HONDA-KADIN
International Symposium
"Innovation by Industrial-Academic Collaboration"

本田財団・インドネシア商工会議所（KADIN）共催
国際シンポジウム2012
「産学連携によるイノベーション」

A Report of
Honda Foundation — Indonesian Chamber of Commerce and Industry (KADIN) International Symposium 2012

HONDA FOUNDATION
公益財団法人 本田財団

For Publication

The present report is an account of the remarks, speeches, lectures and discussions from the international symposium on ecotechnology entitled "Innovation by Industrial-Academic Collaboration" held in Jakarta, Indonesia on June 12th 2012. The symposium was jointly organized by Honda Foundation and Indonesian Chamber of Commerce and Industry (KADIN). The KADIN, who focuses on matters relating to trade, industry and services, is tapping potentials and synergies of the national economy, offering a strategic forum for Indonesian entrepreneurs. This was the first international symposium organized by Honda Foundation since the one held in Bangkok in March 2008.

The business people, policymakers, politicians, researchers and scholars from both Japan and Indonesia invited to this meeting, were enliven by the lively presentations and exchanges of opinion. The ecotechnology concept for Indonesia was revisited in discussions and case studies such as "Innovation Systems and Policies," "Renewable Energies" and "Public Transportation Systems." We would like to thank all the participants for their cooperation, without which it would not have been possible to exchange such fruitful discussions throughout the meeting.

It is our great hope that the discussions and friendships cultivated through this meeting will be effective in the mutual edification of Japan and Indonesia, and accelerating the international understanding of ecotechnology and development of society in harmony with the natural environment.

Satoshi Matsuzawa
Managing Director, Honda Foundation

HONDA-KADIN International Symposium

Innovation by Industrial-Academic Collaboration

Ritz-Carlton Mega Kuningan Jakarta, June 12th, 2012

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Moderator: Atsushi Sunami
Associate Professor, National Graduate Institute for Policy Studies, Special Advisor to Cabinet Office
(National Strategy, Science and Technology, and Space Policy) and HOF Director

Opening Remarks

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration

Opening Remarks

Suryo Bambang Sulisto
Chairman, KADIN Indonesia (Indonesian Chamber of Commerce and Industry)

Your Excellency, Ishida-san, President of Honda Foundation, Your Excellencies, Bapak Wardiman Djojonegoro and Bapak Jusman Syafii Djamal, Dear Yoshino-san, Former President & CEO of Honda Motor Co., Ltd., Dear Prof. Zuhal, Chairman of KIN, the National Innovation Committee, Dear Japanese delegates and dear Indonesian guests,
A warm welcome to all of you this morning in Jakarta. It is a great pleasure for me to open this symposium. We owe the initiative to Honda Foundation which honors us with a large and distinguished delegation. Thank you very much for sharing your knowledge and experiences with us today.

The symposium could not be coming timelier. Being one of the engines of growth in Asia, Indonesia is further shaping its economy to become one of the world's largest economies in the next 20 years. While our recent growth primarily is based on selected sectors like mining, consumption and property development, we all know that our economy has to rely on several pillars to develop more sustainably. With a young and increasing population, it is a political and economic challenge to create sufficient employment opportunities for your next generation. Not at least, thanks to the long-term engagement of our Japanese friends, Indonesia hosts a large number of worldclass manufacturing facilities. We would like to develop this further, horizontally as well as vertically, which means adding value domestically as well as broadening the range of products that Indonesians are manufacturing in their country. Why should we continue importing electronic key components from our Asian neighbors? Why aren't we in the position to develop and manufacture automotive components, drugs and IT solutions made in Indonesia?

I am confident that we will discuss some possible answers during today's symposium. Let me just make two points:

First of all, on public education, it may be just a symbol, but it is quite striking: According to international consulting firms, there are only less than a handful of Indonesian universities among the Top-100 Asian universities. Our flagship university, the Universitas

Indonesia (UI) misses the top-50 ranked universities; dozens of Japanese universities arrange the top positions more or less among themselves. Sure, this is just a snapshot as it touches our education elite only; I am afraid that in terms of basis education, the gap between Indonesian educational institutions and that of our Asian peers is much more dramatic.

My second point is on the value of education itself. Without anticipating the contributions of today's distinguished speakers, I would like to describe it as a triangular institutional constellation. The three parties involved are the private sector, education institutions and last but not least the society itself. Without a strong societal commitment to education, any state-driven or private sector-driven approach will not be crowned with success. Education is a precious good which requires financial means to be spent, which is a long-term investment into the future of our country: expenditure on educational institutions is an investment that can help foster economic growth, enhance productivity, contribute to personal and social development and reduce social inequality. Relative to GDP, expenditure on educational institutions indicates the priority a country gives to education.

With 3.25% of last year's (2011) GDP spent on education, Indonesia still is at the bottom of the list of OECD countries. Just recently, we experienced a growth of public spending on education in Indonesia, but it certainly needs time until it bears fruit.

While exact data is not available, international studies estimate some 40% of the total public expenditures are complemented by private expenditures. According to the World Bank (2010), 32% of the average Indonesian household income is absorbed by expenditures for tertiary education. This is a positive sign for the belief into the chances of our next generation, but it is also a result of the widespread distrust in our education system.

Money and expenditures are indispensible, but not sufficient requirements for paving the way to a knowledge-based economy. At least, equally important is an intelligent design of an institutional landscape that intertwines efforts of companies, the government and the civil society.

I am looking forward to our discussions today. Thank you.

Opening Remarks

Hiroto Ishida
President, Honda Foundation (HOF),
Former Administrative Vice-Minister (Science and Technology Agency),
Former Japanese Ambassador to the Czech Republic

Your Excellencies, ladies and gentlemen, it is my great honor to welcome you to the international symposium jointly-organized by Honda Foundation and KADIN Indonesia under the theme of "Innovation by industrial-academic collaboration." Before going further, I want to thank all the distinguished speakers and participants here for sharing this opportunity, especially Mr. Suryo B. Sulisto, Dr. Zuhal, Dr. Fauzi Bowo and Dr. Wardiman Djojonegoro.

Honda Foundation, or shortened HOF, was established by the father of Honda Motor, Mr. Soichiro Honda who is one of the most famous entrepreneurs from Japan. Since its inception, HOF has permeated with ecotechnology as a guidepost to pursue a more humane civilization and hosted quite a few symposiums in different countries as forums to freely exchange and inspire ideas among intellectuals and experts from all over the world. HOF's attempts have provoked public interest everywhere as the importance of ecotechnology increases in the world that much cares about environmental friendliness.

In the 21st century, innovation through the promotion of science and technology is one of the key challenges for policy makers. It is even said any country can remain viable only if it can successfully exploit scientific and technological inventions and findings for innovations that lead to the people's better quality of life.

There used to be disputes among people who think the advancement of science and technology would deprive many people of their jobs, but rather it relieved them of drudgery. In fact, new technologies create new jobs rather than they are merely compatible. To sustain employment stability, the most reliable measure is to create more jobs to provide the products and services people need and are willing to buy, and we need to strive for this goal through innovations. I believe that one of the key generators of innovation in any country is collaboration between industry and academia.

Our ultimate goal is clear: it is to assure people of humane life, both physically and mentally. Policy makers for this end should

consider providing as good education and training as possible to support and encourage the people to become entrepreneurs, and in turn, expedite economic growth by innovations.

Likewise, to build a rich society in both material and spiritual terms, the government must ensure a stable livelihood in which they can enjoy a steady income and lead a healthy, secure life under untroubled living conditions free from grievous disasters. This is exactly what the ecotechnology concept of HOF aims to achieve. In the decades, Indonesia and Japan have strengthened their cooperation in various areas related to human security and welfare.

I truly hope this Jakarta symposium will be the first big step toward enhancements in the national innovation system of Indonesia and Japan. Thank you.

Keynote Speeches

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration

Innovation For Sustainable Economic Development

Zuhal Abdul Kadir
Chairman, the National Innovation Committee (Komite Inovasi Nasional, KIN)

Indonesia is the planet's largest archipelago, consists of more than 13,000 islands that are beautifully strung like beads across the equator forming the world's only Maritime Continent. This maritime continent is blessed with abundant natural resources – primary oil, timber and minerals, world's most biological diversity of combined terrestrial and marine organisms. This richness is our treasure. It is our comparative advantage that is available to support us thriving to prosperous Indonesia. But, we must manage this precious treasure sustainably, or else it would disappear and we risk endangering our future generations.

To date, Indonesian economy is still heavily depending on exploiting its natural resources (comparative advantage) and much less on its competitive advantage. For example, we have high exports of raw materials, but with equally, if not higher, imports of products made from those exported materials. To achieve a sustainable economic development, we must develop our competitive advantage such as our ability to transform raw materials into high value-added finished products. Innovation is essential for the challenge to establish and maintain Indonesia's competitive advantage.

The late 2000s' financial crisis has caused the emerging and developing economies to replace advanced economies to lead global economic growth. Inevitably, there is a shift of epicenter from the US and Europe to Asia. Many Asian countries such as South Korea, Japan, Singapore, Taiwan, China and India have been preparing themselves well in advance to enter an era of innovation driven economy and to take charge at global stage.

Indonesia, the only ASEAN country selected as a member of the G20, the Global Economic Steering Committee, has a great potential to become the Big7 by the year of 2025. This is one of the reasons that our president has boldly initiated the course of strategic actions to prepare Indonesia to shift from a natural resource-based economy to innovation based economy by 2025.

The World Economic Forum (WEF) determines the competitive index of a country based on 12 pillars: Infrastructures, Macro economic environment, Health and primary education, Higher education and training, Goods market efficiency, Labour market efficiency, Financial market development, Technological readiness, Market size, Business sophistication and Innovation.

Let's take a look at the diagram and see where we are (See No. 2).

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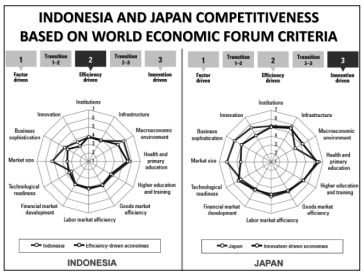


2

Indonesia has been at the level of "factor-driven economy" – a medium category for competitiveness – for a while. We are at this category mainly because we have a relatively low income per capita as our economy lean heavily on export of raw materials which have low added-value (World Economic Forum, 2010). Currently, Indonesia has entered the "efficiency-driven economy" (World Economic Forum, 2011-12). Compared to Malaysia, who is also at the level of efficiency-driven economy, we are weaker in the following areas: Technological readiness (Malaysia 44, Indonesia 94); Higher education and training (Malaysia 38, Indonesia 69). However, for the Market size criterion, Indonesia has a better index of 15 (Malaysia 29). Significantly lower index value of this category is, of course, a strong attraction to other countries such as China, South Korea, Japan, etc., to flood Indonesia with their products.

Fortunately, we could still keep our courage and hope high because in the criterion of Innovation factor, we are ranked 36. This rank shows that Indonesia actually has a capable human capital to innovate. Our researchers, despite limitation in research facilities and the supporting innovative ecosystem, have shown that they are able to produce innovation and compete globally. We can elevate this rank if we seriously put the efforts to improve our ecosystem of innovation.

Actually, Indonesia have had many supporting components of innovation. However, they are not structured in a well organized ecosystem of innovation (See No. 3). Each component still belongs to its own box of its own individual sector and is not strongly interacting with other components.

Several strategic sectors that require serious attention are: Education, Good work ethic and ethical systems, Socio-cultural aspects, Synchronization of public policies and Research funding.

Compared with other Asian countries, Indonesian R&D budget and S&T infrastructure are relatively low (See No. 4). Thus, efforts to increase the R&D budget is a challenge of its own which must be accompanied by the creative and innovative efforts in R&D itself.

This low R&D funding of Indonesia is reflected in the competitiveness indicator according to the World Economic Forum which shows low index of Technological readiness and Innovation. Obviously, we need to increase this rank to catch up with other Asian countries.

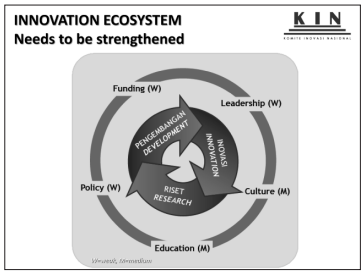
Indonesia has the lowest of both number of scientists and engineers. Both numbers are much lower than those of Malaysia.

Needless to say, science and technology innovation in Indonesia will develop only if its R&D funding is increased at least to about 1% of GDP.

The goal is to create a system where all actors of the triple helix (Academic, Business & Government) function as prime movers, in a harmonious system, supporting each other that are different but one (See No. 5).

I choose this slide depicting several gears that work together in harmony as an analogy to the essential of togetherness in reaching common dream and goal: that is to increase global competitiveness.

The challenges are to provide IPR (Intellectual Property Right), R&D management, research management system and intermediary



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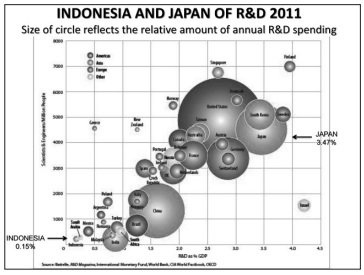

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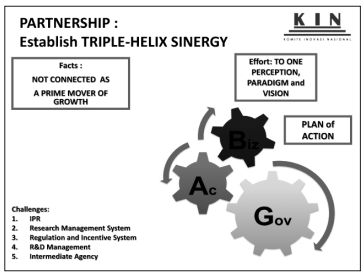


5

agency to transfer science and technology into innovation.

Government plays crucial role to provide legal umbrella to the investors, both domestic and international, so the transfer of technology will occur through clusters in each region in which projects are done. Similarly, the missing link between research institutes, academia and industry to transfer knowledge and results from research into a competitive marketable product requires an intermediary agency. Indonesia is lacking of it, or if it exists, it is not well functioning.

Therefore, the National Innovation Council (KIN) recommends an Innovation Initiative 1-747 to the President of the Republic of Indonesia (See No. 6). This initiative consists of four main interrelated segments:

1. INPUT: 1% of the GDP by 2014 to fund R&D activities. It is recommended to gradually increase the total R&D budget up to 1% of GDP by 2014. This substantial increase is obtained through the partnership with state-owned companies and private sectors, i.e.: through venture capital, angel capital, corporate social responsibility, state-owned companies and foreign direct investment. The ultimate goal is to gradually increase R&D funding from 1% to 3% by 2025.
2. PROCESS-1: Seven strategies to improve national innovation ecosystem.
3. PROCESS-2: Four strategic industries are brought into focus to be developed as vehicles to accelerate the national economic growth, i.e.: a. Basic needs industries: b. Creative industries: c. Regional based industries: and d. Strategic industries.
4. OUTPUT: Seven goals of Indonesia 2025 Vision.

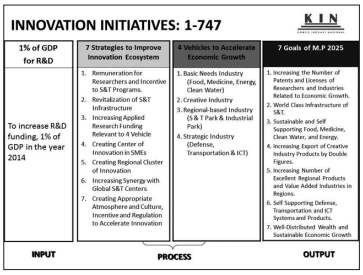
This Innovation Initiative 1-747 is designed to create a conducive environment for the implementation of Long term National Development Plan (RPJPN) and the Master Plan for the Acceleration and Expansion of Indonesian Economic Development (MP3EI).

The goal of Indonesian vision of national development – Vision 2025 – is to become a self-supporting, advanced and prosperous society of Indonesia by 2025 (See No. 7). This vision will be achieved through improvement on three strategic sectors:

1. To increase value added, to expand production processes, distribution and asset management and to provide access to potential resources at different geographical regions through the creation of synergistic activities among economic growth centers.
2. To strengthen national economic resistance by improving production and marketing efficiency and integration of domestic markets.
3. To boost national ability to compete globally and sustainably, through the promotion of innovation in all sectors.

Vision 2025 targets a GDP of US$1.206 trillion in 2014 (among the 14 countries of global economic power), and will reach GDP of US$3.750 – 4.470 trillion (among the 12 global economic power countries) in 2025.

Vision 2025 is aimed to "support Indonesia to become an advanced country by 2025 and become one of 12 global economic power countries through inclusive and sustainable high economic development."



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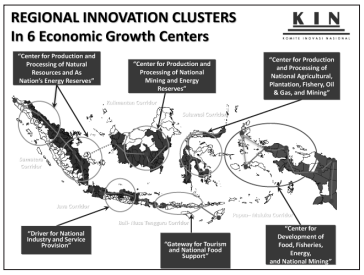
Indonesian government is targeting to get a predicate of a developed country by 2025. To reach this goal, it has launched MP3EI as a complementary to its existing RPJP. KIN is determined to ensure that innovation aspects are embedded in all the MP3EI programs to guarantee a continuous economic and social development to the local community.

I believe that the establishment of innovation clusters both at national and regional levels are crucial to succeed in reaching innovation driven Indonesia. Six corridors have been determined in MP3EI: Sumatera, Java, Bali – Nusa Tenggara, Kalimantan, Sulawesi and Maluku-Papua (See No. 8).



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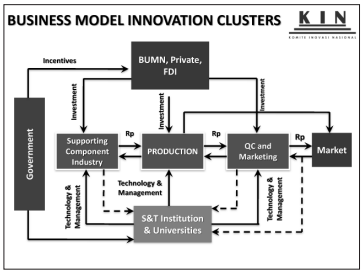
Sumatera corridor: "Center for Production and Processing of Natural Resources and National Energy Barn";
Java corridor: "The Driving Force for the National Industry and Services";
Bali-NTT: "Gateway for National Tourism and the Support to National Food Production";
Kalimantan corridor: "Center for Sustainable Mining Exploration and Production and the National Energy Barn";
Sulawesi corridor: "Center for the Processing and Production of Agricultural Products (including fisheries and plantation), Oil & Gas and Mining";
Papua-Maluku corridor: "Center for Development of Food, Fisheries, Energy and National Mining."



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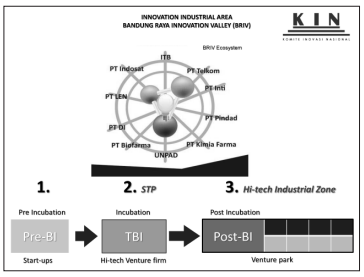
This is an example of a National Innovation Cluster, consisting of the three elements of the triple-helix: Government, Business and R&D Institute/University (See No. 9).

It is essential that industry, government and higher institutions (research institutions) all have the same vision: to increase national competitiveness through innovation. With this understanding, government should provide incentive either through tax incentive or innovation funds to encourage innovation activities and the use of products of national innovation.

It is noteworthy that innovation plays an important role in each section, industrial supportive components, production, quality control and marketing. Closed collaboration among industrial sector (especially the state-owned companies), research institutions/higher education and government is the key success toward innovation-based economy.

Such triple helix collaborations with government incentive, as described in the previous slide, should occur in a well designed location where all actors of innovation including their research and business facilities and government with its supporting regulation exist. In the spirit of this concept, KIN recommends the establishment of Bandung Raya Innovation Valley (BRIV), a science-industry-innovation park (See No. 10).

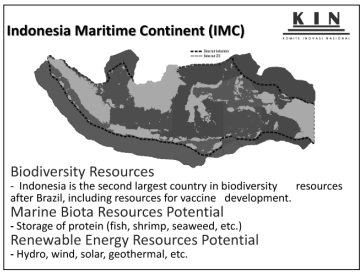
This ecosystem consists of innovation actors such as ITB (representing research institute/university sector); local government of West Java (representing government sector), Indosat, Telkom, Inti, Pindad, Kimia Farma, Bio Farma, DI and LEN (all representing



10

industry sector).

Indonesia is the emeralds of the equator. It is among the very few countries with the most culturally diverse and biologically rich environment in the planet. This beautiful archipelago spans 5,000 km² 95° east to 141° east and 2,000 km² 6° north to 11° south. Uniquely, most areas of this archipelago are covered with water (70%, or about 3.2 million km²) with only 2 million km² of terrestrial area. Even more interesting is that all of the bodies of water connecting islands within this archipelago are relatively much shallower than the oceans surrounding it. Hence it is called the Maritime Continent, the only one in the world (See No. 11).



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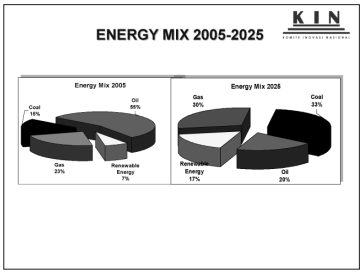
What is the implication of a Maritime Continent in the equator? It simply means that this area has abundant amount of sun light, rain falls and vast oceanic regions. By putting these three together, you end up with a paradise on earth extremely rich in biodiversity, in marine biota and in all the imaginable renewable energy sources such as: wind, hydro, solar, geothermal, bioenergy, etc.

Here is the composition of energy mix in 2005 in which oil was the most dominant energy provider (See No. 12). However, since Indonesia, as shown in the previous slide, is also rich in other sources of energy, the 2005 energy mix or composition will and must be altered. It is predicted that by 2025, through technology innovation as well as, of course, socio-cultural innovation (energy preserving/green living mind-set), this composition will be changing into an increasing use of renewable energy and descending use of oil as the energy resources.



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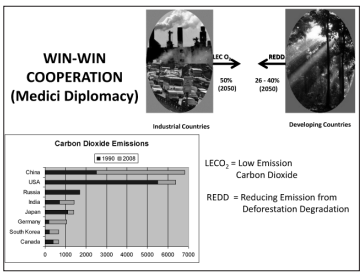
Through Kyoto Protocol, 187 states have agreed to combat global warming. I would like to propose what I called Medici Diplomacy: A meeting point between developed and developing nations to solve or at least to ease our environmental issues (See No. 13). As agreed in Copenhagen in 2010, the Industrial countries will reduce 50% of their current CO_2 emission; while developing countries are expected to decrease up to 40% of their deforestation activity. This is not an easy goal, but I am convinced that if there are political and scientific wills and each of us play our role to help each other, this target is achievable. Here is the scenario: developing nations, with their natural richness in biodiversity, provide natural laboratory to scientists of developed nations to collaborate to find alternative green energy through technology innovations. On the other hand, developed nations provide financial incentive to stimulate developing nations to produce and utilize green technologies. I developed this idea based on the need of harmonious and peaceful interaction among the have and the have-not.



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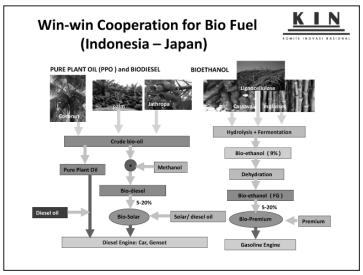
Through research collaborations between Japan and Indonesia, together we could develop biofuel (See No. 14). In this case, Japan has the advanced technology that could help Indonesian scientists to develop biofuel industry. Indonesia, on the other hand, has the comparative advantage of having both human capitals and huge terrestrial area that could be used to grow (with sustainable agriculture means) the raw materials needed for the development of bio fuel industry. Products of this research collaboration such as ethanol, BDF, methanol, dimethyl ether and diesel, enhance list of



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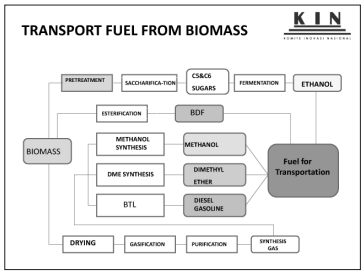
green energy resources available to be used in Japan by exporting them from Indonesia. This is a win-win cooperation.

