Dr. Thanead SATHIENNAM, KKU  
Dr. Paramete LUATHEP, PSU

Vietnam:

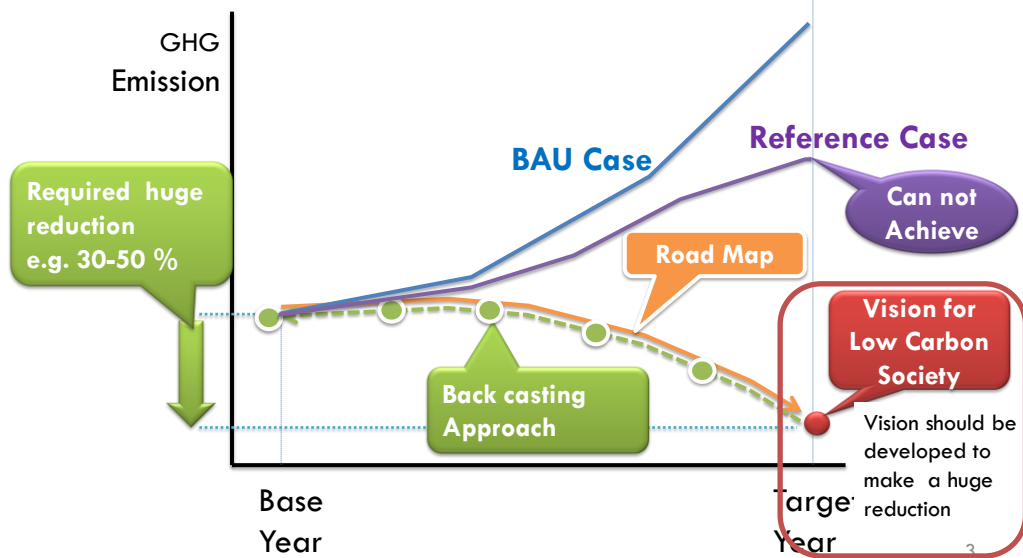
Dr. Khuat Viet HUNG, TU  
Mr. Nguyen Van TRUONG, TU

The Philippines:

