2018

Honda Y-E-S FORUM

Eco-Transportation で
持続可能な社会に向かって舵を切れ

DRIVING TOWARDS SUSTAINABILITY WITH ECO-TRANSPORTATION

2018年7月7日(土) 9:30〜17:30
東京大学 福武ホール
(東京都文京区本郷7-3-1)

July 7 (Sat.), 2018, 9:30 to 17:30
Fukutake Hall, The University of Tokyo
(7-3-1, Hongo, Bunkyo-ku, Tokyo)

主催
公益財団法人 本田財団
HONDA FOUNDATION
Organized by Honda Foundation

後援
科学技術振興機構
Japan Science and Technology Agency
Supported by Japan Science and Technology Agency

Contents

ご挨拶

Message from the President

これまで、製造・生産、運輸、通信などの活動分野における数々の技術革新が、我々の生活に目覚ましい経済成長と大いなる繁栄をもたらし、また多くの利益をもたらしてきました。それにもかかわらず、この成果は環境破壊、汚染、地域紛争など数多くの複雑な問題をも引き起こしています。

このような問題を解決するために様々な研究グループが懸命の努力を続けています。先進国は構造改革、革新的技術、および新発見などを通じて、問題の克服において一定の成果を上げています。開発途上国の一部は、現在その発展の萌芽の時期を脱して飛躍的な成長の段階へと移行しつつあり、特にインフラや輸送開発の分野でそれが顕著に見られます。それでも、輸送機会の増加に伴う汚染やエネルギー安全保障の問題は山積しており、各国における目下の主要課題となっています。近年、国連と世界中の国々で、SDGs（持続可能な開発目標）達成のための取り組みが行われています。今こそ、彼らと共に皆が手を取り合って、私たちの世界と社会が繁栄し続けることができるよう対処することが期待されており、それこそが人類のあるべき進化の姿と考えます。

このような状況を踏まえ、2018年度のHonda Y-E-S Forumは、「エコ輸送で持続可能性を実現する」をテーマと致しました。Honda Y-E-S Forumは、日本を含むアジアの学識経験者や研究者、若手研究者や技術者が、地域の課題認識や、その解決に科学技術が果たすべき役割などを議論する場として企画されました。プログラムに関わる各国が協力し合いながら、理工系の人材育成ならびに人的ネットワーク拡大に貢献することがその狙いです。

アジアの、そして世界の国々が、エコ輸送に配慮しながら、お互いに手を携えてどのように持続可能な社会の実現を目指していくのか。この問いへの答えを探求するのが、このForumの目的でもあります。本活動を通じて将来のリーダーを嘱望される若い研究者たちが国家と人類にポジティブな変化をもたらし、より良い未来の創造に少しでも貢献できるなら幸いです。

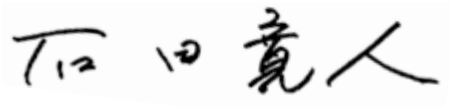
Large numbers of technology innovations in manufacturing and production, transportation, telecommunication, and other activities have brought spectacular economic growth, great prosperity, and lots of benefits to our daily life. However, this achievement has caused numerous and complex problems such as environmental destruction, pollution, regional conflicts, etc.

Various groups of researchers have been working very hard to find the resolutions to address these problems. Industrialized countries have produced results in overcoming them to some extent through structural reform, innovative technologies, new discoveries, etc. Among some of the developing countries, a transition is taking place with economic development moving away from its initial infancy stage toward dramatic growth; especially, in the infrastructure and transportation development sector. Nevertheless, the increase in transportation usage has caused much pollution and energy security issues which are the main challenges for the nations. Lately, the United Nations and many countries around the world are making efforts to achieve Sustainable Development Goals (SDGs). Together with them, now it is time for all of us to join hands and take action to secure the continuous prosperity of our motherland and society. This is the direction in which we believe humankind should evolve.

Having such situation as a background, “Driving Towards Sustainability with Eco-Transportation” has been selected as the theme of the Honda Y-E-S Forum 2018 which was designed as a venue for discussion among academic experts, young researchers, scientists, and engineers of Asia, including Japan, to raise up their consciousness of issues in the region and the role that science and technology should fulfill in resolving them. The Forum hopes to contribute to human resources development in the science and technology fields, and human network growth in the area through cooperation between countries involved in the program.

How do Asian countries and the rest of the world cooperate and plan together to drive our society toward sustainability, with so much attention on eco-transportation? Answering this question is the purpose of this Forum. Through this activity, we hope that we can encourage young people who are expected to be the next leaders, to make positive changes for a better future for their nation and humanity.

公益財団法人　本田財団
理事長



Hiroto Ishida
President, Honda Foundation

プログラム

Program

9:00	開場　Doors Open
9:30	開会挨拶　Opening Remarks Nguyen Cong Tu氏　Y-E-S奨励賞受賞者代表 Mr. Nguyen Cong Tu, Representative of Y-E-S Awardees 石田 寛人　本田財団 理事長 Hiroto Ishida, President, Honda Foundation
9:50	Y-E-S奨励賞受賞者によるプレゼンテーション Presentations by the Y-E-S Awardees ■ベトナム Vietnam …… エコ輸送を目指すベトナムの長短期政策 Long- and Short-Term Policies of Vietnam toward Eco-Transportation ■インド India …… インドにおける内水輸送 Inland Water Transport in India ■カンボジア Cambodia …… カンボジアにおける公共バス輸送 Public Bus Transportation in Cambodia ■ラオス Lao PDR …… ラオスの輸送システムに適合したエコ輸送コンセプトの導入 Adapting Eco-Transportation Concept to Transportation System in Lao PDR ■ミャンマー Myanmar …… ヤンゴン環状鉄道網の強化 Strengthening Yangon's Circular Rail Network
休憩　Break	
11:25	産業界からのプレゼンテーション：本田技術研究所 Guest Speaker from Industrial Sector, Honda R&D 守谷 隆史 氏　本田技術研究所 四輪R&Dセンター 上席研究員 Mr. Takashi Moriya Senior Chief Engineer, Automobile R&D Center, Honda R&D Co., Ltd. ホンダの燃料電池自動車開発と水素社会に向けたチャレンジ Honda Fuel Cell Vehicle Development and Challenge toward Hydrogen Society
11:45	研究ポスターコンテスト プレゼンテーション　Research Poster Contest Presentation
12:15	ランチタイム　Lunch Time
12:45	研究ポスター観覧・投票　Research Poster Viewing and Voting
13:30	基調講演 1　Keynote Speech 1 須田 義大 教授　東京大学生産技術研究所 次世代モビリティ研究センター 教授 Prof. Yoshihiro Suda Professor, Advanced Mobility Research Center, Institute of Industrial Science, The University of Tokyo 自動運転による次世代モビリティ～その実現のためのエコシステム確立 Next Generation Mobility by Automated Driving — Implementation by Establishment of Ecosystem 基調講演 2　Keynote Speech 2 森川 高行 教授　名古屋大学 未来社会創造機構 教授 Prof. Takayuki Morikawa Professor, Institutes of Innovation for Future Society, Nagoya University コネクテッドカー（ネットワーク接続車両）による高度交通管理 Advanced Traffc Management by Connected Cars
休憩　Break	
14:45	パネルディスカッション　Panel Discussion ファシリテーター：角南 篤 博士 Facilitator: Dr. Atsushi Sunami
休憩　Break	
16:35	研究ポスターコンテスト発表&表彰　Award Ceremony for Research Poster Contest
16:50	閉会挨拶　Closing Remarks
17:05	記念撮影　Photo Session
17:30	閉会　Closing

■ Y-E-S奨励賞とは？

Y-E-S奨励賞（Honda Young Engineer and Scientist's Award 略称：Y-E-S（ワイ・イー・エス）奨励賞）は、科学技術分野における将来のリーダー育成を目的に、学生に奨励金を授与する表彰制度です。
2006年に当財団創設30周年を迎えることを機にベトナムで開始。現在はインド、カンボジア、ラオス、ミャンマーを加えた5カ国で展開しており、多くの受賞者が日本に留学しています。

■ What is Honda Y-E-S Award?

The Honda Foundation started the Honda Y-E-S (Young Engineer and Scientist's) Award program to foster future leaders of science and technology fields in 2006 as a part of the Honda Foundation's 30th anniversary project. It is implemented in Vietnam, India, Cambodia, Lao PDR and Myanmar, and many awardees come to study in Japan.

Speaker Profile

須田 義大 教授

東京大学生産技術研究所
次世代モビリティ研究センター 教授

東京大学生産技術研究所（IIS）教授。1982年東京大学機械工学科卒業、1987年東京大学大学院にて博士号取得。法政大学准教授、クイーンズ大学客員准教授（カナダ、キングストン市）を務めた後、次世代モビリティ研究センターのセンター長、およびIIS千葉実験所の所長を務めた。研究分野は、制御動力学、ヒューマン・マシン・インターフェース、ならびにそれら技術の自動車および新世代モビリティへの応用。自動車・鉄道業界と共に、多くの産学連携プロジェクトを行い、トラックの自動隊列走行システムなど、多数の実用化実績を持つ。現在、公益社団法人自動車技術会（JSAE）およびITS Japanの役員を務め、日本政府の複数の委員会で主要メンバーを務める。また国際会議を多数主宰している。

Prof. Yoshihiro Suda

Professor, Advanced Mobility Research Center,
Institute of Industrial Science, The University of Tokyo

Yoshihiro SUDA is Professor of Institute of Industrial Science (IIS). He graduated from the Department of Mechanical Engineering, The University of Tokyo in 1982 and earned a Doctoral Degree in 1987. After working as Associate Professor of Hosei University and Guest Associate Professor of Queen's University at Kingston, Canada, he worked as Director of the Advanced Mobility Research Center and the IIS Chiba Experiment Station. His research area is dynamics and control engineering, human-machine interface, and their applications to automobile and new generation mobility. He has conducted many industry-academia collaborative projects with automobile and railway industries, and developed many practical outputs such as the automated platoon truck system. He is a board member of JSAE, ITS Japan, and a leading member of several Japanese Government committees. He has hosted numerous international conferences.

森川 高行 教授

名古屋大学 未来社会創造機構 教授
名古屋大学COI (Center of Innovation)
移動イノベーション拠点 研究リーダー

京都大学工学修士号（1983）、マサチューセッツ工科大学（MIT）科学修士号（1987）を取得後、MIT（Moshe Ben-Akiva教授監督下）にて博士号を取得（1989）。1991年より名古屋大学准教授を務め、その後MIT客員准教授（1996〜1997）、名古屋大学教授（2000〜）を務める。現在は、名古屋大学COIの移動イノベーション拠点にて研究リーダーを務める。研究分野は、交通行動分析、交通需要予測、交通政策、および高度道路交通システム。

Prof. Takayuki Morikawa

Professor, Institutes of Innovation for Future Society,
Nagoya University
Research Leader, Mobility Innovation Center,
Nagoya University COI (Center of Innovation)

Professor Takayuki Morikawa obtained his Master of Engineering from Kyoto University in 1983 and Master of Science from Massachusetts Institute of Technology (MIT) in 1987. Thereafter, he obtained his Ph.D. from MIT under the supervision of Professor Moshe Ben-Akiva in 1989. In 1991, he began to work as Associate Professor at Nagoya University. From 1996 to 1997, he worked as a visiting associate professor at MIT. Since 2000, he has been a professor at Nagoya University. Now Professor Morikawa serves as the Research Leader of Mobility Innovation Center at Nagoya University COI.
His research areas are travel behavior analysis, transport demand forecasting, transport policies, and intelligent transport systems.

Speaker Profile

守谷 隆史 氏 本田技術研究所 四輪R&Dセンター 上席研究員

1981年、本田技術研究所に入社後、内燃機関（ICE）設計部署に配属。主に将来エンジンの設計に携わる。1995年には、燃料電池電気自動車開発室に配属。燃料電池スタックや燃料電池システムに関する研究活動に携わる。また、FCXやFCXクラリティの初期段階における開発研究も行う。開発室マネージャー、シニアマネージャー、執行役員を歴任後、現在は上席研究員を務める。

Mr. Takashi Moriya Senior Chief Engineer, Automobile R&D Center, Honda R&D Co., Ltd.

Takashi Moriya joined Honda R&D Co., Ltd. in 1981 and was assigned to the Internal Combustion Engine (ICE) Design Department, where he mainly engaged in future ICE design. In 1995, he joined the Fuel Cell Electric Vehicle Development Department where he engaged in research activities in relation to Fuel Cell Stacks and Systems. At the department he also researched early phase FCX and the FCX Clarity development. Today, he is a Senior Chief Engineer after having worked as a Department Manager, a Senior Manager, and an Operating Officer.

Biography of Panel Discussion Facilitator

角南 篤 博士
政策研究大学院大学教授
副学長

Dr. Atsushi Sunami
Vice President, Professor,
National Graduate Institute for
Policy Studies (GRIPS)

1988年、ジョージタウン大学School of Foreign Service卒業、89年株式会社野村総合研究所政策研究部研究員、92年コロンビア大学国際関係・行政大学院Reader、93年同大学国際関係学修士、97年英サセックス大学科学政策研究所（SPRU）TAGSフェロー、2001年コロンビア大学政治学博士号（Ph.D.）取得。2001年から2003年まで独立行政法人経済産業研究所フェロー。2003年政策研究大学院大学助教授、2014年教授、学長補佐、2015年内閣府参与（科学技術・イノベーション政策担当）、2016年副学長、2017年笹川平和財団常務理事、海洋政策研究所所長（現在に至る）。その他、文部科学省 科学技術・学術審議会委員、内閣府総合科学技術・イノベーション会議基本計画専門調査会委員、等。

Professor Sunami holds BSFS from Georgetown University. He obtained MIA and PhD in Political Science from Columbia University. He is currently Professor, and Vice President at GRIPS. He is serving as Special Advisor, Cabinet Office responsible for Science and Technology and Innovation and President and Executive Director, the Ocean Policy Research Institute, the Sasakawa Peace Foundation. Before joining GRIPS, he was Fellow at the Research Institute of Economy, Trade and Industry established by the Ministry of Economy, Trade and Industry, Japan between 2001 and 2003. He also worked as a researcher in the Department of Policy Research at Nomura Research Institute, Ltd. from 1989 to 1991. He was a visiting researcher at Science Policy Research Unit, University of Sussex, the U.K. and Tsinghua University, China. He is also a member of the Advisory Board for the Promotion of Science and Technology Diplomacy in Ministry of Foreign Affairs of Japan, the Council for Science and Technology in the Ministry of Education, Culture, Sports, Science and Technology and the Expert Panel on Basic Policy in Council for Science, Technology and Innovation of Cabinet Office.

Speaker Profile

ベトナム
Vietnam

1. 受賞年　2. 学歴　3. 現在の職業
1. Y-E-S Award Year　2. Education　3. Current Occupation

Nguyen Cong Tu

1. 2008年 Y-E-S奨励賞受賞者
2. ハノイ工科大学 電子材料工学／フランス トゥールーズ国立応用科学研究所にて光通信学・光電子工学システム博士号取得
3. ハノイ工科大学 物理工学部講師兼研究員

1. 2008 Y-E-S Awardee
2. Engineering of Electronic Materials, Hanoi University of Science and Technology / Doctor of Photonics and Optoelectronics System, INSA Toulouse, France
3. Lecturer & Researcher, School of Engineering Physics, Hanoi University of Science and Technology

Nguyen Thi Thu Huong

1. 2012年 Y-E-S奨励賞受賞者
2. ベトナム国家大学ハノイ校 環境工学
3. 韓国科学技術研究所（KIST）博士号候補生

1. 2012 Y-E-S Awardee
2. Environment Engineering, Vietnam National University, Hanoi
3. Ph.D. candidate, Institute of Science and Technology (KIST), Korea

Le Quang Hieu

1. 2012年 Y-E-S奨励賞受賞者
2. ハノイ工科大学 情報技術／同大学にてコンピューター科学修士号取得
3. エコネット社 最高技術責任者／ビッテルグループ クラウド・エバンジェリスト

1. 2012 Y-E-S Awardee
2. Information Technology & Master of Computer Science, Hanoi University of Science and Technology
3. CTO, Econet Corp / Cloud Evangelist, Viettel Group

インド
India

1. 受賞年　2. 学歴　3. 現在の職業
1. Y-E-S Award Year　2. Education　3. Current Occupation

Sashank Vandrangi

1. 2013年 Y-E-S奨励賞受賞者
2. インド工科大学マドラス校 機械工学
3. ボストンコンサルティンググループ マネジメント・コンサルタント

1. 2013 Y-E-S Awardee
2. Mechanical Engineering, IIT Madras
3. Management Consultant, Boston Consulting Group

Harsh Kabra

1. 2014年 Y-E-S奨励賞受賞者
2. インド工科大学ボンベイ校 物理工学
3. ドイツ ベルリン メルセデスベンツ・イノベーション研究所 技術者

1. 2014 Y-E-S Awardee
2. Engineering Physics, IIT Bombay
3. Engineer, Mercedes Benz Innovation Lab, Berlin, Germany

Shyam Sunder Prasad

1. 2014年 Y-E-S奨励賞受賞者
2. インド工科大学ボンベイ校 電気工学
3. バンガロール サムスンセミコンダクターインドリサーチ 上級エンジニア

1. 2014 Y-E-S Awardee
2. Electrical Engineering, IIT Bombay
3. Senior Engineer, Samsung Semiconductor India Research, Bengaluru

カンボジア
Cambodia

1. 受賞年　2. 学歴　3. 現在の職業
1. Y-E-S Award Year　2. Education　3. Current Occupation

Kim Keosopanha

1. 2008年 Y-E-S奨励賞受賞者
2. カンボジア工科大学　食品技術・化学工学／モンテペリエ大学（フランス）にて食品品質のサステイナブルマネジメントにおける修士号取得
3. カンボジア商務省 微生物学研究部研究役員

1. 2008 Y-E-S Awardee
2. Food Technology and Chemical Engineering, Institute of Technology of Cambodia / Master of Sustainable Management of Food Quality, Montpellier, France
3. Lab Officer of Microbiological Lab Department, Ministry of Commerce of Cambodia

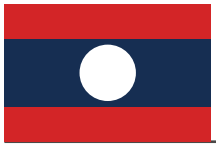
Plong Malypoeur

1. 2009年 Y-E-S奨励賞受賞者
2. 王立プノンペン大学　コンピューター科学／ルーヴェン・カトリック大学（ベルギー）にてインターネットコンピューティング工学修士号取得
3. カンボジア ABA銀行 研究・商品開発責任者

1. 2009 Y-E-S Awardee
2. Computer Science, Royal University of Phnom Penh / Master of Engineering in Internet Computing, K.U Leuven, Belgium
3. Head of Research and Product Development, ABA Bank, Cambodia

※所属・役職名は開催当時のものです。
※Organizations and titles are at the time of the Forum.

Speaker Profile



ラオス
Lao PDR

1. 受賞年　2. 学歴　3. 現在の職業
1. Y-E-S Award Year　2. Education　3. Current Occupation

Mary Pakdimanivong

1. 2011年 Y-E-S奨励賞受賞者
2. ラオス国立大学 道路・輸送工学／忠南大学校（韓国、大田）にて土木工学科学修士号を取得
3. ラオス INTRA株式会社（単独法人） 役員秘書

1. 2011 Y-E-S Awardee
2. Road and Transportation Engineering, National University of Laos / Master of Science in Civil Engineering, Chungnam National University, Daejeon, South Korea
3. Executive Assistant, Intra Corporation Sole Co., Ltd. Lao PDR

Kaynhasith Xayalath

1. 2014年 Y-E-S奨励賞受賞者
2. ラオス国立大学 土木工学
3. ワットタイ国際空港拡張事業 株式会社 安藤・間 積算技術者

1. 2014 Y-E-S Awardee
2. Civil Engineering, National University of Laos
3. QS engineer, HAZAMA ANDO Corporation, Wattai International Airport Expansion Project

ミャンマー
Myanmar

1. 受賞年　2. 学歴　3. 現在の職業
1. Y-E-S Award Year　2. Education　3. Current Occupation

Co Se Lin

1. 2015年 Y-E-S奨励賞受賞者
2. マンダレー工科大学 土木工学
3. 構造工学技術者（フリーランス）

1. 2015 Y-E-S Awardee
2. Civil Engineering, Technological University (Mandalay)
3. Freelance Structural Engineer

※所属・役職名は開催当時のものです。
※Organizations and titles are at the time of the Forum.

Opening Remarks

Opening Remarks

Hiroto Ishida
President, Honda Foundation

Greetings from President at the Y-E-S Forum

Thank you for the introduction. My Name is Hiroto Ishida, president of Honda Foundation. As the opening of this Forum, I would like to thank everyone who joined today's forum here in Fukutake Hall in University of Tokyo. And I would like to deeply express my gratitude for all the support and cooperation offered from various organization of people including Japanese students for joining and applying for the Research Poster Contest.

Honda Foundation has been developing the grant program "Y-E-S" for awarding excellent undergraduate students in 5 countries Vietnam, India, Laos, Cambodia, and Myanmar. The representatives of awardees in each country have planned, discussed, and organized today's Y-E-S Forum for further extending the Y-E-S Award program. The main purpose of this forum is to contribute the developing skills and abilities of students who study here in Japan. It also aims to expand the human network through communications among awardees with Japanese scientists and academia getting to know each other closely, and bringing back what is learnt during the forum to home countries.

The theme for today's discussion is "Driving Towards Sustainability With Eco-Transportation"
On the process of developing in each countries, a rapid growth of economy and increasing transportation utilization have caused much air pollution, traffic congestion and accidents influencing whole energy supply and demand system. Nowadays, sustainable development for such countries is very important and the United Nations and many countries in the world are making efforts for achieving Sustainable Development Goals, SDGs.
How do Asian countries and the rest of the world cooperate and plan together to drive our society toward sustainability, with so much attention on eco-transportation and eco-technology? Answering this question is the purpose of this Forum. Through this activity, we hope to encourage young participants who are expected to be the next leaders in each country, to make positive contributions to a better future for their nation and human being.

I would like to conclude my greeting by asking for your continued cooperation with Honda Foundation in the future. And please spend good time in this good hall at the University of Tokyo. Our metrology agency declared that the rainy season in Japan was over, but we still have heavy rain. Tokyo today has sunshine but other area of Japan has very heavy rain fall and even flood. Prof. Matsunami from Kyoto and many of other participants from area other than Tokyo came to the Forum despite such weather condition. We believe that rain fall and sunshine in June and July will bring about good fruits and crops in August and September. So, today's discussion and talks will bring about good fruits and discussion for future of our countries. Thank you very much.

Nguyen Cong Tu
Representative of Y-E-S Awardees

Opening Remarks by Representative of Y-E-S Awardees

Good Morning Ladies and Gentlemen,

I am Nguyen Cong Tu, Honda Y-E-S Awardee 2008 from Vietnam. I am a Chairman of Preparation Committee of Honda Y-E-S Forum 2018. it gives me immense pleasure to be present here and commence third edition of Honda Y-E-S Forum.

Honda Y-E-S Forum was conceived as a platform where past Honda Y-E-S awardees from Vietnam, India, Cambodia, Laos and Myanmar can come together and engage with Japanese intelligentsia – comprising of researchers, students, professors and industry representatives to discuss about eco-technology.

The topic of Honda Y-E-S Forum 2018 is "Driving Towards Sustainability With Eco-Transportation".

In the first edition which was held in 2015, we discussed about pollution. Just to get some perspective, 23% of world's total carbon dioxide emission comes from burning fossil fuels – 75%of which is accounted by road transport. In Forum 2016, we talked about energy. 95% of road transport depends on oil – and this corresponds to 60% of world's total oil consumption. It is quite apparent that for tackling pollution and achieving energy security, we need to work towards energy-efficient and pollution free means of transport. Hence, we aim to use this platform to talk about eco-transportation.

The Y-E-S scholars from five countries will present their own perspective on eco-transportation – what efforts are being taken and what are the challenges they are facing. The presentation will also be followed by a panel discussion in the later half of the day. I would like to urge a strong participation from the audience so that we can make it a dialogue, and not a monologue. We will love to take questions and deeply appreciate the inquisitiveness.

We all are also very excited and looking forward to the ideas presented by young Japanese students and researchers through their posters.

I hope that at the end of the day, we take one step forward in "Driving towards sustainability with eco-transportation".

Thank you and welcome to Honda Y-E-S Forum 2018.