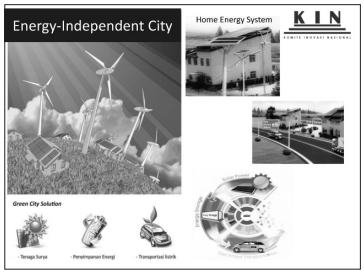
This is a schematic diagram of several products that can be used as fuel for transportation such as ethanol, BDF, methanol, dimethyl ether and diesel (See No. 15).



15

If we can achieve following measures, it may be possible that we have "Energy-Independent City" (See No. 16):

1. Government subsidy of about US$ 10 billion (Rp. 100 trillion) per year for the fuel, and other refined petroleum products (BBM) need to be reduced and/or relocated to support research and development of Indonesia's renewable energy such as: solar, geothermal, wind, etc. which is actually our comparative advantage.
2. For this reason, it needs a strong political and economic will to invest on the research, exploratory and production stages of these alternative energies. For example, solar cells, geothermal units, batteries, etc. should be made by Indonesians by using technology that is invented in Indonesia. So, we can also say, not only made in Indonesia, but also Innovate in Indonesia.



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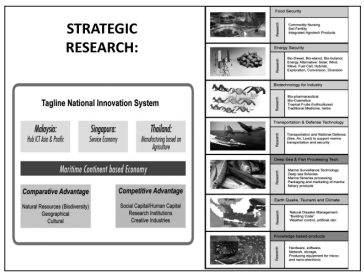
Certainly, due to its huge population size, great cultural diversity and its island geographic distribution, Indonesia's development plan must select and target priority sectors. This leads me to suggest, as mentioned by our President Dr. H. Susilo Bambang Yudhoyono, a national tag-line: Maritime Continent based economy (See No. 17). Economic sectors that should be given priority are: Food security, Energy security, Industrial biotechnology, Transportation and national defense technology, Deep sea fisheries and post harvest technology; Technology for detection of earth quake, tsunami and climate change; and Increasing the production of knowledge-based products.



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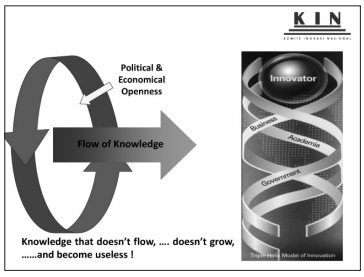
As shown in innovation model for industry sector, the Maritime Continent-based model also requires collaborations between government ministries. In this case, they are most likely the Ministry of Industry, Ministry of Maritime Affairs and Fisheries and the financial institutions (bank and non-bank) to support the R&D activities driven by universities and research institutions. R&D activities, which are the embryo of innovation, should be embedded in all stages from upstream to downstream; from nurseries, processing, packaging and marketing (See No. 18).



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To conclude my presentation, I believe that Japan would regain its economic giant much sooner through S&T collaborations with nations across the globe. This is a golden opportunity where S&T could serve as a universal diplomatic language to bridge the nations, the developed and the developing. Accordingly, the Japanese initiative to establish "the East Asia Science and Innovation Forum" is a great encouragement of promoting science and innovation cooperation in this region. In S&T, we collaborate to produce climate-smart innovations. And through S&T, we create a greener and a better planet to live.

The Power of Dreams

Hiroyuki Yoshino
Former President & CEO, Honda Motor Co., Ltd.,
Former Executive Member, the Council for Science and Technology Policy of the Cabinet Office

Your Excellencies, ladies and gentlemen, It is a great honor to be able to speak in front of this prestigious audience.

We are going to discuss how we can possibly create innovative ecotechnologies and use them to push forward the realization of an eco-friendly society. I am looking forward to this symposium for our theme today is not only global and timely, but of my own long-term concern and goal as an engineer and business professional.

Before going further, I'd like to express my gratitude to people of Indonesia, especially the senior government officials and their staff, business leaders and academic leaders who attend here today.

As a retired executive of Honda, I feel obliged to express my sincere gratitude to all of you for giving Honda the opportunity and generous support in this wonderful, energetic and rapidly growing country to do business. With the competent Indonesian partners, we started motorcycle production in 1971 and automobile production four years later. Since then, we have grown together and Honda is now constructing the fourth motorcycle plant and the second automobile plant in Indonesia. A few years from now, we will employ more than 30 thousand people including those who work for our associated parts suppliers. I am quite certain that other Japanese companies here in Indonesia also enjoy their business with you and feel the same gratitude as mine.

Today I'd like to talk a little about what is needed to create ecotechnology based on what I have learned from my 48-year experience with Honda in which I spent about 20 years in the R&D area.

For a mobility company, research and development is extremely important. At the same time, as a social entity, it is just important to be able to meet the changing social needs through our products, services and other activities. I would be more than happy if my speech could make small contributions to the goal of this symposium. Since its birth in 1948, this 64-year-old company has always been faithful to the philosophy and spirit of the founder, Soichiro Honda. Soichiro was a truly creative man as partially evidenced by the fact that 115 patents and 359 utility model rights have been filed under his name.

Soichiro was always motivated by his dreams. He challenged and challenged to realize them. One good example of his aspiration can be found in his 1954 declaration that Honda aims to win the Isle of Man Tourist Trophy or the Isle of Man TT. Just six years after the

start, this man decided to challenge the world's top motorcycle race at that time. The 48-year-old entrepreneur said, "Since I was a small boy, one of my dreams has been to compete in motor vehicle races all over the world with a vehicle of my own making and to win."

Soon after the declaration, we found the output of motorcycle engine must be tripled to compete. This delayed Honda's first entry until five years later in 1959, but Honda won the race in 1961.

When I joined Honda in 1963, the whole company was still in a frenzy of motorcycle races. Take for example the 125cc motorcycles. Just like now, the 125cc commercial models carried the single-cylinder engine. But, Honda team had used twin-cylinder engines for races. In 1962, the year after the Isle of Man TT victory, they developed a three-cylinder racing model, and another four years later, they achieved a five-cylinder model for 125cc engine!

The initial goal to triple the engine output ended up with engines that are six times powerful during a 12 year of great advancement. As Soichiro said, "You can do it if you really want it."

What is the bottom line of this story? Well, I'd like to emphasize two things. First, you should dream big. It may take longer than a decade to accomplish what really satisfies you, but lofty aspirations endure such a long struggle. Soichiro often asked himself, "How much higher or deeper or farther do you like to go?" His strong commitment to his dreams appears in the fact he named his first commercial motorcycle "Honda Dream."

Secondly, to create products with great impact, top management needs to keep providing economic and mental support to its staff for a long time. As the owner and founder, Soichiro always cared about the company. He liked to talk face-to-face with his employees. With witty remarks, he beautifully conveyed the company vision and made them feel involved in its achievement. In his little spare time, he jacked up his employees at the R&D sites and factories. He was truly a hands-on boss.

Having this kind of boss, Honda Motor's top priority has always been placed on research and development. Our R&D team became an independent firm called Honda R&D in 1960 and has been operated separately from production and sales. This allows Honda to optimize staffing and resource allocations for R&D. Currently, we use about ¥500 billion ($6.25 billion) every year for R&D activities, which stands at around 5% of our total revenue.

This stable funding allows Honda R&D to plan and make their own decisions on new technology development from a long-term viewpoint while providing near-term solutions to the market needs.

Now a total of about 15,000 staff, including experts in production engineering, is involved in these R&D activities. There were only 600 R&D people when I joined Honda in 1963.

Basically, three quarters of the Honda R&D budget is used to address immediate requirements from Honda Motor for products to be delivered in two to three years from now. The remaining 20% goes to medium-term technology development to be commercialized in five to eight years, and 5% is secured to pursue

novel technologies looking into a decade or two ahead.

As for long-term ventures, we have spent 26 years for the development of our first business jet named "HondaJet" (which will be delivered next year) and the biped, humanoid robot ASIMO. Likewise, we embarked on the project for the hydrogen fuel cell vehicles some 20 years ago. All these were not homework from the late Soichiro Honda and the unknown territories for us. It was true, as Soichiro said, "Success is 99% failure." In fact, most of our time was trial and error. We had to make modification after modification and piled up near successes. When we finally progressed to the end products, they felt like luscious fruits dropping off from stately trees.

Honda actively transfers the staff between Honda Motor and Honda R&D. Up to now, all of the Honda's seven president and CEOs have experienced the top position in Honda R&D.

Let's get back to my Honda years more. When I joined the company in 1963, Soichiro Honda went into the automobile business. This was another dream since his childhood. And in the following year, Honda participated in the Formula One car racing.

But in 1968, he suddenly withdrew from all the races to pursue yet another dream – selling his automobiles in the car kingdom, the United States. At that time, the US authority was about to enforce drastically stringent exhaust emission regulations to address worsening air pollution. It was found all automobile manufacturers would be permitted to sell products in the US market only if 90% of harmful substances from their exhaust gases could be eliminated within six years.

Soichiro decided to shift his management resources from racing to development of qualifying clean emission technologies. He gave the staff a pep talk, "Fourteen years ago, only we had to triple the output of motorcycle engine to participate in the race. At this time, everybody stands at the same starting line. This is a race to slash noxious substances to one-tenth." He reorganized the company and set up the ad-hoc laboratory where I was moved. I went to the US in 1969 and stayed there to gather relevant information.

Just then, a global think tank, the Club of Rome, published a book called *the Limits to Growth*.

In it Massachusetts Institute of Technology, or MIT, predicted the future of humanity based on their simulations with different sets of parameters, such as natural resources, food supply, population, industrial output and environment pollution. Their conclusion was sensational because it said the global population would start to decrease during the mid-21st century. In Honda, this book was read ardently across the board, and it stirred up much discussion on our company's future direction. Our conclusion was that gas purification technology was not just a business goal as our boss aimed at, but an important foundation of human survival for the future generations. And, this consensus developed into our environmental vision today: Blue Skies for Our Children.

Four years later, Honda luckily succeeded in the development of a new engine system named Compound Vortex Controlled Combustion, or CVCC, a stratified charge mechanism that uses a rich

fuel mixture to ignite a much leaner one. This was the only engine that meets the regulatory requirements. The US authority had to postpone and loosen the required emission levels because no other manufacturers were able to catch up with the schedule. Then in 1973, the oil shock hit the market, and automobile fashion turned to small cars as gas prices surged. Honda quickly picked up on the trend and released the high-mileage CVCC compact models both in Japan and the US. They sold very well.

The success of the CVCC not only realized Soichiro's dream to enter into the US market, but helped a great deal establish Honda's foothold with a favorable brand image.

In 1973, Soichiro admitted that younger staff's Blue Skies mentality was right and his days were over. He resigned his quartercentury presidency and established this Honda Foundation four years later.

From its experiences, in the development of clean emission technology, Honda has learned many lessons which can be generalized as follows: First; Your engineers work with invariably high morale when your company strives to satisfy great and unmet needs of the society. Second; Your company receives high marks when people recognize what you bring to the market has been socially needed. Third; Your company, the government and the academia can directly or indirectly communicate and work together within various and cooperative frameworks. The MIT's communication via the Club of Rome report is a good example, and this very symposium is another one.

Before closing my speech, I have one more episode to share with you. This is not about R&D, but about the succession of the founder's dreams.

It was our second president who decided to start production in the US although our preliminary study concluded that it would be difficult to attain the same product quality if we produce vehicles in the US. Nevertheless, he ordered to construct manufacturing plants: a motorcycle plant in 1979 and an automobile plant in 1982. This challenge was all because locally producing cars comprises an important part of Soichiro's long-held dreams. And this decision happened to be a very timely action because it complied with the Japanese government's policy of voluntary restriction on car export in response to the intensifying US-Japan trade friction at that time.

We Honda have always believed in "The Power of Dreams." Let me paraphrase: Have a big dream, set up a high goal and gather the power of people who share it with you. Then, almost everything is possible for man's ability is also infinite.

I sincerely hope this symposium will be an inspiring event for the participants. Thank you very much.

Session 1

Innovation Systems and Policies (Presentation & Discussion)

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration

Moderator: Atsushi Sunami

Associate Professor, National Graduate Institute for Policy Studies,
Special Advisor to Cabinet Office (National Strategy, Science and Technology, and Space Policy)
and HOF Director

I would like to welcome everyone to this first session on Innovation Systems and Policies. I will briefly introduce each of the panelists and ask each one of them for a brief presentation followed by a discussion. Then, I would like to open the floor for your questions and comments.

So, let me start by introducing our panelists. On the left, Prof. Akira Goto, Former Fair Trade Commissioner of the Japanese Government, Professor Emeritus of the University of Tokyo and Associate Professor at the National Graduate Institute for Policy studies. He is one of the leading economists in innovation studies.

Next is Prof. Tateo Arimoto, Director General of the Research Institute of Science and Technology for Society, Japan Science and Technology Agency, and he was the Director General of Science and Technology Bureau with the Ministry of Education, Science and Technology. He is currently a professor at National Graduate Institute for Policy Studies as well.

Next, we have Dr. Taizo Yakushiji. He is a Professor Emeritus of Keio University and Visiting professor of the National Graduate Institute for Policy Studies. He is also a former Executive Member of the Council for Science and Technology Policy of the Japanese government. He is a political scientist working at the issues in the international field and science and technology innovation studies.

Next, we have Mr. Franz Gelbke. He is a Senior Advisor to the Indonesian Ministry of Research and Technology. I think we met three years ago as visiting person for OECD research on innovation systems.

Then, we have Mr. Jusman Djamal. He is the President Commissioner of PT. Telkom. He is responsible for the Cluster of Innovation group at the National Innovation Committee.

For the discussion, we have Dr. Gerald Hane, the President and CEO of Battelle-Japan. He is former Assistant Director for International Strategy at White House in the United States, Office of Science and Technology Policy that means that he is active in various regions as well as innovation policy in both the United States and Japan.

So, we welcome everyone for this panel. First, let me start by asking Prof. Goto to give the opening presentation.

National Innovation Systems and Innovation Policy

Akira Goto
Former Fair Trade Commissioner of the Japanese Government,
Professor Emeritus, the University of Tokyo and HOF Director

It is my great pleasure and honor to discuss innovation with you this morning.

My talk is about national innovation systems and innovation policy. Of course, these two issues are closely related because national innovation policy should be based on the careful examination of national innovation systems. My talk is a little bit conceptual, and it has to be the way to set the stage for the following discussion. I hope it is not too boring.

First is innovation. We have to start from this. How does innovation emerge? There are two ways to look at this problem (See No. 2). One is to focus narrowly on the organizations that are creating new technology such as universities, government research laboratories or companies. But, these organizations do not exist in a vacuum; they are influenced by the environment that surrounds them which includes laws, regulations, rules and so on.

This leads us to the second broad view that emphasizes the importance of creating a favorable environment for innovation. In each case, the interaction of these factors, institutions and organizations is very important for innovation.

Then, this leads us to the concept of a national innovation system. Once we can successfully describe a nation's innovation system, we can start thinking about how to improve the performance of the national innovation system through innovation policy.

The concept of a national innovation system has been developed by several scholars almost at the same time. And among them, the most well-known is Prof. Richard Nelson of Columbia University. According to his definition, a national innovation system is a set of institutions whose interactions determine the innovative performance of national firms (See No. 3). The key point here is the interaction of actors in certain institutional backgrounds.

Who are the main actors here? There are three of them (See No. 4). The first actor is universities. They perform two highly important functions in the national innovation system: research and education or human resource development. At universities, these two functions are performed at the same time and the same place. This is important for research as well as for education.

The second actor is industries or companies. They conduct research that is often described as profit-driven research in contrast to the curiosity-driven research at universities. This profit-driven

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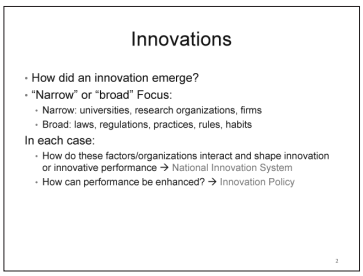

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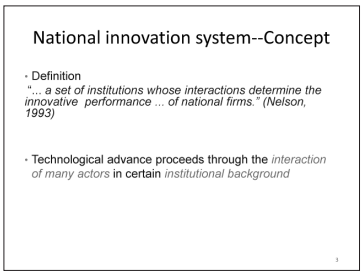

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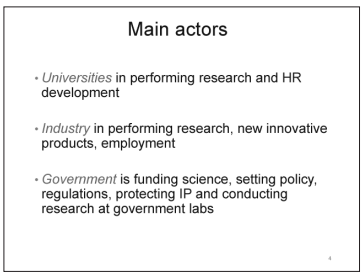

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research creates new innovative products and processes, and in turn, creates jobs and employment.

The third actor is the government. The government provides funding for education and research and sets rules under which all these actors have to play. It also conducts research on its own through government-owned research laboratories.

The environment or institutional background includes many things such as financial institutions, fiscal or trade policies, regulatory frameworks and so on (See No. 5). I won't go into details today. The actors interact in the environment created by these institutions, and a national innovation system evolves over time.

The concept of a national innovation system is regularly employed to analyze national efforts for R&D and innovation. Then, comparisons with other countries are useful to assess your own country's system (See No. 6).

This figure shows how national innovations systems are related to the economic development of nations (See No. 7). It is taken from a study by two European economists named Mr. Fagerberg and Mr. Srholec. This is one of the well-known studies to try to quantify the concept of a national innovation system.

The vertical axis is GDP per capita, which represents the stage of economic development. The horizontal axis is what is called the factor score on innovation systems.

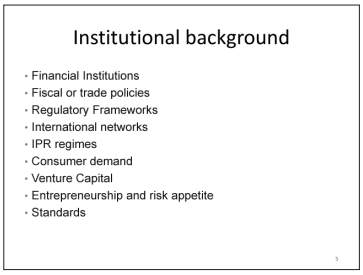
As you can see, the better innovation system a nation has, the higher its level of economic development is. The correlation coefficient is 0.86 which is very high. Indonesia is somewhere around the center.

The factor score on innovation systems, which is the horizontal axis, needs some explanation. The authors used the statistical technique called Factor Analysis, and the horizontal axis represents the factor score related to the innovation system such as the number of US patents a nation has, the number of science and engineering articles, the number of ISO9000 certificates, secondary and tertiary school enrollments and other factors that characterize national innovation systems. These component factors are sort of ground into one single factor score.

Now, let me move onto innovation policy. Once we can evaluate the national innovation system, particularly with solid evidence, we can start thinking about innovation policy to improve the performance of the national innovation system (See No. 8).

Innovation policy can be classified into three groups (See No. 9). The first type of innovation policy is related to the creation of new technology which is called the Supply-side innovation policy. These policies can promote the creation of new technology by providing, for instance, R&D tax credits, subsidies, government-backed venture capital, low-interest loans from the government, banks and so on. Also, the government can promote education and training for scientists and engineers. After all, these are the people who create new technology.

The second type of innovation policy is called Demand-side innovation policy. This aims to promote innovation by creating a



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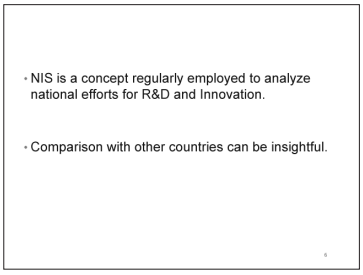

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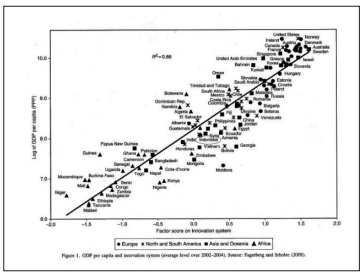

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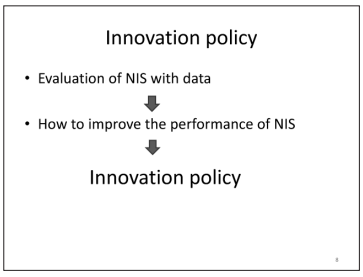

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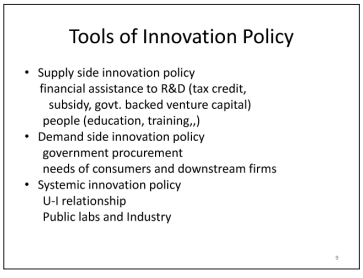

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demand for innovative products and processes. For instance, the government can promote environmental technology by announcing that electricity companies are going to purchase electricity from renewable sources at a premium. This practice has been employed by the German government, and it has helped to promote domestic solar companies in Germany. The Japanese government is trying to do the same in the near future, yet we should be careful that there is WTO regulations on the government procurement.

Also, as demand-side innovation policy, the government can educate consumers so that they can start to buy innovative products. In that way, the government can provide a market for innovative products, which in turn provides an incentive for companies to introduce innovative products.

The third type of innovation policy is Systemic innovation policy which is extremely important. I have emphasized the importance of interaction among actors in the national innovation system to promote innovation, closer relationships between universities and industry. Also, government laboratories and industry are very important. If there are structural barriers that impeded closer cooperation between these actors, removing them would be the first step. Then, the various tools to promote closer relationships can be employed.

In the end, innovation is bringing about new products and processes (See No. 11). Mr. Schumpeter talked about new combinations to do things differently. It needs not to be new to the world, but it needs to be new to the company or new to the country. It needs not to be a high-tech product invented at a fancy laboratory with a lot of PhDs. It just needs to be better than the current product. And, this type of innovation plays a major role in economic development in many countries. In order to acquire new knowledge to create new products and adapt it to local conditions, if necessary, and produce better products, a nation's innovation system has to have the capability to do so. Innovation policy can help to improve national innovation systems and promote a nation's capability to innovate.

That's all I have to say. Thank you for your attention.

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Innovation System and Policy – Administrative Viewpoints –

Tateo Arimoto
Director General, Research Institute of Science and Technology for Society (RISTEX), Japan Science and Technology Agency (JST) and HOF Director

My name is Arimoto. Because I have been involved for many years in Japan's science policy making as a government official, this time I will talk about the innovation system and policies from administrative view points.

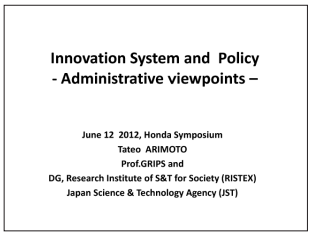
This morning, the first item is the historical change of the world system over the past 20 years (See No. 2). Next is the new perspectives in such a changing world, the STI (Science, Technology and Innovation). Next, I will explain some aspects of Indonesia's innovation advantage from my own point of view. Finally, we need reshaped STI ecosystems.

First, I should point out that 20 years ago, the world systems changed (See No. 3). Politically, it was the end of the Cold War and technologically, three years after 1989, internet services opened to the general public. Politically and technologically, they opened globalization. Within these two decades, we have faced difficulties such as natural and artificial disasters and climate change. But, we have also faced BRICS surging and economic activity expanding. In parallel, we have faced economic crisis such as the Lehmann shock as well as the current Euro crisis.

This is a very interesting picture described by *the Economist* almost six years ago (See No. 4). The upper line is the share of the total GDP of the G7 developed countries, and the lower line is the total GDP of emerging countries. The two crossing points are around the late 19th century and now, which is around 130 years later. Emerging economies are rapidly growing, so the world economic and social systems are rapidly changing.