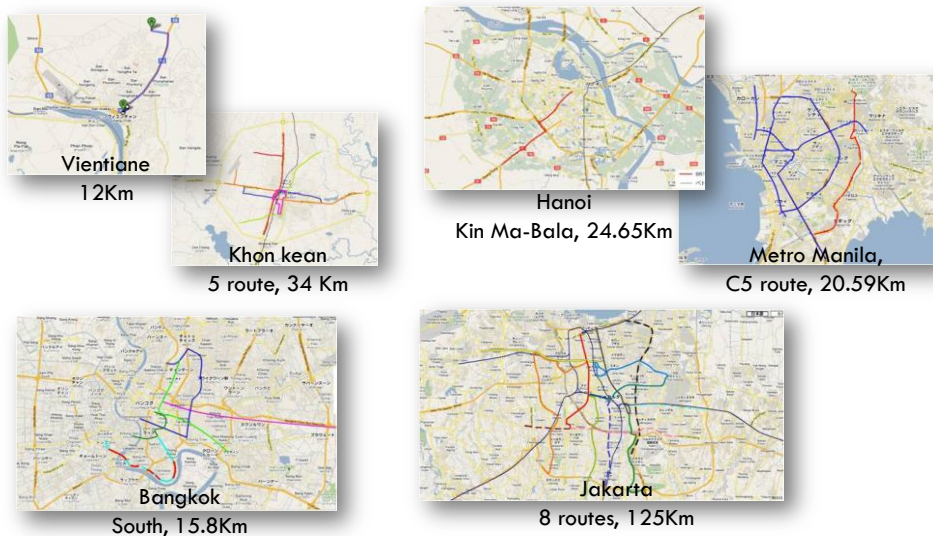
Dr. Alexis FILLONE, DLU

# Future Vision

“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



## Limit of GHG Emission Reduction through Single Transportation Project

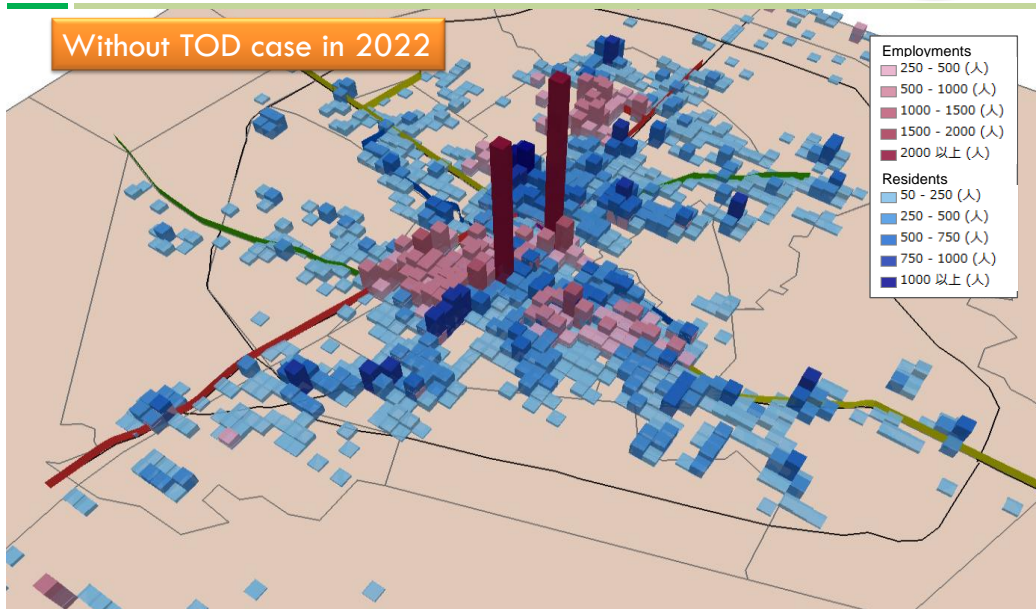




### Future Condition in Khon Kean

Shift

Without TOD case in 2022

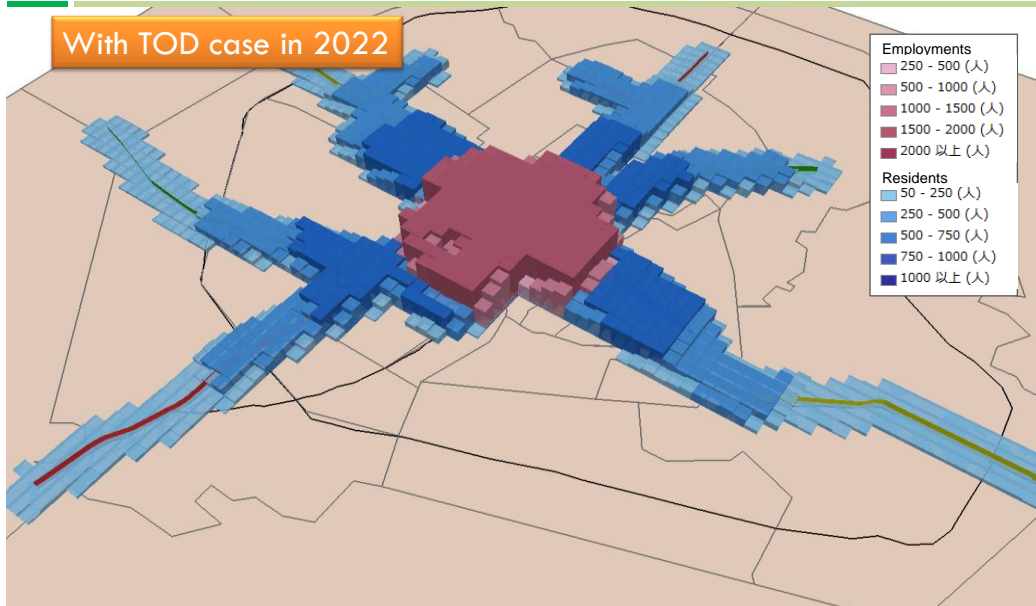


### Future Condition in Khon Kean

Avoid

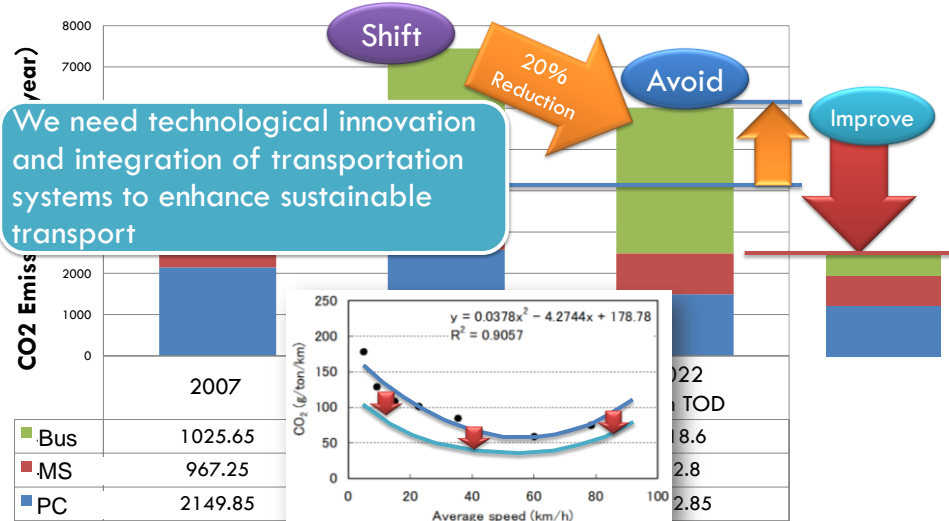
Shift

With TOD case in 2022





## Estimated CO2 Emission



## Future Condition in Khon Kean

**Avoid** **Shift** **Improve**

- Hierarchical Compact City
- Leverage Advanced Technologies
- Seamless & Hierarchical Transportation System
- Bio Ethanol Production and Ethanol Bus Introduction

## Future Study of Low-carbon Society in Khon Kean

S6-5 study group continue to study possibility of low-carbon society based on transportation system, urban structure and technological innovation related to transportation in Khon Kean as the best practice in Asian region with cooperation of Khon Kean Municipality, Khon Kean University and other related organization.