Presentations by the Y-E-S Awardees

Vietnam

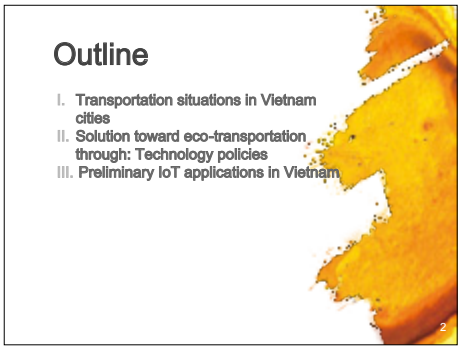
Nguyen Cong Tu
2008 Y-E-S Awardee
Nguyen Thi Thu Huong
2012 Y-E-S Awardee
Presenter **Le Quang Hieu**
2012 Y-E-S Awardee

Toward eco-transportation through Vietnamese policies

In an increasingly connected world, eco- transportation is fundamental to tackle dual challenges of rising pollution and energy security. The efficiency of new technologies and materials is still a controversial topic. Using new technologies and new materials, especially in transportation, indicates the changing of the habit of people and method in manufacture. These changes not only require the will of people but also the strong support from society and government through policies in pursuing sustainable development. Following presentations about Eco-technological solutions for Water pollution in Vietnam (in Honda Forum 2015); Energy in Vietnam: current status and the potential of wind power (in Honda Forum 2016), in Forum 2018, the topic of Vietnam team is moving towards eco-transportation through Vietnamese policies.

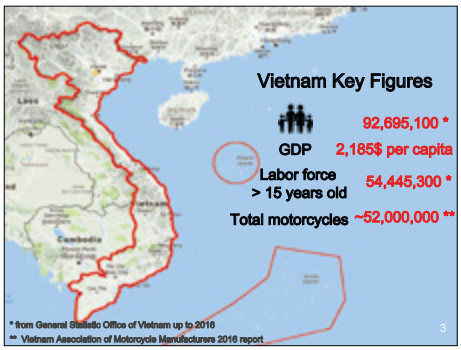
1

In this presentation, firstly we are going to introduce an overall picture of the transportation situation in Vietnam, some issues regarding pollution that block us towards achieving eco-transportation. The second is the current technology policies towards eco-transportation, achievements in big cities of Vietnam. The last section of this presentation will show Preliminary IoT applications in Vietnam.



2

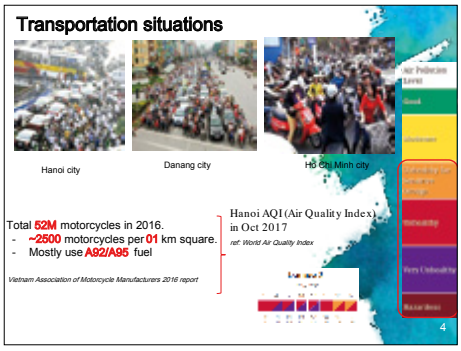
We begin with some key figures. Vietnam is a developing country in the most active region in the world i.e. South-East Asia. In 2016, the population of Vietnam was about 93 million. The GDP per capita is approximately 2200 US dollars. Vietnam has a young working force with approximately 55.5 million people in the working age. It is interesting to note that there are approximately 52 million using motorbikes in Vietnam out of 55 million of working population. These motorbikes are used not only for daily private transportation but also business-like grab-bike, taxi-bike or mobile/portable-shop. These two numbers mean in Vietnam a person in working age uses 1 motorbike.



3

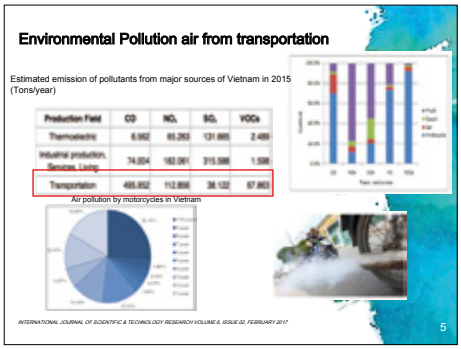
Presentations by the Y-E-S Awardees

With this ratio, there is a lot of private transportation means in Vietnam (2500 motorbike per 1 km square with mostly using A92/A95 fuel), especially in rush hour (from 7 to 8 am in the morning, and from 4 to 7 pm in the evening). Transport congestion happens on daily basis due to a huge number of private vehicles, particularly in metropolis cities such as Hanoi and Ho Chi Minh city. Instead of spending 15 minutes for a 5-km distance of commuting from home to office, people must spend 30 minutes or even more. This is not only wasting time but also extra emission gas leading to air pollution with AQI always around the unhealthy range.



4

Emission gas from transportation (mostly in-land transportation) is the main reason for environmental pollution air. From the table, we clearly see that there are three main sources of air pollution (Carbon monoxide, nitrogen oxide, sulfur oxide and Volatile organic compounds): thermoelectric, industrial production, service, living, and transportation, in which transportation contributes 86% of carbon monoxide gas and 94% of Volatile organic compounds. In the graph, the distribution of the motorcycle is clearly showed 60% of CO and 90% of VOC in transportation are contributed by using the motorcycle. Thus, tackling the motorcycle section will be very an important part in reducing the emission air or enhance eco-transportation.

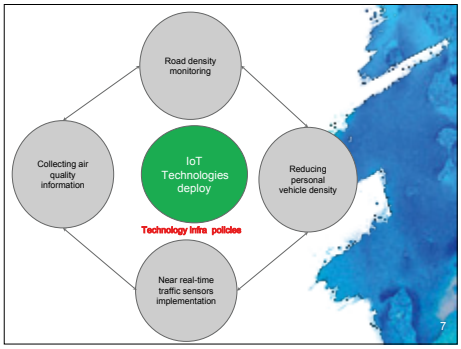


5

Vietnamese governments have been enacting many solutions such as building new line of BRT (Bus Rapid Transit) with high priority, building new metro system, expanding the road, building the cross bridges, promoting use of electric vehicles by building an eco-system for them like smart-city, preparing for banning use of motorcycle in city center, changing the schedule of students/ pupils to reduce the number of vehicles participating in traffic in rush hour etc. Most of these policies are the long-term solutions and these solutions will change the habit of people and will take a lot of time. Parallelly with these long-term and expensive solutions (building new infrastructure), Vietnamese government recently promoted another solution with less impact on the habit of people and in our opinion has most effect: The technology policies – using IoT platform.

6

IoT – Internet of Things is one of the most important parts of industrial revolution 4.0. In transportation, IoT is embedded in the smart-city model and is deployed for road density monitoring, reducing personal vehicle density, near real-time traffic sensors implementing air quality monitoring. With the implementation of near real-time IoT traffic sensors and IoT platform, we aim to optimize the flow of traffic in order to reduce the number of the personal vehicles. One of the outcomes is reducing the time on road of vehicles and consequently leading to air pollution mitigation.

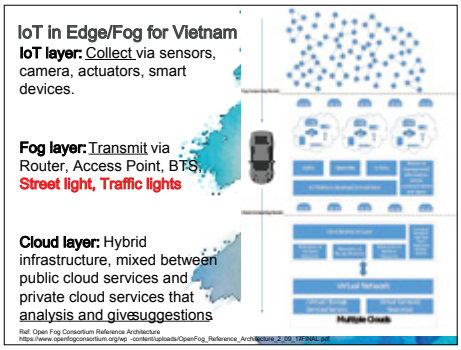


7

Presentations by the Y-E-S Awardees

The targeted high-level design of IoT in Vietnam is conducted in three layers. The top layer namely the IoT layer contains sensors & actuators that reach end-user. The middle layer – fog/edge layer mostly include middle-ware devices and IoT platforms for distributing the processing workload from centralized cloud infrastructure into a smaller unit such as traffic light, street light controller, BTS or personal router, access point. The bottom layer - the cloud layer process and store almost data collected through the whole stack. This design is following the proposal architecture of Open Fog Consortium.

Thus, the vital mission in progress towards eco-transportation in Vietnam through IoT is following and completing the whole stack of the above design. The only obstacle is designing and building the fog/edge layer because up to now, there is no de-facto standard for either IoT platform or device communications.



8

Hence, here is our proposed timeline of emission mitigation and sustainable transport with the IoT concept for Vietnam, divided into 3 phases.

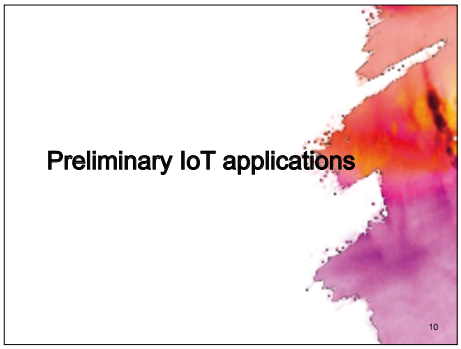
The first phase is preparation, where we start will small scope of piloting technology focusing mostly on upgrade transmit infrastructure. The current data transmitted in Vietnam is only around 300Gb/s per DWDM (Dense Wavelength Division Multiplexing connection) because we had focused and centralized the connectivity only in the big city in Vietnam. There are some decrees that target upgrading connectivity of province level to DWDM SFP for bringing the overall throughput of Vietnam to more than 10Tb per province.

The second phase is shifting. We had already completed some proof of concept for public Wi-Fi hot-spot in Hanoi (around Hoan Kiem lake) and Danang city. We also evaluated some solutions for smart parking areas to develop multimodal transport, logistic services, and network of ICD ports.

The last phase is applying some advanced technologies such as Artificial Intelligence and Machine Learning in computer vision for traffic jam prediction and real-time traffic jam monitoring/alerting.

9

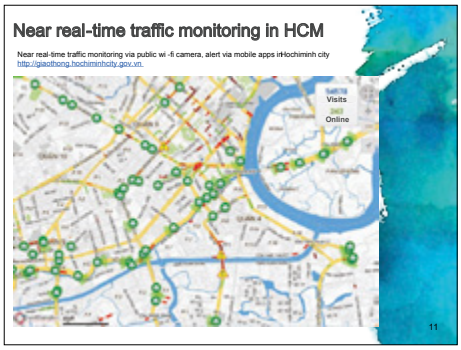
The following sections will cover and show our Preliminary IoT applications, some proof of concept or researched project already implemented in Vietnam. After that, we would like to show the SWOT (Strength – Weakness – Opportunity – Threat) analysis based on the current context.



10

Presentations by the Y-E-S Awardees

The first Preliminary application is the "Near real-time traffic monitoring system", already implemented in Ho Chi Minh city. The green dot in the digital map is the security cameras deployed along the roads, and the red/green lines show the current traffic situation of the road. Almost the status of traffic on roads is currently updated manually by public security officers.

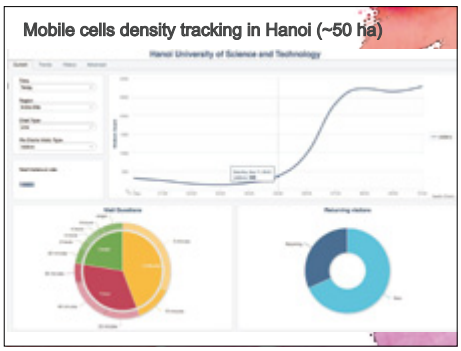


11

Another Preliminary application of "Near real-time traffic monitoring system" was POCed in Hanoi. This is the head-quarter of the system, showing all the near real-time stream and alerts of traffics from piloted roads.
The communication between the headquarter and in-field officers were mostly performed manually by walkie-talkie.

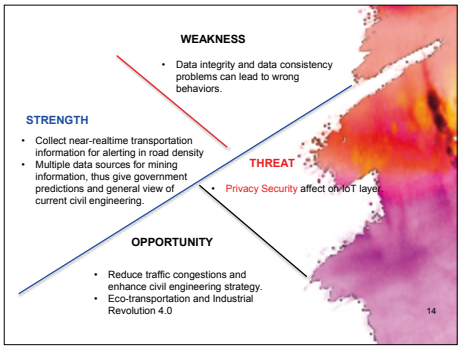
12

These two above traffic monitoring system can only provide the traffic status based on computer vision through the public security camera, and this approach is depended on many factors that can affect the result such as weather or network, device quality etc. Another approach for solving the problem of monitoring traffic in real time is tracing the road density based on mobile cells tracking in Hanoi. This is a research project, funded by a Singapore NGO with the pilot area around 50 ha, around one district of Hanoi.
The target of this project is predicting the road density by passively gathering mobile cell ID properties such as durations, movements in one small area and then visualizing the result.
There are some blocking points of this research project for applying in real life such as some policies in collecting information from personal mobile devices.



13

For the summary, we gather some key factors in following SWOT graph of applying IoT technology policies in Vietnam. Currently with all pilots and PoC projects such as near real-time traffic monitoring, tracing road density based on mobile cell tracking, Vietnamese government can have a potential data lake for mining and having a concrete general view of the current civil engineer. Then, with all mining information, we can reduce the traffic congestions by expanding along with applying new technologies for enhancing transportation and civil engineering strategy.
The problems here in Vietnam are the data integrity and data consistency could lead to wrong behaviors and produce bad recommendations. Another concern in Vietnam is the security of IoT devices and IoT platform.



14

For conclusion, the Vietnamese government has been promoting transportation policy to follow sustainable development. Most of the policies are long-term policies, but recently the Vietnamese government strongly stimulates the use of eco-transportation technologies (IoT deployment, Electric Vehicles…).
These policies, up to now, are not comprehensive and synchronous; we need to spend more effort on research and consulting to build a comprehensive policy in all fields (transportation, construction, education, culture etc.). Our government strongly supports the usage of IoT on smart-cities and on optimizing the traffic flow, but it is just the beginning.

15

16

Presentations by the Y-E-S Awardees

India

Harsh Kabra
2014 Y-E-S Awardee

Presenter **Sashank Vandrangi**
2013 Y-E-S Awardee

Shyam Sunder Prasad
2014 Y-E-S Awardee

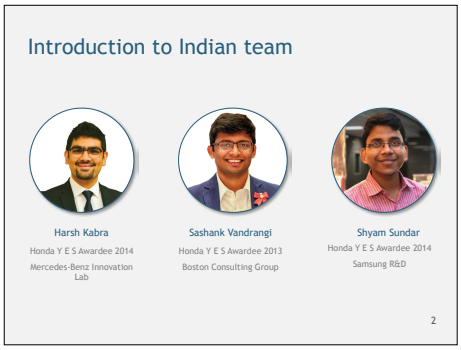
Inland Water Transportation

Benefits of using Inland waterways to reduce the ecological impact of freight transportation

Good Afternoon, everyone! I am Sashank and am excited to be here. I am grateful to the Honda Y-E-S organization and to all of you for making this event possible. Today, we are going to talk about Inland Water Transportation as a means to achieve sustainable transportation and how India adopting this mean of transportation.

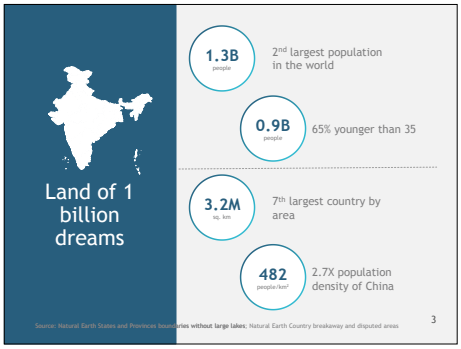
1

There are three members of our team: Harsh Kabra, Honda Y-E-S Awardee 2014; Shyam Sunder Prasad, Honda Y-E-S Awardee 2014 and me Sashank Vandrangi, Honda Y-E-S Awardee 2013.



2

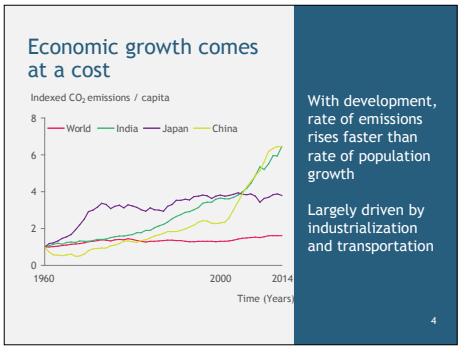
Before I begin, I just want to set some context how large and crowded India is. India has 1.3+ billion people in an area of 3.3 million km^2. India is a young country with the 65% of the population is younger than 35. India has a highly dense population of 482 people/km^2 – 2.7 times of China's density of population. Demographically, India is a young country and is entering a phase of economic growth. Transportation and Industrial infrastructure are the pillars of economic growth for any country.



3

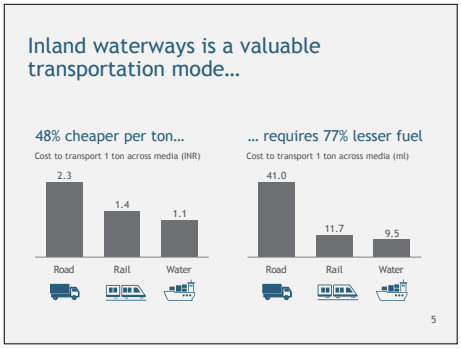
Presentations by the Y-E-S Awardees

But the economic growth comes at a cost. In the graph is the indexed CO_2 emission per capita from 1960 to 2014 of India, Japan, China and whole the world. We see that, with the development, the rate of emissions rises faster than the rate of population growth.
Japan starts the industrialization since the 1960s with the drastic increase in indexed CO_2 emission per capita. After that, the CO_2 emissions of Japan is almost constant. Look at the Chinese and Indian industrialization journeys, they start much later in the 1990s and they have a drastic increase in CO_2 emissions per capita in the period from 2000 to 2014. This trend seems to continue increasing. This increase also causes the clear rise of the CO_2 index of whole the world. Industrialization (more power plant, more chemical plant,) and transportation (freight or industrial transportation) are the two main reasons for that growth.



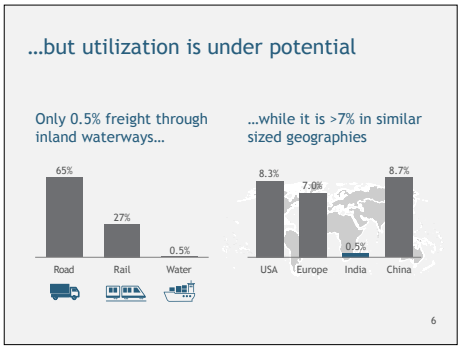
4

We consider three big media of freight transportation: road, rail, and water. Regarding Inland waterway, it is a valuable transportation mode with 48% cheaper per ton and it requires 77% lesser fuel. So, Inland waterways is an amazing choice of transportation for large freight – it is cost effective and more fuel efficient (for same weight; which means it makes both business and ecological sense to adopt this mode.)
India has invested extensively in transportation. We now have the world's 2nd largest road network, the 3rd most active rail network, the 3rd largest aviation network, but our inland waterways network is still very poor.



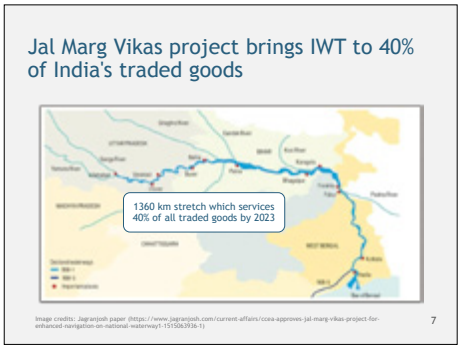
5

The using of freight transportation utilizing inland waterways in India is under potential. Only 0.5% of Indian freight travels by waterways. This is much lower than global benchmarks – the USA at 6.3%, Europe at 7% and China at 8.7% which have similarly sized geographies.
Of 14,500 recorded km of inland waterways in India, only about 2000 km are utilized. This indicates a large potential to utilize this resource further.



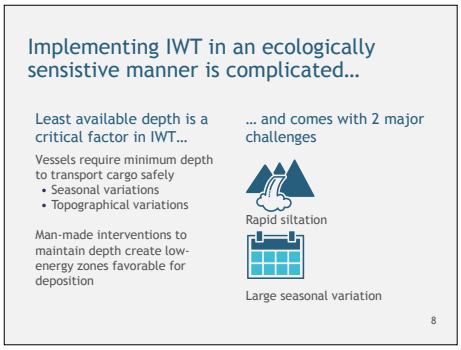
6

The Government has noticed, and they start the project called Jal Marg Vikas which focuses on developing 1360 km of Ganga river which connects two large industry centers – Allahabad and Hadia.
This project will make Inland Water Transportation contribute larger part in freight transportation in India. In 2023, it proposedly services 40% of all traded goods.



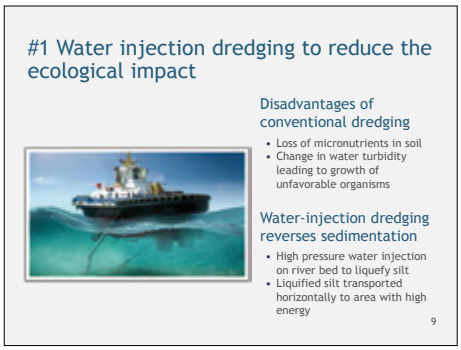
7

Now that we've discussed how IWT is a valuable option, let's get to the challenges of adopting this mode. The key challenge to IWT adoption is ensuring that the river maintains "Least Available Depth"
This means that the river should have a minimum depth and steady flow characteristics between both ports. This requires artificial management – such as dredging, constructing barrages, river straightening, etc. All these activities affect the delicate water ecosystem in many ways.
These man-made interventions to maintain depth create low-energy zones favorable for deposition and comes with two major challenges: rapid siltation and large seasonal variation.



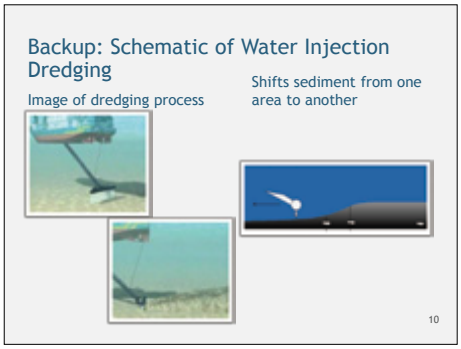
8

With the first challenge, we propose to use water injection dredging technology to reduce the ecological impact. One alternative to conventional dredging is water injection. This approach uses water pressure to liquefy silt deposits. The induced currents deposit dense slush in the bottom of the river and ensure that the sediments remain inside the river ecosystem.
The disadvantages of conventional dredging are the loss of micronutrients in soil and the change in water turbidity leading to the growth of unfavorable organisms.



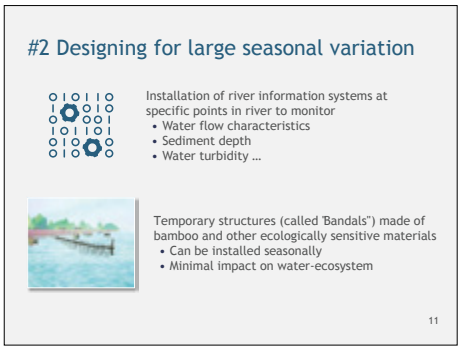
9

These pictures are the schematic of water injection. The dredging process starts with the water high pressure to liquefy silt deposits. Then the induced current will shift sediment from one area to another. This new technology help to protect aquatic organisms from the suction stream in traditional dredging method – it means dredging water injection method is eco-friendlier.



10

The second challenge is designing for the large seasonal variation.
To monitor the sediment depth, water turbidity, water flow characteristics, etc., the river information systems will be installed at specific points in the river.
Another pro-active measure is to use eco-friendly temporary structures called Bandals instead of permanent barrages. The Bandals are made of bamboo and other ecologically sensitive materials; they can be installed seasonally, and they cause minimal impact on water ecosystem.
In addition to this, there are two more projects which help reduce the ecological impact: Proactive identification of ecologically sensitive areas and ban on dredging in these areas; and managing a river information system to collect and monitor the ecological health of the river.



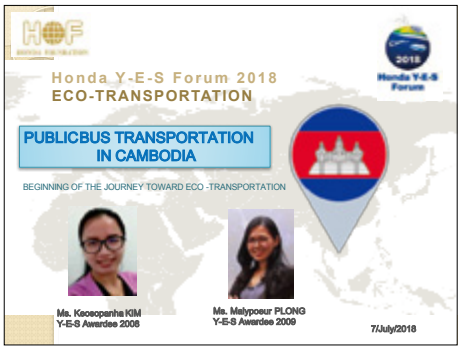
11

In summary, Inland Water Transportation is both ecologically and economically efficient. It is worth investing in research to identify and solve these problems to unlock sustainable growth.

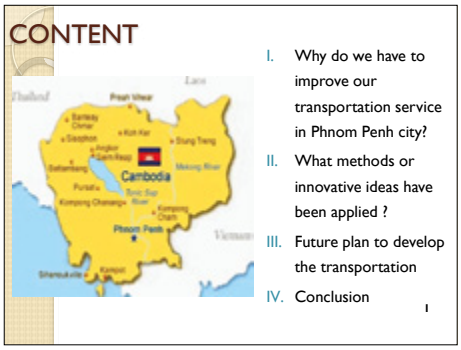
Cambodia

Presenter **Kim Keosopanha**
2008 Y-E-S Awardee
Plong Malypoeur
2009 Y-E-S Awardee

Public bus transportation in Cambodia

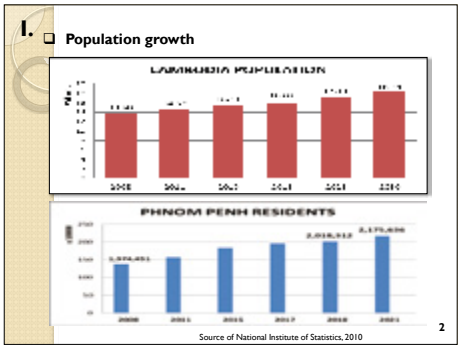


On behalf of the Cambodia team, I would like to single out PUBLIC BUS TRANSPORTATION IN CAMBODIA as my presentation's title. I am going to talk about firstly why do we have to improve our transportation service in Phnom Penh city, secondly what methods, or innovative ideas that the government has implemented? Then, future plan to develop the transportation. Finally, I will give the overall summary of my presentation.