So, we are facing changes in the rules of the game (See No. 5). The strategy and management of private companies are changing as well as the public policies of science and technology and university management, of course.

Another point is that we need technological innovation and social innovation for new challenges in innovation values. Social innovation includes institutional reform and participation by private companies and public participation. Therefore, every country has set up on green innovation and so have Asian societies. Under such a situation, we need redesigned government and management of STI systems, locally, nationally, regionally and globally.



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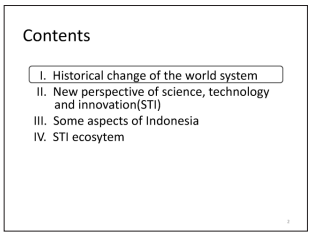

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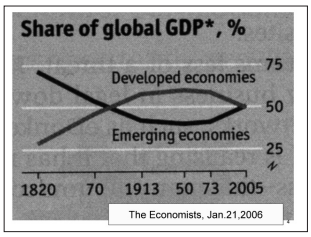

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In the last 20 years, you will remember that the Asian economic systems have been rapidly changing (See No. 6). Almost for 20 years until the 1980s, we had so-called flying geese pattern. Japan was the leader at that time, and China, India and the other big countries were running slowly. But after the end of the Cold War and the opening of internet services to the general public, the last two decades have seen economic integration and simultaneous globalization across Asia. So, over these years, the economic and also the scientific innovation systems have changed rapidly.

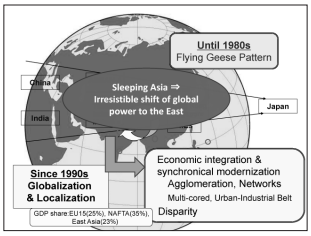
Next is the new perspective of STI systems (See No. 7 and 8). I'm going to show you two charts. One is chart of R&D expenditures the US Science Foundation estimated (See No. 9). In the upper-right chart, left bar is 1996 and right bar is 2009. So, the North American and European percentage is decreasing rapidly, and the Asia Pacific area R&D expenditure is now rapidly increasing.

The other one is the numbers of doctoral degrees (See No. 10). This is a similar chart to the previous one on expenditure. China has a high number of doctoral degrees and researchers. In China, South Korea and Taiwan, they increased particularly after the Lehman shock.

Coming back to the new perspectives, one important point is the gravity of scientific activities moving to developing countries, particularly in Asia. So, how can we reshape the scientific government management and policy making? Also, how can we keep scientific integrity, ethics and norms in the scientific activities?

What does science and technology innovation mean in this changing world of the 21st century (See No. 11)? Of course, there are the traditional values of STI for profit, competiveness and growth. But now, the STI values are expanding and diversifying into employment, well-being, safety and social cohesion and finally sustainability and resilience. Particularity after March 11th, last year's big tsunami and earthquake, Japan is now focusing on resilience and sustainability (See No. 12).

Now I will show you some advantages of Indonesia from my personal view. One important point is the population (See No. 13). This is the



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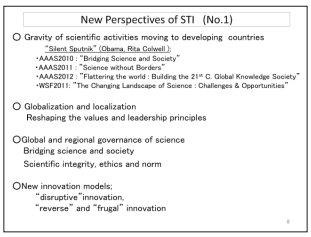

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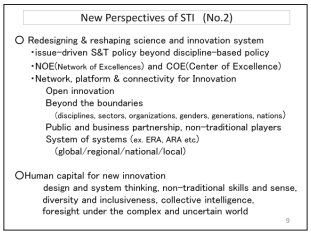

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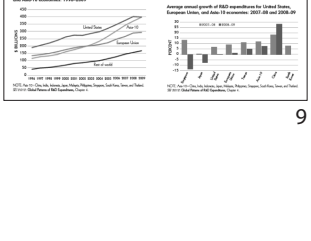

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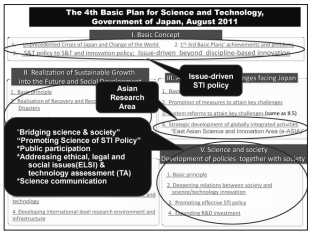

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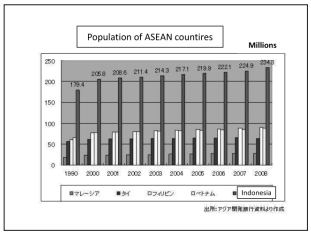

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population of the ASEAN countries. The red line is Indonesia with a population of 234 million in 2008. In other countries, Malaysia, Thailand, Philippines and Vietnam, the population is a little bit lower. So, the important point is the potential future market as well as the potential for future distinguished scientists and engineers.

Another important point is the GDP per capita (See No. 14). Indonesia's is rapidly increasing. So, probably in two or three years, it will be US$ 3,000 per capita. This is the turning point of the GDP per capita as purchasing power because the percentage of people with TVs is only 56%, refrigerator is 19%, washers is 4%, and air conditioners is 3% (See No. 15). Also, sales of motorcars are rapidly increasing.

The numbers show us that there is a big potential market for the future for new innovative instruments and services.

Finally, coming back to the STI ecosystem. One important point is how to reorganize the science and innovation systems to adjust to the changing world.

The first tier is the policy making and science advice systems (See No. 16). The second is the ministries, programs and funding agencies. The third tier is implementing organizations. The fourth is the individual scientists and engineers.

So for instance, your president established two years ago the National Innovation Committee. This is an important message for the new challenging innovation policies. Now, new Japanese government is considering reform of our supreme advisory board systems.

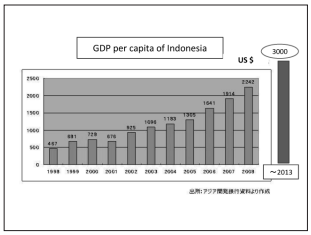
The second tier is the reform of the funding agencies. Vertically and horizontally, we need to connect beyond the boundaries, which means disciplines, organizations and finally national borders.

This chart shows Japan's research funding systems (See No. 17). It's just a schematic. The left-hand side is JSPS, one of the public research funding organizations that are supporting curiosity-driven research and fundamental science. The second stage is at my mother agency, JST, Japan Science and Technology Agency, supporting mission-oriented basic research. Finally, NEDO, "exit"-oriented research and development, prototype demonstration and social experiments. Later this afternoon, NEDO's Mr. Ishida will show you NEDO's stages, areas and activities.

So, how can we bridge among science and technology, society and the market? This is the main subject. Every country has public policy on new science and innovation, redesigning funding systems for issue-driven innovations.

Finally, I stress that we need more collaboration particularly in Asia. You will remember that the European areas have a lot of collaboration with university networks, funding agency networks, studentships and fellowships across 27 European countries. Well, it's high time to set up an Asian research area including China, South Korea and Indonesia (See No. 18). We have a lot of national innovation systems, but we need a more organized system of systems under globalization that is coherent and compatible.

That's my presentation. Thank you very much.



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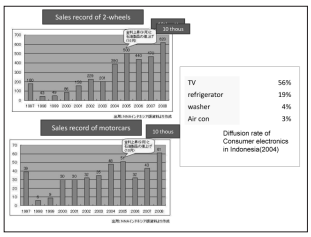

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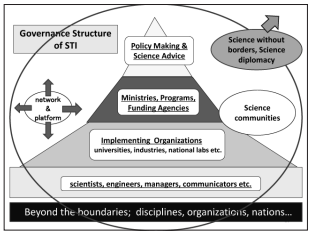

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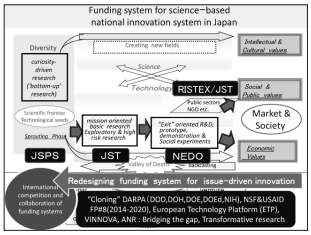

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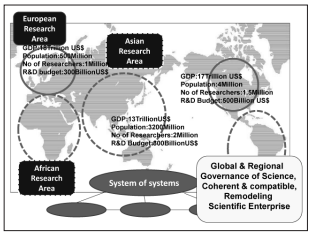

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Thank you very much for your attention!!

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Radical Innovation Policies

Taizo Yakushiji

Former Executive Member, the Council for Science and Technology Policy of the Cabinet Office,
Research Counselor and a Board Member, the Institute for International Policy Studies (IIPS) and HOF Director

I was at the government with my colleagues, Mr. Hiroyuki Yoshino, at that time the President of Honda Motor, and Dr. Kazuko Matsumoto. I was not interested in talking about what innovation is all about. Instead, I will talk about how we can make government policy to boost innovation. You can see why we need radical innovation policy, not innovation policy, but radical innovation policy (See No. 1).

I have a very lengthy set of slides, so I'm going to point out only three (See No. 2).

Innovation has many failures and successes, ups and downs. That makes a cycle and waves. That is the first message I would like to ask you to memorize. There is a lot of failure, so the cycle is important. You can see here the famous Kondratieff long cycle, the up and down of great powers like Dr. Paul Kennedy noted (See No. 3). So, innovation brings you this kind of cycle of failure and success. Japan is failing because of a lack of innovation, but maybe we can come back, so it's the up and down. At the moment, we are coming down, but we will come up, so there are cycles. And, there is the famous flying geese theorem.

This is a very famous picture of Dr. Ray Vernon's product life cycles same as Dr. Akamatsu Kaname of Hitotsubashi University just after World War II (See No. 4).

Innovation is not related to science and technology. In order to boost science and technology innovation, you need other policies like manpower policies and social policies. Without thinking about manpower policies and social policies, you are not going to make innovations in science and technology (See No. 5). That's the point. This is the second minor point.

And also, next is a very important point. The social norms, the social systems of a country are unique so that countries make unique innovations (See No. 6). Unique innovation is universal innovation. Indonesia should have its own innovations because you have to touch upon the social norms. Manpower policy is related to social norms.

The American system is very unique. Don't copy the American innovation system because America came from religious persecution from UK, the Anglican church. They started with the science. It's a kind of new frontier. The federal government doesn't commit itself, but it helps. So, industry or state has to make their own innovation, but the federal government helps. That's the American pluralism. It's a social norm. That's why America can make Apples. We cannot make

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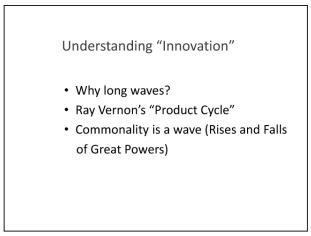

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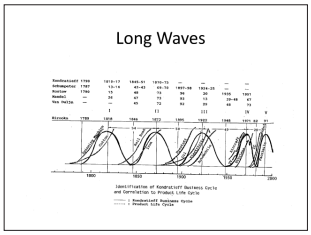

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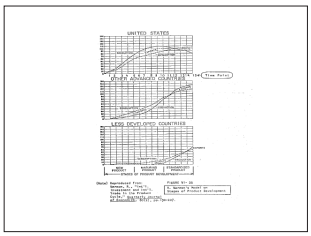

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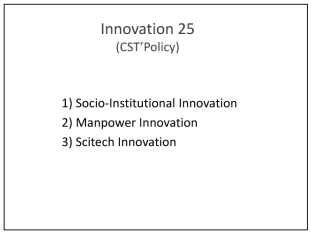

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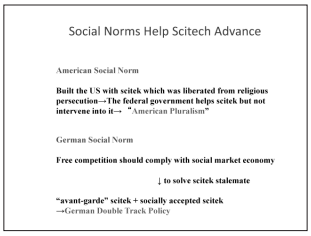
Apples or iPads or things like that. America can make iPads. We can copy, South Korea can copy, but America can always make new innovation that is the American social norm or the country's philosophy.

Germany has strong science and technology. But, the German people hate technology. Do you know the German word "technic-feindseligkeit"? In English, it means "hostility (See No. 7)." Germany doesn't like science and technology in your private life. They hate science and technology. There are a lot of articles on German hostility against science and technology. But, Germany's technology is very innovative. Why? It is because they have a double track policy. If you have reached a state of stalemate standardized by the German industrial norm, you can eventually get a stalemate with your own technology. So, Germany has a double track policy. All this useless avant-garde technology switch to the new standardized technology if the previous innovative technology has become stalemated. So, it's a switch in policy, the German policy.

This is the reason Germany doesn't like to get innovation in your life. Recently, Germany has changed a lot because I thought German people never used cell-phones, but there are a lot of German people using cell-phones. But when Japanese people put a fax machine at home, a lot of German people hated the Japanese. "Why do you have a fax at home? It will disturb your life." However, Germany is now changing.

It is my last message. My argument is that emulation is the key to getting innovation. And innovation is very, very hard. It's a cozy word, but its meaning is not just like that. There are a lot of meanings in that. But, emulation is competitive copying. To copy is very important, but when you copy technology, you can apply it to your own social setting (See No. 8-10). Then, you can innovate. So, emulation is the key to my concept of innovation.

These are my last words. Thank you very much.



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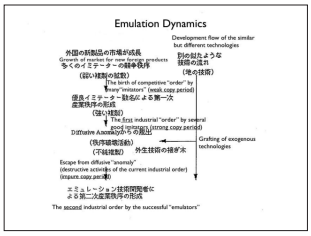

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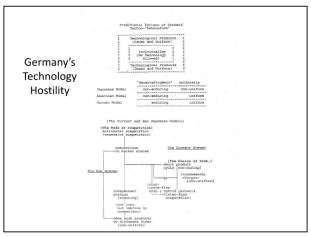

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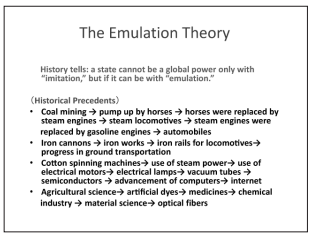

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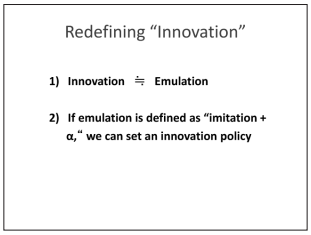

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Innovation Systems and Policies – Flashlights from Indonesia

Franz Gelbke
Senior Advisor to the Indonesian Ministry of Research and Technology (RISTEK)

My name is Franz Gelbke from Germany. For my profile, I studied computer technology in Berlin and worked for 16 years in companies, small ones and big ones. Then, I was a managing director for 14 years at a technology transfer agency in Germany. And now, I have already been in Indonesia for six years working here with the Ministry of Research and Technology in cooperation with the German BMBF which is also the Federal Ministry of Education and Research.

Ten minutes is very short, so I'm under pressure. But, I would like to make some remarks because understanding innovation is very important (See No. 2). I would like to give some important elements, 30 determinants. The second part is the development phases within SMEs (Small and Medium-sized Enterprises) by using the example of the situation in Indonesia. Then, the last part is an example of how we would like to boost the innovation systems in the region and in Indonesia.

For the understanding of innovation, of course it's a big wave. In the last 10 years, everyone has been saying innovation is very important. It is very important actually, but you must understand what innovation is. There are still a lot of meanings or different understandings, but the most important is that the responsible people understand what innovation really is, the kind of modules needed for that and even what an innovation system is.

Unfortunately, many political people are using the words, but they are not really understanding what is behind them and what is necessary for that.

Innovation for me is the successful process of putting a product on the market (See No. 3). It's not only to have some functional research. It's not only the production. Only when you put all together and put products on the market, then you come to an innovation.

Many modules are very important. I've put the companies in the middle, so when we talk about the development of the economy, the main goals are the company itself (See No. 4). So, the additional value, what you have in the country, will be coming from companies. They are making the products, they are making the additional value.

What does a company need to be innovative? How can you get a successful product on the market? Of course, you need education. When you haven't educated people, you are really in big trouble. When education is not so right, when we talk about new technologies, then we really have to learn to learn. For a hundred

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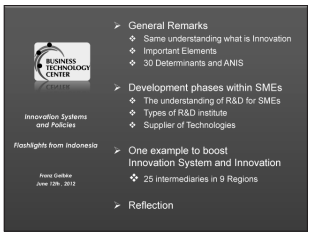

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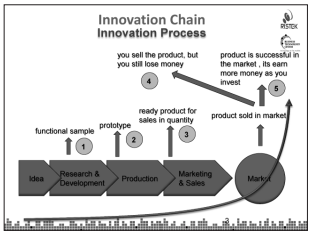

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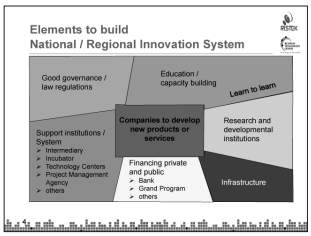

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years, in one life maybe, you didn't have many new things to learn. You just mentioned about mobile phones. I'm actually using a mobile phone even though I'm German, so the pressure on humans always to be adaptable is very high even that has to be mirrored by the education system. So, we have to learn to learn because it never ends.

Then, of course, we need good research centers and development institutions. We also need infrastructure. We can't deliver the products if you can't ship it. Then, after all, you can't be successful on the market. Also, you need financing systems. Especially when you talk about innovation in universities, incubators and so on, there has to be some innovation. It doesn't matter if it comes from the public sector or the private sector.

Then, we need support institutions like intermediaries, incubators, technology centers, project management agencies and so on. So, this is a big flower of necessary institutions that are needed, and everybody can do the real work to help the company and the private sector to be successful.

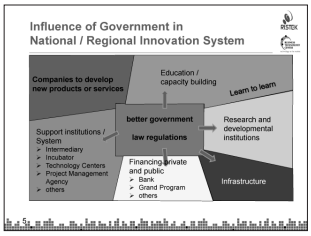
Additionally, you need good governments. That was also mentioned by Dr. Zuhal that in Indonesia, there are maybe some weaknesses in the government. I have put the government in the middle (See No. 5).

So, the challenge that we have in Indonesia is that we really have to improve our government. On one hand, however, we have to be patient because the democratization process started around 15 years ago in Indonesia. We have the decentralization, so there is a huge learning process. It is ongoing here, but of course, it has to be faster. Globalization is always changing faster, so the pressure on the government to adapt to the new situation has to go faster. That is really important.

The 30 determinants (See No. 6). From the left, we have the political level with different focuses, the institutional level with incubators and technology centers, the programmatic level with funding systems and the innovation capacity level which includes all the implementers. Actually, that is nearly the same all over the world; there are not big differences.

What we, RISTEK, did was we created a questionnaire with ANIS (Analysis of National Innovation Systems) method, and we already have six regions where we are trying to analyze these 30 determinants. One difficulty we found was that political people say they would like to make incubators. That's nice, but when we talk about the system, there has to be an environment. The incubator has to be embedded in something. When there is not a great program behind that, when there is not a business competition program, when there is no entrepreneur training, how can you get good tenants? We obviously have to take care that when we talk about the different modules in innovation, they are embedded in the whole system. Otherwise, they will not really be successful.

Companies. In the situation in Indonesia, we have over 4 million small and medium-sized companies. I am very focused on them. We have a lot of family businesses, and they are far away from the demand for universities (See No. 7). So, we need



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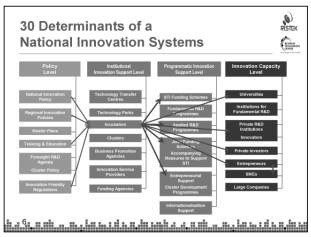

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clusters, marketing training and so on, but the technology needs on their part are quite low.

The second step is mechanical production (See No. 8). This is a company in Makassar. Actually, they have copiers already, but the understanding of some mechanizations, the understanding of tolerances and so on is quite low. They still need basic knowledge about quality, about standardization, and everybody needs marketing and promotion.

The third companies are electronic and mechanical development. This is a small company with around 30 employees, and they deliver to the Ministry of Education in Indonesia. They have some modules for physical lessons and so on, and they are quite skilled. Then, they already cooperate with some research institutions and universities to develop new components.

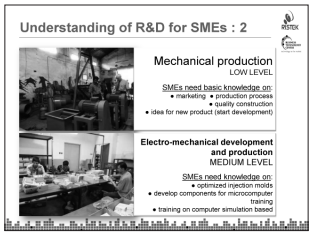
The last example is a company which is located close to Jakarta (See No. 9). They developed a pharmacy packaging machine and a bakery machine, so they are developed. They have around 100 employees. They are already using CAD systems and need cooperation with universities for simulation and for finite element. There are many things where they can really learn and work together with universities.

What I would like to show is the different levels of companies, and they need different partners for the transfer of technology. One which we have all over the world is the vocational school (See No. 10). For the family business or even for the second step, the mechanical part, vocational schools are very important.

The second level is the polytechnics or universities of applied science (See No. 11). They are very application oriented. And, these are the most partners for medium-sized companies when they already have developed.

The last one is universities or other big research centers (See No. 12). Remember, the first picture was a family business. Of course, they have many difficulties to cooperate together with universities themselves.

When you talk about SMEs, we first have to convince them (See No. 13). There are many companies that are not really convinced to do research, but we need somebody who has their own research, then we have to enable them. So, that is the beginning process that you need to push the button.



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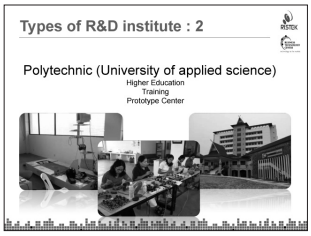

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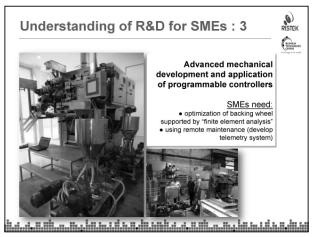

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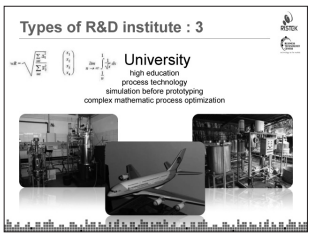

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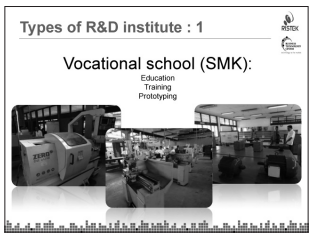

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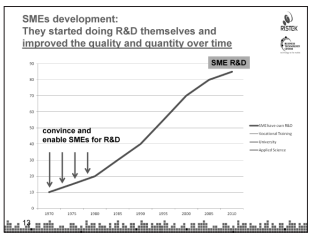

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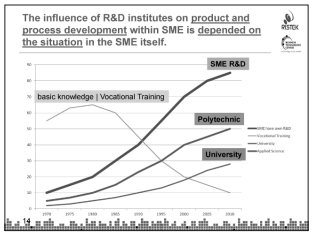
This growth is not a real analysis, so I'd like to show a trend (See No. 14 and 15). You can see it takes around 40 years to have obvious result, which means development of the economy and small companies really needs time. It's not possible to do it in five years. Political people are thinking only about the next election, but it really has to be a strategy over many years to develop the companies themselves.

Who can be the partners for the technology transfer? That is, at the beginning, the vocational schools because you need the basic skills, the basic understanding of industrialization, of quality thinking and so on. Then, coming up the polytechnics for applied science, and later on, even the universities.

That's one, but very often there is something missing, other industries. Maybe more than 90% of technology transfers are between companies themselves.