Roadmap to realize low-carbon society will be developed for several scenarios.

The results from Khon Kean Study will transfer to the case of other Asian city.

2011/8/26

S6-5

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## Study of MRV for Transport Sector in Vientiane

**New Flexible Mechanism** which might encourage reduction action should be proposed and its feasibility should be examined from the view point of **Measurable, Reportable and Verifiable**, or **MRV**.

In transport sector, a mechanism which can deal with the comprehensive transportation strategy is required. It must be rather wide concept than PoA of CDM.

**Urban Transportation Improvement Package**

Last year, as the part of the study of Global Environment Centre Foundation (GEC), we mainly prepared the tool to estimate reduction of CO<sub>2</sub> and other roadside emissions for above mentioned approach.

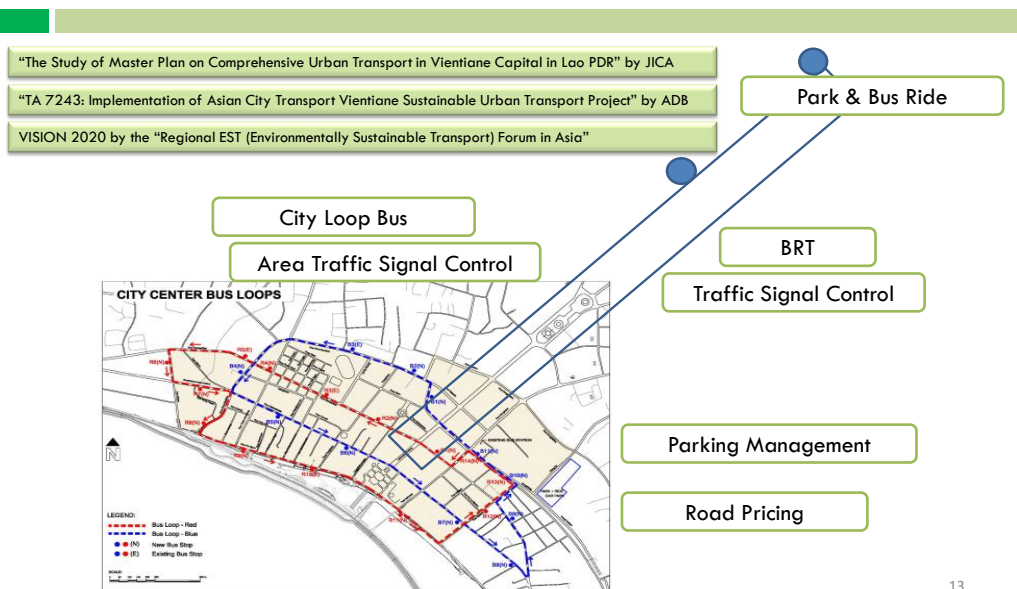
Dr. Yasuki SHIRAKA, Climate consulting

Dr. Tuenjai FUKUDA, Dr. Makoto OKAMURA, Mr. Hidenori IKESHITA & Myself, Nihon University,

Mr. Yoshihiko HASHINO, PTV-Japan

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## Summary of Proposed Measures