1

First, related to population growth. Transportation connects importantly with the living life of Cambodian people. According to the graph, the number of populations is increasing from 13M in 2008 to 18M in 2030. And meanwhile, Phnom Penh resident number will be expanding to more than 2M in 2021. Therefore, urban transportation has to be changed and improved.



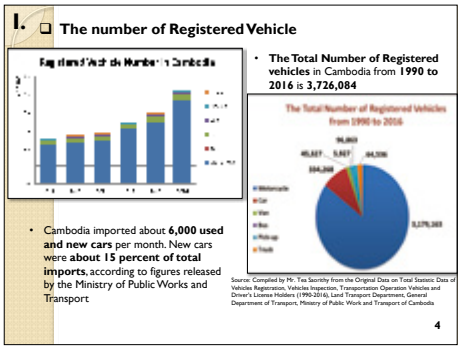
2

Presentations by the Y-E-S Awardees

Due to the flow of foreign direct investments remains strong and the main sources of investments come from China, Asian, and Japan, there have many constructions in the city and it reached $5.63 billion in 2017. Urban development typically brings more people to the city, where employment opportunities are greater than those in rural areas. as well as the increase of GDP per capita creates the main challenge of urban transport in Cambodia, as its circumstances traffic congestion become the serious issues in the Capital.

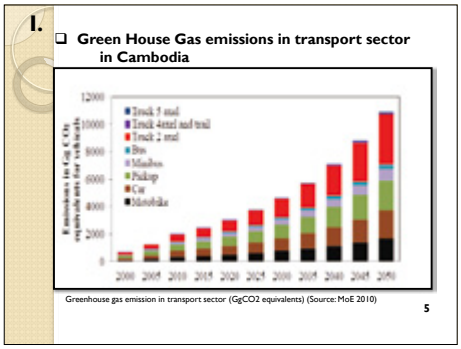
3

Talking about the number of registered vehicles, Cambodian normally use motorcycle, car, van, bus, pick-up, or truck as their transportation. Regarding the graph, their numbers are increasing from 2011 to 2016. We can see that the number of motorcycles dominates the biggest share of the registered vehicle about more than 3 million from 1990 to 2016. The second is the car that we imported about 6000 used and new cars per month.



4

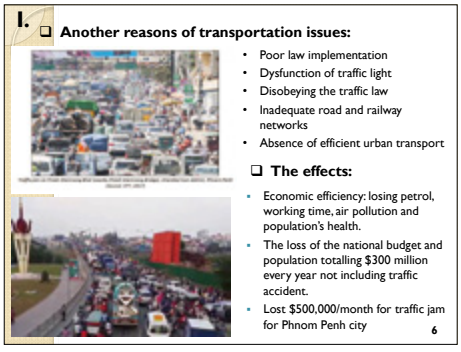
When there has the high growth of the number of vehicles and most of them are old and without pollution control devices so the emission of CO_2 to the environment has to be concerned. Following the graph, we estimated from 2000 to 2050; all vehicles will contribute to expanding the emission more CO_2 to the environment.



5

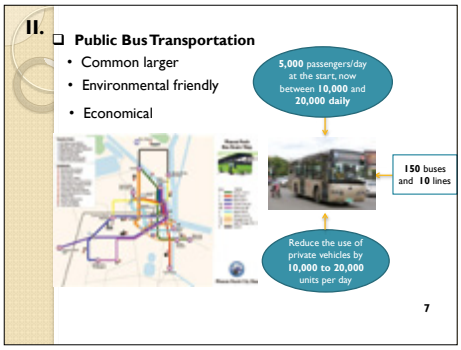
Not only the number of vehicle and people but also there another reason for transportation issue. For example, poor law implementation, dysfunction of the traffic light, driver behavior without respecting traffic law, the last is the lack of road and railway networks and without the efficient urban transport. We have faced the effects of this issue:

- Economic efficiency: losing petrol, working time, air pollution and the population's health.
- The loss of the national budget and population totaling $300 million every year not including traffic accident.
- Lost $500,000/month for traffic jam for Phnom Penh city.



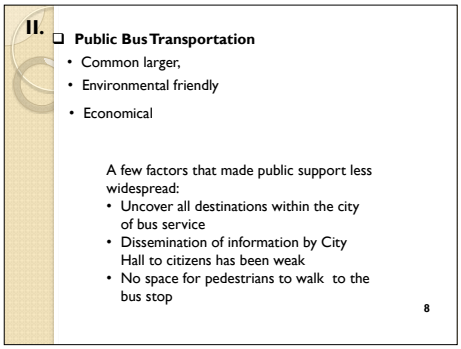
6

Now our government is reinforcing the promotion of public bus transportation because it is considered as common larger, environmentally friendly, and economical service. Today we have 150 buses and 10 lines circulating in Phnom Penh city. At the start, we got 5000 passengers per day but now between 10 thousand and 20 thousand per day, so it means that Phnom Penh residents have shown their support and get more regular using this service. This service helps to reduce of private vehicles car motorcycle by 10 thousand to 20 thousand units per day. However, we still meet many weak points, for example, uncover all destination within the city, lack of information about this service to people, and no spacing to pedestrians to walk to the bus stop.



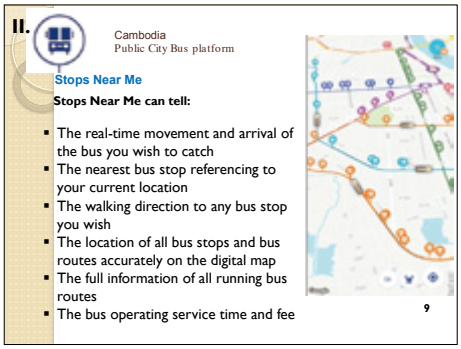
7

Coming up the innovative ideas to facilitate the public bus user, our Cambodia team Y-E-S awardee created the Stop Near Me application. This application can help the user to know the real-time movement and arrival of the bus, location and the nearest bus stop, bus operating service time and fee and information and so on.



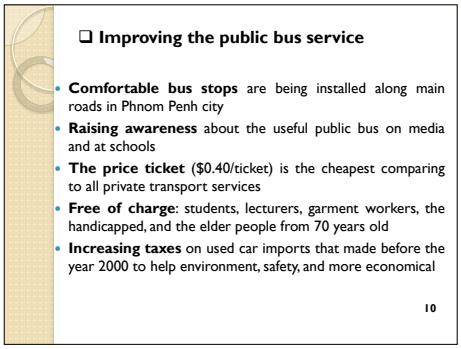
8

Our government has also improved the public bus service, for example, comfortable bus stops are being installed along the main roads, raising awareness of the usefulness of the bus to the public on media and at schools. The price ticket is the cheapest one comparing to other private transport services. Moreover, all students, garment workers, lecturers, the handicapped, and the elderly people from 70 years old. Finally, it is increasing the tax on the imported personal cars that make from the year 2000 to help the environment, safety and more economical.

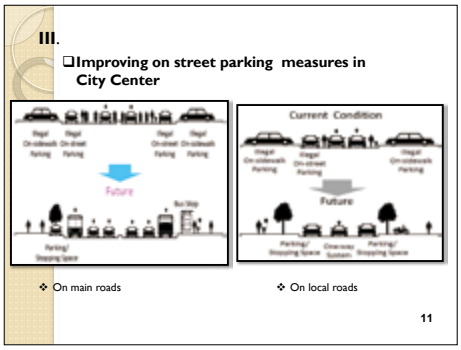


9

Services will expand further next year, once Japan donates about 100 buses to Cambodia and we will increase the number of the route more and more. Furthermore, we will adjust the sidewalk for the pedestrian area. Our city call will plan to organize the parking street on the main roads and local roads to facilitate the traffic in City Centre.

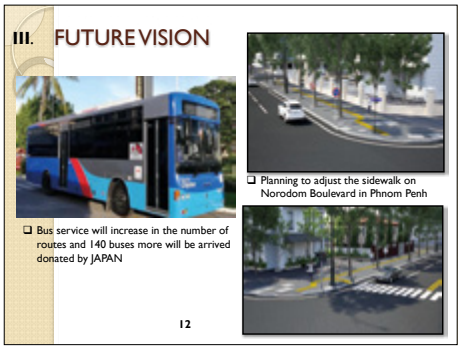


10

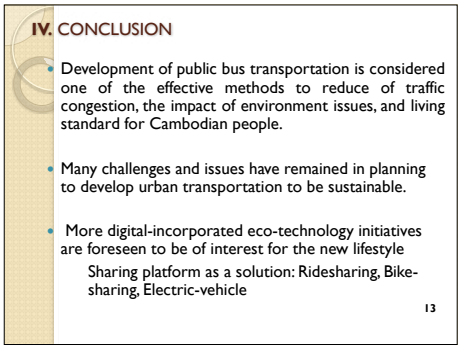


11

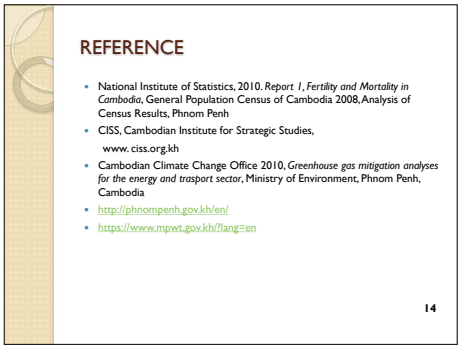
In summary, in Cambodia, the development of public bus transportation is one of the effective methods to reduce of traffic congestion, the impact of environmental issues and living standard for Cambodian people. However, many challenges and issues still have concerned in planning to develop urban transportation to be more sustainable. I hope that more digital-incorporated eco-technology initiatives will become the interest for a new lifestyle for Cambodian.



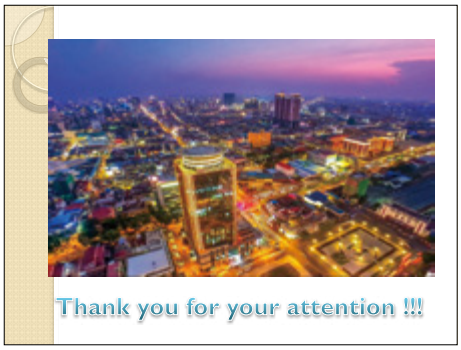
12



13



14



15

16

Laos

Presenter **Mary Pakdimanivong**
2011 Y-E-S Awardee
Kaynhasith Xayalath
2014 Y-E-S Awardee

Adapting Eco-Transportation Concept to Transportation system in Lao PDR

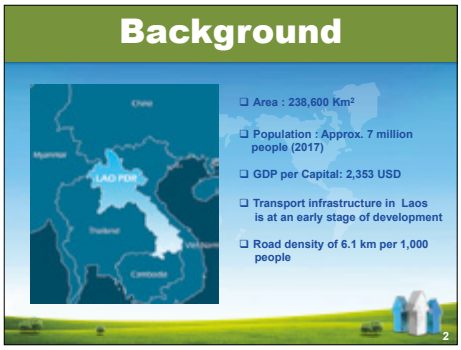
On behalf of Laos's team, we would like to bring the title of Adapting Eco-Transportation Concept to Transportation System in Lao PDR in this Honda Y-E-S Forum 2018.

This slide shows the contents of this presentation comprised of 1. Background of the transportation system in Laos; 2. the occurred challenges; 3. the solution and 4. Conclusion.

1

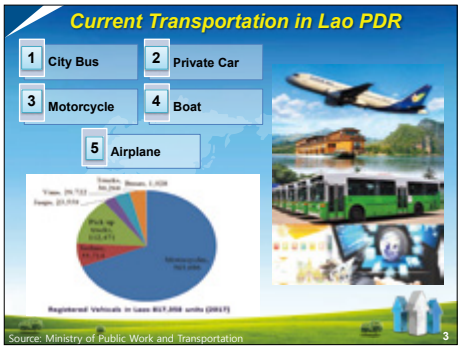
Presentations by the Y-E-S Awardees

Lao, officially the Lao People's Democratic Republic, Lao PDR is a Southeast Asian Country and a land-linked country bordering Myanmar, Cambodia, China, Thailand, and Vietnam. The total land area is 238,600 km2 and about 7 million people live in its 18 provinces, with the GDP per Capital is 2,353 USD.
The current transport infrastructure in Laos is at an early stage of development with the road density of 6.1 km per 1000 people.



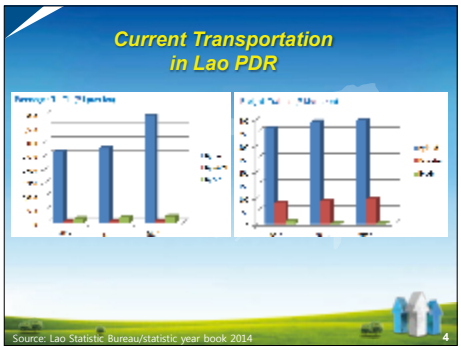
2

There is 5 main transportation used in Lao PDR including: 1. City bus; 2. private car; 3. Motorcycle; 4. Boat and 5. Airplane.
Until 2017, the number of registered vehicles has totaled 817,358 units, of which 563,696 are motorcycles, 55,714 sedans, 112,471 pick-up trucks, 23,559 jeeps, 29,722 vans, 30,268 trucks and 1,928 buses.



3

The figure shows the statistic of passenger traffic which shows the highest passenger traffic is by land and it is increasing annually as well as the freight traffic, the result shows the freight traffic by land is the highest compared to by water or air.



4

As the current situation, most of the Lao people prefers to use their own private car and motorcycle rather than the city bus. So, the Government of Laos is trying to persuade citizens to use public transportation more by enhancing public transportation and promote the sustainable friendly concept.

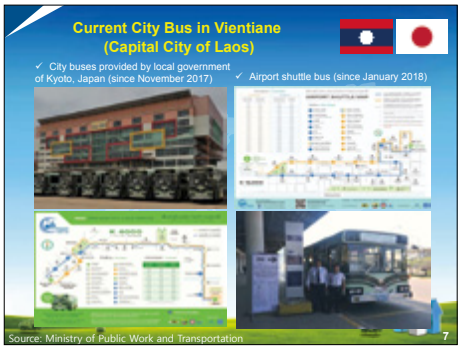
5

Presentations by the Y-E-S Awardees

Due to the inconvenience of the old city bus, with the cooperation of Laos and Japan; Japanese Government has supported buses to enhance the transportation in Vientiane which is the capital city in Laos.
Also, the passenger can track the real-time location of all city buses in Vientiane by the link https://lao.busnavi.asia/?lang=lo

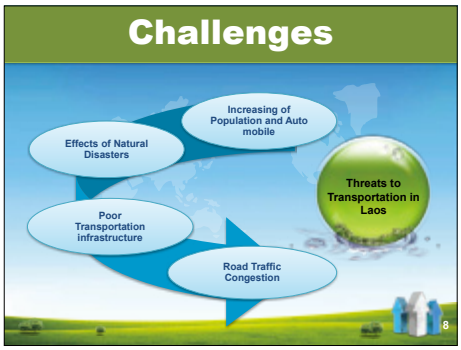
6

Furthermore, City buses provided by the local government of Kyoto, Japan have been operating in Vientiane on a trial basis since November 2017.
And since January 2018, the airport shuttle has been operating to provide more convenient passenger service.



7

For the challenges, there are many threats to transportation in Laos comprise of the increase in population and automobile, effects of natural disasters, poor transportation infrastructure and road traffic congestion.

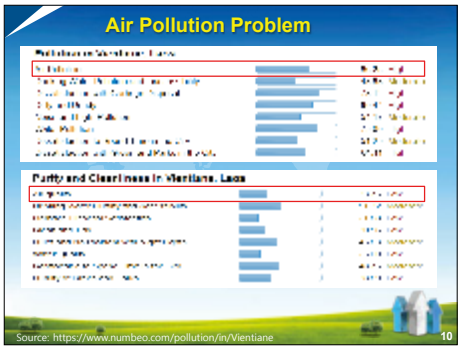


8

With the main problems occurred are road traffic congestion during peak hours, unpaved road, and poor pavement quality, also with destroyed road infrastructure from urban flooding and poor drainage system.

9

AND due to the fact that air pollution in Vientiane which is the capital city is quite HIGH and Air Quality is quite LOW.

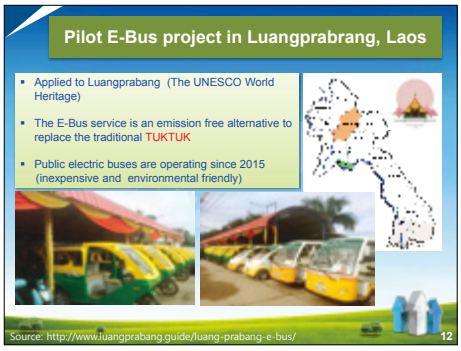


10

To adapt the Eco-Technology concept to the Transportation system in Laos is the SOLUTION.

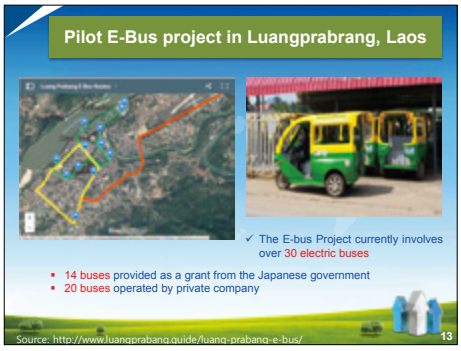
11

Laos has applied the Eco-Technology concept to Transportation system by the Pilot project called E-Bus project. The E-Bus service is an emission-free alternative to replace the traditional tuk-tuk.
Public electric buses are operating since 2015 in Luang Prabang which is the UNESCO World Heritage town by promoting inexpensive fee and environmentally friendly.



12

The E-bus Project currently involves over 30 electric buses including 14 buses provided as a grant from the Japanese government and around 20 buses operated by the Lao Green Company.



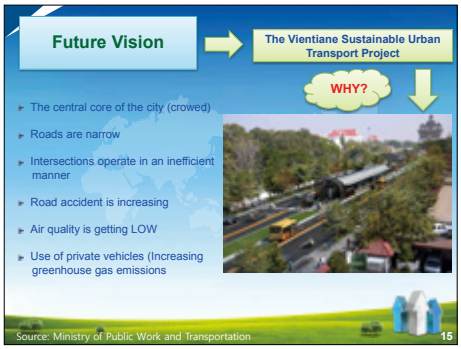
13

Presentations by the Y-E-S Awardees

Along with Vientiane Capital City, E-Bus service tour for travelers to tour around the capital city has operated by many tour service companies.

14

There are many reasons why "The Vientiane sustainable urban transport project" should be established; because the central core of the city is crowded, which has a mixture of government, educational, religious, and commercial institutions, as well as residential areas, and is also the tourism center, with many hotels and historical and cultural attractions. Many of the roads in Vientiane are narrow, and many of the intersections operate in an inefficient manner. As the city is starting to experience congestion, increased incidence of road accidents, and deteriorating local air quality. The expanding use of private vehicles is also increasing greenhouse gas emissions.



15

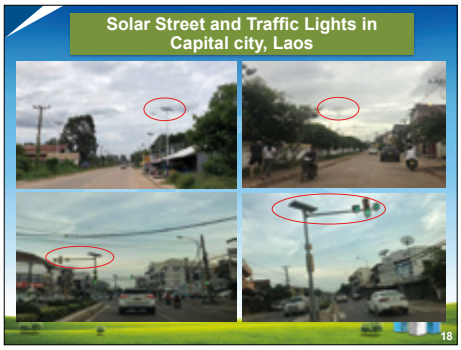
For Future vision:
The Vientiane Sustainable Urban Transport Project (the project) executed by the Ministry of Public Works and Transport (MPWT) of Lao PDR will improve urban transport operations and capacity in Vientiane by establishing a transport management entity, high-quality bus services, and bus rapid transit; by improving traffic management, parking system and vehicle registration; and improving accessibility for pedestrians and non-motorized transport.

16

The total project cost is 99.7 million USD which is financing by government of Laos US$14.55 million, Financing by private sector US$6.41 million, Loan from Asian Development Bank (ADB) US$23.474 million, Loan from European Investment Bank credit US$20 million, Loan from OPEC Fund for International Development US$15 million, European Union – Asian Investment Fund technical assistance grant EUR 5 million, Global Environmental Facility grant US1.84 million & other funds.
The project will improve quality of life in Vientiane, improving access and mobility, promotes sustainable development and greenhouse gas reduction.

16

From the beginning, results of the Vientiane Sustainable Urban Transport Project, Ministry of Public Work and Transportation of Lao PDR has installed the solar street lights along many road infrastructures in the capital city and due to an enough sufficient radiation in Vientiane area, the solar traffic lights are installed to reduce the energy consumption.



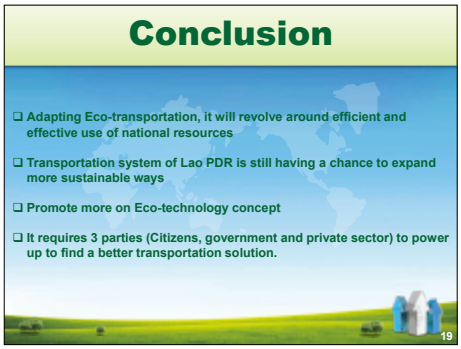
19

Conclusion:

To enhance the transportation system in Lao PDR by adapting Eco-transportation, it will revolve around the efficient and effective use of national resources, transport structure modification and create more natural in a friendly way of traveling.

The transportation system of Lao PDR is still having a chance to expand more sustainable ways, according to the fact that transportation infrastructure is not fully implemented yet with a small number of populations.

Knowledge about Eco-technology is the priority for current situations. In order to make this happen, it requires 3 parties (Citizens, government and the private sector) to power up and find a better transportation solution.



20

21

Myanmar

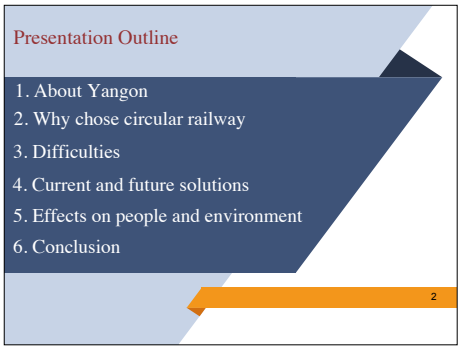
Presenter **Co Se Lin**
2015 Y-E-S Awardee

Strengthening Yangon's Circular Rail Network for Eco-Transportation

Due to industrialization and an increase in population in a few decades, the demand for public transportation in the big city of Myanmar, Yangon, is dramatically rising. The government is still finding the best ways to solve this challenge and one of the possible solutions comes with an idea for upgrading an old circular rail network in Yangon.

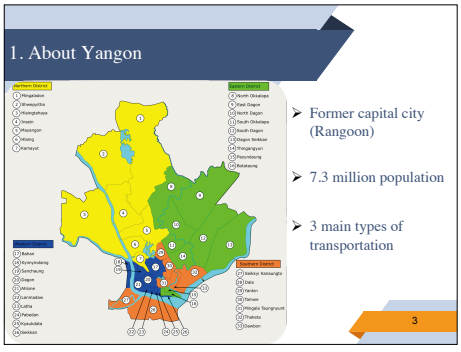
1

In this presentation, there will be 6 main parts. The first one is the information of Yangon along with the current transportation modes that are being used by people followed by the reasons why circular railway is the best possible solution for the traffic problem. The third one is the description of the difficulties and current conditions that people are now facing with the use of a circular railway. Following is a set of solutions that are currently being done or that are likely to be implemented in the future for the better circular railway system. The fifth one is about the positive effects of upgrading circular railway system on both the environment and the local people. Finally, the main points of the presentation are concluded along with some of the challenges that appeared with the upgrading project.



2

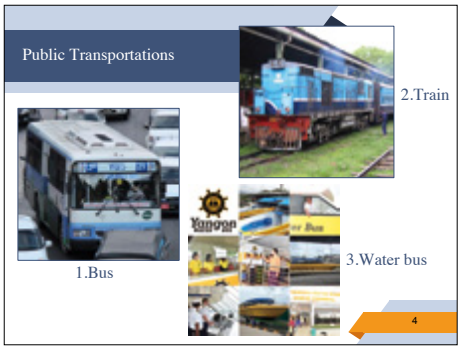
Yangon (commonly known as Rangoon) is the former capital city of Myanmar with an estimated population of around 7.3 million and this massive amount of population mainly depends on three types of transportation for their daily routines.