Let's take Honda which has many service stations. That means because you would like that the customers use your products, you train customers. And, you even have electronic components in your products. When you take a look at the description of microcomputers, that's very deeply explained. Even Motorola and others make workshops together to train others to use the components. So, it means that 90% of technology transfer is happening between companies themselves. Research centers are a little bit more for basic and applied research, but they are also focused on bigger companies. However, all of this has to be a mix. When you talk about technology transfer, don't miss that there even has to be a connection and a gathering between companies themselves.

Finally, last year, we trained 25 people for three months: two months in Germany and another month here in Indonesia on what an innovation system is (See No. 16). They also got to work in an incubator, and it was a younger generation that was highly motivated. What RISTEK did was that they are now working in nine regions also focused on the MP3EI with Balitbangda or with Bappeda together to help the regions to understand what SIDA (Regional Innovation Systems) is, what a rich innovation system means and even what technology transfer means (See No. 17). RISTEK pay at this moment one year's salary, but it is not enough



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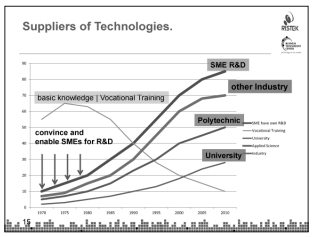

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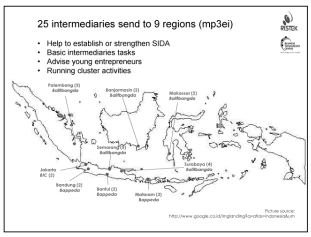

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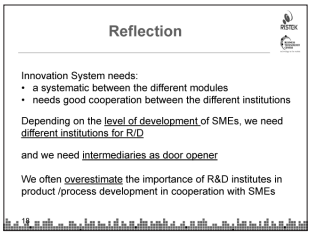
and I hope that we will pay another year. Another hope is that they will go to different regions and can implement in the new regions. We can't do everything centralized from Jakarta, so we have to decentralize it in the regions where the companies are located.

A short reflection (See No. 18). Innovation systems need a system between the different modules and they need good cooperation between the different institutions. That is a challenge not only in Indonesia, but even Japanese have some experience that some ministries don't like to work together so close. I have same experience, of course, in Germany.

Then, depending on the level of development of SMEs, we need different institutions for R&D and need intermediaries as door openers. We often overestimate the importance of R&D institutes. Again, companies help themselves, they help each other and when you would like to sell a product, you also need some transfer of knowledge.

Okay, thank you very much.



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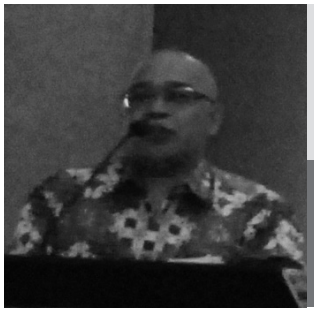


National Innovation Systems Towards Low Carbon Society

Jusman Syafii Djamal
President Commissioner, PT. Telkom,
Head of Group of Cluster of Innovation, National Innovation Committee

Thank you very much for inviting me to this prestigious symposium.

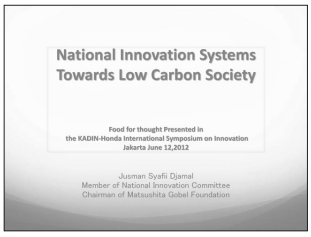
Prof. Zuhal has already mentioned about the innovation committee and also the objective, why President Dr. H. Susilo Bambang Yudhoyono created that committee. So today, I would like to share my view on what I call the national innovation system towards a low-carbon society because if we frame the national innovation system into one objective, then maybe all the effort will go somewhere. Therefore, in this case, I would like to share if we can develop a national innovation system to transform our society into a low-carbon society.

This is the framing of the issue (See No. 2). In today's Asia, the population size is more than 4 billion people. But, more than half of the region is vulnerable to climate change, so substantial institutional transformation towards low-emission development is required. A strong will, forward-looking vision, commitment to fairness and justice are needed. This is the frame of why we need a national innovation system with the goal to achieve and transform into a low-carbon society.

Every one of us already knows that Asia has become the new source of growth in the economy, and it is also our dilemma (See No. 3). Under the leadership of President Dr. H. Susilo Bambang Yudhoyono, Indonesia has already thoroughly had the commitment to do that we are committed to reduce emissions 26% (See No. 4 and 5). It means that with that commitment, Indonesia has already locked the "system" that we cannot exploit all of our natural resources. We started considering environmental problems. At the time, there was the initiative of the Bali Roadmap to change the Kyoto Protocol. In July 2008, there was the establishment of the National Council on Climate Change in Indonesia, so there is a foundation in Indonesia that we can go to the national system of the innovation system for the building of a low-carbon society.

If we talk about building a low-carbon society, there are economic instruments, behavioral changing, political frameworks and also the technology and innovation to develop what we call a low-carbon society (See No. 6 and 7). What is the objective? It's that we have to develop a national system in order to make sure that our temperature in the world does not rise more than two degrees Celsius, otherwise we go into the red zone. There will be no one living on this earth (See No. 8).

With that kind of background, we need a new approach



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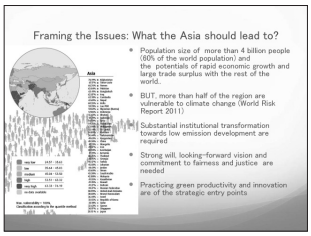

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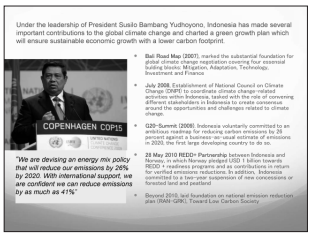

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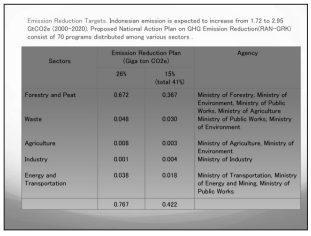

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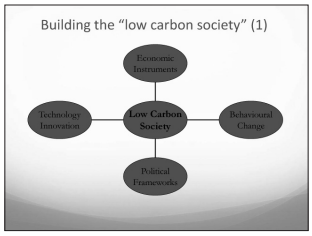
on innovation systems (See No. 9). That new approach is challenging and mitigating the climate change. The second is low-carbon innovation and green industrial evolution. I know that Japan is already leading in this kind of approach. It means that if Japan can share the knowledge and experience how to transform the society into friendly with the environment using the low-emission carbon society which has already been developed in Japan, then Indonesia can accelerate their commitment to the world.

The existing paradigm for the national innovation system (See No. 10). Every single company thinks that if we put restriction for the environment, this will become a burden to business because they think that this means increased costs and reduced profits. The market also cannot absorb the high price of the product, and then the economy cannot grow. This is the existing paradigm on national innovation systems.

But with a new paradigm, there are possibilities that if companies focus on green growth, the restrictions for the environment can be seen as a business opportunity (See No. 11). And in the market, the integration of environmental parameters into the economic process can also create a good product that has good quality, but affordable. Then, economic growth can be decoupled from environmental degradation. This is the basis of what I call our national innovation system toward a low-carbon society.

I have one example here. This is a lesson I have learned as chairman of the Matsushita Global Foundation in Indonesia (See No. 12-15). I will share the lesson learned in Panasonic global. There are eco ideas for manufacturing, for products and for everybody and everywhere. So, the Panasonic's research center in Japan created what they call green technology and green industry. Then, they came to Indonesia. Working together with the Indonesian people who have 50 years' experience of working together as one company, Panasonic created all the three pillars of the national innovation system in a low-carbon society.

Honda must have the same. This is one example. For example, when we talk



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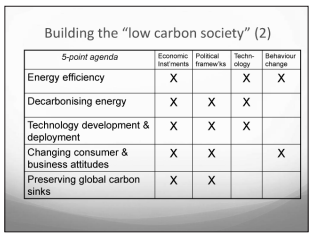

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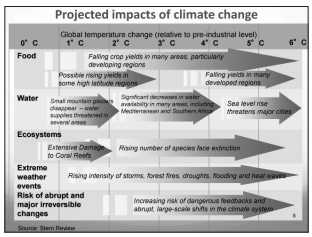

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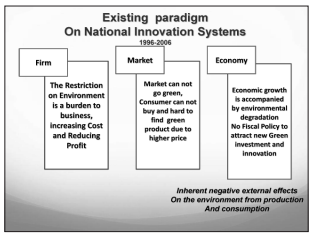

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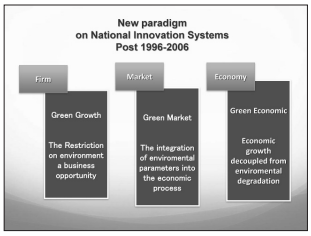

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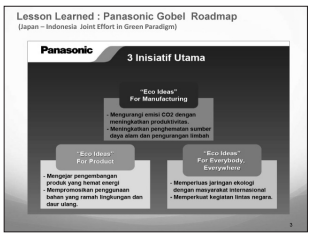

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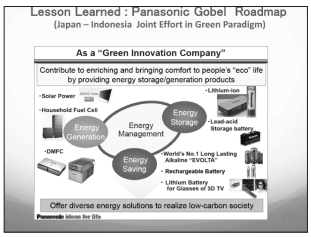

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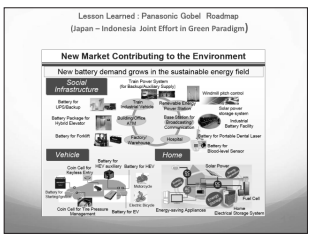

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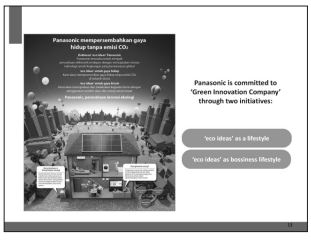

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about hybrid, the focus of Panasonic is the battery with energy management including three areas, the energy saving, energy storage and energy generation. Then, in those three areas, we can make the national innovation system into a certain goal of how to reduce emissions in society. It is also an example of how we can work together, and this is also what everybody thinks.

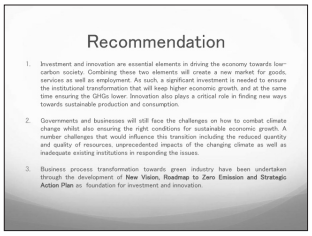
My final recommendations are that if we aim to develop national innovation system for a low-carbon society, investment and innovation are essential elements in driving the economy towards a low-carbon society (See No. 16).

Second, governments and businesses will still face the challenges on how to combat climate change whilst also ensuring the right conditions for sustainable economic growth. So, we need government policy in order to absorb the costs of investment and the costs of innovation within the private sector and universities.

Third is that business process transformation towards green industry has been undertaken through the development of new vision. We have to develop a roadmap to zero emission and start the action for that in order to develop a national innovation system for a low-carbon society.

And then, investment towards green industry is developed through a cluster of innovation by learning from the last 50 years' collaboration between Japanese companies and Indonesian companies (See No. 17). We can develop what we call an eco product cluster, an eco manufacturing cluster and an eco ideas for everybody cluster. It means that if we work toward a national innovation system that we design with a vision from our President, then Indonesian society can become a low-carbon society working together with Japan.

That's my proposal. Thank you very much.



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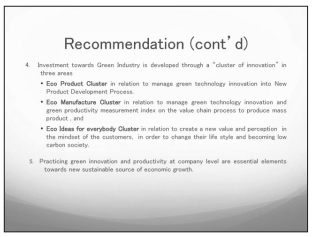

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Gerald Hane
President and CEO, Battelle-Japan

Firstly, I would like to thank Dr. Sunami, Honda Foundation and KADIN for the opportunity to offer comments on this very distinguished group of speakers.

I have observed science and technology innovation policy primarily in the Japan and US contexts. And now, I'm more involved on the venture innovation side by participating in the Japan-US Entrepreneurship and Innovation Council that the two governments have formed. However, recently I have become more involved in the same thing in Indonesia as we have tried to bring some innovations here to form innovation-based venture businesses in Indonesia. Then, I have experienced some of the innovation system challenges that have been discussed.

The speakers have distilled a couple of very important themes. One is clearly the perspective that innovation must be considered as a system and that you must consider the ecology of this system to implement and design policies most effectively. Achieving important goals such as a low-carbon society, low-carbon innovation, is a major innovation system challenge that again benefits from an understanding of the overall system as the speakers have laid out.

Just as a personal aside, my nephew was recently in Papua working on low-carbon policy, and that innovation system in Papua is a very complex system. So again, you have to understand all of the elements and how they connect.

Prof. Goto offered a very nice and clear way to frame this thinking by looking at the policies for supply, policies for demand and policies to affect systemic issues or translational issues. It is clear where the government can play a role in promoting each of these elements, and all of the speakers have addressed those. And, those lessons come from decades of accumulated knowledge. It's quite valuable as a reference point.

In addition to the government, foundations also play a critical role in catalyzing new ideas. Because foundations connect more quickly, they are not afraid to challenge new ideas and not afraid of risk. So, in this innovation policy development, foundations also play a very important role globally.

The second thing was adapting to social norms in the social system. Each country is quite different in the way business is conducted, in the way innovation interactions are designed, thus it has to be incorporated into national policy. We are finding that on

the ground, in our own experience of doing business, in different countries, certainly doing business in Indonesia has different characteristics than doing business in Japan and in the US.

So from a business perspective, and again I come from the side of promoting innovation-based venture businesses, one thing that I would highlight among the many offered is, which is a thing for the mid-term and which is to better network what already exists. This is what RISTEK is doing with it's establishment of the intermediaries to try and bring together what already is there and see if you can create a greater sum. Gain the 1 + 1 = 3 or 4 or 5, kind of outcome.

We think that this is an important step now. For our innovation-based company coming into Indonesia, we are looking for partners to develop innovations, but where do you go? Who do you talk to? The ecosystems, the groups that allow you to network are difficult to find for us, coming from the outside. So, if we know how to access information, how to access partners or whether they are investment partners or demand-side partners, this is very valuable. Besides, it's valuable to integrate with international entities as well as domestically to better leverage the innovation resources that already exist.

Among the many good ideas offered from the business side, in the mid-term, promoting venture innovation and networking would be a very helpful step because there is a lot of talent, a lot of good ideas and a lot of capital already available.

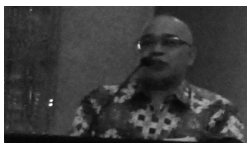
And finally, regulatory reform was mentioned today. In every country, regulations are different and are often very complex. Particularly as an international entity coming in, it can be quite challenging to understand them. We find that regulatory clarity is something that would help smooth towards path of successful innovation, particularly of the small venture-type of operations.

Again, thank you for the opportunity to comment and in the interests of time. I'll stop right there. Thank you.

Atsushi Sunami (Moderator)
I'd like to take any questions or comments from the floor. If you have any, please raise your hand.

Question from Jon Respati
My name is Jon Respati, and I am from METI (Masyarakat Energi Terbarukan Indonesia), the Indonesian Renewable Energy Society in Jakarta.

If I look at the MP3EI, as Mr. Djamal said, we saw no sign of green in the MP3EI. So, how do you agree to omit the green from the MP3EI? If you want to establish low-carbon technology, then you have to integrate it into the economic master plan which we call here MP3EI. How do you propose to do that?



Jusman Syafii Djamal
I don't think I am the right person to answer your question. It's a policy matter, but as you saw about the six corridors of the MP3EI, you saw the example in Java. So, if you want to transform Java as the center of growth of the economy, then you have to transform the existing industries into green industries. What does this mean? It means that we first have to use raw materials coming from the earth, which means recycling, reuse and also not to generate waste of that kind in the certain industry we develop. Then, we can learn from Japanese companies in Indonesia. If you see how the company works, you can see what they do to efficiently use the raw materials from the earth. It's already there.

Second, we can transform all the industrial clusters into using efficient lighting, for example, and then really helping the industries into more efficient use of energy, more efficient use of material and more efficient use of water. That has been developing in that area. So, you have to see the MP3EI planning not as an end in itself, but also as the vehicle to transform our society by helping the collaboration with advanced technology nations such as Japan. That's my answer to the question. Thank you.

Comment from Ilham A. Habibie
I am here in a matter of function actually. I'm also responsible for the research and technology within KADIN. It is through this collaboration with Honda Foundation that we have this wonderful seminar this morning that will extend into the afternoon.

I'd like to say a few words and to hear your comments on what you think about the role of an organization like the Indonesian Chamber of Commerce in this particular regard because we are talking about something that is related to industrial-academic collaboration. Making the R&D work between the institutions and the universities in the region is already done. But, the use of that in industry is still very weak.

As Mr. Gelbke already pointed out, vocational schools play a very important role in that. As I know from my experience in Germany, when it comes to vocational schools, the Chamber of Commerce is always very active to establish the curriculum that makes it really acceptable by the industry so that the people coming out from the vocational schools will really be capable.

It is at first a burden to the industry to make spaces available at the factory or the company because it's a double system. You basically go to school and work for a few months, and then you go back to school. Of course, it costs some money for the industry, but in the end it pays off very well. And, this is something that we need to improve on in Indonesia.

Again, I just want to underline that it is important for KADIN to be active because KADIN determines and establishes the curriculum accepted by the government. But in the end, it is KADIN who makes sure that the individual curriculum is acceptable to the industry.

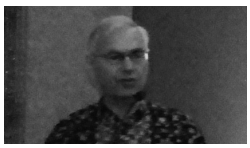
The second thing is that in general, for industrial-academic collaboration which has been said all along, we do not spend enough in Indonesia. I should think in GDP terms, it's about 0.08% of GDP on R&D, and its 80%+ is from government. About R&D from the industry, it is usually spent on buying existing patents from oversees and paying the royalties rather than to develop themselves. It has to do sometimes with marketing because our own people don't really believe and are not sure about something that has been developed in Indonesia. They are more apt to buy something that has been developed in Japan, in Germany or in the US because there is an image factor involved. A lack of self-confidence is something that KADIN has to do with. I don't know how that has been done in Japan in previous times. It must have been many, many centuries ago or maybe decades ago.

The third thing is also whether you would see KADIN as one of the intermediaries that would make it happen. In that regard, I would like to propose actually something like a pilot project where we can maybe do something in the context of fulfilling all that we have said. Along those lines I have talked to the President of Honda Foundation, I suggested why doesn't Indonesia together with Japan, particularly Honda Foundation and with some protagonists in Indonesia think about something like an electric motorbike for Indonesia. It's a national or international collaboration where you can see and check the system, the universities, the research institutions, and industry. And also in the international context, there are so many components that are important for a low carbon-footprint for eco growth, eco market and eco economy.

Indonesia is the third largest country in Asia in terms of the motorcycle market with about 8 or 9 million units per year. However, we don't have a single national event. Number one is China, and they have national events. Number two is India, and they also have national events. Indonesia? Zero.

I think it would probably be good to have something national in Indonesia, so why not start with something that is relatively new, such as green technology, green motorcycle, a low-carbon motorcycle, an electric motorcycle. They can be by hybrids, maybe combined with a bicycle or many other different opportunities that would be something, a beautiful follow-up to our symposium today.

Thank you very much for you attention and comments.



Comment from Franz Gelbke

The role of KADIN can be very important. We already cooperate as RISTEK as intermediaries with some of the KADIN representatives. They are very good existing in Slabaya and also Javatanga.

Many things are driven by the people and even by an organization like KADIN who has some people very adjusted and very good in the implementation, but you even have some regions where KADIN are not active. So, that's the same when I talk about the different steps of transfer agencies of technology providers. The universities in Indonesia unfortunately do not have the same level. Of course, all over the world, the level is a little bit different, but we have to fill in the gaps. It is the same on the part of the polytechnics.

Again, you have a lot of experience with Germany, and the Chamber in

Germany is very strong. But of course you get mass payment by the companies in Germany, so they really have a lot of power. And if you remember, I was working for 14 years as a managing director. This institution, as a technology transfer institution, was owned 50% by the Chamber of Commerce and the other 50% by the government. So, you can say that it was really a public-private partnership with the Chamber of Commerce, and it was very successful. It was a win-win situation because the Chamber of Commerce was a door-opener to the companies themselves and was even running a grant program.

When you mentioned the part of RISTEK as the intermediaries, they were training 25 people, but we actually wasted much more.

Also, we tried focusing on the innovation system to change the grant system that we used to have. At this time, we were not allowed to give money directly to companies. Therefore, we campaigned for a grant program for researchers. But you still have problems, and project management is sometimes very difficult because ownership of the project normally has to be in the private sector by the company who are responsible for the product. Then, they don't get the payment. So, it is absolutely necessary that R&D investment be maybe 1% of the GDP. That is one part. The other part is that you have to change some procedures, and at this time I have many projects that failed not because of money, but because of the process. We have to work for more investment. Also in parallel, we have to strengthen the different processes for the implementation of technology.

Comment from Gerald Hane

The idea of a grant challenge is an excellent idea because not only you mobilize resources for something that is important for a nation, but there is also a lot of spillover effect, an additional effect. In that, it inspires a lot of young people to look at new ideas and to think that they themselves can come up with new ideas. So, it helps promote this kind of culture, an innovative entrepreneurial culture beyond the benefit of the actual innovation itself, which again is important.

Grant challenges in general are excellent ideas, but for some reason, they are not highly used. Maybe they are difficult to organize, but it would be great if such a grant challenge could be organized.

From the international side, an internationally open grant challenge where you draw the best ideas from the world and choose which way you go would be a very fascinating way to approach rather than other kinds of platforms. An internationally open platform for bringing in the best ideas and choosing the ones that best match your needs may give you the most cost-effective solutions that are the best to be offered at the time.

Comment from Eddy Satriya

My name is Eddy Satriya. I am from the Secretary of MP3EI and also the Deputy Assistant for ICT (Information and Communication Technology) to utilize in coordination with the Ministry for Economic Affairs. I thank you very much for coming, Honda Foundation, for having such a very important symposium.

I just got an email from Dr. Habibie's staff while I was in the middle of traffic. Dr. Habibie believed it was most important for me to attend this morning. So, again thank you very much.

Actually, regarding the first question of the MP3EI, I'm really happy to join this symposium because right now I do believe that the things regarding the innovation and the green stuff of MP3EI have to be discussed and prepared sometime and somehow from our staff.

So, I ask KADIN and Honda Foundation how to really make improvements in our implementation of MP3EI so that it can answer many questions regarding local economics, especially the local situation of innovation. Then, Indonesia can really realize the largest economy in the next decade by putting more innovative strategies in the policies regarding, especially in my office, how to use ICT for a more productive level than lifestyle. In this situation, I do offer for looking for some contact with them to make use of ICT for the innovation itself and how to put more of the innovation letters and innovation strategies with our colleagues and other staff of our MP3EI.

Thank you very much for this occasion.

Comment from Taizo Yakushiji

Japan has a very unique problem of manpower because during the 1970s and 1980s, a number of young people went to the US, stayed there and competed with Americans. They then came back to Japan and became industrialist, innovators and things like that.

Nowadays, young people are not interested in going to the US or somewhere else because they worry about job security, university assistants and associate professors, which is the serious problem we are facing.

Ten years ago at the government, I made a completely different radical innovation policy which is called Science and Technology Diplomacy. And working with Indonesia, for example, in the area of environmental studies and also national disaster, tsunami and so on, the Japanese government spends money to cooperate with Indonesia scientists. There is the assumption that in this Indonesian area of study, with the social application of the joint study, it would make a different kind of innovation. So, in order to learn such a new innovation, we can send more and more people to Indonesia, Africa, Asia and Latin America. And by doing that, we are educating young scientists to be very globalized because we are getting very inward looking. Young people, young scientists and young technologists are getting more inward looking.