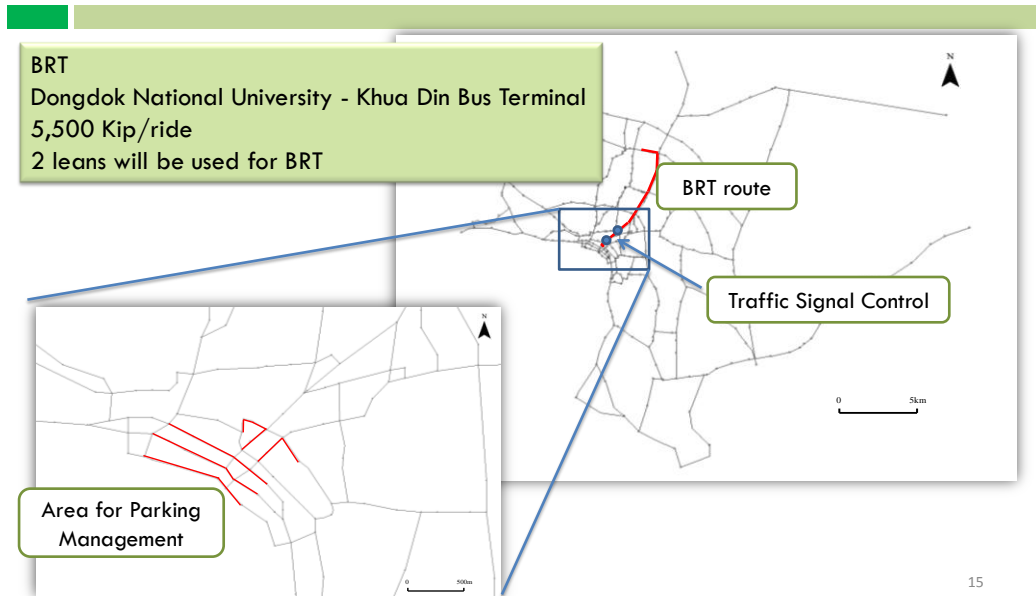
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## Selected Projects for Package

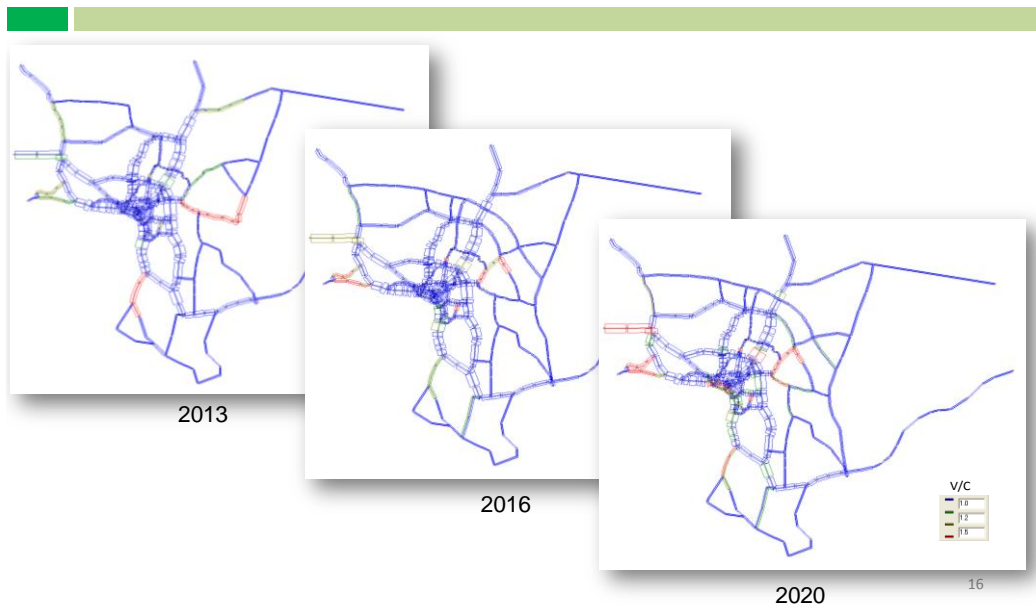
Selected Projects	2013~	2016~
1 Corridor		
1-1 BRT(with/without)	—	○
1-2 Traffic Signal Control by BRT Route	—	○
1-3 Park & Bus Ride at BRT Stop (with/without)	△	△
2 Traffic Management at Downtown		
2-1 City Loop Bus (with/without)	△	△
2-2 Area Traffic Signal Control (with/without)	△	△
2-3 Parking Management (without On-street Parking/with)	○	○
2-4 Road Pricing (with/without)	—	△

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### Target Area and Route on STRADA network