3

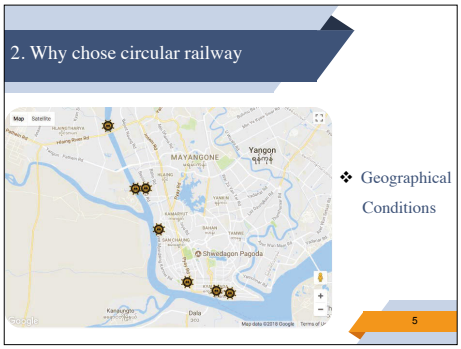
Currently, people mainly depend on these public transportations:

1. Yangon Bus Service (YBS)
2. Yangon Circular Railway and
3. Yangon Water Bus



4

The first reason for choosing circular railway is because of the city's geographical conditions. As it can be clearly seen from the map, water transportation is available mainly for people living near the river and for those who are living far from those areas cannot use the water bus for their transportation.

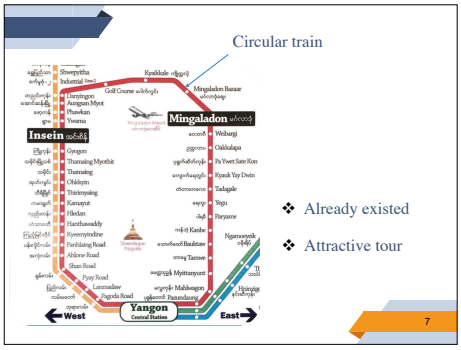


5

The second reason for upgrading circular railway is to find a completely alternative way of transportation from road transport since the government has already tried many ways to facilitate the traffic problems such as widening the roads, building flyovers, constructing new roads but the problems still exist. For this reason, finding an alternative way of transportation is currently needed.

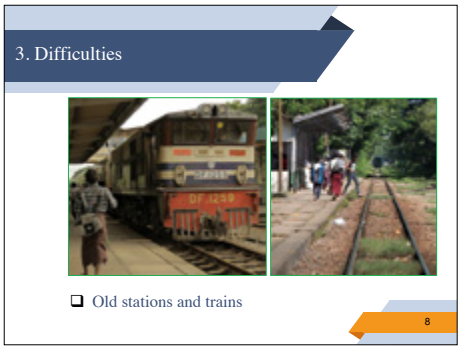
6

Since it is an upgradation project, an old circular railway line is already located around the city, so the government can avoid the problems that are likely to occur if they start a new railway line such as compensating for the people's belongings. One interesting point is that the existing line passes through most of the famous places around the city so if the project is finished, the railway line might become attractive not only to local people but also to foreigners since they can go around the city with a minimum amount of time at a cheap cost.



7

But at present, people have many difficulties with using the circular railway. One major challenge is because of old locomotives and dangerous stations. Current locomotives travel with an estimated speed of around 8mph and people feel like "seeds being rolled in the pan" so they feel really uncomfortable with using it. Moreover, since the old stations are being used for over a long time without any maintenance, most of the components such as roofs are already damaged, and people cannot use these properly during bad weathers.

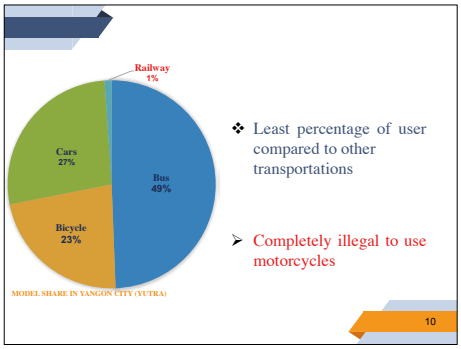


8

Another problem arose because of the poor infrastructure and lack of regulations along the railway lines. Although there are pedestrian bridges at some points of the railway lines, people hardly use these because of no maintenance and as a result, these are not safe for use and so people just walk over the railway line although it is dangerous. In addition to this, local sellers use spaces near the railway lines as a place for selling their products like vegetables and meat. This is not only dangerous to them but also a cause for creating a polluted environment around the railway lines.

9

If the circular railway is compared to other types of transportation such as cars, buses, or bicycle, it has the lowest percentage of users, with an amount of approximately 1 percent. So, the government is trying the best to promote the usage of circular railway among local people in the future. One thing that is quite interesting to be described here is that it is completely illegal to use motorcycles in Yangon.



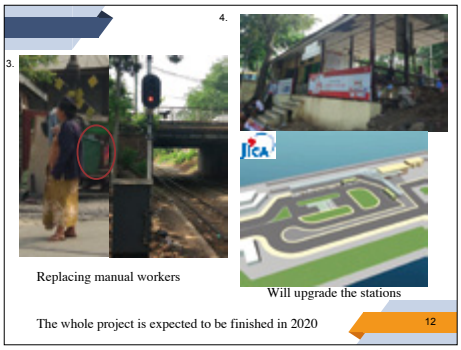
10

Currently, the local government is replacing old diesel locomotives with new Diesel Multiple Units donated from the Japanese government. So, a sincere gratitude is sent to the Japanese government and people for their help. Another point is that people usually have to jump when they get in or get out of the train because of low-leveled platforms and for this reason, high-leveled platforms are being constructed for people to use railways more comfortably and safely.

11

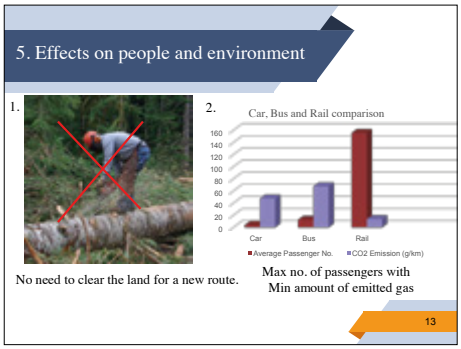
Presentations by the Y-E-S Awardees

In some parts of the railway line, the train drivers need to depend on the signals delivered by manual workers. For example, waving a green flag to signal the driver that it is safe to go. Since this is not convenient and there may be mistakes by human workers, digital traffic signals are being installed along the railway lines and solar-powered signals may also be used in the future for being more environmentally friendly. To upgrade the stations, the government is cooperating with JICA to construct more convenient and reliable stations in the future. JICA is helping not only in the station upgradation but also the whole upgradation process.



12

This project has many positive effects on both people and the environment. In the first place, cutting trees or clearing the land for making a new way can be avoided since this is an upgrading project. In addition, the railway system can carry the maximum number of passengers with a minimum amount of carbon dioxide emission into the environment compared to other transportation modes such as cars or buses.

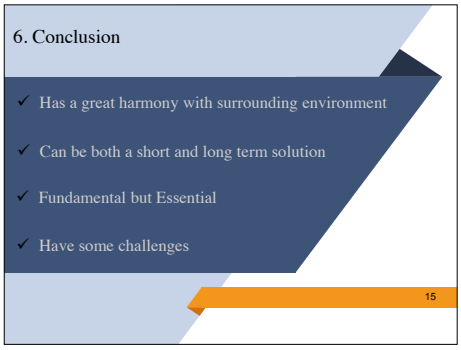


13

By considering from the social perspective, local people will no longer need to wait in buses for their daily travel. Currently, people have to spend around one hour on the bus even to go for a short distance. For passengers with heavy goods, the circular railway will become the best transportation system for them since they can carry their products in the cheapest way which cannot be done with buses.

14

To conclude the points, although there are some challenges, the circular railway is likely to be the best solution for traffic problem in the big city both as a short and long-term solution. It also has a minimum negative impact on the environment. Finally, the upgrading project is very fundamental and basic, but it is also essential for the development of the city.



15

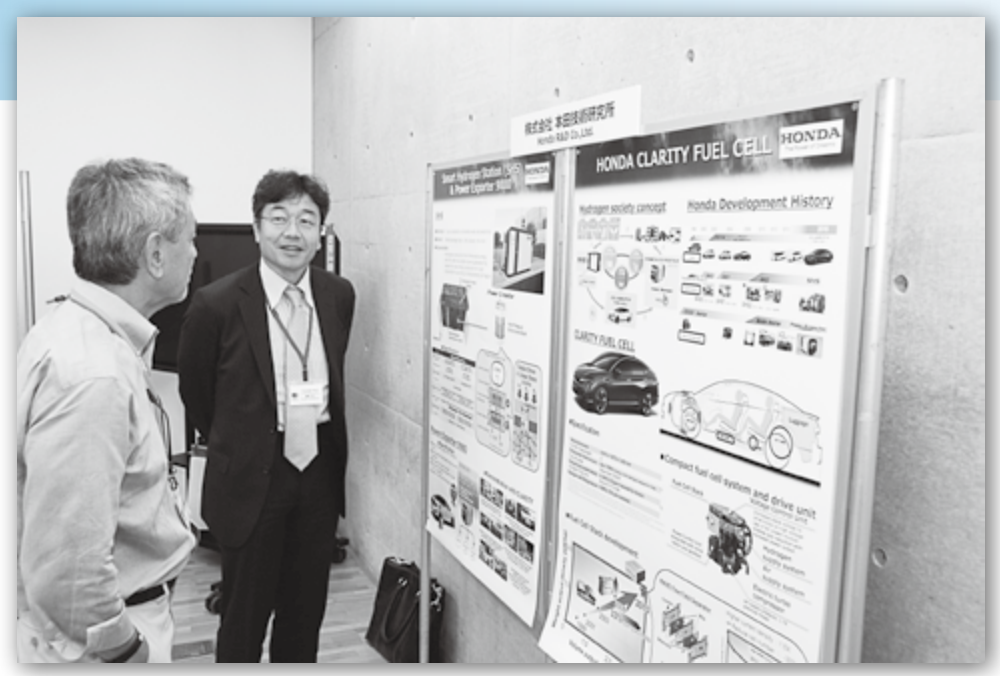

Thank You
16

16


References
Ministry of Information, Myanmar.
Japan International Cooperation Agency. JICA
Embassy of Japan, Myanmar.
Global New Light of Myanmar.
Eleven Media, mmtimes.

17

Presentation and Poster Exhibition from Industrial Sector



Presentation from Industrial Sector

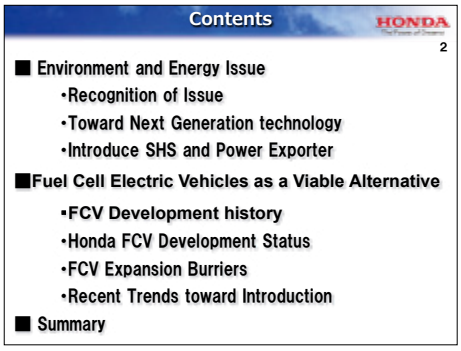
Mr. Takashi Moriya
Senior Chief Engineer, Automobile R&D Center,
Honda R&D Co., Ltd.

Honda Fuel Cell Vehicle Development and Challenge toward the Hydrogen Society

Thank you Chairman,
I'm Takashi Moriya of Honda R&D.
I explain Honda's Fuel Cell Vehicle development status and efforts for establish the hydrogen society.

P-1

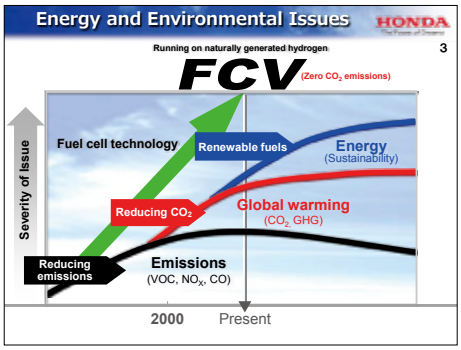
Today's contents are here.
At first, I explain the environment and energy issue and efforts for hydrogen society of Honda.
And then, I explain Fuel Cell Vehicle (FCV) development of Honda.



P-2

This slide is a conceptual image of the issues facing the automobile industry today.
Namely,
- Harmful exhaust emissions
- Global warming related to CO_2 exhaust
- And the energy issue

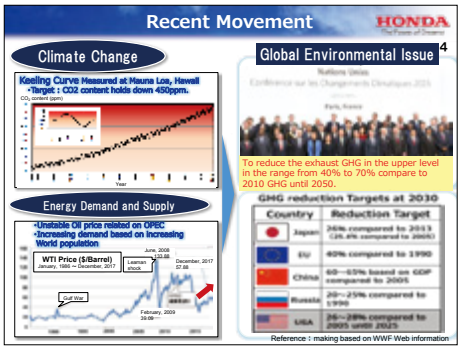
At Honda, we believe fuel cell technology to be a very promising solution for all three issues.
We Honda consider the fuel cell electric vehicle to be the ultimate answer.



P-3

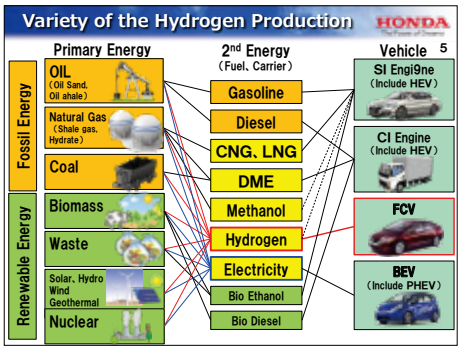
Presentation from Industrial Sector

This slide explain the recent actual situation regarding the concerning issues.
In order to achieve the target (less than 2 degree centigrade),
CO_2 concentration must be kept less than 450ppm.
However Kieling curve has already indicated over 400ppm.
In terms of Energy Issue, Oil price is not stable depending on various reasons.
However future prediction is that price will increase, because of limited resources.
December 2016, COP21 was held in Paris for discussion regarding the countermeasure of climate change.
Participating countries have set their individual targets toward 2030.



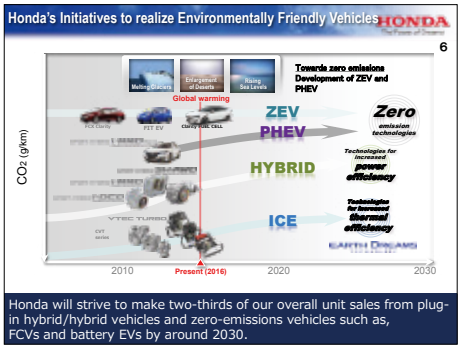
P-4

Hydrogen is 2nd energy career.
And hydrogen produce from various primary energy.
Not only fossil energy but also renewable energy and Hydrogen and electricity have this feature.



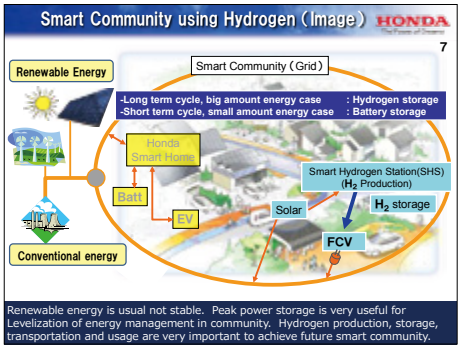
P-5

This is CO_2 reduction strategy of Honda.
Near future, we must reduce the CO_2 in main market.
At first we concentrate to improve the efficiency,
and increasing Hybrid Vehicle.
Buying time for effort of these counter-measure,
we must develop the PHEV and ZEV simultaneously in the future.
And Honda will strive to make two-thirds of our overall unit sales from PHEV and ZEV by around 2030.



P-6

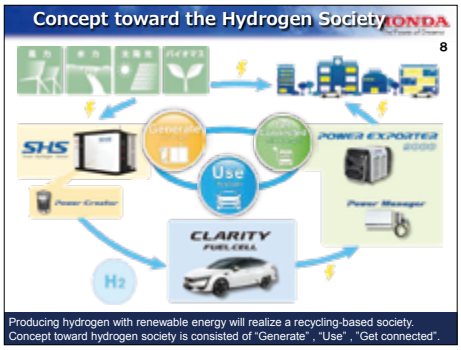
This is our Smart Community image including hydrogen.
Hydrogen will be a buffer of electricity from renewable energy.
Renewable energy is usual not stable.
So peak power storage is very useful for leveling of energy management in community.
Hydrogen production, storage, transportation and usage are very important to achieve this smart community.



P-7

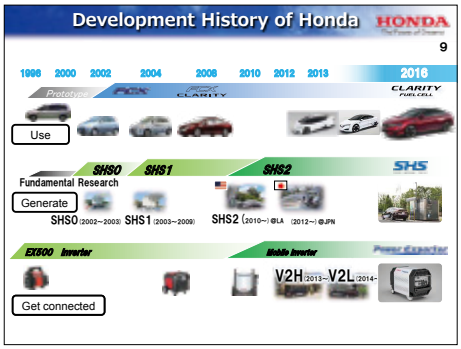
Presentation from Industrial Sector

Honda has tackled toward the hydrogen society based on our original concept. We call "generate," "use," and "get connected with hydrogen" as key technologies for a recycling-based society.



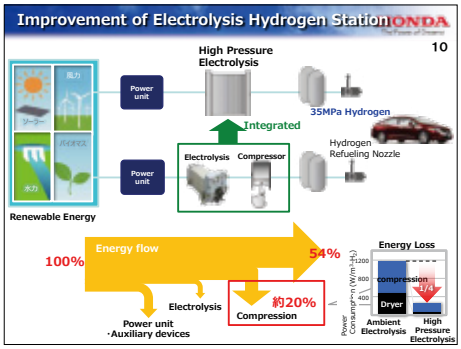
P-8

This is the development history of Honda.
Vehicle development started from the end of 1980s.
I will explain detail following slides.
SHS has been developed from around 2000.
From 2010, we developed high differential pressure electrolysis.
And we developed the mobile inverter, we called Power Exporter, based on our power products R&D technology.



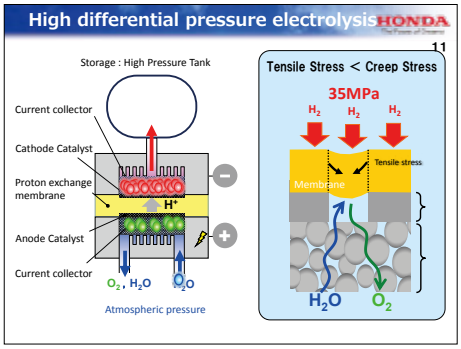
P-9

This is our development concept of SHS (Smart Hydrogen Station).
Old version system needs the mechanical compressor for producing the high pressure hydrogen.
We developed this high pressure electrolysis in order to reduce the compression loss.



P-10

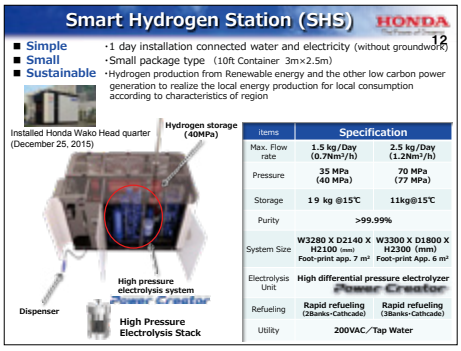
This slide explain the fundamental function of high pressure electrolysis.
Water come in, applied electric power and this power is applied little bigger than needed electrolysis power.
So this electrolysis has two functions.
One is electrolysis and one is chemical pump.
Honda found the new support method of membrane in order to protect weak thin membrane.



P-11

Presentation from Industrial Sector

I introduce SHS.
S means Simple, Small and Sustainable.
Simple means 1 day installation connected water and electricity.
Small means 10 ft container size package.
Sustainable means hydrogen production is not only solar but also the other carbon free power.
In front of this container, high pressure electrolysis system named Power Creator.
Hydrogen production capacity is only 1.5 kg/day.
And back yard, 19kg 40MPa hydrogen storage vessels are installed.
And recently, Honda is developing 70 Mpa type SHS.



P-12

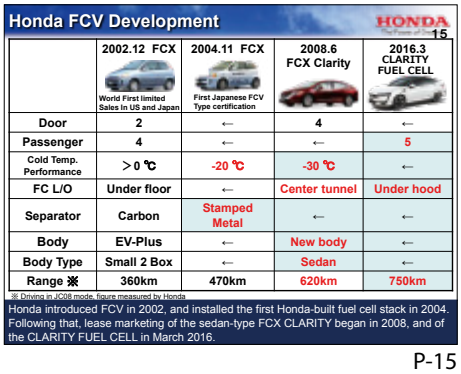
This slide explain the mobile inverter, named Power Exporter 9000.
This inverter can provide 9kW ac power by connecting to clarity.
This ac power can save various use cases.

P-13

These pictures are demonstration activities using the Power Exporter.
Vehicle to Home, Education, amusement and disaster case.
FCV has an additional function compared to conventional vehicle.

P-14

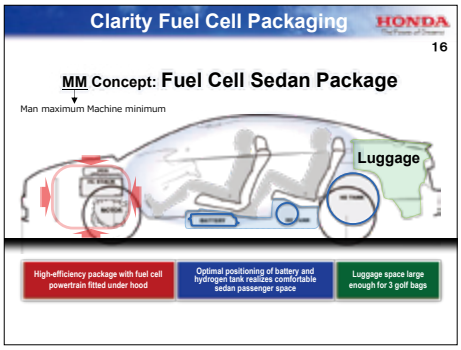
From now I explain Honda's FCV development activities.
We began the first known lease marketing of a fuel cell vehicle in December 2, 2002,
and installed the first Honda-built fuel cell stack in 2004.
Following that, lease marketing of the sedan-type FCX CLARITY began in 2008, and of the CLARITY FUEL CELL in March 2016.



P-15

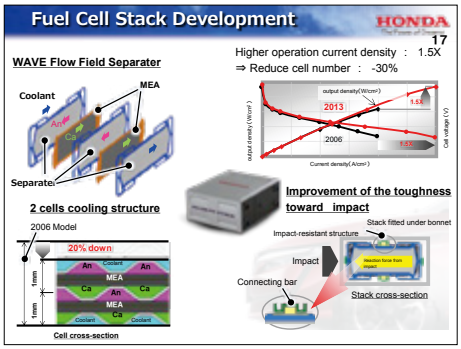
Presentation from Industrial Sector

Honda has a basic vehicle design concept. We call the MM concept.
MM means "Man-maximum and Machine-minimum".
Clarity Fuel Cell is designed based on this concept.
High efficiency package with fuel cell powertrain fitted under hood.
This concept will be able to expand the other type of vehicle in the future.



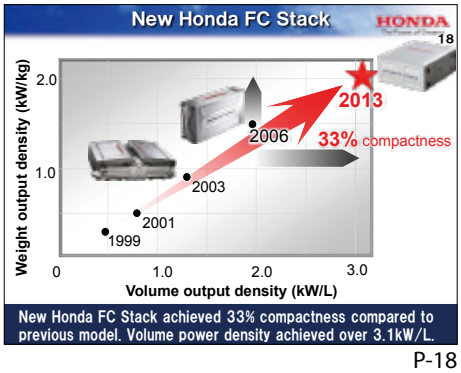
P-16

I explain the compactness technologies of Fuel Cell Stack.
Our cell is constructed by 2 MEAs and 3 separators.
This structure is reduced one separator compared to conventional cell structure.
We improve 1.5 higher operation current density compared to previous model.
This improvement was achieved by control of water behavior in the cell.
And we reduced the cell thickness 20%, so current cell thickness is 1mm.
The other side, we must improve the toughness toward impact,
because of front installation.
This connecting bar improve 4 times higher toughness compared to previous structure.



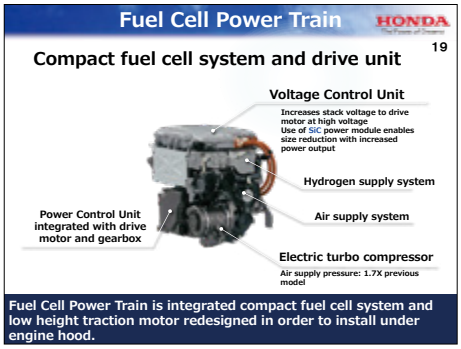
P-17

Volume output density of new stack achieved 3.1kW/L (World top class)
contributed by higher current density operation and thinner cell structure.
New stack compactness achieved 33% smaller than previous one.



P-18

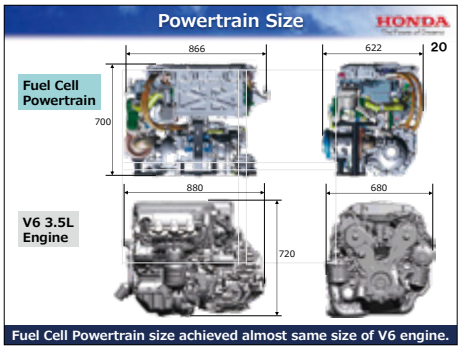
Fuel Cell Power Train is integrated between BOP,
Voltage control unit and driving motor.
Turbo compressor is used for increasing air pressure.
Driving motor integrated power control unit is redesigned for decreasing the height.
And voltage control unit installed SiC is located on the fuel cell stack.