So, my idea is let's work together, the Indonesian and Japanese young people, to apply an innovative area. The area is always innovative, social application of innovation is a real innovation. We are lacking that kind of momentum.

Comment from Tateo Arimoto

My last comment is that we need to accumulate knowledge about how to redesign the innovation ecosystems, nationally and globally. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) started last year a big, challenging program, so-called science and technology innovation policy. MEXT deliberated with the GRIPS, National Graduate Institute For Policy Studies, as a national center of such newly emerging programs. Now, it is headed by Dr. Goto that program is of course very challenging, but I will stress again that in order to adjust and redesign the other complicated innovation ecosystems, we need new knowledge and experience to be accumulated. Also, we need expand our international relationships, not only with the advanced countries, but also with Indonesia and the Asian countries who are expanding the challenging new program.

Thank you very much.

Comment from Franz Gelbke

I'd like to make a recommendation again about the electric motorbike. It's a good idea because I'm living in Jakarta and would appreciate it if we had a lot of electric motorbikes in Jakarta as there would be less air pollution.

Two weeks ago, there was a question of establishing electro-mobility in Indonesia. I put some figures together to see what the investment in Germany is. And, I found figures from 2008 and up to 2014. So, the spend from the industrial side was around €17 billion and from the government side, around €4 billion. I sense the figures in Japan are similar, China may be similar and the US, too.

It means that when we go to electro-mobility, we have to recognize that there is a high competition worldwide. I appreciate the basic idea, but I hope that the panel in Indonesia can be a little bit focused. In my time here, many projects come up, and when the project finishes it slows down. So, there is not sustainability.

That is why we need such kinds of projects. We also had a project last time with RISTEK for a wind power engine. Actually, that failed because investment wasn't high enough. So, when we try to start up in a branch of technology, we have to think who the partners are. I think it is a good chance to have partners, and we have already a very powerful partner. But, we have to say what is the part of Indonesia, what are the strengths we can deliver in research and what we can deliver on the economy side. Of course, we can deliver into the market, but it has to be with a strong commitment from the government. Otherwise, it will be difficult to compete with the existing branches of global companies.

Thank you.

Question from Floor

Thank you very much. I am from the National Research Council in Indonesia. It is quite interesting at our symposium today because we have been talking about innovation by industrial-academic collaboration. My question is, has Honda Foundation plans to follow up this symposium because I now have a relationship with a small/medium enterprise to produce a component of Honda?

Atsushi Sunami (Moderator)

Thank you. I think I will have to ask the chairman of Honda Foundation to answer that question later.

I would like to thank the panelists for their valuable contributions.

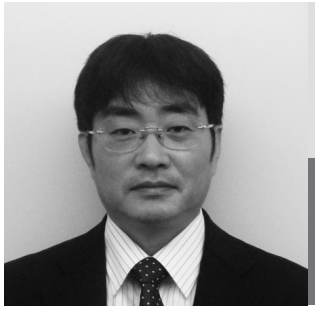
Thank you very much.

Session 2

Renewable Energies (Presentation)

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration



NEDO's Renewable Energy Activities – A Sustainable Future Made Possible by Renewable Energy

Fumiaki Ishida
Principal Research Associate, New Energy and Industrial Technology Development Organization (NEDO)

I would like to express my congratulations on the opening of the symposium "Innovation by Industrial-Academic Collaboration" jointly organized by Honda Foundation and KADIN Indonesia.

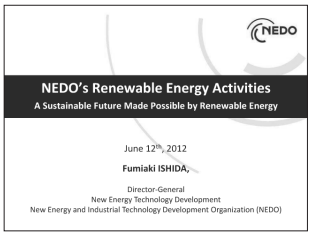
I would like to thank you all for inviting NEDO to participate in this distinguished symposium. This is my first time in Jakarta, and I am thrilled to be here today. I believe that I will have many opportunities to talk with you individually throughout the day.

As you can see from the title of my presentation, "NEDO's Renewable Energy Activities – A Sustainable Future Made Possible by Renewable Energy," today I will discuss Japan's recent energy mix after 3.11 and NEDO's activities to promote energy policy through technological innovation in the renewable energy fields of PV (Photovoltaics), biomass, wind, ocean, geothermal, etc.

I would like to briefly introduce NEDO (See No. 2). NEDO's mission is to promote R&D and demonstration projects in the energy, environmental and industrial technologies fields in close cooperation with METI, and to coordinate and manage various R&D projects by providing necessary financing to industry, academia and public research institutes. Currently, the number of NEDO personnel is approximately 1,000. Our current annual budget is ¥150 billion. Our budget and number of personnel have gradually decreased in recent years.

NEDO categorizes funding into four broad areas and two supporting activities (See No. 3):

1. Technology Seed Development Activities: subsidies for R&D projects that aim for industrial application by young researchers at universities and public institutes to strengthen Japan's industrial competitiveness.
2. National Projects: encompass key industrial technology fields such as energy & manufacturing.
3. Practical Application and Commercialization Promotion Activities: energy and environmental technology fields help revitalize the economy by speeding up practical application and commercial promotion through subsidies to private enterprise technology development close to the stage of practical/commercial application.
4. New Energy/Energy Conservation Technology Introduction and Dissemination Activities: demonstrations of new energy and energy conservation technologies that can secure a stable energy supply for Japan and contribute to the mitigation of climate change. Knowledge and know-how acquired by these activities are



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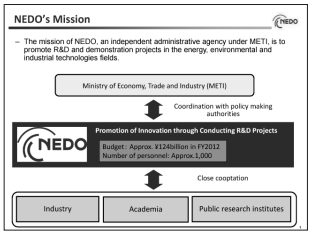

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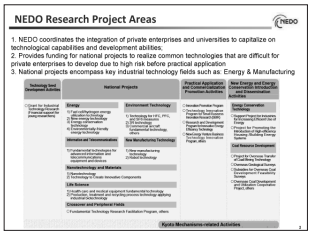

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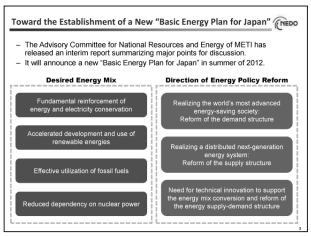

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applied to technology development.

Supporting Activities:

1. Kyoto Mechanisms: Japan supports international efforts to mitigate climate change, promote the sustainable development of developing countries and to acquire Kyoto Mechanisms credits.
2. International Projects: Japan's various energy and environmental technologies are demonstrated worldwide in expanding Japan's presence in the global market by promoting international standards, establishing international networks and cooperative relationships to contribute to resolution of global energy and environmental issues.

In the wake of the Great East Japan Earthquake and subsequent Fukushima Daiichi nuclear power plant accident, the Japanese government is currently conducting a fundamental review of Japan's Basic Energy Plan (See No. 4). In order to formulate a new Basic Energy Plan, these points were presented for discussion last December. Renewable energy will play a more important role in the new Basic Energy Plan which will be announced in the summer of 2012.

This figure shows Japan's electricity supply structure (See No. 5). Nine percent of Japan's total electricity is generated from renewable energy, of which 8% is derived from hydropower and 1% is from other renewable energy including PV. Renewable energy capacity is still considered to be low in Japan.

This slide shows a breakdown of Japan's renewable energy generation capacity (See No. 6). Hydropower accounts for approximately 90% of the total. PV capacity has been steadily growing and increased by nearly 1,000 MW in 2010 alone.

Let's look at renewable energy generation costs (See No. 7). Compared to coal and LNG, the cost of power generation using renewable energy resources is still high. The most important issue in further introducing renewable energy is reducing power generation costs.

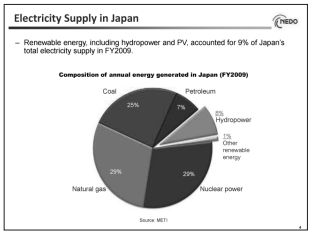
On July 1st 2012, Japan's Ministry of Economy, Trade and Industry, or METI, will launch a new feed-in tariff scheme in which power companies purchase electricity generated from renewable energy resources at a fixed-price for a certain period of time (See No. 8). This new scheme is expected to accelerate the introduction of renewable energy in Japan.

NEDO carries out R&D and demonstration projects related to various renewable energy resources with the aim of reducing generation cost as well as improving performance (See No. 9).

For example,

1. NEDO's R&D on PV has a history of over 30 years.
2. Biofuel production that does not compete with food resources is also being studied.
3. NEDO is currently planning a demonstration project for offshore wind power stations.
4. In 2011, NEDO started R&D and demonstration activities relating to ocean energy, such as wave power and tidal current power.

NEDO has been carrying out research and development on various types of solar cells some of which are shown here (See No. 10).



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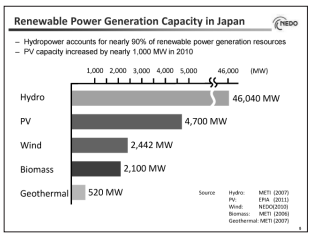

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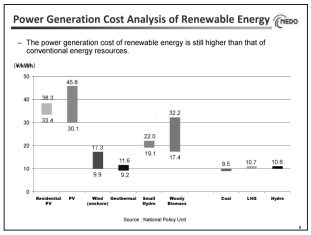

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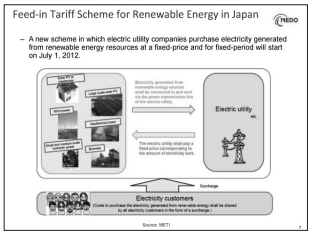

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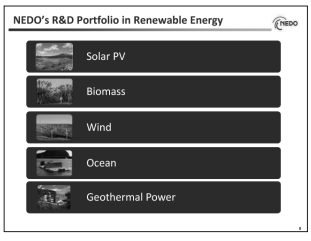

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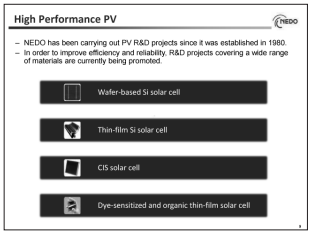

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In order to improve efficiency and reliability, R&D projects covering a wide range of materials are currently being promoted.

I would like to mention a few of our achievements in recent years (See No. 11). This slide shows the result of a successful R&D project entrusted to Sharp Corporation. Sharp achieved the world's highest non-concentrator solar cell conversion efficiency of 36.9% using a triple-junction compound solar cell with a cell surface of about 1cm².

In February 2011, Solar Frontier launched operation at a PV factory with a production capacity of 900 MW per year, the largest production capacity in the world (See No. 12). The solar modules produced at this factory are a result of NEDO's CIS PV technology R&D that was entrusted to the Showa Shell Sekiyu Group starting in 1993.

Thin-film solar cells that Sharp has developed under NEDO projects have been successfully installed at a large-scale solar power generation plant in Thailand (See No. 13). Thin-film solar cells are suitable for hot climate regions as the cells can maintain energy conversion efficiency even under high temperature conditions.

Biomass material for producing bioethanol is classified by generations, and each generation has its unique features (See No. 14). I'm going to explain about this. The first generation, represented by sugarcane and corn, produces bioethanol using fermentation technology. The markets for these plants have already formed and are active mainly in Brazil. However, technology development that does not cause competition with food supplies is needed.

The second generation, represented by wood and grass, produces bioethanol from cellulosic materials that are not in competition with food supplies.

However, producing ethanol from wood usually takes considerable time, and technology development for efficiently producing ethanol from wood is needed.

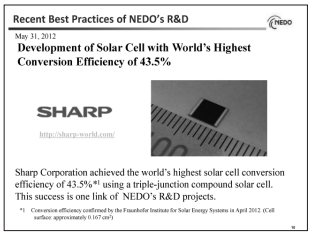
NEDO is now carrying out R&D focusing on the second generation and a system that integrates progress from the cultivation of crops to ethanol production.

In addition, NEDO is carrying out technology development on third generation biofuel production, represented by microalgae. The goal is to realize efficient and high yield production technology by the year 2030.

NEDO's efforts also include the development of biomass energy technologies (See No. 15). In recent years, our focus has been placed particularly on technologies for manufacturing bioethanol from biological materials, including wood and herbaceous plants, which do not compete with food supply production. Some of these activities are being carried out in cooperation with Southeast Asian countries which have an abundant supply of feedstock.

This photo shows NEDO's demonstration plant for bioethanol production technology which is one of the largest plants in Japan (See No. 16). The plant aims to establish technology that efficiently produce bioethanol from woody biomass at a low cost, and it is capable of producing 250 ℓ of bioethanol per day.

In the "Development of Technologies for High-efficiency



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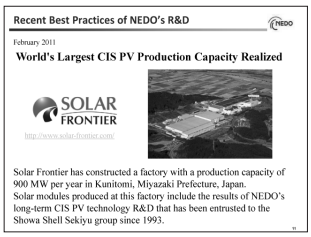

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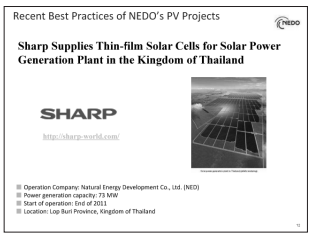

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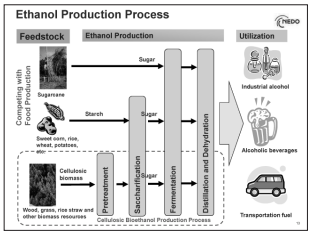

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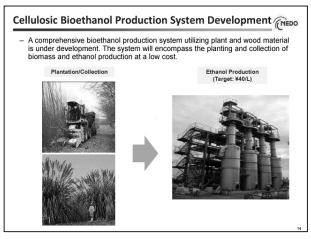

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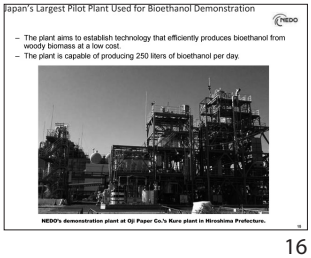

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Conversion of Biomass and Other Energy" project, technology for efficiently and inexpensively producing fuels and chemical feedstock from fermented cellulosic biomass is being developed (See No. 17). More specifically, high-yield plants suitable for use as an energy source are being developed using genetic modification technology. Research is also being conducted on innovative technologies that include methods to produce efficient and low-cost biofuels with the aim of achieving practical application after 2015. A comprehensive process for such technologies will also be established. In addition, technology to inexpensively produce propylene from bioethanol is being developed.

NEDO is conducting Japan's first full-scale demonstration project on offshore wind power systems (See No. 18). Particularly in Japan, there are few onshore areas suitable for wind power generation. This demonstration project is therefore expected to promote the introduction of offshore wind power generation systems by verifying the systems' technological effectiveness and economic efficiency.

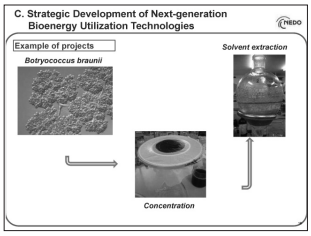
Wind turbines for offshore wind power generation systems tend to be getting larger as such systems incur high construction costs (See No. 19). NEDO has recently launched a project to develop 7 MW-class wind turbines for offshore wind power generation systems with the aim of deploying business opportunities in the future. The development of high-efficiency and low-cost wind turbines is expected to promote the introduction of offshore wind power generation systems in Japan and abroad.

In addition to solar energy, NEDO is also conducting research and development on ocean energy (See No. 20). In 2011, NEDO started technology development and demonstration research relating to ocean wave power and tidal current power.

Japan has the third-largest geothermal resources in the world after the US and Indonesia (See No. 21). However, Japan has developed less than 1% of the potential resource. Since the 3.11 earthquake in Japan, there is much more attention on geothermal power generation as an alternative to nuclear power plant. Due to this increased interest, strict development regulations around national parks have been re-evaluated. Based on NEDO's past geothermal resources studies, many new development plans are being proposed by geothermal companies.

There are two major types of geothermal power generation systems (See No. 22). One is by steam power generation. The second one is by binary power generation system. This means a working fluid other than water is used like Pentane with a low boiling temperature. Steam generation systems have been commercially available for over 100 years and is the most common geothermal power plant in the world. Secondary low-temperature working fluid systems are now being developed for geothermal power generation system. This is for distributed power generation where there is low grade waste heat available.

In 2010, Japan captured about 70% of the global market share for geothermal power systems via three companies, Mitsubishi



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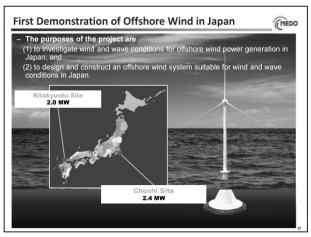

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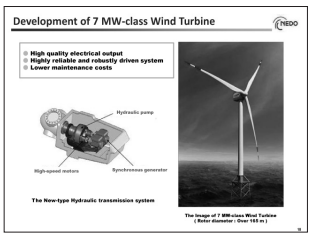

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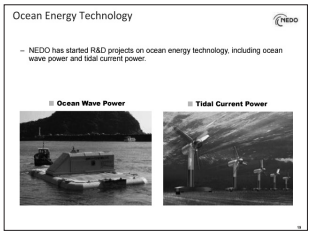

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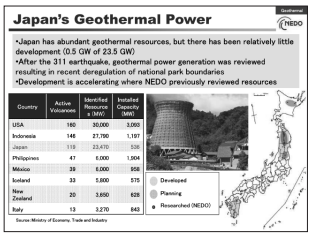

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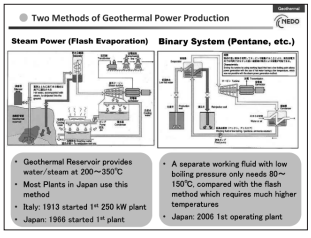

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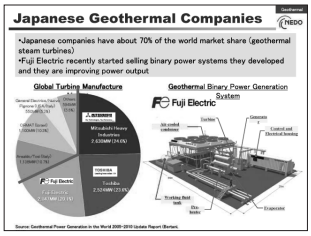
Heavy Industries, Ltd., Toshiba Corporation, Fuji Electric Co., Ltd. (See No. 23). There is a high level of trust in the systems they sell due to a long history of reliability and accurate planning estimates. Fuji Electric recently started selling commercial binary power generation system in addition to their steam turbine systems. They are moving forward with the large scale worldwide introduction of the binary system technology. NEDO supports accelerated development of domestic and global market expansion and provides the necessary support to these leading companies.

Thank you very much for your attention. If you would like further information, please visit our website (See No. 24).



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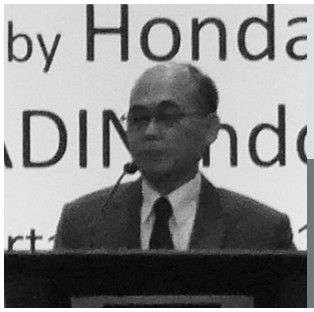
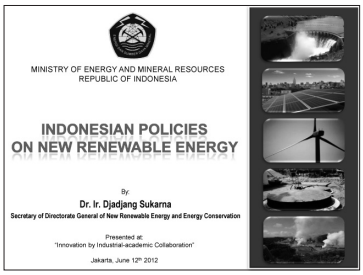


Indonesian Policies on New Renewable Energy

Djangjang Sukarna

Secretary to the General Director, Renewable Energies and Energy Conservation,
Ministry of Energy and Mineral Resources, Republic of Indonesia



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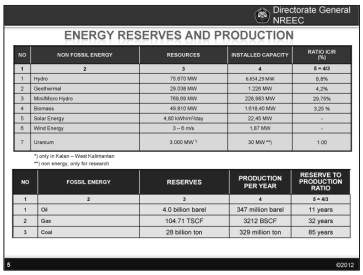

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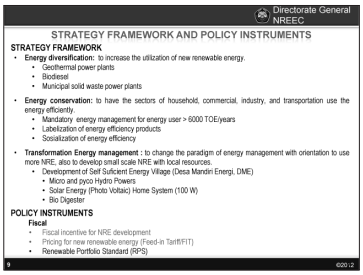

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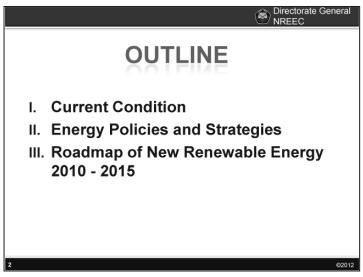

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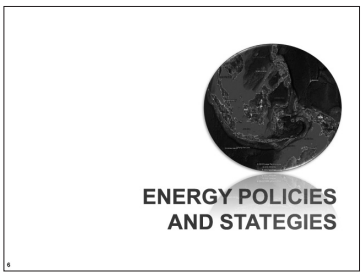

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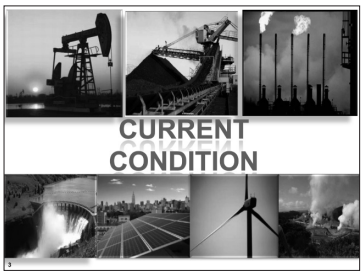

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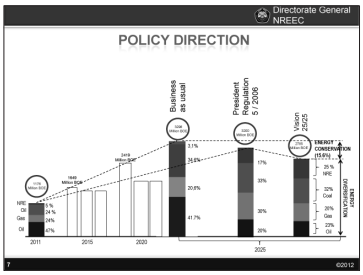

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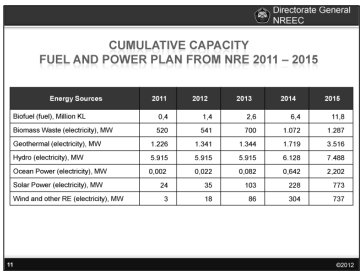

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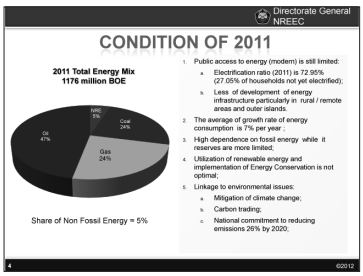

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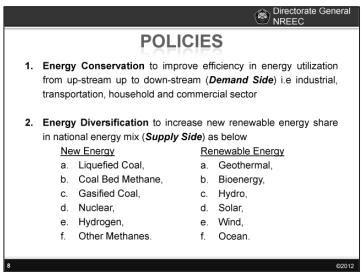

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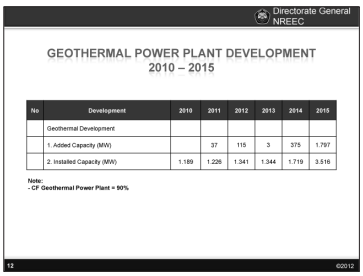

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Directorate General NREEC

WASTE BIOMASS POWER PLANT DEVELOPMENT 2010 - 2015

No	Development	2010	2011	2012	2013	2014	2015
	Waste Biomass Development						
	1. Added Capacity (MW)			21	159	172	415
	2. Installed Capacity (MW)	500	520	541	700	1.072	1.287

Note:
- CF Waste Biomass = 70%

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Directorate General NREEC

OCEAN POWER PLANT DEVELOPMENT 2010 - 2015

No	Development	2010	2011	2012	2013	2014	2015
	Ocean Power Development						
	1. Added Capacity (MW)		--	0,02	0,06	0,56	1,56
	2. Installed Capacity (MW)	0,002	0,002	0,022	0,082	0,642	2,202