### Estimated Traffic Condition (Reference Case)

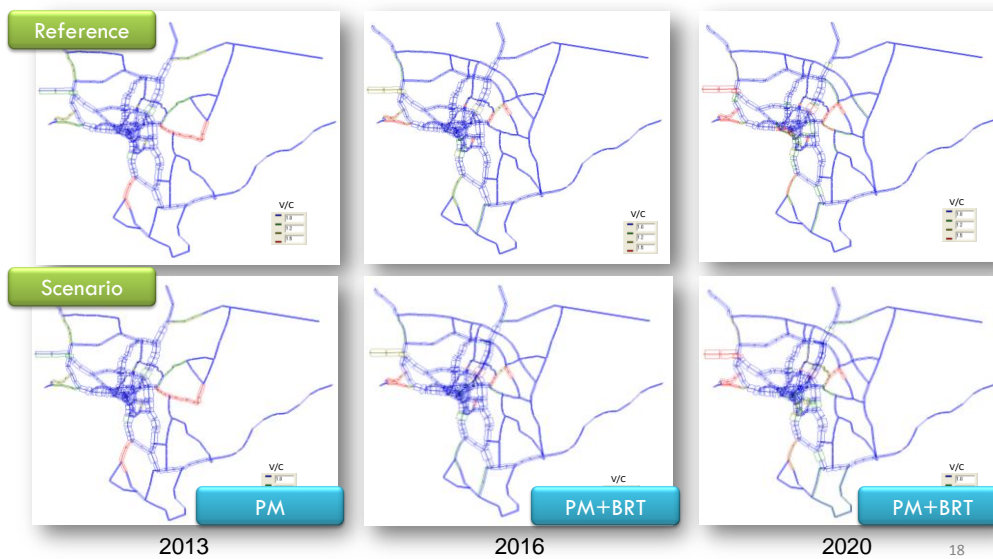


## CO2 Emission Reduction

Year	Scenario	Amount of Emission	
		Day (t/day)	Year (t/year)
2013	1	-5.16	-1883.40
2014	1	0.00	-1.22
2015	1	5.15	1880.97
2016	2	-4.45	-1624.25
2017	2	8.54	3117.10
2018	2	21.53	7858.45
2019	2	34.52	12599.80
2020	2	47.51	17341.15

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## Comparison of reference and scenario case



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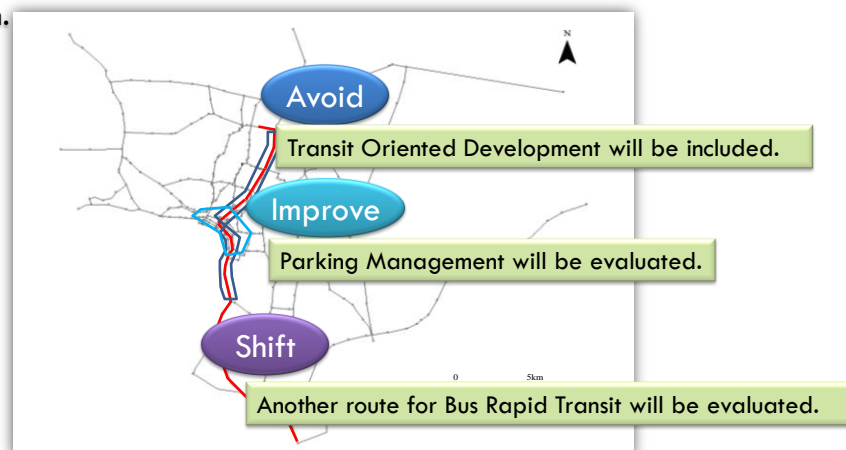
## Roadside Emission (Reduction)

Year	Scenario	NOx		CO		PM	
		Day (t/day)	Year (t/year)	Day (t/day)	Year (t/year)	Day (t/day)	Year (t/year)
2013	1	-0.03	-10.95	-0.33	-120.45	-0.07	-25.55
2014	1	0.00	0.00	0.09	34.07	-0.03	-12.17
2015	1	0.03	10.95	0.52	188.58	0.00	1.22
2016	2	-0.01	-3.65	-0.58	-211.70	0.02	7.30
2017	2	0.08	28.29	0.23	83.95	0.07	25.55
2018	2	0.17	60.23	1.04	379.60	0.12	43.80
2019	2	0.25	92.16	1.85	675.25	0.17	62.05
2020	2	0.34	124.10	2.66	910.90	0.22	80.30

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## Future Study of Low-carbon Society in Vientiane

S6-5 study group with cooperation of MTPW, Laos will develop the future vision for Vientiane and estimate an impact on CO<sub>2</sub> emission reduction.





Thank you very much.