P-19

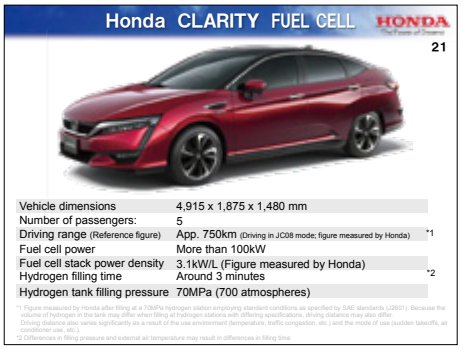
Presentation from Industrial Sector

This is size comparison between fuel cell powertrain and V6 engine.
Fuel cell powertrain achieve almost same size of V6 engine.



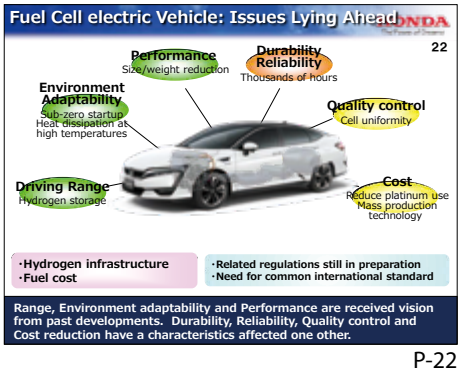
P-20

This is the main specification of clarity fuel cell.
5 adult passengers can seat confortable by fuel cell power-train installation under hood.
And approximately 750km driving range is achieved by 70MPa hydrogen storage.
Of course, hydrogen filling time is around 3 minutes.



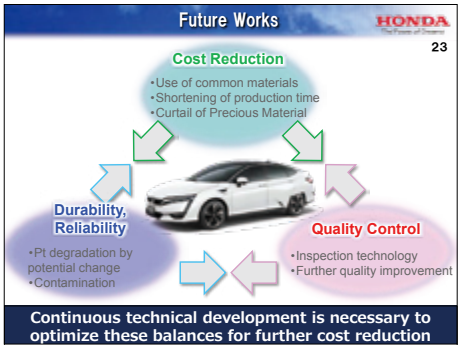
P-21

FCV still need to overcome many issues before they can be considered a commercially viable alternative.
While we have been able to reach a certain level in these green items.
And the other items are required extensive work continuously.
I explain detail in next slide.
Simultaneously, we need the preparation of infrastructure and harmonization of Global standard.



P-22

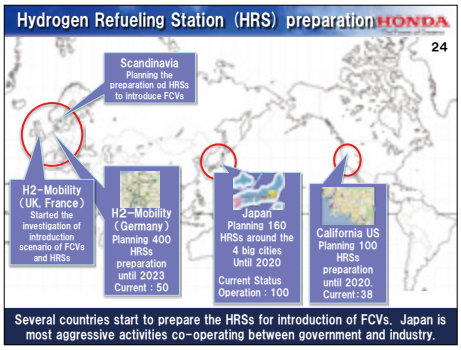
We must concentrate to develop cost reduction and quality control.
Cell production is required at very high accuracy, because stack is composed of series connection of several hundred cells.
One cell failure causes stack failure.
However high accuracy is opposite direction for cost reduction.
These 2 items relationship is current dilemma.
And platinum reduction has a negative consequence for performance.
So these three items are tri-lemma.



P-23

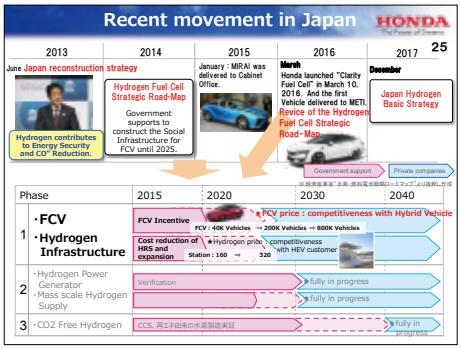
Presentation from Industrial Sector

This is Hydrogen Refueling Station deployment situation all over the World.
In US, only California state increases the Stations.
And Germany established the company for Hydrogen station named H2-Mobility for acceleration of this activities.
Japan is most aggressive activities for preparation.
Japan established the similar company of H2-Mobility in March 2018. named JHyM.
And current 101 stations are operating.



P-24

I like to explain recent activities in Japan.
In 2013, prime minister Abe announced the importance of hydrogen for energy security.
And ministry of Economy, Trade and Industry (METI) issued the hydrogen and fuel cell road-map in 2014.
And Japanese cabinet approved Japan Hydrogen Basic Strategy in December 2017.
Numerical targets for FCV and Hydrogen Station are set in this road-map.
And this road-map is indicates not only FCV targets, but also mass market introduction to market for base load contribution.

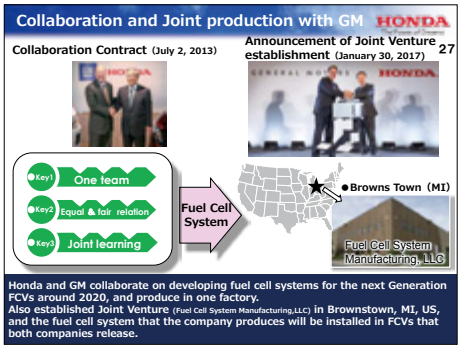


P-25

New "Hydrogen Council" launched on January/2017 at Davos.
Collaboration and promotion of Hydrogen related activities among global industries are also important.
This council was founded by 13 companies and current participants are 39 companies.

P-26

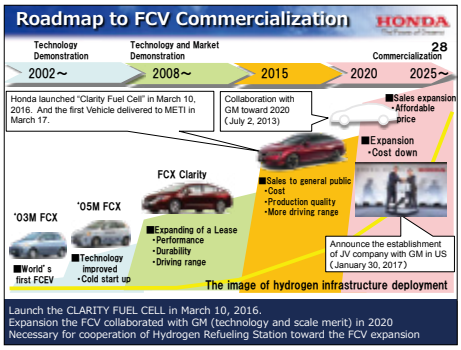
Honda and GM collaborate on developing fuel cell systems for the next Generation FCVs around 2020, and produce in one factory.
Our development policies are one team, equal & fair relation and joint learning.
These policies are very important for a successful collaboration.



P-27

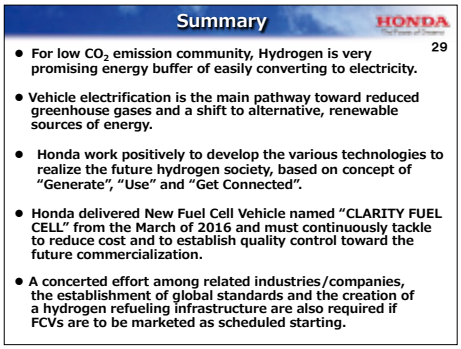
Presentation from Industrial Sector

Regarding the perspective of Fuel cell commercialization, we will be addressing cost reduction for FCV expansion.
And also addressing realization of competitive hydrogen price as the expected business opportunity for the future.



P-28

This is summary.
Hydrogen is very promising energy for low CO_2 emission community.
Vehicle electrification is the main pathway toward the future.
Honda works hard toward the hydrogen society based on concept of "Generate", "Use" and "Get connected".
Honda continuously tackle to reduce cost and to establish the quality control.
And in order to expand FCV, we need hydrogen station preparation and harmonization of Global standard.



P-29

P-30

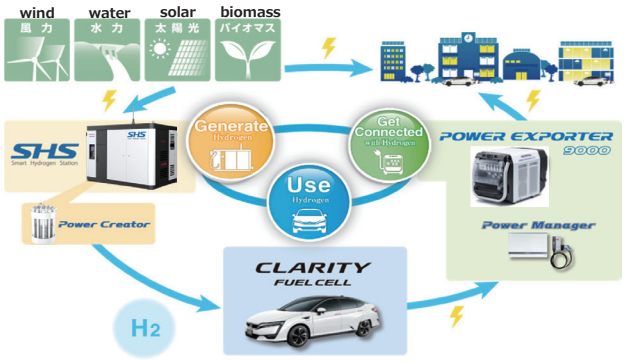
Poster Exhibition from Industrial Sector

Guided by Mr. Yosuke Fujii, Honda R&D Co., Ltd.

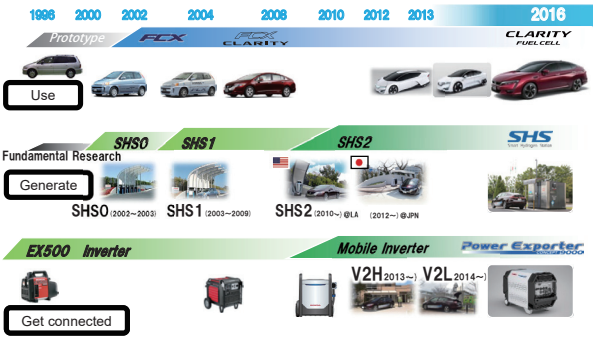
HONDA CLARITY FUEL CELL

HONDA
The Power of Dreams

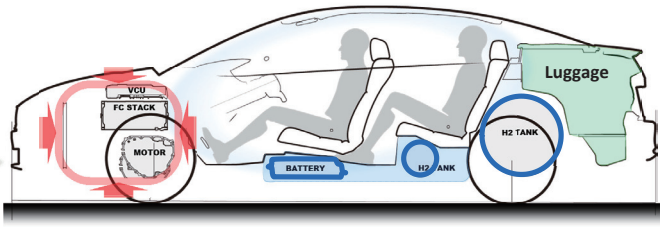
Hydrogen society concept



Honda Development History



CLARITY FUEL CELL

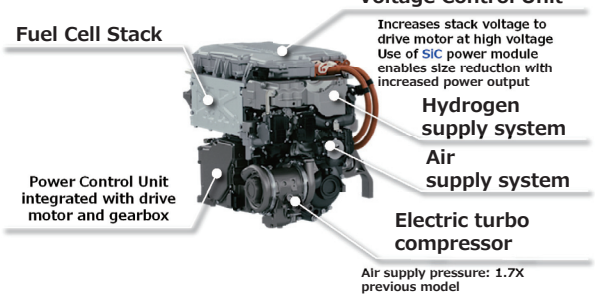


■Specification

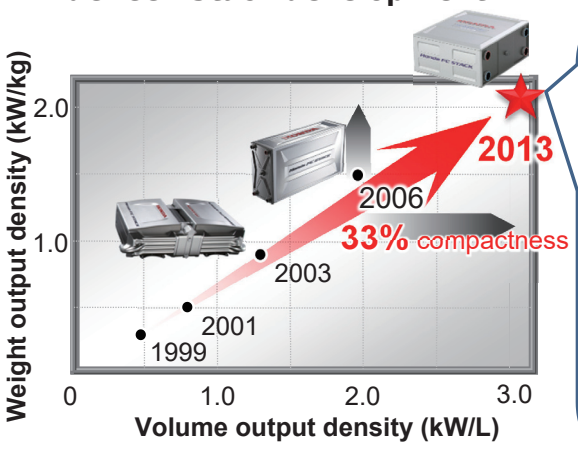
Vehicle dimensions	4,915 x 1,875 x 1,480 mm
Number of passengers:	5
Driving range (Reference figure)	App. 750km (Driving in JC08 mode; figure measured by Honda) *1
Fuel cell power	More than 100kW
Fuel cell stack power density	3.1kW/L (Figure measured by Honda)
Hydrogen filling time	Around 3 minutes *2
Hydrogen tank filling pressure	70MPa (700 atmospheres)

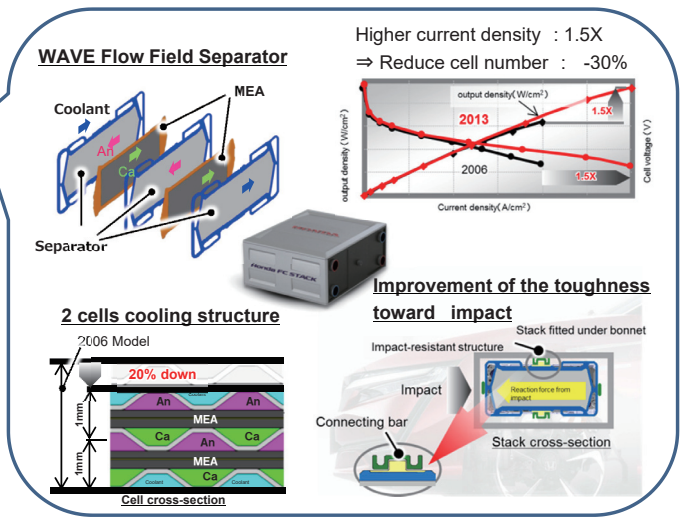
*1 Figure measured by Honda after filling at a 70MPa hydrogen station employing standard conditions as specified by SAE standards (J2601). Because the volume of hydrogen in the tank may differ when filling at hydrogen stations with differing specifications, driving distance may also differ. Driving distance also varies significantly as a result of the use environment (temperature, traffic congestion, etc.) and the mode of use (sudden takeoffs, air conditioner use, etc.).
*2 Differences in filling pressure and external air temperature may result in differences in filling time

■Compact fuel cell system and drive unit



■Fuel Cell Stack development





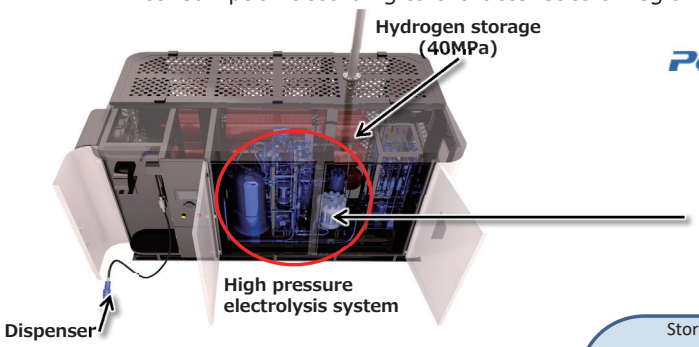
Guided by Mr. Yosuke Fujii, Honda R&D Co., Ltd.

Smart Hydrogen Station (SHS) & Power Exporter 9000

HONDA
The Power of Dreams

SHS

- **Simple** ・1 day installation connected water and electricity
- **Small** ・Small package type （10ft Container 3m×2.5m）
- **Sustainable**
  ・Hydrogen production from Renewable energy and the other low carbon power generation to realize the local energy production for local consumption according to characteristics of region

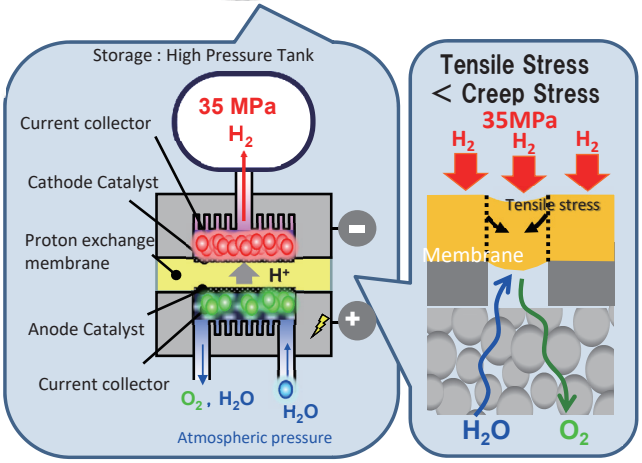


Power Creator

High Pressure
Electrolysis Stack

■Specification

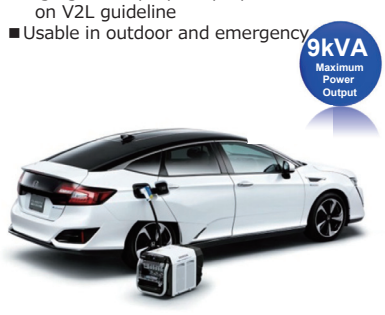
items	Specification	
Max. Flow rate	1.5 kg/Day (0.7Nm³/h)	2.5 kg/Day (1.2Nm³/h)
Pressure	35 MPa (40 MPa)	70 MPa (77 MPa)
Storage	19 kg @15℃	11kg@15℃
Purity	>99.99%	
System Size	W3280 X D2140 X H2100 (mm) Foot-print app. 7 m²	W3300 X D1800 X H2300 (mm) Foot-print App. 6 m²
Electrolysis Unit	High differential pressure electrolyzer Power Creator	
Refueling	Rapid refueling (2Banks-Cathcade)	Rapid refueling (3Banks-Cathcade)
Utility	200VAC／Tap Water	

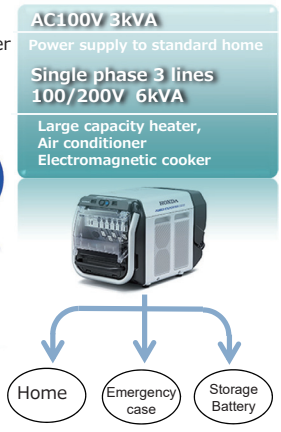


Power Exporter 9000

■Specification

- ■Maximum power supply 9kW connecting to FCV
- ■High reliability accumulated Honda inverter business
- ■High quality AC power output
- ■High general-purpose properties based on V2L guideline
- ■Usable in outdoor and emergency





■Demonstration with CLARITY

Vehicle to Home demonstration in Kita-Kyushu from October 7, 2016

Education for Vehicle to Load to children at Suzuka elementary school November 23, 2016

Vehicle to Load : Power supply to Medical equipment in the case of disaster December 3rd , 2016

Clarity Fuel Cell supply electricity to huge X'mas tree in the Christmas season. From December 1 to 25, 2016

Participation of Kink-area DMAT block event.
Clarity Fuel Cell supply electricity to SUC office in Kobe airport.
December 17, 2016

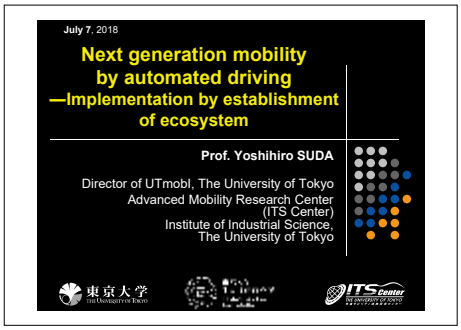
Keynote Speech

Keynote Speech 1

Prof. Yoshihiro Suda
Professor, Advanced Mobility Research Center,
Institute of Industrial Science, The University of Tokyo

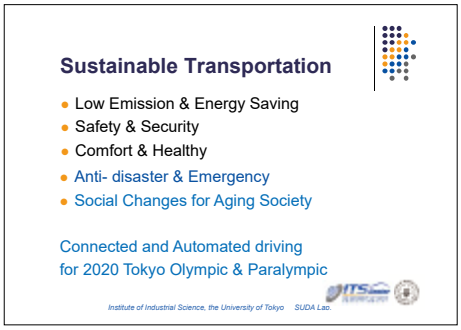
Next Generation Mobility by Automated Driving — Implementation by Establishment of Ecosystem

Good afternoon, ladies and gentlemen. Thank you very much for the introduction. Also, I very appreciate your invitation for the keynote speech today. And also, welcome to the University of Tokyo. So, I belong to the Institute of Industrial Science in Komaba Campus. However, in the graduate school, I was working with the Hongo Campus. And this building belongs to the Graduate School of Interdisciplinary Information Science. So, I am a mechanical engineer, but in the secondary graduate school, I belong to here. I'm very familiar with this building, so welcome. So today, I'd like to talk about the next generation mobility by automated driving system. So automated driving is now very popular technology. So, I'd like to talk about this system. How to implement. How to establish in the real world. So, I'd like to talk about that it is very important to establish the ecosystem.



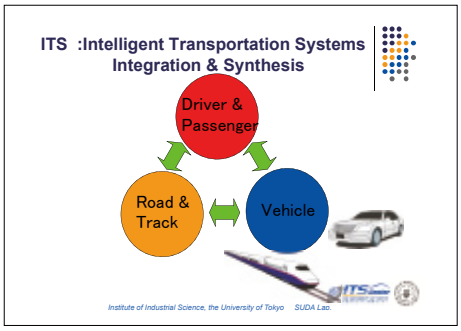
1

First, I'd like to talk about sustainable transportation. Maybe this is the topic of this symposium. So, low emission, energy saving, of course, important. Of course, the transportation system, the safety and security is very, very important. And two, target. This is, just little bit negative implementation. So negative effect should be zero. So, I said the third target is comfort and healthy to keep the sustainable transportation, comfort and healthy, very important. Unfortunately, in Japan, we have very many disasters. Today and yesterday, I saw very heavy rain in the western part of Japan. And also, two weeks ago, a big earthquake in Osaka area. So anti-disaster and emergency is very, very important for the transportation system. And another point in Japan is the social change for the ageing society. And also, another point, 2020 Tokyo Olympics and Paralympics will be held. So, for that time, connected and automated driving systems should be implemented for the future mobilities.



2

And another point is intelligent transport system, that is very important, that is ITS. So, integration and the synthesis in the transportation systems. So, transportation system has three major components: passenger, or driver; the infrastructure; and the vehicle itself. So, in the railway system, these — human, infrastructure, vehicle — is connected in one operator. However, in the road traffic in the past, this is very independent. This is very free for transportation. However, this is a problem for road congestion and road safety and so on. So, using communication technologies, this integration is a very important thing to establish sustainable transportation systems. And nowadays, the ITS target is now the establishment of the automated driving systems.



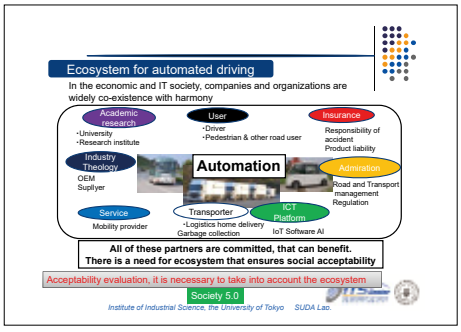
3

So, background. The University of Tokyo, Institute of Industrial Science, our Institute, established the Advanced Mobility Research Center to integrate infrastructure, vehicle, and communication technologies. A total of eleven professors from mechanical, electrical, and civil engineering department. And many collaboration members from Japanese universities have joined. And Professor Morikawa, also very nice collaborator.

And also, we have many collaborations with government and industries, and in very, very hot topics that challenge to mobility innovations. So, we established Mobility Innovation Collaborative Research Organization at the University of Tokyo. So, the Institute of Industrial Science, Graduate School of Frontier Sciences, and Center for Spatial Information Science were established there this July. Just born, in Kashiwa Campus, not here in Hongo.

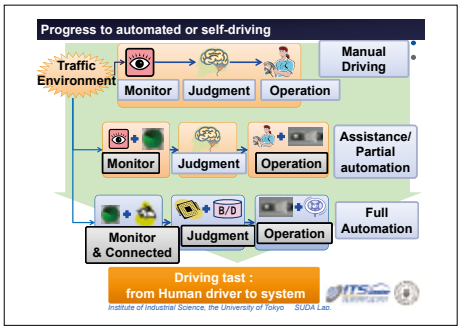
4

So, the ecosystem, maybe you, maybe people recently know about this ecosystem. So, in the ecosystem, economic, and IT society, the company and the organization widely coexist with harmony. So originally, ecosystem means the biological term. However, in this era, "ecosystem" is used for the actual economic systems. So, implementation for the automation, automated driving system are not only the technology, but also academia and industry. So maybe acceptance, social acceptance for the user, some kind of insurance and demonstrations, and ICT platform, and the transporter, and so on. So, all these partners are committed that can get the benefit. There's a need for the ecosystem to enjoy social acceptability. So, nowadays, this is a very important thing.



5

The automated driving system, what is this? So, human drivers. We are doing the monitoring, judgment, and operations. Operations itself with automation is a little bit easy. So usually, cruise control and lane keeping assist, such assistant systems are now in commercial use. However, the monitoring and judgment, very difficult in the industry. However, recently, with big data, AI, IoT, and such new technology, is possible to realize automation in monitoring and judgment. In the future, full automation should be possible.

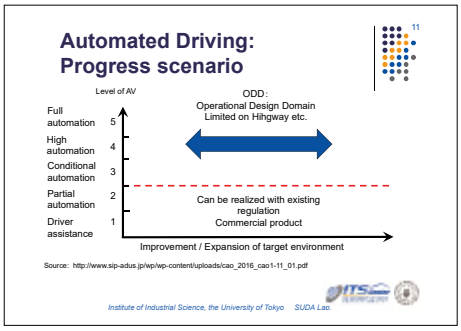


6

So that worldwide the automation level is defined with 6 grades. Level 0, 1, 2, 3, 4, 5. So level 0 is manual driving, no automation. Level 1 is one possible source, such as cruise control. And Level 2 is usually nothing to do with the driver. However, the monitoring is very important for the driver. So, in this area, the responsibility of the driving is the driver. However, the Level 3, the main task is free for the driver. So, the automobile itself should be responsible for the monitoring, judgment, and operations. So, no need, no necessity for the driver. However, if something happens, it should be taken over by the driver. This is Level 3. This is very difficult. And you need the precious human-machine interface. However, the high automation — in such a case, all of the driving systems should be made by the automation. No responsibility for the driver. So, our target is Level 4 or higher. It's a very important thing for the next generation people. And Level 5, full automation everywhere. It is possible. Level 4 is limited area. This is the difference.