Note:
- CF Ocean Power Plant = 60%

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Directorate General NREEC

MINISTRY OF FINANCE REGULATION NUMBER 130/PMK.011/2011

Concerning on Provision of Exemption Facilities or Reduction of Income Tax

CORPORATE TAXPAYERS

can get facilities:

EXEMPTION OR REDUCTION OF CORPORATE INCOME TAX

EXEMPTION OF CORPORATE INCOME TAX

5 - 10 tax year

After the end of Corporate Income Tax exemption facility

REDUCTION OF CORPORATE INCOME TAX

50% of Income Tax Payable for 2 tax years

Minister of Finance may grant facilities Corporate Income Tax exemption or reduction for a period EXCEED the time limit period of time

* The facility can be utilized if:
1. Had executed the entire capital investment
2. Has been produced commercially

- PIONEER INDUSTRIES
- Having a new investment plan min. IDR 1 trillion
- Placing funds in the Indonesian banking min. 30% from the total investment value
- Existed as ENTITY INDONESIA

- Industry of Basic Metals Manufacture
- Industry of Oil Refining and / or Basic Organic Chemicals sourced from Oil and Natural Gas
- Industry of Machinery
- INDUSTRY OF RENEWABLE RESOURCES FIELD
- Industry of Communications Equipment

PIONEER INDUSTRIES

21 ©2012

21

Directorate General NREEC

BIOFUEL DEVELOPMENT 2010 - 2015

No	Development	2010	2011	2012	2013	2014	2015
	Biofuel Development						
	1. Added Production (Million KL)		--	0,9	1,2	3,8	5,4
	2. Production of Biofuel (Million KL)		0,4	1,4	2,6	6,4	11,8

14 ©2012

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Directorate General NREEC

WIND POWER PLANT DEVELOPMENT (AND OTHER RE) 2010 - 2015

No	Development	2010	2011	2012	2013	2014	2015
	Wind Power (and other RE) Development						
	1. Added Capacity (MW)		1	15	68	218	433
	2. Installed Capacity (MW)	2	3	18	86	304	737

Note:
- CF Wind Power Plant = 40%

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Directorate General NREEC

PRICING FOR NEW RENEWABLE ENERGY FEED-IN TARIFF

Declared : Biomass, Biogas and Municipal Solid Waste (Ministerial Decree No. 4/2012)

Ready to declare : Geothermal and Hydro

Under review : Solar and Wind

22 ©2012

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Directorate General NREEC

HYDRO POWER PLANT DEVELOPMENT 2010 - 2015

No	Development	2010	2011	2012	2013	2014	2015
	Hydro Development						
	1. Added Capacity (MW)		204	--	--	213	1.360
	2. Installed Capacity (MW)	5.711	5.915	5.915	5.915	6.128	7.488

Note:
- CF Hydro Power Plant = 40%

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Directorate General NREEC

GOVERNMENT POLICIES TO SCALE UP GEOTHERMAL DEVELOPMENT IN INDONESIA

Pricing Policy

- ✖ Ministerial Regulation of Minister of Energy and Mineral Resources No. 02/2011 on geothermal price structure. The MR gives Ceiling price US $ 9,7 cents/kWh from geothermal power plant.
- ✖ Fiscal incentives for geothermal development (based on Government Regulation No. 62/2008 jo No. 1/2007;
- ✖ Ministerial Regulation of Minister of Finance No. 177/PMK.011/2007 on Exemption from import duty on Import of Goods for Upstream Oil and Gas and Geothermal
- ✖ Ministerial Regulation of Minister of Finance No. 22/PMK.011/2011 on Government-borne value added tax on Import of Goods For Upstream Oil And Gas Exploration And Geothermal Operations :
  - 30% of corporate income tax;
  - 10% of added-value tax paid by the GoI;
  - Custom duties exemption for geothermal developer;
  - 25% per year depreciation for 8 years with double declining balance method; and
  - Investment tax credit 5% per year for 6 years.
- ✖ Currently the mechanism of Feed in Tariff for each GWA is being developed by the GoI in order to make geothermal business more attractive to investors.

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MINISTER OF ENERGY AND MINERAL RESOURCES DECREE NUMBER 4 YEAR 2012

Concerning On Electricity Price Purchased by PT. PLN from Small Scale and Medium Scale Renewable Energy Electricity Generation or Excess Power

No.	Energy	Capacity	Electricity Tariff	Note
Medium Voltage				
1.	Biomassa	until 10 MW	Rp. 975,- / kWh X F	
2.	Biogas	until 10 MW	Rp. 975,- / kWh X F	Non Municipal Solid Waste
3.	Municipal Solid Waste (MSW)	until 10 MW	Rp. 1050,- / kWh	Zero waste *)
4.	Municipal Solid Waste (MSW)	until 10 MW	Rp. 850,- / kWh	Landfill *)
Low Voltage				
1	Biomassa	until 10 MW	Rp. 1.325,- / kWh X F	
2	Biogas	until 10 MW	Rp. 1.325,- / kWh X F	Non Municipal Solid Waste
3	Municipal Solid Waste (MSW)	until 10 MW	Rp. 1.398,- / kWh	Zero waste *)
4	Municipal Solid Waste (MSW)	until 10 MW	Rp. 1.198,- / kWh	Landfill *)

- F as an incentive factor based on the region where the power plant installed, as follows:
  - Jawa, Bali, and Sumatera region : F = 1
  - Kalimantan, Sulawesi , NTB and NTT region : F = 1,2
  - Maluku and Papua region : F = 1,3

Note : *) Based on Act No. 18 Year 2008 concerning to Waste Management.

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SOLAR POWER PLANT DEVELOPMENT 2010 - 2015

No	Development	2010	2011	2012	2013	2014	2015
	Solar Development						
	1. Added Capacity (MW)		4	11	68	125	545
	2. Installed Capacity (MW)	20	24	35	103	228	773

Note:
- CF Solar Power Plant = 40%

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MINISTRY OF FINANCE REGULATION NUMBER 21/PMK.011/2010

Regulation of tax and customs facility for renewable energy resources utilization activities

FINANCIAL INSTRUMENTS SUPPORT

- Income Tax
  - Reduced net income for 30% of total investment
  - accelerated depreciation
  - Imposition of Income Tax on dividend p aid to Foreign Taxable at 10%
  - compensation for losses in certain circumstances
- Value Added Tax
  - Exemptions of VAT for Taxable Goods, machinery and equipment for RE utilization (not included spare parts)
- Import Duty
  - Exemptions for Import Duty of:
  - ❑ Goods and Machinery for development and capital investment
  - ❑ Capital Goods Imports for construction and development of electricity industry
- Tax Borne by Government
  - Regulated in State Annual Budget Law and its implementing regulations

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Thank You

Go Green Indonesia !

green energy, future energy

MINISTRY OF ENERGY AND MINERAL RESOURCES REPUBLIC OF INDONESIA
DIRECTORATE GENERAL OF NEW, RENEWABLE ENERGY, AND ENERGY CONSERVATION
Jalan Jenderal Gatot Subroto, Kav. 49 Jakarta 12950; Telp: 021-5266235; 5250375; Faks: 021-2520190; 2552012
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Honda's Future Progress in Environmental Technologies

Takashi Moriya
Senior Chief Engineer, Honda R&D Co., Ltd., Research Project Leader,
Fuel Cell Vehicles

Good afternoon, everyone. I am Takashi Moriya of Honda R&D. Today, I would like to show you what action Honda is taking for the future of power train.

First, let's take a look at the overview of issues concerning the environment and energy (See No. 2). Then, let me discuss the direction in which Honda is heading in evolving our technologies as mentioned here.

The environment and energy issues. Everyone has the desire to travel freely anywhere at anytime. The fundamental value of cars and motorcycles is to realize free travel (See No. 3). What Honda is pursuing is to realize "the Joy and Freedom of Mobility" and "a Sustainable Society where People Can Enjoy Life." However, there are several challenges we need to solve for their realization.

This slide shows the severity of environmental and energy-related issues in the past, present and future (See No. 4). In the past, the major issue was air pollution caused by exhaust gases containing toxic substances and factory emissions and so forth. Now, we are faced with significantly different issues, such as global warming and future energy needs. To address these issues, we must bring forward research and development of CO_2 reduction technology and technology that enables us to take advantage of alternative energy. At the same time, we need to figure out how we can generate renewable energy for future demand.

At Honda, we are not just developing technologies for internal combustion engines and hybrids which use gasoline as energy (See No. 5). We are also working on various technologies to utilize CNG, bioethanol, electricity and hydrogen with a mission to diversify energy sources.

Let us look at Honda's estimation of how much next-generation vehicles can help reduce CO_2 emissions (See No. 6). As we can see here, the introduction of hybrids and plug-in hybrids alone is not enough to achieve the target of reducing wheel-to-wheel CO_2 emissions to one third of current levels. In other words, the electrification of the automobile needs to be based on low carbon electricity generation.

Biofuel and renewable energy sources are solutions being investigated toward zero CO_2 emissions.

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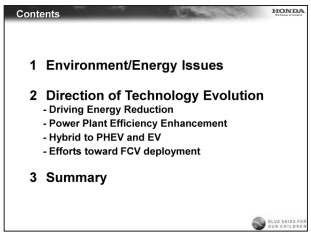

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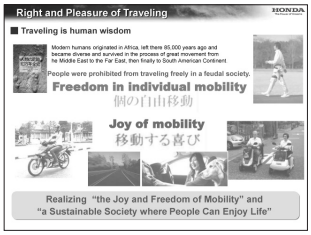

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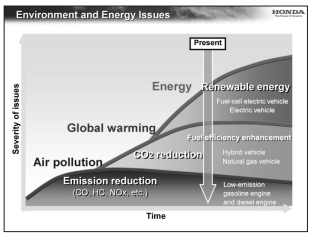

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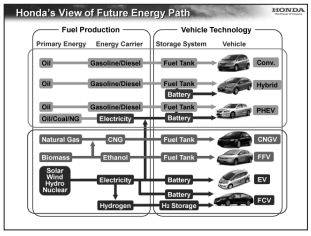

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Next, I explain the direction of technology evolution of Honda (See No. 7). With ICE (Internal Combustion Engine) efficiency improvement in mind, we can further increase combustion efficiency mainly through Honda's original variable valve timing technology, called "VTEC." VTEC can also be employed to cylinder deactivation technology and variable cylinder management technology. We also push forward the technology advancement on hybrid, which takes advantage of both an ICE and motor.

There are two things we can do for ICE to reduce CO_2 (See No. 8). One is to reduce driving energy, meaning reducing vehicle body weight and rolling resistance. The other is to improve the efficiency of ICE. Integration technology supporting eco-driving is also an effective means.

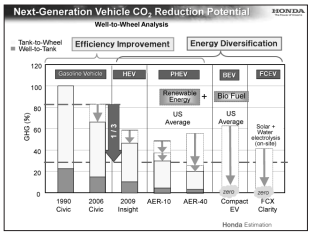
In 1999, Honda launched and began sales of the first hybrid model, Insight and has extended the lineup since to the Civic and the Accord (See No. 9). When developing the second generation Insight introduced in 2009, we were on a mission to make it accessible to more customers by lowering the price, thus putting more hybrid cars on the road, which ultimately reduces overall CO_2 emissions. In addition, Honda offers a wide variety of hybrid models to suit customers' needs, such as the CR-Z with the "Fun to Drive" element which Honda believes is the true appeal of the vehicle and the FIT series which offers more utilities. As you can see, offering various hybrid models, with each model having its own character, at a reasonable price, will help accelerate the penetration of hybrid vehicles in the future as the call for CO_2 reduction heightens.

For realizing "the Joy and Freedom of Mobility" and "a Sustainable Society where People Can Enjoy Life," Honda has this future vision in which "Renewable Energy Technology" and "Electromotive Mobility" are managed together through Honda's unique information communication (See No. 10). Based on this concept, we announced two years ago that we would start a demonstration experiment on the next generation of personal mobility. We are working jointly with two locations in Japan, with the city of Torrance, California in the US and China.

Each vehicle has a different driving range, characteristic and performance (See No. 11). When introducing a next generation vehicle, it is important to consider the role of each vehicle with these differences.

Honda also tries to expand vehicle electrification for increased environmental benefit through developments of plug-in hybrid EV and Battery EV (See No. 12). This is an example of experimental plug-in hybrid vehicle. It is based on a mid-size sedan, the US version Accord. It uses highly efficient 2.0 Li-VTEC engine which was specifically developed for this model combined with two high output motors. In order to maximize its all electric range, Li-ion battery has been developed. This vehicle currently achieves the all electric range of 25 km.

As for additional efficiency enhancement by electrification, various technologies and know-hows from the development of



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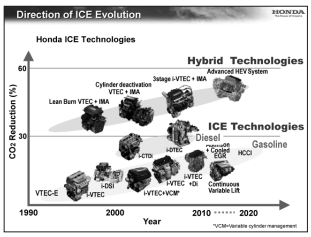

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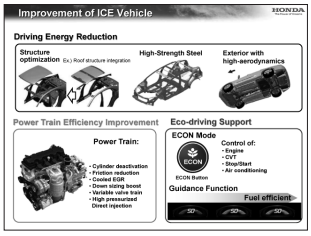

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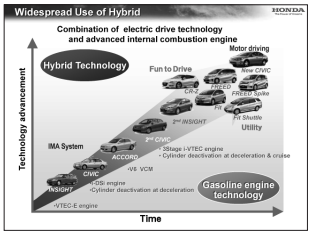

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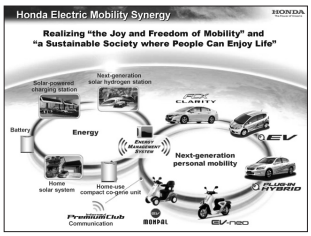

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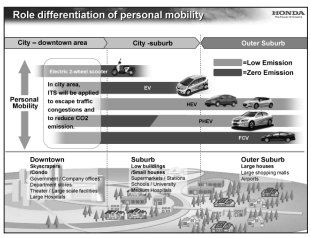

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EVPlus in 1990's as well as FCX Clarity have been further advanced and used (See No. 13). This EV for demonstration is based on Fit which is very popular for its utility. Technologies for its motor and Li-ion batteries are adopted from FCX Clarity. In this particular model, its 200 V charging time is 6.5 hours, and the range after being fully charged is currently over 210 km. Honda's experimental plug-in hybrid EVs and battery EVs are now being used at demonstration projects conducted with same locations of Plug-in Hybrid.

Honda has developed renewable energy since the beginning of the 1990s (See No. 14). We have developed a solar cell which is much thinner compared to conventional types and requires as little as half the energy to manufacture. This was made possible by using a CIGS (Copper, Indium, Gallium and Selenium) compound different from conventional silicon material. Honda Soltec Co., Ltd. has already begun production and sales. We will have this Honda-made solar cell installed in solar-powered charging stations in our headquarters in Saitama prefecture as well as our manufacturing plant in Kumamoto prefecture. In the demonstration experiment, we are planning to verify the effectiveness of such renewable energy use.

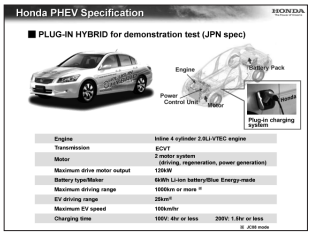
Honda started its fundamental research on fuel cell in late 1980s (See No. 15). As the milestone of the development, FCX was launched simultaneously in Japan and the US in December 2002. This made us the first to introduce fuel cell electric vehicle (FCEV) in the world. FCX was not materialized just in one step, but it is the accumulation of our efforts in development of various key technologies including:

- Motor technology for electric vehicle which was released in the 1990s.

- Energy management technology which was developed for hybrids such as Insight and Civic hybrid.

The progress was also made to the fuel cell stack which is the core technology for the system (See No. 16). The fuel cell on the FCX Clarity is much smaller, lighter and more powerful than its predecessors. This was made possible by the use of new cell structure. Compared to the stack used for the previous version of FCX, the power/volume density has been increased by 50% and power/weight density by 67%. Such technical leap makes our fuel cell stack to be one of the best in the world. From the early version of our fuel cell stack of 1999, power/weight density has been increased by five times. Now that the stack is compact enough to fit in the center tunnel, the flexibility in vehicle design has been dramatically increased.

Each new FCX model has shown an improvement in energy efficiency and vehicle range (See No. 17). FCX Clarity is no exception. It now achieves an energy efficiency of 62% or twice that of a gasoline-hybrid vehicle. Vehicle range using the Japanese 10-15 test mode has been extended by some 30% to now reach 620 km. Users require a range of 300 miles or about 500 km in normal driving conditions with the air conditioner/heater system on, so we are working to extend the range still further.



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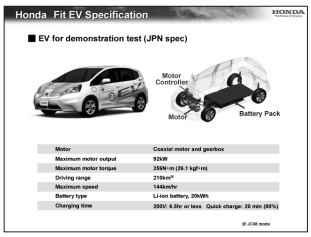

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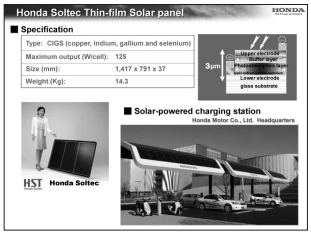

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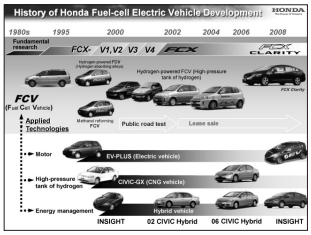

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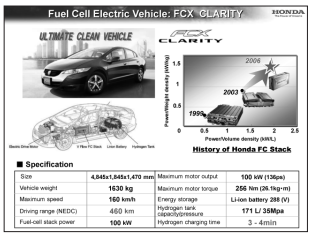

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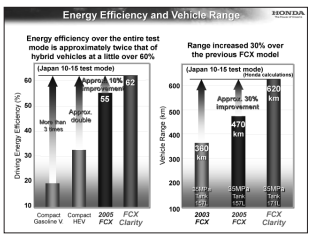

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Here is the commercialization scenario for FCEVs and hydrogen stations drawn by the Fuel Cell Commercialization Conference of Japan (See No. 18). This scenario sees commercialization of FCEVs and hydrogen stations beginning in 2015. Last year, it was complemented by the added goal of making FCEVs and hydrogen stations a viable business by 2025.

Here is a list of the companies that have responded to this scenario by issuing a joint declaration on January 13th of this year (See No. 19). This joint declaration calls for commercialization to start in 2015 with the energy companies readying hydrogen stations in four major urban areas and the automotive industry developing production-ready vehicles.

In an effort to materialize a completely renewable concept, the station uses solar panels to supply electricity to generate hydrogen through electrolysis of water, then the hydrogen is used to power fuel cell vehicles (See No. 20). While hydrogen is used to power the vehicle, it once again returns to water as an emission. Honda continues to experiment this carbon-free and circulating concept with hydrogen from water which returns to water, and the electricity for splitting water from renewable energy.

Hydrogen generated by natural and renewable energy is a carbon-free energy carrier which human beings can create.

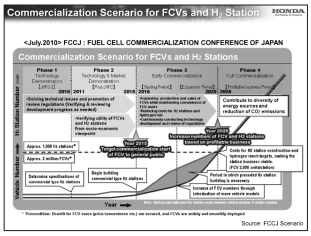
Honda was developing a plan to install a solar hydrogen station for the first time in Japan on March 27th 2012. This solar hydrogen station has a high pressure water electrolysis system solely developed by Honda, and only with electrolysis of water, it can produce 35 MPa (Mega Pascal) high pressure hydrogen (See No. 21). Used together with another power source, it can produce 1.5 kg hydrogen in 24 hours, with which FCX can run for 150 km.

The FCX Clarity tested in Japan has the function of electricity supply (See No. 22). This vehicle has a connecter in the cargo space for a special inverter which can supply electricity. This can be used in case of natural disaster. This system was developed rather as emergency power supply for the damaged area than for normal use. Making use of the uniqueness of fuel cell, compared to engine generator, this system can produce more than seven hours with max 9 kw. This is six days worth power supply for an ordinary household. The special inverter can be delivered in a cargo space only when needed. When the vehicle arrives at destination, the inverter can be used for AC output.

This is our smart community image including hydrogen (See No. 23). Usually, smart community is based on electricity only. However, hydrogen will be a buffer of electricity from renewable energy. Renewable energy is usually not stable. So, peak power storage is very useful for levelization of energy management in community. Hydrogen production, storage, transportation and usage are very important to achieve this smart community.

Our system is an example for this concept. In the future, toward the clean society, we Honda believe the smart combined system using electricity and hydrogen will come.

In order for Honda to realize the “Joy of Freedom with



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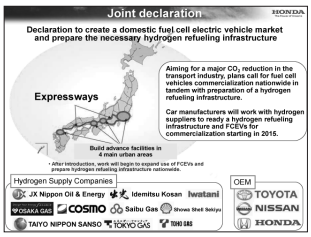

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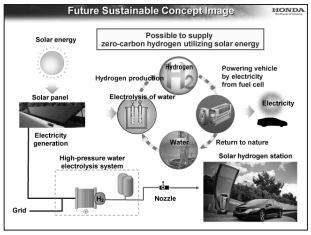

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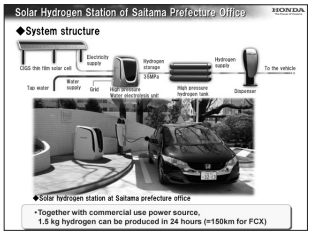

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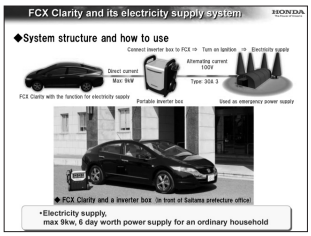

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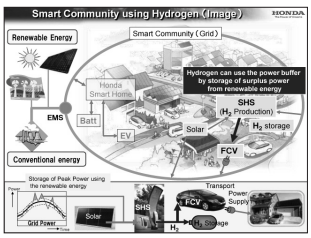

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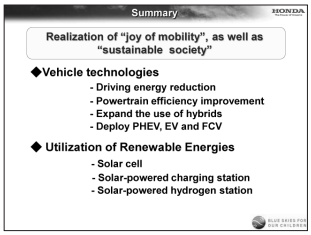
Mobility" and a "Sustainable Society where People Can Enjoy Life," we will pursue vehicle technologies and utilization of Renewable Energies including these items (See No. 24). As mentioned earlier, CO_2 reduction does not just require powertrain technology, but also needs to utilize renewable energies.

Before I finish, I would like to introduce the global environmental slogan that Honda has established. It is; "Blue Skies for Our Children" (See No. 25). We can't help but hope that one day this will all become a reality.

Thank you very much for your kind attention.



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Innovation by Industrial-Academic Collaboration

Writer: Rachmat Gobel
President Commissioner, PT Panasonic Gobel Indonesia,
Chairman, Indonesia Renewable Energy Society, 2012 – 2015

Co-writer & Speaker: Riki F. Iblahim
Executive Director, Indonesian Renewable Energy Society
(Masyarakat Energi Terbarukan Indonesia, METI)

Innovation, as we all know, is related to bring and put something new into economy (financial prudence) involving a creation and realization in the economy system; new commercial plan and design; new way of commercial strategy; and goods and services.