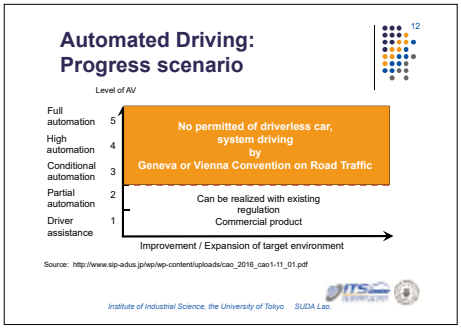
7

So, I'd like to show the figure, like this. So, implement, in the area, in the target in this area, where to the operation of the automation. Level 1, 2, 3, 4. In this area, it is possible under the existing regulations and now commercial use, commercial product. However, in this area, Level 3 or higher is limited. The operational design domain is a limitation of the highway research that we saw.



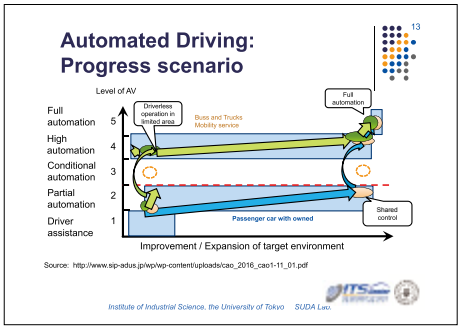
8

So, in this moment, it's not permitted to have driverless car systems by the Geneva or Vienna Convention on Road Traffic. However, nowadays we are planning to try these conditions.



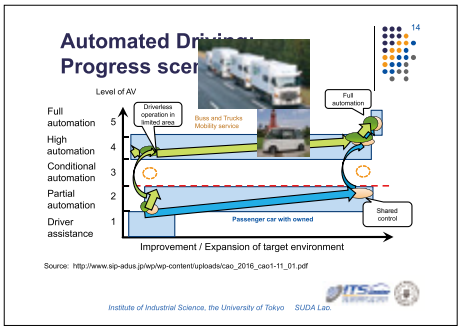
9

For the future of automation, the possibilities are divided two ways. Passenger car, your usual passenger car, now Level 1, Level 2 in this stage. So many engineers and the car industry are striving to establish widely expanded. And now Level 3 is the next target. However, the next Level 3 is little bit difficult for the human-machine interface. So, now, another possibility is now coming. That is Level 4, high automation with the driverless operations in very limited areas. Limited route, limited area, and limited time. So, it's easy to know, easy to establish that no human-machine interface with the driverless operation. So, what is the difficulty?
Now, I'd like to show these conditions.



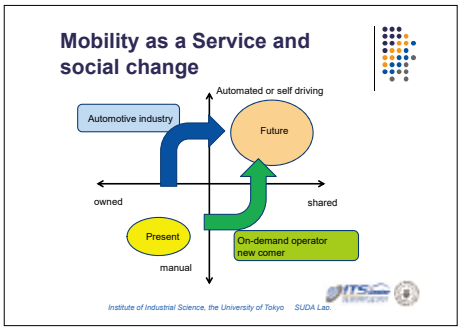
10

So, one possibility for domestic applications is platform truck operations. The leading car, human driver. However, trailing car, trailing truck has driverless operation. This is one of the possibilities. And another possibility is very low-speed operation and small cars in limited areas.



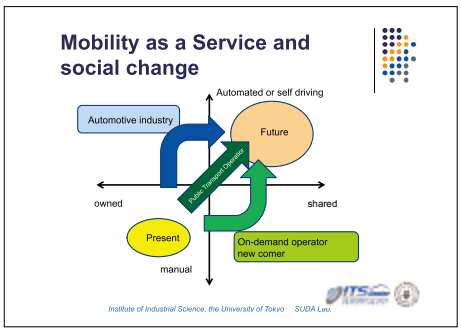
11

So, if such a system is established, the mobility condition will be changed. Nowadays, mobility as a service concept is widely accepted for transportation areas. In this moment, in this present time, the manual operation, owned society. However, in the future, the automated self-driving, or shared mobility.
So automotive industry like this and another on-demand operator or newcomer, like this.



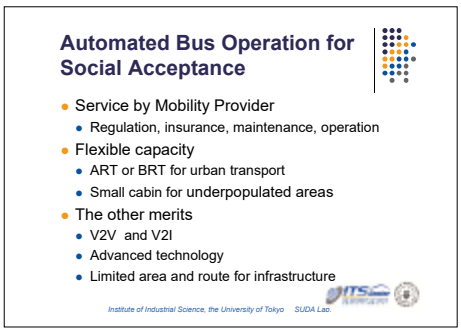
12

And also present public transportation operators should try to automate. So, in the future, three operators are thinking about this future.



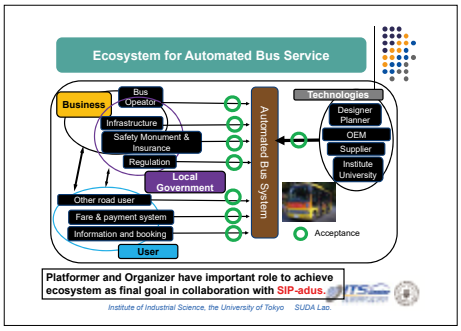
13

So automated bus operation needs social acceptance. So, service by mobility provider and the flexible capacity and the merit of the infrastructure communications with V2V, V2I and the advance technology under limited area in the route for the infrastructure.



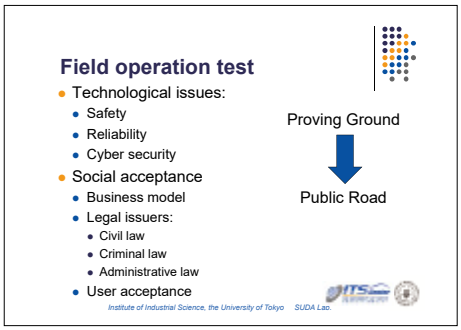
14

So, this is the ecosystem for the automated bus systems. So many not technical areas, business, and operation users. Now very, very attractive systems.



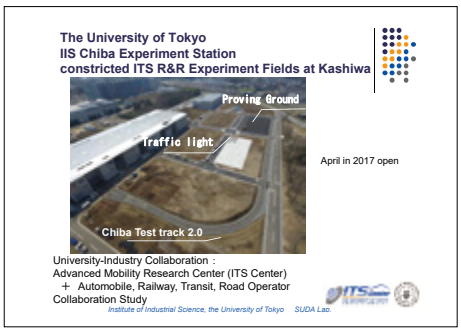
15

So, we are now doing field operation tests for the technological issues, for the safety, reliability, and cyber security, and also social acceptance, business model, legal issues, and user acceptance.



16

And also, we are working with the proving ground for the testing in the University of Tokyo, in Kashiwa Campus. We established a proving ground.



17

Nowadays, we are some trying to the automated bus system in Kashiwa Campus like this.

18

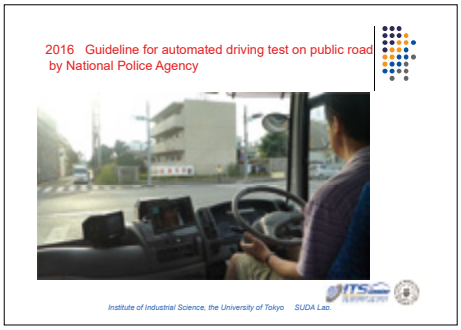
19

And in our system, not in the proving ground, last year, we tried, in Okinawa Prefecture, the automated bus in Ishigaki Island.

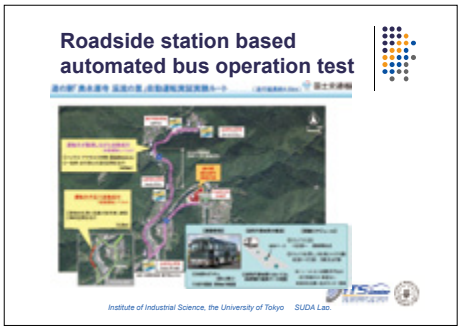
20

21

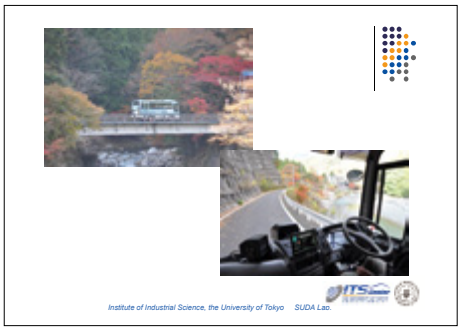
So, we are now testing. So driverless, automated driving system in the public road.
And in the rural areas, it's possible to use the infrastructure magnetic marker systems like this. So, in rural areas, some passenger car is a social acceptance.
And also, automated driving systems in the snowy conditions in the Hokkaido area.



22


Roadside station based
automated bus operation test
Institute of Industrial Science, the University of Tokyo SUDA Lab.

23


Institute of Industrial Science, the University of Tokyo SUDA Lab.

24


Magnetic marker
2m interval on road center
Institute of Industrial Science, the University of Tokyo SUDA Lab.

25


Institute of Industrial Science, the University of Tokyo SUDA Lab.

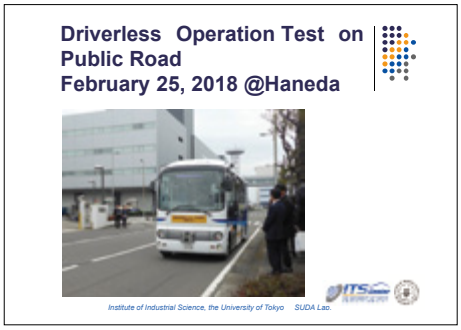
26

27

So, in the snowy conditions, the automated system is also tried.

28

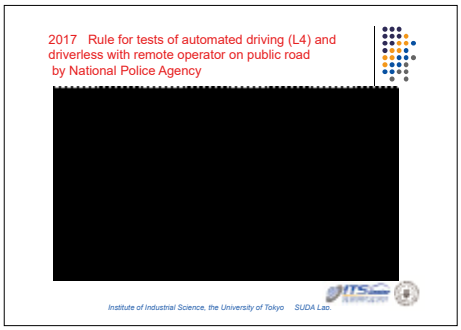
And finally, driverless operation tests were held in Haneda areas. So, ANA and SB Drive tried this challenging system for the driverless operation in the public road. So, you can see, no driver in the seat. So, fortunately, the National Police Agency accepted this route for the test for a public road with driverless operations with a remote operator, driverless as a condition. So, no driver. Remote driver. And it's possible to turn right safely.



29

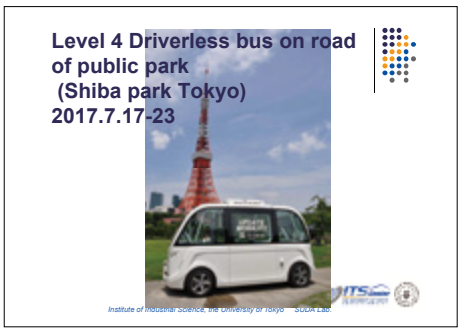
30

31



32

And also, the small bus operation like this.

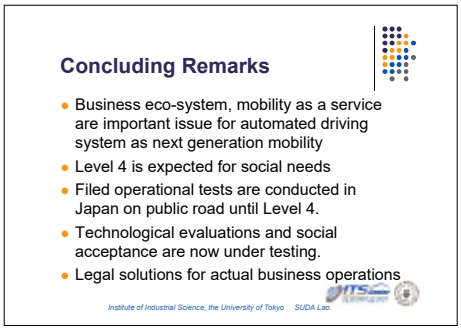


33

This bus concept is unfortunately not Japanese, but a French venture company made this bus. This has no driver seat, no steering wheel, no accelerator, and no pedal for the brake. However, this is possible. In the future mobility, such a system should be implemented.

34

In concluding remarks, business ecosystem mobility as a service is an important issue for automated driving systems as next-generation mobility. Level 4 is expected for social needs. Nowadays, field operation tests are also conducted on public roads. And also, technological evaluations and social acceptance are now under testing.



35

Thank you very much for the kind attention.

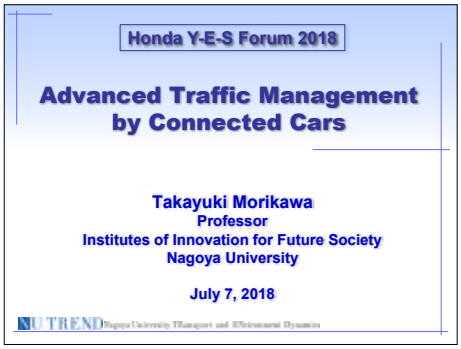
36

Keynote Speech 2

Prof. Takayuki Morikawa
Professor, Institutes of Innovation for Future Society,
Nagoya University

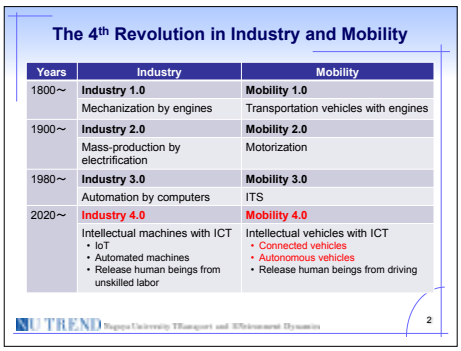
Advanced Traffc Management by Connected Cars

Thank you very much for your kind introduction. I'd like to thank Honda Foundation for providing me with this opportunity. So, this afternoon, I'd like to talk about connected cars, because I knew that Professor Suda would talk about autonomous driving, so I'd rather avoid talking about autonomous vehicles. I'd like to talk about connected cars. Of course, I'd like to touch a little bit about autonomous driving.



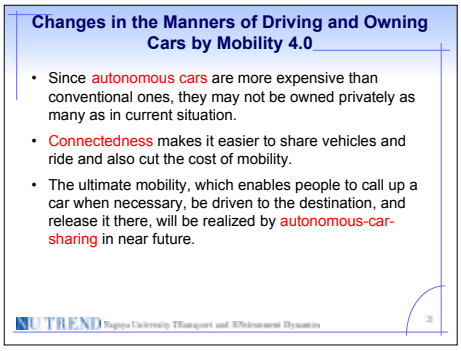
1

So, now, let me start from the revolutions, both in industry and mobility. Let me start from Industry 1.0 and Mobility 1.0. Of course, everybody knows that the Industrial Revolution started in the U.K. Mechanization by engines, and at the same time transportation — vehicles, actually — get engines. Of course, it started from the steam engine, then internal combustion engine. And around 1900, industry 2.0 and mobility 2.0, mass production by electrification and motorization. Actually, at that time, in the U.S., Ford Motor Company introduced the Ford Model T. That is the starting point of motorization. And around 1980, industry 3.0 — automation by computers — and mobility 3.0 by ITS, as Professor Suda mentioned. Now we are expecting industry 4.0 and mobility 4.0, and actual starting time will be around 2020. And industry 4.0 — actually, this term came from Germany. It is said that intellectual machines with ICT, provided with IoT automated machines, that it can release human beings from unskilled labor. So, it's parallel to the industry 4.0. Within the era of mobility 4.0, probably we can get intellectual vehicles with ICT. Connected vehicles like IoT, autonomous vehicle like automated machines, then it can release human beings from driving.



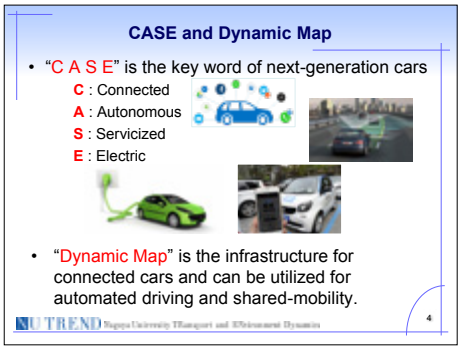
2

So now, it is said that there will be changes in the manners of driving and owning cars by mobility 4.0.
Since autonomous cars are more expensive than conventional ones, they may not be owned privately as many as in the current situation. That's maybe bad news for car manufacturers. But at the same time, connectedness makes it easier to share vehicles and ride, and also cuts the cost of mobility. Then, the ultimate mobility, which enables people to call up a car when necessary, be driven to the destination, and release it there — that's ultimate mobility — will be realized by autonomous-car-sharing in near future. That is actually shown in Professor Suda's diagram up there. The current situation is here, shared autonomous vehicles was there.



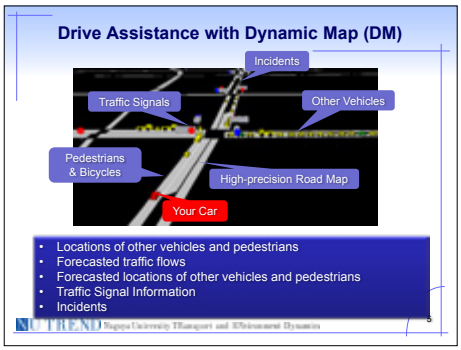
3

And probably you've heard this term, C-A-S-E, CASE. C stand for Connected, Autonomous, Servicized or Shared, and Electric. That's the key word for next-generation cars. And in that era as an infrastructure, "Dynamic Map" I think is the infrastructure for connected cars and can be utilized in autonomous driving and shared mobility.



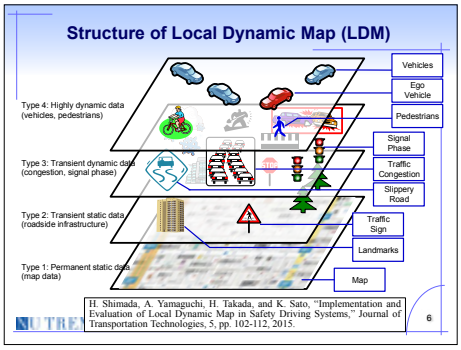
4

This is how the Dynamic Map works for your driving. Suppose this is your car. You can get information on pedestrians and bicycles, like incidents, other vehicles, and traffic signals, on a high-precision roadmap. Of course, if you're driving, you can get that information. If your car is an autonomous car, also that autonomous car can take advantage of getting that information.



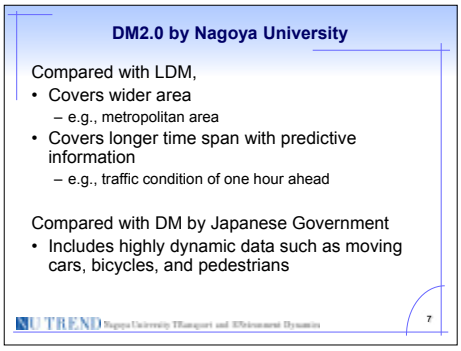
5

This is the so-called Local Dynamic Map, or LDM. In this LDM, there are four layers. In the bottom layer, this is kind of a static map. In the second layer, it contains information of transient static data. Something like traffic signs, landmarks, and so on. In the third layer, it contains information of transient dynamic data, like signal phase, traffic congestion, or slippery road conditions. And the top layer, it's really the highly dynamic data, like moving vehicles. And of course, your vehicle, and pedestrians, and so on. And those, from highly dynamic to static data, are actually stacked on the same static map. That's a kind of infrastructure.



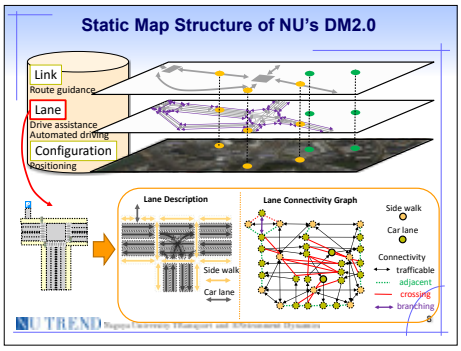
6

And we— actually, I'm from Nagoya University, our university is proposing a little bit advanced dynamic map, that is called the DM 2.0. So, compared with the local dynamic map, DM 2.0 covers a wide area, like a metropolitan area, and it covers a longer time span with predictive information, such as traffic condition of one hour ahead. And also compared with the dynamic map by the Japanese government, our dynamic map includes highly dynamic data, such as moving cars, bicycles, and pedestrians. Because the current Japanese government dynamic map does not contain highly dynamic data.



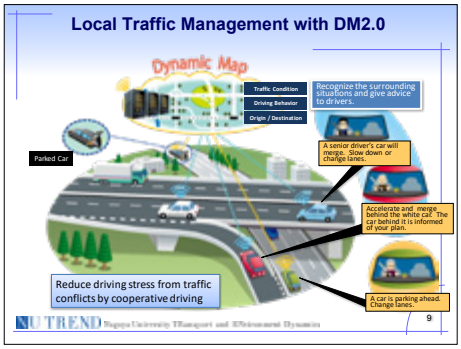
7

And also, we are proposing a static map structure for Nagoya University's Dynamic 2.0. Currently, digital map is like a link-based map, but together, in the same structure, we provide a lane-based map. Something like this. And in this configuration, the connection condition is expressed by this diagram. And also, this bottom layer, that is a high-definition 3D map that is used for the localization of autonomous vehicles. So, link-based, lane-based, and a 3D high-definition map are stacked in the same structure.



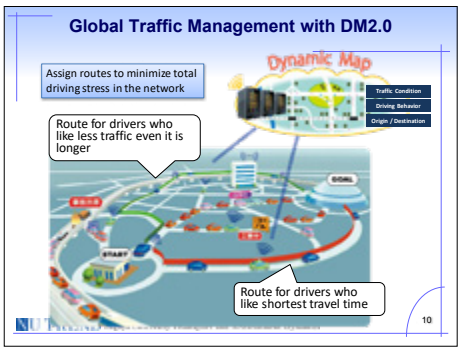
8

Then, are we going to be happy with that kind of a dynamic map? That is one example, it's called local traffic management with Dynamic Map 2.0. The typical situation is like this merging situation. Suppose this red car is driven by a senior driver who is very bad about merging. He is really scared of merging. And in this situation, this blue car is informed that a senior driver's car, the red car, will merge, so please slow down or change lane to the right. Then the red car, that senior driver, is informed like, "okay, please accelerate and merge behind the white car". And the car behind, the blue car, is informed of your plan. This kind of cooperative driving can be realized with DM 2.0. And also, in the road below, this car is stopped, but it is not stopped at a traffic light — it is parked. But with only the sensor, it is very difficult to distinguish from a car stopped at a traffic light and a parked car. But with DM 2.0, this car knows this car is actually parked. So, this car should detour, avoid this car. That kind of highly advanced traffic management can be done with Dynamic Map 2.0.



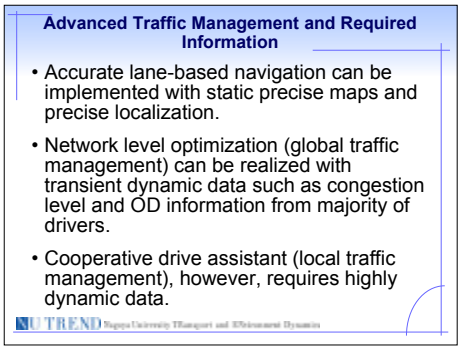
9

And also, in a more global, wider-area management, the network itself will be optimized by distributing a lot of cars in the desirable route. For example, this route, is for drivers who like less traffic even it is longer. And this route is for drivers who like shortest travel time. Then, of course, we try to avoid the congestion by not concentrating on a specific intersection, so we can optimize network performance by knowing the origin and destination of all the cars.



10

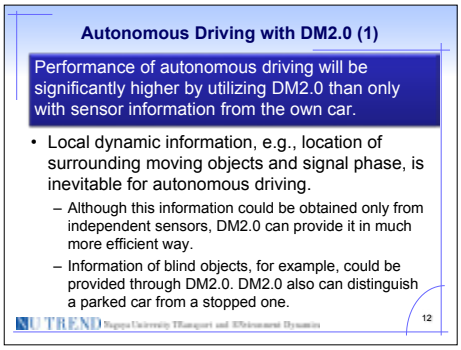
So, we can expect to have advanced traffic management. Now I'm listing what kind of information is required for that kind of advanced traffic management. For example, accurate lane-based navigation can be implemented with static precise maps and precise localization. A little bit more advanced, network-level optimization with global traffic management can be realized with transient dynamic data, such as congestion level and origin and destination information, from the majority of drivers. Not necessarily all the cars, but the majority of drivers. And highly advanced traffic management, like a cooperative drive assistant or local management, however, requires highly dynamic data.



11

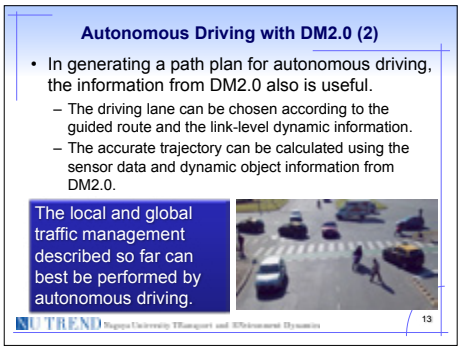
Also, that Dynamic Map 2.0 is very good for autonomous driving. The bottom line is the performance of autonomous driving will be significantly higher by utilizing DM 2.0 than only with sensor information from their own car. Of course, autonomous driving can be done from only the sensor data, but what I'm saying is that if you use DM 2.0 information, the performance of autonomous driving is much higher.

For example, local dynamic information, such as locations of surrounding moving objects and signal phase, is inevitable for autonomous driving. Probably you know that detecting the signal — red, yellow, or green — is sometimes very difficult by using the camera. But if we use the Dynamic Map 2.0, the traffic signal information is sent to the car. So, all this information can be obtained from the independent sensors, but DM 2.0 can provide it in a much more efficient way. And also, information on blind object, for example, could be provided through DM 2.0. So, DM 2.0 can also distinguish a parked car from a stopped one, as I've already mentioned.



12

And also, in generating a path plan for autonomous driving, the information from DM 2.0 also is useful. For example, the driving lane can be chosen according to the guided route, and the link-level dynamic information. And the accurate trajectory can be calculated using the sensor data and the dynamic object information from DM 2.0. So, the local and global traffic management described and told so far can best be performed by autonomous driving. And eventually, like this picture, intersections without any traffic signal can be realized using DM 2.0.



13

Now, I'd like to talk about traffic controls by connected cars.

14

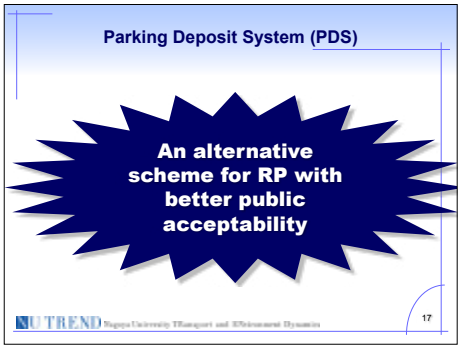
Nobody here is from Singapore, I think. Road pricing is very famous in Singapore and also in London. And road pricing is very, very effective to alleviate congestion in the city center, as we know.

15

But only Singapore, London, Stockholm, and Milan, those are the only four cities in the world. Other cities like Tokyo, Nagoya, New York City, and many other cities tried but failed, because public acceptance is so low. Nobody likes paying money. But we know that road pricing is very effective to alleviate congestion, like all the PCM members, like Ho Chi Minh City, like Yangon, whatever. Every big city in Asia is suffering from heavy congestion, but public acceptance is a problem. So, we need to develop alternative schemes for road pricing that are more socially acceptable.

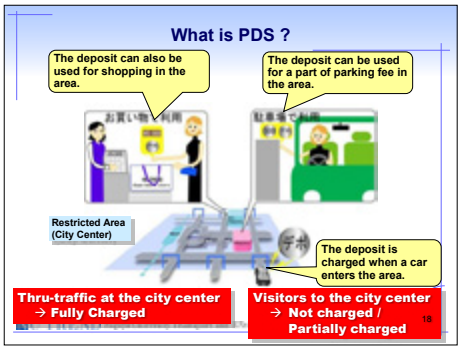
16

So, what I invented around 10 years ago is the Parking Deposit System, or PDS. That's an alternative scheme for road pricing with better public acceptability.



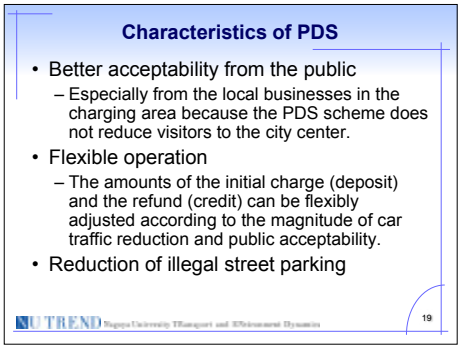
17

It is a very simple idea. Suppose this is a restricted area, like a city center. If you are familiar with Singapore's system, if you go, crossing the cordon line, you have to pay money. The same situation — suppose this is the car trying to get to restricted area — you have to pay money. But it is not just a payment; it's considered a deposit. That deposit money can be used at the parking lot or department store or restaurant. So, it's just deposit money. And that money can be used if you do some economic activity in the city center. For example, if you have to pay 500 yen, you can use that 500 yen for the part of your parking fee. But you will not necessarily be refunded the full 500 yen. You can use just part of it, like 300 yen. So, you can have that kind of a difference between the initial payment and the refund amount. So, what we can do is, if you just go through the restricted area, you just pay, but you have no chance of using it. So, it's a kind of differential road pricing. That's the idea of the parking deposit system.



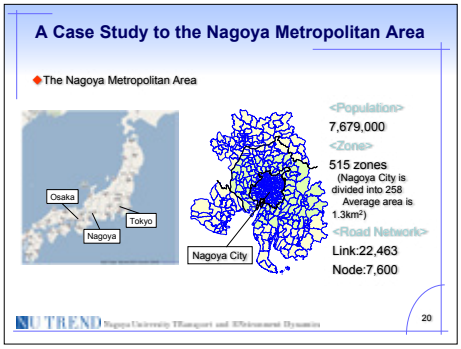
18

And we conducted a lot of research about this, and we found much better acceptability from the public compared with road pricing. Especially from the local businesses in the charging area, because the PDS (parking deposit system) scheme does not reduce visitors to the city center. And we can expect flexible operation. The amount of initial charge or deposit, and the refund or credit, can be flexibly adjusted according to the magnitude of car traffic reduction and public acceptability. Also, it can reduce illegal street parking in the city center.



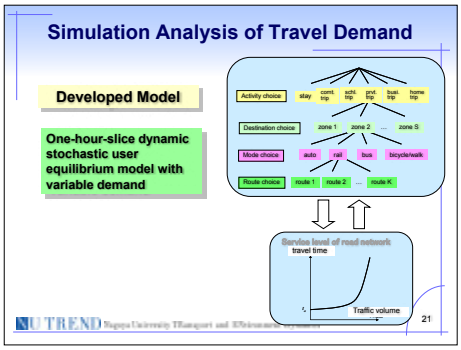
19

We conducted a case study in Nagoya. Nagoya is located here. It's the third biggest metropolitan area in Japan.



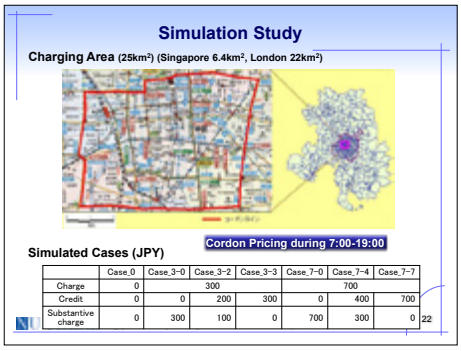
20

We actually made a very sophisticated, precise, detailed, travel demand model to simulate.



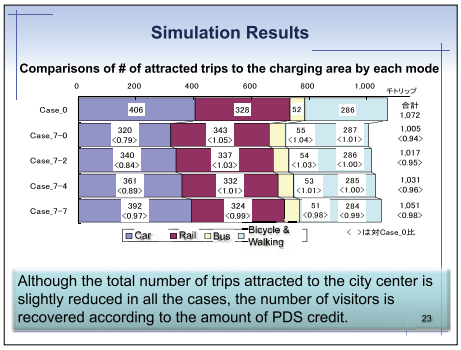
21

And this is our assumption. This is the city center of Nagoya, and this is the cordon line. The area is 25 square kilometers. Singapore's charging area is 6.4 square kilometers, London's is 22 square kilometers. So, it's more or less comparable with London's charging area. And we simulated a lot of cases. Like, Case 3-2 means the initial payment is 300 yen and the refund is 200 yen, and so on. If it is 7-0, the initial payment is 700 yen and no refund.
So, this is a simple road pricing of 700 yen.



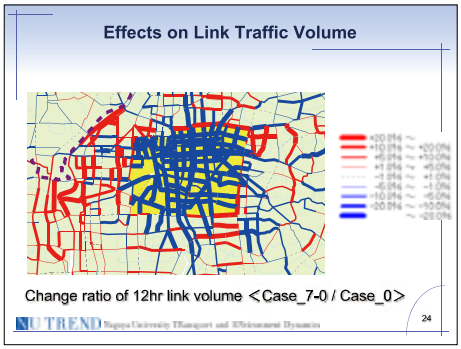
22

And we conducted the simulation, and I'm showing some of the results, like the 7-0, that is a simple road pricing of 700 yen. This is the number of trips to the city center. This is the current situation, and we can see that by the simple road pricing, the number of people coming to the city center will be reduced by 6%. But with the full refund, the loss of visitors is very few.



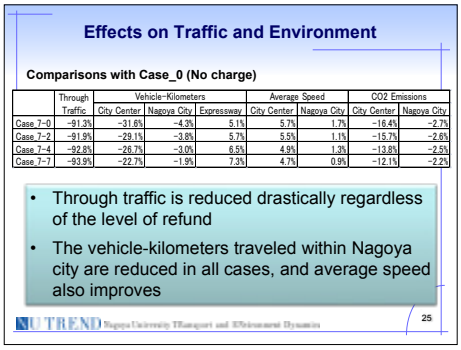
23

And also, the congestion level. This yellow area is a charging area, and a blue line means big reduction in traffic. So, within the charging area, very, very big reduction in traffic. So almost no congestion in this zone. Of course, we have some increase in traffic in surrounding areas.



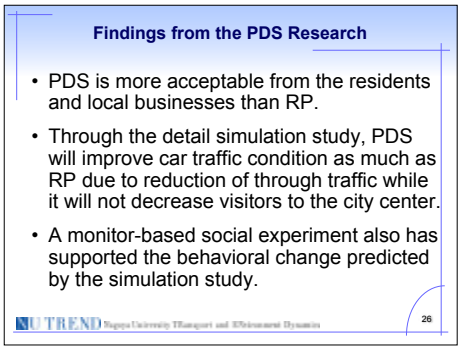
24

And altogether, we can expect much reduction in the CO_2 emissions, and, say, 5% increase in the average speed and so on.



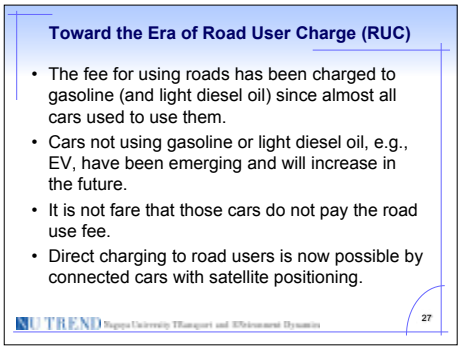
25

So, what we found is the parking deposit system is more acceptable to the residents and local businesses than the road pricing. And through the detailed simulation study, PDS will improve car traffic conditions as much as road pricing due to the reduction of through traffic, while it will not decrease visitors to the city center. And also, we conducted a kind of social experimentation. A monitor-based social experiment also has supported the behavioral change predicted by the simulation study.



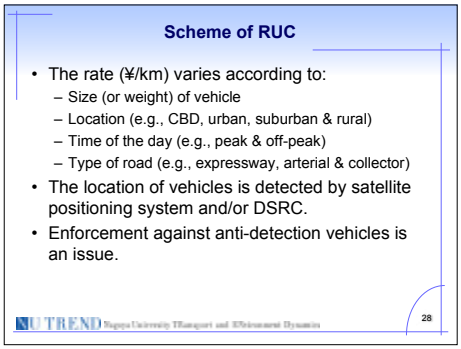
26

And we can expect the era of the Road User Charge, RUC. Probably you have heard about road user charge. Currently, the fee for using roads has been charged to the gasoline. Probably all of your countries, of course light diesel oil. Since almost all cars use gasoline or light diesel oil, that's okay. But we're expecting the era of electric vehicles. So EVs don't have to pay any gasoline tax like diesel tax. It's not fair really, because EVs also damage roads and EVs actually require roads. And roads have to be constructed by using some tax. So, we have to do something for the era of electric vehicles.



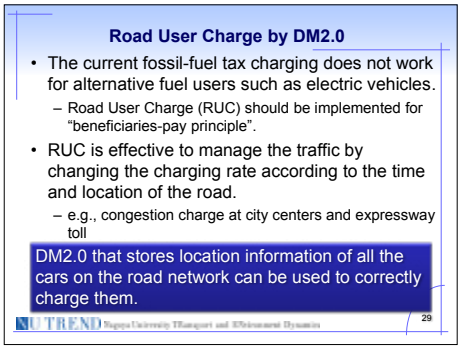
27

So, the road user charge is actually paid by distance, and also the rate. So, like the yen per kilometer varies according to the size of the vehicle, location of the section of the road, time of the day, type of the road, expressway or arterial or collectors. And of course, the location of the vehicle is detected by the satellite positioning system and/or dedicated short-range communication. Of course, there is an issue, enforcement against anti-detection. But we can do something for that.



28

And also, a road user charge can be implemented very easily with Dynamic Map 2.0 because all the vehicles are located on the Dynamic Map 2.0. So, DM 2.0, which stores location information of all the cars on the road network, can be used to correctly charge them. So, with the DM 2.0 we can expect very smoothly the era of road user charge.
I think that's all I wanted to talk about this afternoon.



29

Thank you very much for your kind attention.

30

Panel Discussion

Panel Discussion

Panel Discussion — Summary

1. Introduction

The panel discussion is one of the most expected sessions of Honda Y-E-S Forum 2018 wherein seven panelists including five awardees from five countries (Vietnam, India, Cambodia, Laos, and Myanmar) and two keynote speakers (Prof. Yoshihiro Suda and Prof. Takayuki Morikawa) discussed together on eco-transportation with unprepared questions from facilitators. Dr. Atsushi Sunami facilitated this session with numerous tough and meaningful questions. This session highlighted the key aspects of eco-transportation in each country as well as suggestions from keynote speakers to drive towards sustainability with eco-transportations.

2. Content of Discussion

First of all, Dr. Sunami gave five awardees an opportunity to introduce themselves about their career, dream, and achievement after receiving Honda Y-E-S Awards. They respectively introduced themselves, share their dreams and the influences of Honda Y-E-S Awards in their career. For example, thanks to Honda Y-E-S forum, Se (Myanmar) has approached to eco-technology concept in the first time, KIM (Cambodia) got chance to internships in Japan with invaluable experiences, Pay (Laos) changed his philosophy to reach Mr. Soichiro Honda vision about future life with slogan "Blue sky for children".

Secondly, each awardee highlighted the main points of their presentation, then they discussed their country's eco-transportation strategy, responded questions from Keynote speakers and received their suggestion. To begin with the representative from Myanmar, he introduced about his country case in Yangon going along with the current transportation modes that are being used by citizens, then followed by the reasons why circular railway is the best possible solution for traffic problem, mostly focused on the difficulties and solution of upgrading current circular railway. He also raised a question as to how to persuade people to utilize this eco-transportation. Prof. Morikawa suggested that the main core of transportation is to make people's lives better by using this new system. One example is to apply some policies by the government, for example in circular railway case, the local government should also provide some public facilities such as cinemas, supermarkets or shopping malls near the railway lines so that people will be more interested in using the railway system. Prof. Suda also mentioned that electric train will be more efficient for Myanmar case instead of diesel as current status.

In Laos, a country with 7 million people (2018) and the total area of 230,800 m^2, they not confronted yet with the big problem caused by transportation such as air pollution, serious congestion or energy issues. Currently, the biggest problem of Laos is flooding street because Chinese fulfilled a reservoir which controls water flow during the rainy season to build up Chinatown. In terms of a big city like Vientiane capital, with an increase in the automobile and tourists, the representative from Laos proposed a project run by JICA which is providing electric tuk-tuk to passenger in Luang Prabang, in his option, Laos could expand the using electric tuk-tuk. Keynote speakers suggested that a small electric bike is suitable for Laos situation because of easy establishment and rich hydrogen electricity resource in Laos.

Cambodia representative explained why she raised up the public bus transport system in Cambodia is a serious issue and many challenges such as traffic congestion, flooding, and poor system road management, etc. Especially in Phnom Penh city with more than 2 million people, Cambodia government has been working with developing partners to encourage citizens to use the public bus service since this service is more common, environmental friendly, and economical that are suitable to Cambodian society. Many difficulties will be handled with cooperation with JICA's support, for instance, we will get 140 buses more to cover all the destination routes in Phnom Penh city, such as adjust sidewalk for pedestrian for bus users, and improve the parking space between motorcycle, car, and pedestrian. Dr. Morikawa shared his research experience that Cambodia used to fail the public bus project in 2001 and urban transportation system wasn't improved since the ending of the civil war. This public bus service was started to be launch again in 2014. Now it is running in Phnom Penh city, however, it still needs to be improved the system to facilitate the users. Another question related to the public bus is why the first service of city bus failed in 2001 comparing to present. She replied that the reason of the failure of launching bus service in 2001 is that 20 years ago, the transportation system of Phnom Penh was not a big issue with no traffic congestion in the city as today, low population, and no flooding occurred in the city. Moreover, the public bus took a long time to reach each destination than motorcycles, so Phnom Penh residents preferred the quick transport service. In overall, she has positive thinking on this service that is one of the effective methods to solve the transportation issues in Cambodia. She believes that in the future the more environmentally friendly transportation will become our new lifestyles such as Bike-Sharing, Electric Vehicles, and Ride-Sharing.

The representatives of India shared how India has invested in infrastructure to activate the inland waterway channels in the country about both technical and operational challenges plague this project. The key technical challenge was to maintain the least available depth, despite seasonal and topographical variations. It is harder to do this at scale, along with the entire river length, regardless of the river width. They mentioned some of the technical initiatives being implemented to achieve this in an ecologically sensitive manner – such as water injection dredging, river information systems, temporary structures, etc. Prof. Morikawa was curious to understand why India, despite being one of the oldest civilizations, does not already have a strong channel system. The team responded that India was primarily a collection of multiple kingdoms, and agrarian channel systems are well developed across different regions. The challenge is to connect these systems and connect points which are further away. Additionally, Indian rail and road networks are very well-developed, and this has reduced the need to rely on waterways. Prof. Suda suggested that we should consider supporting a shift in the technology used in boats from diesel to more eco-friendly fuels. It might be beneficial to budget any port requirements to enable this shift up-front. The team accepted that this was an important aspect, and mentioned how the project is still in its early stages, and how there would be 3 learning curves – a technical curve to create and manage the channels, a business adoption curve where existing water freight would take a longer journey, and a growth curve where transport destined for other modes would adopt waterways.

Last but not least, in Vietnam, the traffic congestion is a vital and exigent problem. Vietnamese government enacted many policies to solve this problem, but the results are not much effective. Most of the policies are long-term policies like expanding infrastructure, building the new road, change the time schedule of school, etc. which will change the habit of people and take very long time to be efficient. In this presentation, we would like to introduce a short-term solution based on Internet of Things platform. Using this technical solution, we hope to reduce the on-road time of vehicles caused by traffic congestion which consequently reduces the exhausted gas. He also raised a question to Professor about the most efficient method to handle traffic congestion in Vietnam. Prof. Morikawa suggested that Vietnam should parallelly implement three solutions including using eco-transportation, changing awareness of commuters and increasing the demand of eco-technology via its benefit explanation.

3. Conclusion

The facilitator would like to get consultants from two keynotes speaker about a big question that how to promote eco-technology in developing countries? Prof. Morikawa believes that the combination of three approaches: Technology base, People base, and City base is the main core to solve traffic problem and promote eco-transportation. Prof. Suda mentioned that the transportation is composed of human, infrastructure, vehicle and communication technology, thus in order to efficiently promote eco-technology, we should cover four components in local condition.

Research Poster Contest

Entry List of Research Poster Contest

Finalist for 1st, 2nd and 3rd Prize

Team	Abstract Title	Organization	Name/Leader
A	Sustainable eco-transportation with energy saving and road safety provided by high visibility expressway tunnel lighting	Ehime University	Koji Okusa
B	Evaluation of digital map Ability for Vehicle self-localization	The University of Tokyo	Ehsan Javanmardi
C	Development of eyeball shaped display for low speed automated vehicles for communicating with pedestrians	Keio University	Yoshiki Tagawa
D	A study on mode choice behavior of high school students in Da Nang city, Vietnam	Yokohama National University	Truong Ong
E	Temporal and spatial differences in the adoption of car-sharing systems	Kyoto University	Cen Zhang
F	Biofuels: Will we be able to make enough in the limited time?	IIT Kharagpur, India	Piyush Nanda
G	Hub facility design for the comfortable daily life and eco-transportation in underpopulated suburban area	Toyo University	Dai Furuwatari
H	A study on improving ranging performance of UWB radar system with inter-vehicle communication	Tokyo University of Science	Keiichi Inada
I	Risk indicator of intersection collision based on energy reduction and the closest distance	Aichi Prefectural University	Masaki Tani
J	Impact of V2V communication on eco-route choice	University of Yamanashi	Faysal Ibna Rahman

Participation for Audience Award

Team	Abstract Title	Organization	Name/Leader
K	On the range of inter-vehicle communications based on the "TsRm" evaluation method-considering vehicles that need to communicate each other-	Saitama University	Shotaro Kondo
L	Aiming private vehicle-free urban commute by improving BRT services: An eco friendly transportation motive	Nihon University	Ryohei Hashimoto
M	The transport route selection of international container intermodal transport base on the China railway express	University of Yamanashi	Bohao Zhao
N	Sustainable transportation: A tool for implementing healthy city	University of Tsukuba	Wenzhu Cui
O	Road boundary detection using in-vehicle monocular camera	Hirosaki University	Kazuki Goro
P	Study on the matching method between tidal flow of passengers and transport capacity of line network in urban railway: Take Chengdu as an example	University of Yamanashi	Sixia Chen
Q	Analysis of vulnerability in the undirected and weighted urban rail transit network	University of Yamanashi	Meiyi Zhao

1st Prize

Development of Eyeball Shaped Display for Low Speed Automated Vehicles for Communicating with Pedestrians

Yoshiki Tagawa[1], Manabu Omae[2]
[1,2]Graduate School of Media and Governance, Keio University, Japan, yoshisfc / omae@sfc.keio.ac.jp

Background & Objectives

- Automated vehicles are expected to sustain mobility for the elderly in rural area.
- In Japan, field tests have been in process by the name, Last One Mile Automated Driving.
- An environment with a sense of insecurity from the automated vehicle could be predicted, so a sense of security must be given for pedestrians.

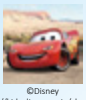
Feasibility studies and field tests of Last One Mile Automated Driving have been actively carried out in Japan.


Chatan town(Okinawa Pref.)


Eihei-ji town(Fukui Pref.)


Wajima city(Ishikawa Pref.)

- To reduce the sense of insecurity and to arouse feeling of friendless to automated vehicles, installing an eye like "Thomas and Friends" and the movie "Cars" on the automated vehicle is thought to be effective.

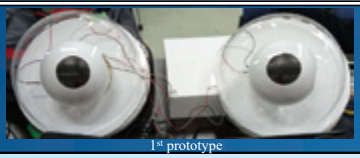


- To develop and validate a vehicle-exterior communication device that contributes to public acceptance of automated vehicles.

Development of Eyeball Shaped Display

Expected effect of the display: Showing the vehicle's attention and intentions to pedestrians with reducing the sense of insecurity and with arousing feeling of friendless

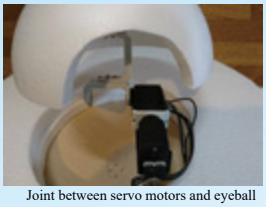
- 1st prototype eyeball shaped display have been developed and attached to a self driving car.
- LED based 2nd prototype is now under development.

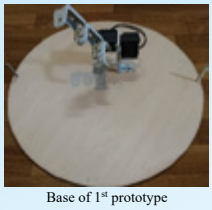

1st prototype

1st Prototype

- In the 1st prototype, pupils are moved mechanically by servo motors.
- One eyeball shaped device is composed of half-spherical shaped Styrofoam, acrylic dome, wooden base and two servo motors.
- The eyeball shaped display is mounted on the experimental automated vehicle by a magnet
- The pupils of the eyeballs are controlled to direct the pedestrians detected by a LiDAR sensor fixed on the experimental vehicle


1stPrototype on the vehicle


Joint between servo motors and eyeball

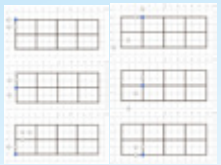

Base of 1st prototype

Evaluation & Results

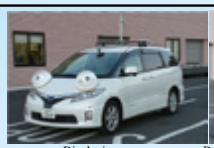
Evaluated where the focus point of the prototype.
Recorded where the subjects felt seen the most, out of the 15 destination point set and displayed the gaze.