It is absolutely vital for Indonesia to increase its national capacity supporting Indonesian national economic development, a policy popularly referred to as "Pro - Growth & Pro - Job" as stated by Indonesia President, Mr. Susilo Bambang Yudhoyono (See No. 2). Therefore, as a matter of basic policy, the government of Indonesia has to maximize and assure the success of the implementation of food and energy sector. In renewable energy, job-creation related to energy project development would make ever-increasing employment opportunity to Indonesia as well as decreased dependence on energy fossil because energy sector has become an important issue for society and national energy security.

Today, Indonesian policy related to the energy project and job-creation is affirmative in maximizing the use of renewable energy project; application of domestically-produced materials and equipment, and employment of national service companies in the development of infrastructure projects. GOI (Government of Indonesia) already declared Presidential Decree No. 5/2006: National Energy Policy to meet with 17% of Indonesia energy mix; emission reduction that was declared in Green Economics Development, Bali 2011 to meet with GHG (Green House Gas) 26% or up to 41% in 2020 (See No. 3). We, as Indonesia Renewable Energy Society (METI in Bahasa Indonesia or IRES in English), definitely support national plan (central and local government) on increasing public access to energy; increasing the security of energy supply; adjusting price of energy with its economic element; making adequate energy infrastructure available; as well as increasing the efficiency of energy use.

For your information, GOI has a road map for national goals to establish security of energy supply by 2025 (See No. 4). The measurement factor to meet with this national goals must be based on the achievement of energy availability and creating an optimal energy mix: the role of oil decreased to a maximum of 20%, the role of gas increased to a minimum of 30%, the role of coal increased to 33%, by utilizing brown coal, coal liquefaction & coal briquette, the role of geothermal & biofuel increased to 5%, respectively, also the role of other renewable energies increased to 5%. National energy security is to reduce domestic fossil energy supply by decreasing oil import gradually.

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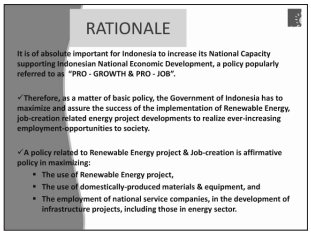

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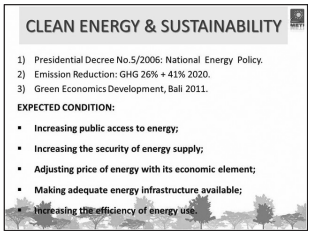

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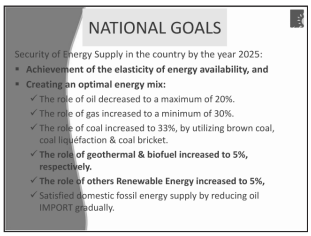

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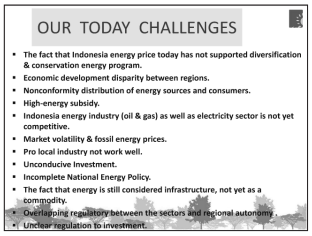
There are many challenges (national challenges) increased every time we get influence from globalization which we cannot entirely control (See No. 5). Indonesia energy price today has not supported diversification and conservation energy program, and fossil is still heavily subsidized. Economic development disparity among regions is also difficult to manage due to the lack of infrastructure. Nonconformity distribution of energy sources and consumers also lacks infrastructure. High-energy subsidy is still dominant due to the poor society. Indonesia energy industry (oil & gas), as well as electricity sector, is not yet competitive. Market volatility & fossil energy prices are dominant, besides, pro local industry has not been worked well due to lack of coordination. Unhelpful Investment is still not responded well. Incomplete action plan of National Energy Policy is everywhere, and so is the fact that energy is still considered infrastructure, not as a commodity. Overlapping regulation between the sectors and regional autonomy mentioned above remains high (weak). Unclear regulation to investment is still dominant due to poor coordination and low education.

How to act to challenges mentioned above? As far as we know the challenges, a strategy to respond on this issue must be developed (See No. 6). As mentioned above, innovation means bringing and putting something new into the economy (financial prudence) that involves a creation and realization in the economy system; new commercial plan and design; new way of commercial strategy; and goods and services. METI believes we must develop mechanisms for energy prices that are the main factor. Then, we must re-construct the priority. We must make domestic energy need as high priority.

As a part of world commitment, we must improve the security to energy supplies and pay attention to environmental aspects. We must apply principles of good governance and transparency as world needs those. Encouraging private investment for energy development is one of the common world strategies to build a country. Do not forget to apply energy conservation and ensure energy provision to any social group. The world needs to enhance community empowerment in the energy management and increase the efficiency of supply and energy utilization. We must support on ways of energy diversification program used by local energy utilization. METI, as organization, must work with GOI to build economics with Energy Self-Creation Village (Desa Mandiri Energi). Certainly, an important part of innovation is to develop human resources capacity and technology as well as to maximize the state revenues from energy sector.

As Indonesia is an under developed country, we must make conducive/favorable policies that is related to mandatory of renewable energy utilization; Implementation of feed-in tariff as an important part of energy policy; Bankable contract (PPA) in order to meet with investor's requirement; Incentives (fiscal & taxes) used for long-term national goals; Transparent licensing process without being convoluted (See No. 7).

To meet with economic growth, an attractive local bank



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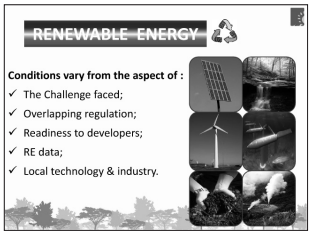

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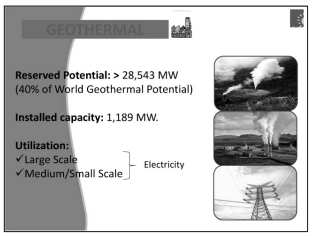

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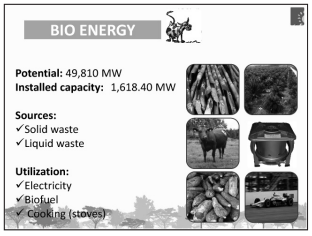

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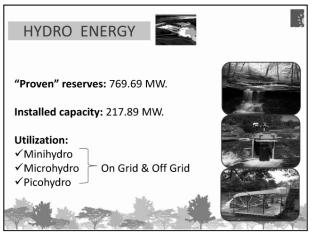
funding package, information of accurate renewable energy sources is required. To meet with world competitiveness, the development of local technology and industry must be planned and executed properly. The last but not the least, the national standardization of equipment should be enacted to renewable energy technology. This is important to build and implement.

Innovation by industrial-academic collaboration strongly supports and encourages self-reliance domestic industry (See No. 16). This is a common sense, and to start the coordination for Indonesia energy security program, we must establish or develop:

First, a policy affirmative in sector goods/ product and service will create positive impacts to the national interest if industry and businessmen develop as well to lead the process of initiative development. But, at the same time, they keep hold of GOI to do a study and examination as an important part of today's global need.

Second, BPPT (The Agency For The Assessment and Application of Technology) as the technology research development should possess greater authority to the independence of domestic industry and technology needs.



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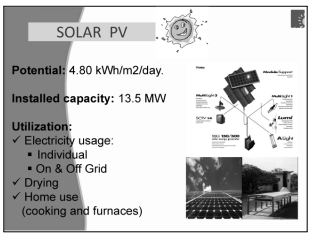

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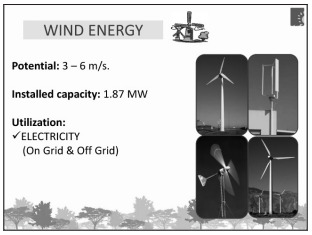

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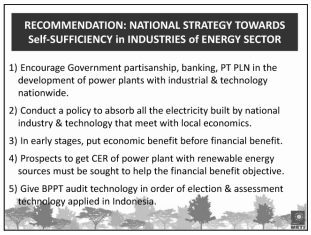

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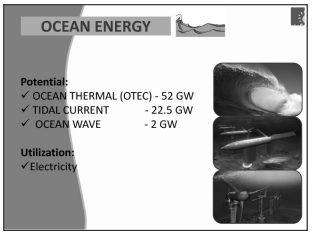

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Session 3

Public Transportation Systems (Presentation)

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration

Public Transportation System in Jakarta

Fauzi Bowo
Governor, the City of Jakarta (DKI Jakarta)

A very good afternoon to all of you. Prestigious guests, ladies and gentlemen; President of Honda Foundation, Ishida-san; Yoshinosan, former President and CEO of Honda Motor Co., Ltd.; Ilham Habibie, Chairman of the Standing Committee on Research and Technology, Indonesian Chamber of Commerce and Industry.

I'm very delighted to speak in front of you in this seminar, particularly in regards to this very interesting thing, transportation in Jakarta because the traffic jams are one of the biggest issues the city is facing, and it impacts on almost everybody. Almost everybody here has complained about the traffic jams in Jakarta, and since this is almost the campaign time for the governmental election, the topic has become more and more interesting. Maybe it is also even more important to influence your decision on June 11th.

I will try to explain once in English and once in Indonesian. Since the journalists are Indonesian, I think some of my presentation will be in Indonesian. I hope you don't mind.

I don't want to go into details on the reasons why we are facing what looks a little like an impossible task for Jakarta because if we look closely at the road capacity of Jakarta, the road map, the road ratio of Jakarta is only 6.4% compared to Tokyo with 21%; Paris, 24%; Singapore has a road ratio of almost 17% (See No. 2). Road ratio is actually the space for roads compared to the total space or area of one city.

And if you look closer into the demands, there are almost 22 million trips daily in Jakarta, and 70% of those trips are motorized. The number of motor vehicles is skyrocketing thanks to all the manufacturing here, and most of their products are sold in Jakarta and the surrounding area.

As a matter of fact, in 2011, we have almost 8 million units running in Jakarta, and 98% out of the 8 million motor vehicles are private vehicles. On the other hand, public transport is very limited. You have less than 2% of the total motor vehicles in Jakarta. Every year, the number of motor vehicles is growing by 8% to 9% while our capacity to increase our road plan is very limited. This is mostly due to the fact that planning permission is very difficult. Usually, it involves a social problem in Jakarta. Now that Indonesia has become a very democratic country and everybody can complain and proceed to the court, it takes some time to clean up all these cases.

So having said all this, let us look closely at the congestion

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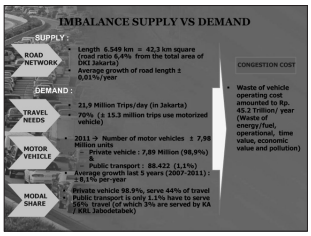

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that we are experiencing in Jakarta (See No. 3). The use of road space is certainly not efficient and not effective. We don't have any means to control the growth of motor vehicles. Because you, Honda Foundation, know best if we restrict the growth of the automobile industry by 0.5% only, there will be many, many workers and laborers unemployed, which we cannot take.

So, what we mostly are building towards the future is restricting the usage of private vehicles. It's done in almost every big city in the world, Singapore, London and Stockholm. We will introduce electronic road pricing at the same time as we increase the capacity of public transport for some areas of the capital.

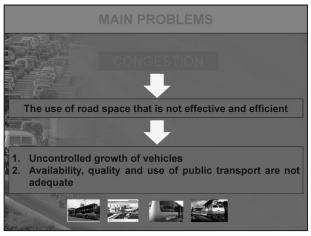
The other impact that also has to be seriously taken into consideration is the commuters, about 2 to 2.5 million daily commuters coming from the surrounding areas into Jakarta who mostly use their private cars, and of course, this is an additional burden to the traffic congestion in Jakarta (See No. 4). Currently, there are approximately 8 million motor vehicles, everyday entering the city and going back into their residence destination at nighttime. And, this has caused a lot of traffic jams particularly at those entrances and exits, coming and going into Jakarta.

This will give you a clearer picture of the percentage of transportation on one hand and use of traffic in Jakarta (See No. 5). Seventy percent of these trips are motorized, only 30% are not motorized, and then because of this distribution, 51% or more are using public transport, which is only less than 2% of the total number of vehicles, and 44% is still using their private vehicles. So for this reason, we have set a master plan for what we call this "Macro Transportation Scheme for Jakarta."

This is the worst scenario that will hopefully not happen in Jakarta because if we compare the total number of motor vehicles with the absorbing capacity of the road plan, we are going to become stuck in 2014; two years from now (See No. 6). Hopefully, this is not going to happen because we are going to improve our public transport capacity accordingly, and we are also trying to restrict the usage of private vehicles at the same time.

According to the Macro Transportation Scheme (PTM), mass public transport will be the BRT (Bus Rapid Transit) and the train (See No. 7). This is the solution for the traffic congestion in Jakarta. Then, we will implement traffic restrictions: motor vehicle restriction, road pricing, restriction in parking management; improvement in the road network capacity: intersection/junction would be resolved through Intelligent Transportation System (ITS) including fly-under and underpasses, road widening and new road development. We will also install pedestrian and bicycle lanes on the major arteries of Jakarta.

All this will be followed by the next question, which is how to finance this because our financial capacity is limited. I will give you some explanation about how we can finance the MRT (Mass Rapid Transit). We have been discussing the MRT for the last 20 years. There are many, many options that we had and were trying to explore. Basically, we knew that the MRT or such infrastructure



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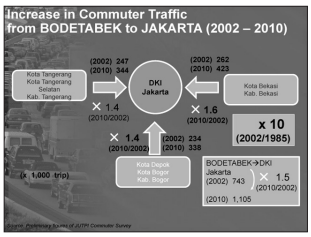

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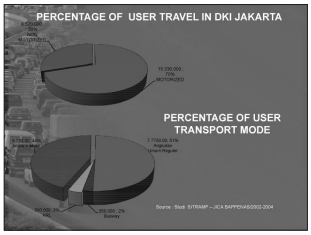

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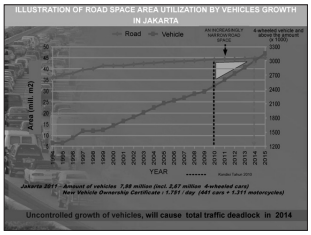

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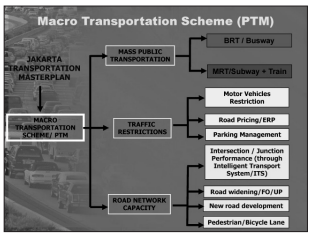

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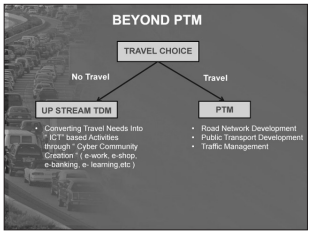

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could not be financed by commercial loan or commercial money, so we kept on looking not for a commercial loan but for a loan with a long-term scheme and certainly the lowest possible interest.

Finally, we found that by getting a STEP loan, a Special Terms for Economic Partnership, from Japan with 30 years plus 10 years risk period, and the interest was 0.25% on a yen basis. Only this type of financing would enable us to build the MRT. If it is not feasible, we would not be able to start the construction of the MRT.

There is another point that I wanted to mention. If Jakarta's government had not taken the initiative to take over the majority of this loan, the MRT would still be a dream for Jakarta. So, we took over 58% of the total loan while central government took only 42%, the lesser than us.

It is certainly our responsibility and we feel that we could not wait. For that reason, we dare to take this kind of responsibility, the majority of responsibility. Driven by this, I finally made my decision and have driven my financial management to uphold the objectives that we have to push in order to back up the loan agreement.

So, we worked hard for the last five years and finally managed to get the approval, a clear balance sheet from the state government. It was the best deal we could get, and then on top of that, this is the first time that Jakarta has been given this kind of approval by a state audit. This will certainly back-up our financial capability in acquiring this loan from any institution in the world.

The other obviously important thing is to change the mindset of my people and of my administration, in short, they should feel more responsible for any kind of loan or financing debt that they have received from a third party. In this particular case, it was from the Japanese government, but also from the public money because this year we are going to issue municipal bonds, not general purpose bonds. So, this goes hand in hand because in our long-term financial projection to pay back our loan agreement, we have to present our cash flow up to the year 2025, and this has been approved by the Japanese government.

What I would like to underline once again is that this kind of big project requires consequences to be fulfilled by the entire administration. While at the same time preparing for bond issue, we are also rated by an independent agency. Recently, they gave my administration the rating of AA+ which is very good and we are happy with that. This is once again proof that we have been going well with our financial management in the capital city.

So, as the final step, all that we need to do next is to build up on these strengths and enhance the trust that we get from the capital market, from the people, from financial resources from abroad and to make it more useful to improve our infrastructure in Jakarta.

Ladies and gentlemen, this is what I have been trying to explain that if we improve the capacity and quality of our information communication technology, we are sure that we can save a lot of traveling, so we can control the demand for travel and reduce the traffic at the same time. Jakarta is already, not

100%, but more than 60% to 70% is wired, so we can have access to information and communication technology from everywhere in Jakarta. If we can combine this with the ability to control this demand for travelling, I certainly hope we can reduce the traffic that are not necessary, but at the same time we need to improve the other aspects, road plan, public transport and traffic management at the same time.

Once again, ladies and gentlemen, this is a short presentation. I know talking about traffic congestion in Jakarta will take hours, maybe days, to come to a conclusion and come to a suggestion for any kind of solution. But, this will give you at a glance about how serious the many causes that lead to the traffic congestion in Jakarta and the solution that we are going to push for the future are.

I would like to close my presentation by mentioning that the most important part of the solution is the financing. It will cost the government of Indonesia almost 15 trillion rupiah to build up the first stage of the MRT from Lebak Bulu in the southern part of Jakarta to Bulus-Bundaran HI in the center of Jakarta. Then, it will cost another 13 to 14 trillion rupiah to continue into the old city of Kota.

Now we are under negotiation for the financial need for East-West. East-West would connect the city of Cikarang in the east and the city of Balaraja. It is beyond my administrative boundary, but we do so because we know that the demand is not only in Jakarta. It is also very high in the neighboring areas of Jakarta, and that will certainly cost more. It will be possible in the range of 100 trillion rupiah, but this is what we need.

And at the same time, we also need to improve the capacity of the train. Existing train railways that are already operating here need to be improved. We also need to build flyovers and underpasses in order to make it possible for the trains to go faster and increase the frequency of the trains.

Some of these things can be done by public-private partnership, but on the side of the MRT, for example, it is not always possible to invite the private sector to join because it is expensive unless you get a full concession, which is most likely not possible in Indonesia for the time being. So, we have to change a lot of regulation, even my administration had to change the law on the railways in Indonesia to make it possible for us to run the MRT because according to the previous law, railways are a monopoly of PT Kereta Api which made it impossible for us to run the MRT. I used to say to everybody that my first goal is to look for proper financing for infrastructure, the second is how to change the regulations because there are many regulations that have to be changed and be especially tailored for the capital city to acquire the proper financing.

The third point is that in most cases, we forget to improve the capacity of human resources that are supporting the system. If we go into the system which is based on the financial market, all the human beings, all the staff involved in that should change their mind and prepare themselves accordingly.

This is what we are doing in Jakarta currently. I'm happy with the result, taking office in 2010. And I'm looking forward to having faster development which will bring maybe long, great steps towards solving the many problems of the capital city in the coming years.

Thank you very much for your attention.

Honda's Views and Approaches on the Next Generation Personal Mobility

Toshio Yokoyama
Senior Chief Engineer, Technology Development Division, Honda R&D Co., Ltd.,
Research Project Leader, Next Generation Transportation Systems

Good Afternoon. I am Toshio Yokoyama of Honda R&D, Japan. I joined Honda in 1979 and have worked on automotive R&D, fundamental research. I am currently leading Honda's future transportation system research including ICT (Information and Communication Technology)/ ITS (Intelligent Transport Systems) area. Today, I would like to talk about public and personal transportation systems.

These are my topics today (See No. 2). First, I want to tell you about a variety of mobility and its surroundings. Then, I will explain mobility issues in urban areas and share our goals and technologies for future transportation society. And finally, I will show you our vision regarding future of personal mobility and urban transportation.

Mobility is an essential human need (See No. 3). When you trace locations where Homo sapiens' fossils were found, it is suggested that our ancestors emerged from Africa some 6 million years ago. Our ancestors departed Africa about 90 thousand years ago and took 50 thousand years to reach Eurasian Continent and Oceania. They then arrived in South America about 10 thousand years ago. In other words, humans traveled all around the world in 80 thousand years. Mr. Soichiro Honda, the founder of Honda, once said, "No matter how often you talk on the phone, it is no match to face-to-face communication and firm handshakes." Mobility is essential for human lives and I believe it is vital for us to evolve.

These are from World Business Council (See No. 4). Honda is an active member of this council. When income increases, people choose personal mobility over public transportation because personal mobility is more convenient and gives you more freedom. Naturally, travel distances increase dramatically as people use more personal mobility. When the economy is growing, people and products move actively. When people move more, the economy grows more.

Cars give you convenience and freedom. In 2000, there were 700 million vehicles in the world (See No. 5). Now, the number is growing much faster than we expected. As the world economy expands, the number of total vehicles may reach more than 2 billions by 2050.

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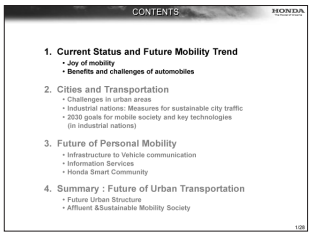

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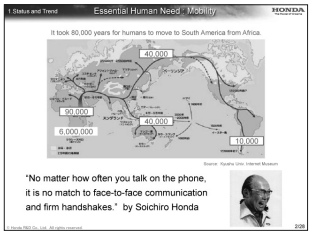

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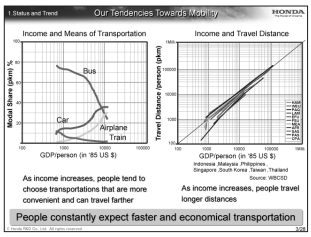

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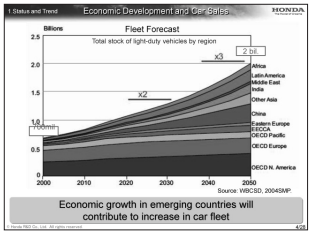

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Here, you can see a variety of mobility choices (See No. 6). We can categorize them into two major groups. One is personal mobility that can move freely anytime anywhere. The other one is public transportation that can move large number of passengers from one point to another. Among personal mobility, motorcycle and car are especially convenient because they can travel long distances as you can see.

The number of cars is growing fast in the world due to its great convenience as I mentioned earlier. However, its energy consumption and CO_2 emission are challenges when you compare to other transportations (See No. 7). As the number increases, these issues will become bigger. We also concern that traffic accidents and congestions will increase and that may impact economy.

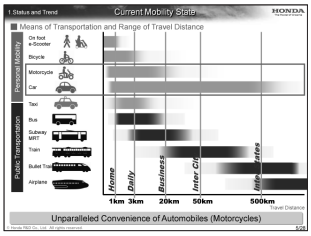
In the next chapter, I will touch on city and transportation.

This graph shows the global population growth trend (See No. 8). You can see that developed countries maintain the status while population in emerging nations is likely to grow drastically. Especially, the urban population in emerging countries increases so much that it is expected to reach 5.5 billions in 2050.