Experiment environment

- When the distance to the unit is close to the subject, setting the focus point in-front makes the feeling of being seen
- The farther away the subjects are from the unit, the fewer the difference among individuals, and resulted in accurate information being transmitted

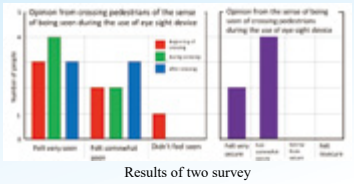

Results

Evaluated difference in the sense of security the pedestrians crossing in front of the automated vehicle felt, with and without the unit installed on the vehicle.


Displaying gaze


During cross in front of the experimental vehicle

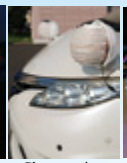
- The arousing the sense of security for pedestrians crossing was successful
- Creating an exterior and movement that looks more like a human eye and expanding expressions by expressing intentions other than gazing are some of the points that could be improved


Results of two survey

2nd Prototype

- 2nd prototype displays eyeball optically for various expression.
- It is composed of Styrofoam disks stacked up as a sphere.
- LED tapes are attached on the profile making a three-dimensional display possible.
- Each LED on the tape has a micro-controller and color and intensity can be controlled independently, resulting in enhancement of expression and weight reduction.
- The eyeball shaped display is mounted on the experimental vehicle by magnet base.


Attached to experimental vehicle (day and night)


Close up view


2nd prototype


LED tape

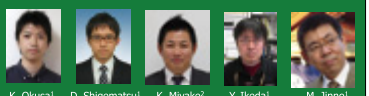
Conclusion

The validity of the eyeball shaped display, having the potential of making self-driving vehicle become something more close to people, and arousing a sense of security is confirmed by experiments using the first prototype. Coming up with variety of expressions and message communication methods utilizing LED control and validating the effectiveness of them are the future works.

2nd Prize

Sustainable Eco-Transportation with Energy Saving and Road Safety Provided by High Visibility Expressway Tunnel Lighting

K. Okusa[1], D. Shigematsu[1], K. Miyake[2], Y. Ikeda[1], M. Jinno[1]
[1] Dept. of Electronic Eng., Ehime University, 3 Bunkyo-cho, Matsuyama, Ehime 790-8577, Japan
[2] West Nippon Expressway Engineering Shikoku Company Limited. 3-1-1 Hanazono-cho, Takamatsu, Kagawa 760-0072 Japan



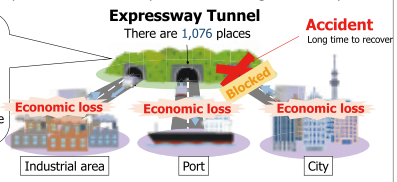
Honda Y-E-S Forum 2018
Fukutake Hall, The University of Tokyo
July 7, 2018

Introduction

Contribution to Eco-Transportation

Expressway tunnels play an important role in transportation and logistics in Japan.

- Annual net freight flow exceeds 2.5 billion tons, of which 50.2 % are transported by vehicle in Japan.
- Total distance of expressway → 0.6% of all roads (km) ※
- Domestic land freight transport volume → 47.7% of all roads (t•km) ※

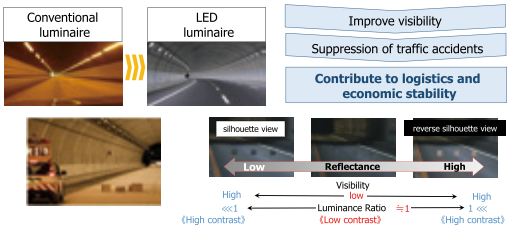


Logistics is blocked due to tunnel accident
→**Economic loss**

Realization of sustainable Eco-Transportation for restraining the occurrence of a tunnel accident.

Motivation

Improve visibility in the tunnel by illumination control technology



☐ Low luminance contrast between "objects" and "background road surface"
⇒ **Recognition is difficult**

Experimental Setup

Miniature tunnel model

■ Inside the tunnel model

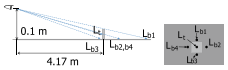
■ Schematics of experimental (Scale: 1/24)

9%,25%,56%,69%,77%
0.8×0.8cm
(Assumption of 20×20cm)

Evaluation method

■ luminance contrast

$$C = L_t / \{(L_{b1} + L_{b2} + L_{b3} + L_{b4})/4\}$$

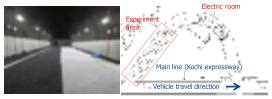


■ Subjective evaluation

3･･･Better
2･･･Good
1･･･Bad
0･･･Not recognized

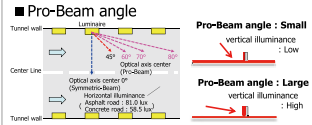
Actual tunnel

■ Houou tunnel in Kochi expressway



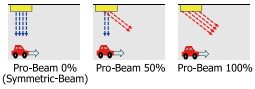
Lighting distribution control

■ Pro-Beam angle



■ The illuminance on road surface occupied by Pro-beam

- Miniature tunnel model
  0%(Symmetric-Beam), 25%, 50%, 75%, 100%
- Actual tunnel
  0%(Symmetric-Beam), 30%, 100%



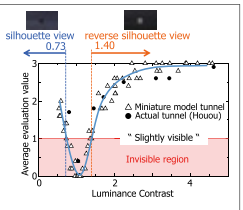
Results & Discussion

Asphalt road

■ Actual tunnel (Pro-Beam Angle : 45°)

Reflectivity of objects	Symmetric Beam		Pro-beam 30%		Pro-beam 100%	
	E.V.	L.C.				
56%	2.6	3.44	2.9	4.61	2.8	6.30
25%	reverse silhouette view 2.1	1.71	2.5	2.24	2.6	3.09
9%	invisible 1.7	0.80	0.4	1.04	1.8	1.45

Constant illuminance : 40.0 lux (Due to power shortage)
E.V. Evaluation value
L.C. Luminance contrast



■ Model tunnel (Pro-Beam Angle : 80°)

Reflectivity of objects	Symmetric Beam		Pro-beam 25%		Pro-beam 50%		Pro-beam 75%		Pro-beam 100%	
	E.V.	L.C.								
56%	2.6	1.99	reverse silhouette view 2.6	2.58	3.0	3.25	3.0	3.89	3.0	4.57
25%	invisible 0.0	1.08	1.0	1.35	1.8	1.75	2.4	2.01	3.0	2.45
9%	silhouette view 1.6	0.59	1.4	0.73	invisible 0.4	0.96	0.0	1.07	0.8	1.29

Constant illuminance : 81.0 lux
E.V. Evaluation value
L.C. Luminance contrast

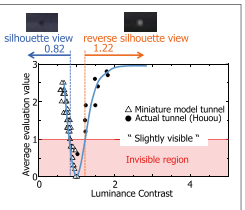
Optimal conditions
Asphalt road
Pro-beam angle 80°
Pro-beam 100%

Concrete road

■ Actual tunnel (Pro-Beam Angle : 45°)

Reflectivity of objects	Symmetric Beam		Pro-beam 30%		Pro-beam 100%	
	E.V.	L.C.				
77%	1.9	1.24	2.6	1.48	2.8	1.79
69%	reverse silhouette view 1.5	1.22	2.4	1.56	2.7	1.82
56%	invisible 0.6	1.02	1.2	1.23	1.9	1.49

Constant illuminance : 40.0 lux (Due to power shortage)
E.V. Evaluation value
L.C. Luminance contrast



■ Model tunnel (Pro-Beam Angle : 45°)

Reflectivity of objects	Symmetric Beam		Pro-beam 25%		Pro-beam 50%		Pro-beam 75%		Pro-beam 100%	
	E.V.	L.C.								
77%	1.7	0.71	1.3	0.75	1.3	0.79	1.0	0.82	0.8	0.84
69%	1.7	0.65	silhouette view 1.7	0.69	1.3	0.73	1.3	0.76	1.3	0.79
56%	2.3	0.56	2.0	0.59	2.2	0.63	2.3	0.65	2.2	0.67

Constant illuminance : 58.5 lux
E.V. Evaluation value
L.C. Luminance contrast

Optimal conditions
Concrete road
Pro-beam angle 45°
Pro-beam 50%

Preceding vehicle visibility

Asphalt road

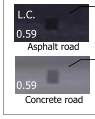
Improvement of Visibility

Concrete road

Improvement of Visibility

High vertical luminance
Visibility is improved
V.L. : Vertical luminance

Discussion



Background luminance: 4.66 Mesopic vision
Background luminance: 18.78 Photopic vision
L.C. Luminance contrast

Luminance contrast that the subject could recognize the object was different between asphalt road and concrete road

The range of the unrecognizable luminance contrast is reduced in a photopic vision

Conclusions

- **Obstacle visibility is determined by the luminance contrast between objects and background road surface.**
- **To set the optimum vertical illuminance, the visibility of the objects and preceding vehicles was improved.**
- **The range of the unrecognizable luminance contrast is reduced in a photopic vision.**

Acknowledgements

This study was supported by West Nippon Expressway Engineering Shikoku Company Limited.

3rd Prize

A Study on Improving Ranging Performance of UWB Radar System with Inter-Vehicle Communication

○ Keiichi Inada, Akira Nakamura and Makoto Itami
Tokyo University of Science
E-mail: inada@itamilab.te.noda.tus.ac.jp
Itami Lab.

Background

ITS (Intelligent Transport Systems)

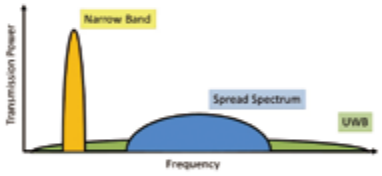
(Active Safety Technology)
- Pre-crash Safety System
- Lane Change Assist
- Blind Spot Detection
- ABS

The sensors monitoring around the vehicle are important.

Communication Scheme

UWB-IR (Ultra Wide Band - Impulse Radio)

- Very wide frequency band.
- High distance resolution.

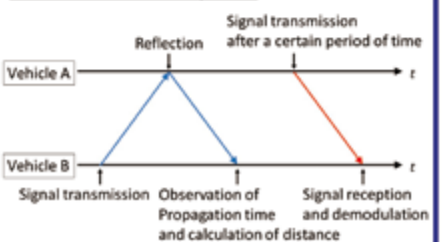


System Model

Interference Vehicles are Randomly placed at the Position of 10-100m around Vehicle B.

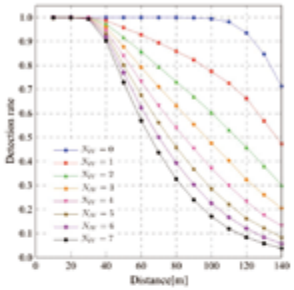
A: Target Vehicle
B: Measuring Vehicle
C,D: Interference Vehicles

Flow chart of the system

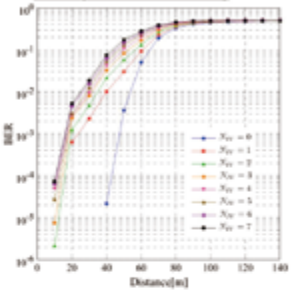


Results of Simulations

Detection Rate



BER (Bit Error Rate)

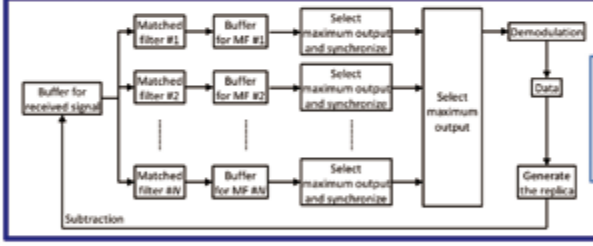


Channel Model	Free Space Loss Model
Pulse Width	1ns
Center Frequency f_0	26GHz
Band Width B	4GHz
PN Code	M Sequence (Length 127)
Data Modulation Scheme	BPSK
Error Correcting Code	Convolutional Code
Reflection Loss	3dB
Transmission Power	-41.3dBm/MHz
Noise	AWGN (-103dBm)
Number of Interference Vehicles	0-7
Antenna	Isotropic Antenna (Gain: 0dB)
Number of Simulations	20000

As the number of interference vehicles (=N_{IV}) increases, Detection Rate and BER decreases.

Near-far Problem
- Received power from each vehicle is different.
- Signal from a far away vehicle cannot be detected due to a nearby vehicle.

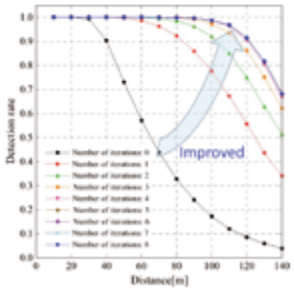
Iterative Detection using SIC



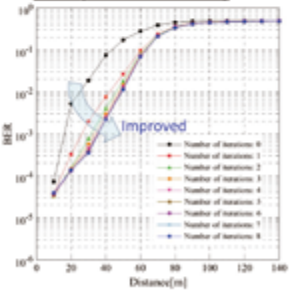
Subtracting other signals that interfere with the desired signal.

Results of Simulations with SIC

Detection Rate



BER (Bit Error Rate)



Conclusions

- UWB Radar System with Inter-Vehicle Communication was proposed. When SIC is performed, it is possible to improve the reception characteristics.
- By accurately measuring the distance, it is possible to make the inter-vehicle distance adequate. It leads to alleviation of traffic jams.

Audience Award

Sustainable Transportation: A Tool for Implementing Healthy City

○ SAI BUNCHIKU（Graduate School of Systems and Information Engineering University of Tsukuba, Ph. D course）
KATAYAMA AKANE（Graduate School of Systems and Information Engineering University of Tsukuba, Master course ）

Ⅰ. Background

Lately, Japan is confronted with issues of relocation of convenient facilities to the suburbs and discontinuance of public transportation in local cities. Increased automobile use accompanying these is exacerbating environmental problems. Moreover, a health problem has emerged by which too much dependence on automobile use increases the risk of developing the symptoms of lifestyle-related diseases such as obesity, diabetes, and cancer. To resolve these difficulties, it is considered necessary to encourage the utilization rate of sustainable transportation including environmentally friendly automobiles.

Ⅱ. Objectives

We propose new policies for implementing the reconciliation of promotion of sustainable transportation and healthy city, using people's willingness for health promotion related to food and exercise in this study.

Ⅲ. Break-through points

This study analyzes the relation between health and sustainable transportation with additional information related to the food environment, such as food facilities and eating habits for the first time. This study furthermore performs proposals large cities with a matured public transportation system, as well as local cities that are highly dependent on automobiles a new viewpoint to encourage behavior contributing to improvement in health conditions and solutions to environmental problems by introducing the viewpoint of environmental protection and the IoT technologies.

Ⅳ. Methods

Analytical methods
①quantification method II analysis
②covariance structure model analysis

Analytical Data
①WEB Questionnaire
②geographic information
✓ status of transportation facilities
✓ status of food facilities
✓ population and density

Ⅴ. research outline

Research object
①Research Method WEB Questionnaire
②Implementation Period 2016.2.15th～2.21th
③Number of surveys distributed 500 samples
④Number of surveys collected 469samples

Respondent:20 plus adult
Area: Tokyo 23 area & Ibaraki prefecture

Main research subject
①Body Mass Index(BMI) & Self-healthy awareness(HRQOL)
②personal attribute
③social capital
④dwelling environment
⑤Daily routine-food environment

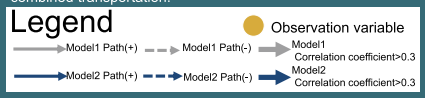
Evaluation standard
Using health index numbers
BMI & HRQOL
As evaluation standards

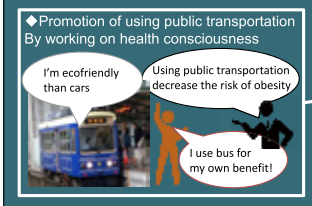
Ⅵ. Results

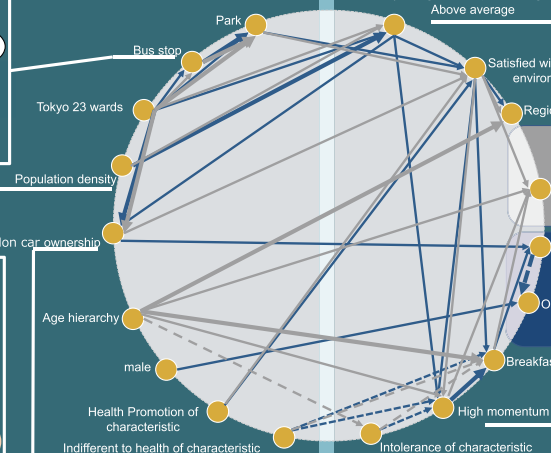
Regarding the relation of health conditions with the food environment and regional environment, factors that might contribute to improvement in health conditions include the development of
(1)public transportation and parks,
(2) increased density of food retail facilities, and population density,
(3) food retail facilities within a 10 minute from the place of residence,
(4) good eating habits and the non-automobile dependent lifestyle, and
(5) satisfaction of walking environments.

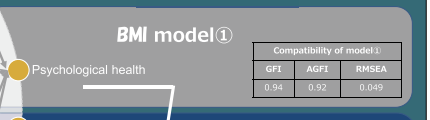
Ⅶ. Conclusion

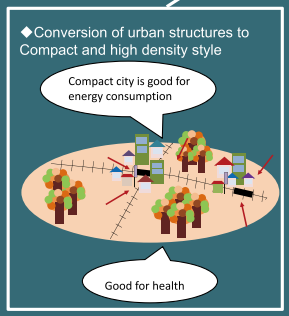
The following measures are proposed in this study with the findings described above for healthy city and sustainable combined transportation.

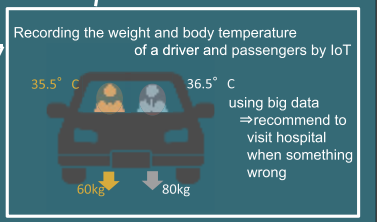


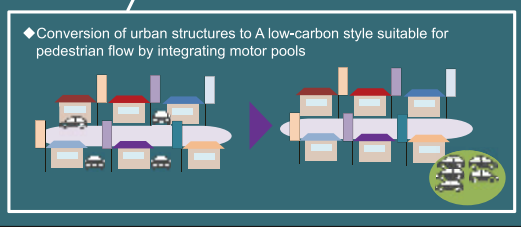












Lab. for Urban Transformation

Dr. Kazuko Matsumoto
Executive Director, Honda Foundation
Honorary Adviser, Japan Education and Research Support Foundation

Comments on Research Poster Contest

First of all, I'd like to congratulate all the awardees of this Honda Y-E-S forum. I'm very much impressed and pleased to look around at all those posters, and found that all the projects are so well organized and focused on very advanced subjects. As a whole, this year's forum is focused on transport technologies and transport systems in cities and villages. And many people participated. I'm very pleased to see so much participation, of posters and many people in the audience. And as a summary, I would say that the projects focused on new technologies of electric cars and autonomous driving. These two technologies that, of course, you are very much familiar with. And actually, they are starting to use in society very recently, but of course, a lot of innovation is necessary for these technologies. And many of the posters are related to these technologies.

Furthermore, the subjects focused to reduce four very important items. That is to reduce energy consumption, and to reduce greenhouse gas emission, and to reduce traffic congestion in cities, and traffic accidents, of course. I think young people concentrated to develop new technologies in these regards. And if I name some of them, for instance, some posters report on development of new tunnel lighting systems, very new ideas. Others are applications of digital maps, or some car display systems for pedestrians and analysis of human mobility behavior in cities, or new bio-fuel systems in India, or transportation in suburban areas, or a radar system for inter-vehicle communication.

There were several more technologies reported. And Honda Foundation is pleased to see these very advanced activities of young people.

I once again congratulate the awardees, but I'd like also to tell those people who were not selected not to be disappointed very much, because this forum is a very good opportunity to meet other people to discuss about your research. And maybe this experience will enhance your research in the next few years. And I hope you will enhance our relations between Honda Foundation and Asian countries.

As you know, Japan is suffering from disastrous rainfall that is unprecedented, and many places, many areas in Central Japan and Western Japan, are suffering now with heavy traffic disruption, collapse, and many residents are being evacuated from their homes. This is really a disastrous accident. And I presume municipal governments will think about new technology, new engineering, to recover and improve the traffic system, road system, or embankments along big rivers, because many places are severely damaged now. So this, our experience, may be news or may be information to other Asian countries. I know from today's talk that many Asian countries also suffer floods in many places. So this time, flood is unprecedented in Japan. And so this is our experience. And recovery by the government will be new information for other Asian countries. And by the exchange of such information, I hope that our ties between Honda Foundation and other young people in Asian countries, and the participants, will be strengthened in the next few years and in the future. Thank you for your participation.

Closing Remarks

Closing Remarks

Mr. Akira Kojima
Advisor, Japan Center for Economic Research

Thank you to everybody. On behalf of Honda Foundation, may I thank all of you for your wonderful participation. This is a Saturday. You sacrificed a very important weekend, but I strongly feel that you are feeling very happy.

And what I found, the issue, in this forum, is the dedication and the sense of mission. As for sense of mission, you came across this document, our mission. Mission is very important. Without missions, what happened? It was just ten years ago, 2008, when Lehman Brothers collapsed. They lost a sense of mission, they perused only commission. And yes, as for this ecotechnology — ecology and technology — this is a very important challenge for all of you. And here, your mission is important. The technology matters very much. And as for today's subject, transportation technology, this is the 110th year since the first T type Ford motor car was put onto the market. So, 110 years. But in the past few years and ten years, I could mention that the auto industry, auto technology, are showing fundamental change. And this is very important. Honda Motors, the founder of Honda Foundation, say that they are not only an automobile producer. It's more than that. They say that they are a mobility company. So that's the important concept. And a couple of years ago, they entered into the private jet airplane market. And now, they enjoy the largest share of the market, surpassing that of traditional companies like Cessna. So very important things are happening, to change.

And in this forum, I repeat it to you. The important thing here is that you share the same sense of mission and dreams. As for dreams, Mr. Moriya said that it's a catchphrase from the founder of Honda Foundation, Soichiro Honda. And he is just a graduate of primary education, but what did he pursue, his achievement? Oh, yes. He devoted his whole life to his mission. And what was it supporting? His strong sense of sustainable mission in his dream. At his age, the power of dreaming is very important. So, with dreams and dedication to these, you're ready to challenge maybe other deeds.

Decarbonization, this is a very important concept. Disasters. It's what Matsumoto Sensei said, just now, many disasters. More frequently, disasters in every part of the world, with the background of climate change or something. Digitalization. Yes. The auto industry is also more and more digitalized. And decentralization. The degradation of the environment, and a challenge. In Japan, depopulation. Demography is a challenge, very much of a challenge. And the other technology, we often hear about disruptive innovation. It's not just improvement of technology, but we are all trying to change the basic paradigm of technology to overcome the difficult challenges.

So maybe in a sense, we are standing at a very important crossroads of history. And look at the flag of our forum. Please read the bottom sentence.

"Go green together."

This is our challenge. Our mission. To all our audience in the forum and all participants, all guest speakers, all attendants, I myself enjoyed it very much, especially feeling the sense of mission and the strong sense of dedication. Continuity is very important. And another thing is connectivity; not only technological connectivity, but human connectivity. This is a good occasion to continue to start a new era of human connectivity. Try to keep in touch. It's a good occasion. And again, may I thank you again for all your contributions. Thank you.

Closing Remarks

Harsh Kabra
2014 Y-E-S Awardee

Good Afternoon Ladies and Gentlemen,

I am Harry from India, Honda Y-E-S awardee 2014. I, on behalf of Preparation Committee, would like to give a word of thanks for this Forum.

First of all, please give a big applauds to everyone present here to be a part of this forum. It was amazing to learn and share about our developing countries in Asia. I was delighted to see the engagement and responses from the audience during presentation and panel discussion.

I express my sincere gratitude to all the guest speakers for sharing with us their knowledge and expertise. Thank you very much Prof. Yoshihiro Suda, Prof. Takayuki Morikawa, Mr. Takashi Moriya. I would also thank Dr. Atsushi Sunami for his brilliant work in moderating the panel discussion.

I congratulate the winners of the Poster contest and all the participants for enlightening us with your ideas. I hope that the forum proves to be an encouraging stone for you all to excel in this field.

We are grateful for the support we received from Honda Foundation in organizing this forum. Without their constant support, our efforts would not have been fruitful. Getting so much freedom and so much responsibility, both at the same time are the amazing experience at this young age.

Good things come to an end but we have created a legacy for the future generation. Looking forward to seeing many more successful Forum like this. Go Green Go Honda. Let the power of dreams make this world a better place for a generation of the future.

THANK YOU

Honda Y-E-S Forum

公益財団法人 本田財団
HONDA FOUNDATION
Organized by Honda Foundation

Honda Yaesu Bldg., 6-20 Yaesu 2-chome, Chuo-ku, Tokyo 104-0028
Tel: +81-3-3274-5125 Fax: +81-3-3274-5103
http://www.hondafoundation.jp