These are major challenges that urban areas in the world currently have (See No. 9). Global warming, increasing traffic accidents and energy consumption are some of the global issues. There are local specific challenges, too. More people you have, more congestions you will have, and pollution gets worse. When you have less people, public transportation system will be depressed so that mobility-poor people like seniors lose mobility. As a countermeasure, some cities in developed countries have introduced “Compact City” concept. On this map, you see red dots. These are some of the successful compact cities such as Portland in the US, Nantes and Strasbourg in France. Our team visited these cities to study them.

First, look at the history of city structure to study how it changed from age to age (See No. 10). In the 1770s, the Industrial Revolution began. People used to work at home or close to home, but with the industrialization, people started to commute. About the same time, London and Paris began to develop as modern cities. In the 1920s, high economic growth and mass consumerism drove people to live in suburbs and work in cities. People started to use personal cars, and that advanced road infrastructures. Megacities polarized into one, like Tokyo and New York where public transportation systems are well established and the other like Los Angeles and Houston where people are largely dependent on personal cars. In the 1970s, a concept of compact city was born, and Nantes and Strasbourg incorporated the idea in the 1980s in an effort to achieve sustainable society.

These are some of the actual compact city examples around the world (See No. 11). This is a typical compact city road infrastructure. The blue line is an orbital road built around the center of the city. From the city center, several arterial roads run radially. Vehicles travel mainly on this infrastructure. On the orbital road, many Park & Ride systems are available. You leave your suburban



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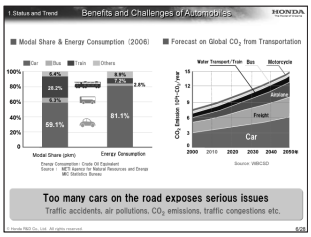

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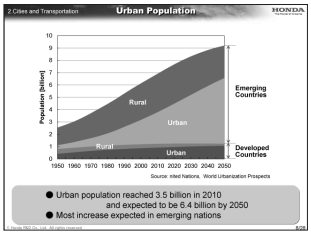

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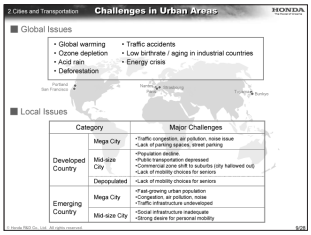

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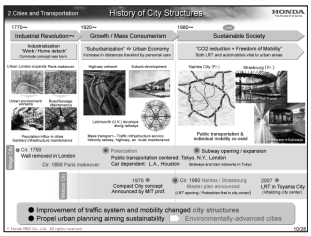

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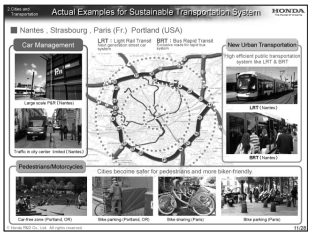

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home by car and park it at your Park & Ride station, then you can take advanced public transportation such as Light Rail Transit (LRT) and Bus Rapid Transit (BRT) to the city center. You don't need to use your car to get to the city center, so there is no traffic. In the city center, people move around with LRT or BRT. That makes streets safe for pedestrians and bikers. Basic concept here is not to remove vehicles but make good use of variety of transportation systems.

From what we learned so far, a sustainable transportation system should (See No. 12):

1. Provide a variety of mobility choices
2. Provide safe environment for everyone on the road including pedestrians, bikers, and those who use public transportations and vehicles.

Good compact cities with a sustainable transportation system like this has lower dependency on personal vehicles in comparison to that of North America. We can see there is a sound balance between personal vehicles and public transportation.

Honda aims to bring joy of using personal mobility all the time. We are focusing on several key technologies to achieve sustainable society (See No. 13).

For the next personal mobility, electric vehicles and variety of mobility options for optimal means of transportation are important in order to deal with growing travel distances and to reduce CO_2.

For Traffic System, ICT/ITS information network that can help driver make decisions while driving is essential.

For Energy area, energy management that helps reduce CO_2 in cities is critical.

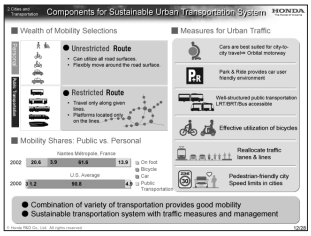
Now, I will talk about Honda's idea of future personal mobility.

This page was shown by Mr. Moriya earlier, however, this page looks like sales talk of Honda. It is why I would like to explain again (See No. 14). At Honda, our vision is to provide "the Joy of Mobility" and create a "Affluent and Sustainable Society." To achieve these, we are working toward Honda Electric Mobility Synergy Vision. With this vision, we can manage electric mobility you see on the right circle and various energy technologies including renewable on the left using Honda's unique information communication method.

Honda is conducting feasible study to validate practicality of electric mobility in cities and charging system using solar power generated and stored at home. We are looking at this from energy management point of view.

When thinking about personal mobility's future, we first looked at LRT (See No. 15). LRT is considered as one of the most environmentally friendly inner-city transportation. We use LRT as a benchmark for developing our future personal mobility concept. We want to create a personal mobility that exceeds LRT both in environmental performance and traffic capacity. Environmental performance can be achieved with electrification and light weight body technologies. Traffic capacity can be satisfied with platoon driving using ICT/ITS technologies.

Quite a few studies on platoon driving are conducted in Japan (See No. 16). For inner-city traffic, some are working on optimal traffic



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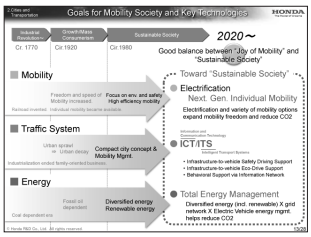

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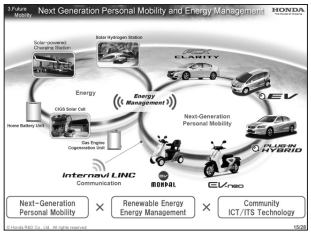

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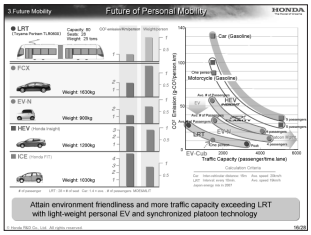

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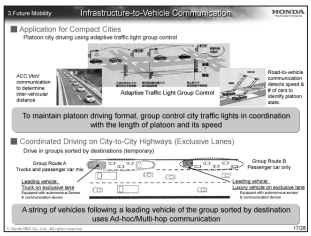

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light control based on road density to smooth congestions. For city-to-city highways, a method of coordinating a group of vehicles driving on exclusive lanes is considered. This will help reduce traffic jams and improve traffic flows.

For electric vehicles, Information and Communication Technology would be more important (See No. 17). Japan has also started several feasibility studies to improve charging support services. The studies include easy way to check battery charge levels and to find charging stations.

This is our idea of Smart Community (See No. 18). In this community, homes, cars and charging stations are connected by information, and all are managed by Honda Energy Management System. Honda Energy Management System can help us reduce CO_2 and become less dependent on grid with this Smart Community concept, with which we can continue to enjoy joy of mobility and still can make society sustainable.

Now, I will use Jakarta as an example to talk about future of urban transportation.

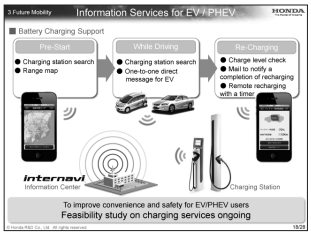
Let's look at Indonesia (See No. 19). According to a report from the United Nations, World Urbanization Prospects, about half of the population in Indonesia live in cities, and the number is expected to increase substantially. As urban population increases, the number of towns with a population of 500 thousand to 5 millions is likely to balloon. What can we do to provide enough mobility freedom and successful lifestyles to the growing population in urban areas? What city size and structures are appropriate? What kind of city transportations are required?

As Indonesia's economy grows, the number of motorcycles and cars also increase solidly (See No. 20). However, Jakarta is also facing a traffic congestion issue, and in order for Jakarta to continue its successful development, traffic congestion is something Jakarta has to find good solutions.

DKI Jakarta has an area of 660 km² with a population of 10 million (See No. 21). Jakarta's metropolitan area is about 30 km in radius with a population of 30 million. Jakarta has a very similar urban structure as Tokyo.

At the earlier of the presentation, I said Jakarta and Tokyo are similar. However, there is one difference between Jakarta and Tokyo: trains (See No. 22). The total length of rails in Tokyo is 10 times longer than that of Jakarta. And, Tokyo metropolitan trains has 10 times more transport volume. In spite of its length, Tokyo trains run amazingly punctual. I can commute always on time. Punctuality is one of the appealing points that a competitive city has to offer.

However, Tokyo still has extreme congestion issues (See No. 23). High land price and high concentration of business in inner-Tokyo made people move to suburbs. Many Japanese commute from outside of central Tokyo so that even with great passenger capacity, trains are packed more than full, and many roads are congested. New York City is well known for its high land value, but still, New York has less people commute from outside of the city compared to Tokyo. This is a problem in Tokyo. However, the land



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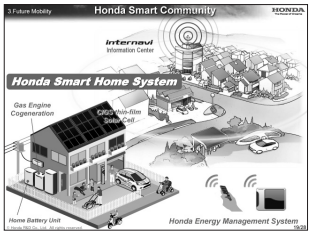

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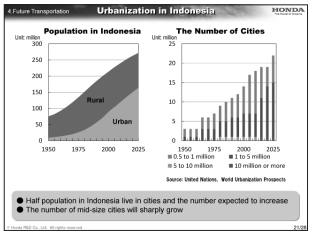

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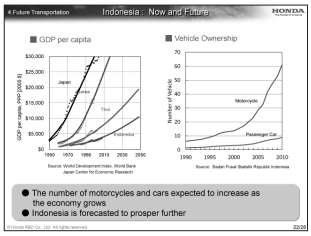

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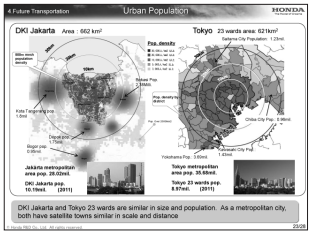

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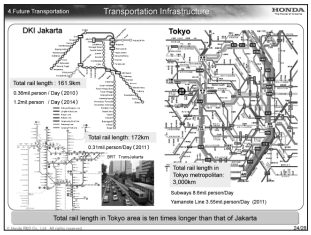

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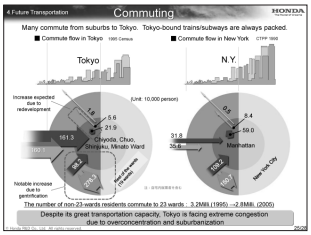
value in Tokyo is declining, and we see some people have started to come back to central Tokyo.

Urban area in future should be a place where we can move freely, safely and comfortably and can lead affluent life (See No. 24). On the other hand, we need to consider our resources on earth are limited. It is therefore very important for our future city to be sustainable. In suburban cities in Japan, the city centers are losing people to outer areas, and this is damaging suburban economy. Revitalization effort to bring back people into the city centers is critical. In mega cities like Jakarta and Tokyo, we want to start building more than one hubs with multiple functions instead of one large hub where everything is concentrated. A city structure with connected smaller-scale hubs will provide mobility freedom and sustainable lifestyle.

This slide shows various personal mobility that will play important roles in Honda's sustainable society vision (See No. 25). Inner-city, suburbs, further out, each situation and each location has its optimal form of mobility. Honda is working hard to provide "Joy of Mobility" and aim for "Sustainable Society" by reducing CO_2 from our motorcycles and cars, by providing comprehensive supports for people using mobility with information-communication and ITS technologies and by optimizing energy necessity for day-to-day life.

Ecological and clean personal mobility will come to your towns very soon. Honda wants to work with you to create a low-carbon society where all of us enjoy freedom of mobility (See No. 26). Thank you for your attention.



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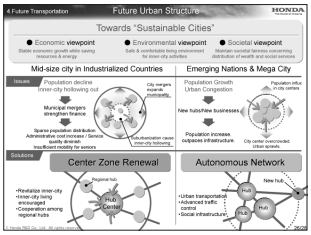

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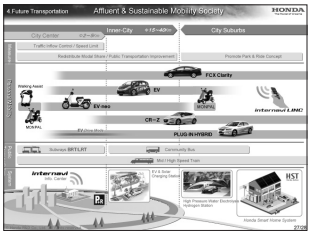

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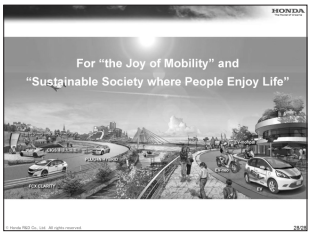

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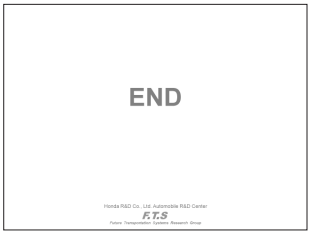

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Wrap-up Session

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration

Ilham A. Habibie
Chairman, Standing Committee on Research and Technology, KADIN Indonesia

Good afternoon, ladies and gentlemen. His Excellency the Japanese Ambassador to Indonesia is also present with us today, and I thank you to everyone who is still here at this late hour.

I have honor and pleasure to try to wrap up, which is not easy because the scope of today's presentations is very large.

We started this morning by basically looking at national innovation systems on both sides, in Indonesia and Japan. We had a very good insight into the role of, for instance, how Japan is running national innovation systems in regards to energy and manufacturing technologies, mobility and other very important topics for the future.

Then on the Indonesian side, the chairman of the National Innovation Council, Prof. Zuhal, gave a little outlook on how Indonesia perceives the future in which a system based on what he calls the 1-747, 1% of GDP needs to be spent on R&D, which is not the case at all at the moment as we are only spending less than 0.1%, actually.

Then, we need to focus on, for instance, food and water supply or new energy systems and other important topics.

In the afternoon, we were then looking into the topics such as energy in general, renewable energy on both sides. Through the presentations, it became clear that there is similarities in both countries, with one exception that is Japan has already fully embraced nuclear technology and nuclear energy as a very substantial part of the current energy mix, about 30% or a little less. In Indonesia, it is not the case at all. And, you have heard from the secretary general of the Ministry of Energy and Mineral Resources that we are looking at it as a last option.

The role of renewables on both sides is clearly understood and is certainly very important. We are looking at the areas such as geothermal, wind, solar, biomass, all of which are largely available on both sides, but the usage is undeveloped. Therefore, Indonesia as well as Japan wants to go firmly into a more substantial part of renewable energy-based sources for the energy in the future.

It was obvious that there is a great potential to collaborate with one another because of the similarity in the availability of resources on both sides, geothermal and others.

In the last part of our presentations, we were talking about transportation in both countries. The Governor of Jakarta, Dr. Fauzi Bowo, gave a very interesting speech about how Jakarta's problem

costs today. We have certainly a lack of investment here, and if you compare ratios here, it was quite amazing that the road ratio in Jakarta is just around 6% compared to cities like Tokyo and Paris who have road ratios of 17%. Investment is very slow, around 0.01% per annum for additional roads in Jakarta, which has to do with congestion, and the legal situation with difficulties to acquire new land shows the obvious challenges for Jakarta.

Land acquisition is one, and of course, the other is the tariffs imposed on the general public in order to persuade people to use public transport, which is not available yet, but hopefully it will be available soon. The MRT or more buses will be especially shown as an alternative to use.

And then, as another example, if you compare Jakarta with Tokyo as a city of double the size of Jakarta, the statistics shows way more railroads, about 3,000 km of railroad compared to about 300 km. Also, only less than half a million people a day use public transportation in Indonesia. In Tokyo, it is 8.6 million, so it is a big difference and is the point that Jakarta can specifically learn something from Tokyo.

Going back to where we started, it was very clear to all of us that learning from the example of Honda, Honda is a company basically where everything has to start from a dream. People need to dream big in order to achieve something that can be useful for humanity. And as the founder of Honda, Mr. Soichiro Honda dreamt about a motorcycle and then immediately tried to invigorate the corporation by giving certain targets. Whatever the target was, he made everyone cherish and enjoy and reaped the fruits of those targets.

Basically, competition participating in international events such as races was very early on identified as a means to develop and drive the organization to perform and excel in their fields.

So, the road ahead for Honda was clear. From motorcycles to cars and last but not least, it will be something else. It may be space even we do not know. But right now, hopefully in next year, we are going to see the first HondaJet which is going to be produced in the United States.

And as I learned in private conversation, which was not clear if it's true or not, Honda even produces the engine of HondaJet, so it is very unique as one manufacturer produces both the airframe and the engine. In today's world, this is quite unique and probably it is a strength to have more control about the fundamental technology that makes sort of vehicle successful.

The overarching topic is basically how to innovate by cooperation with industry and academics. And now, again coming back to the first session, this morning in various presentations was made clear that collaboration between these two are essential to make it happen. Universities and also vocational schools are learning from our industries in the context of SMEs and others, and it is essential to really drive innovation and the growth of the economy.

Innovation doesn't necessarily mean rocket science. It can be something very simple, very new, not necessarily in the whole world, but maybe in that country. In addition, it needs to be very

down to earth, so it doesn't have to be very sophisticated, but a little contribution to make it more easier for the consumers in the country or for the manufacturers in that country and for a collaborative effort between the two, industry and academics, supported by the government.

Then, as Prof. Zuhal was saying this morning, the so-called triple-helix synergy between ABG, academic, business and government, is basically necessary to maximize the synergies between the three in order to drive the economy and to go. We are talking about an efficiency-driven economy to something that Japan has already achieved, which is a large based and innovation-driven economy, and that is the future of Indonesia.

Even though I stand here as the Chairman of the Standing Committee for Research and Technology, the Committee has not been very dominant within KADIN in the last decade. The KADIN organization has looked into the current practices of the industry and current issues, but for research and development, you can see that in Indonesia it has not been done a lot, and that is certainly an exception on the government side. However, the private sector certainly needs to invigorate its investment, its commitment, its projects in R&D to basically drive their industries, their companies to a better future. So, we have to push collaboration with academics and with the government as necessary.

And, I would just like to close the wrap-up by saying thank you very much to all the participants and hope that this will not be the last symposium held in Jakarta by Honda Foundation. I feel this can hopefully be continued, and I thank everybody here and perhaps His excellency can say a few words to all of us to encourage us.

Thank you very much for your kind attention and all the best. Thank you.

Yoshinori Katori

Ambassador of Japan to Indonesia

First of all, thank you for your kind invitation. This kind of symposium focusing on innovation of science and technology and the cooperation, as was mentioned the ABG, is one of the most important areas where we should continue our efforts. I'm therefore very happy that I could come here and also notice that this kind of important symposium is taking place.

As I mentioned, it will be a very useful and important activity if Honda Foundation can continue this kind of symposium in Jakarta. We, I mean Japan and Indonesia, already have a history of cooperation, but recently we are also discussing how we can continue this very important relationship. One key point is innovation and science and technology, so I am very glad to notice that we are already cooperating in many areas and I hope, especially in the field of innovation and in the field of science and technology, that Indonesia and Japan can cooperate even more in the future.

Thank you very much for inviting me.

Akira Kojima
Former Chairman, Japan Center for Economic Research and HOF Director

Good afternoon, ladies and gentlemen. After the beautiful wrap up with eloquence from Habibie-san, I almost lost my job.

Before my wrap-up, I would like to deliver a report about what Japanese people are thinking about Indonesia. It's a feeling of deep, deep, gratitude. After the disaster, your society and people are so warm and kind, and the most impressive thing is that second year after Japan's earthquake disaster, your President together with the first lady visited the disaster stricken areas and encouraged the people. This is very important. Japanese people were deeply moved.

After the disaster, the decline or loss in economic activities was tremendous. At that point, auto production declined by nearly 50%. A similar thing happened in the year 2009 after the Lehman Brothers collapse. These were different reasons. In 2009, demand disappeared in the international markets. But, this time after the disaster, we became unable to produce. Our capacity was lost because of the disaster. The supply chain was severely disrupted. But, it has recovered now to the pre-disaster level.

Relating to today's subjects, we are now suffering from energy problem: How and how much we can encourage renewable energy sources. Last March we lost a vast nuclear power station, so at this moment out of the total 54 power stations all are now idle, and we are now discussing when we can reactivate some of the power stations. But anyway, at the moment, 30% of the total potential electricity supply capacity has been lost.

After these discussions, I feel that we haven't reached agreement on several points. First, as was mentioned by Goto-san, we are just in the midst of a great transformation. This transformation can be characterized by historical events. It's not 9.11 but 11.9 in 1989. This is the day when the Berlin Wall fell. Next year the unification of two Germanys. Next year implosion of Russia, symbolizing the end of Cold War. Then, almost explosion of foreign direct investment leading to the creation of globalization and the global economy.

And Japan is now focusing on the next global economy, VIP, Vietnam, Indonesia, and the Philippines. You are one of them as your high economic growth proves. For next step, we have a common understanding that our challenges can be achieved only by innovation, technological and social innovation. This issue is very important.

We discussed very much, the discussion was very rich, and it was so compressed, so it is not easy for me to swallow.

Anyway, today, I am not the specialist in natural science. My area is social science, so I see with that perspective. We have to speak in terms of growth accounting. The economic growth ratio is determined by contributions of three factors. One factor is the continuation of the input of capital. The second factor is input of labor. The third factor is what we call the TFP, total factor productivity. In Japan, the demographical situation is different from your country. We are now entering into depopulation age. The total population is beginning to decline. So, unless we fix our systems and challenge innovation, our growth ratio will constantly go down. That's our challenge.

As for Indonesia, you are still developing. That's the strong point. China, they are growing, but in 10 years' time, they will face all of a sudden an ageing demography after one-child policy more than 30 to 35 years since its introduction. So, China is facing very soon and very tough demographical problems. In the terms of demographic bonus, Japan's was lost almost 10 years ago. In China, the bonus is peaking out, in 10 years they will lose all the bonus. But in Indonesia, the bonus will last another 20 years. You have plenty of time to fix and introduce technological and social innovation. That is a very, very important thing.

Anyway, I have a lot of learning about this very compressed discussion. May I thank you for your attention.

Closing Remarks

HONDA-KADIN
International Symposium

Innovation by Industrial-Academic Collaboration

Closing Remarks

Kunio Nakajima
Vice President, Honda Foundation (HOF),
Former President, Japan Chemical Innovation and Inspection Institute

Thank you for your kind introduction. I am Kunio Nakajima, vice president of Honda Foundation. Through a whole day, I believe that this symposium became very fruitful and valuable for all of us here today.

Started with keynote speeches from Indonesia and Japan side, we had presentations and discussion by experts of Innovation System and Policy in the morning. Then, forefront professionals introduced their works related Research and Development.

There were various symposiums between Indonesia and Japan. But, today's symposium is uncommon because we had prestigious representatives all together from academics, industries, and business areas related with science and technology. I suppose that every session fully excited you thus you must be little tired.

Taking this symposium as the beginning, we would like to maintain close relationships with Indonesia for further development of both of us. I thank you very much for attending this symposium.

Published by: Satoshi Matsuzawa
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Published April 2013

HONDA-KADIN

International Symposium

"Innovation by Industrial-Academic Collaboration"