

TOWARDS SUSTAINABLE  
GROWTH: BUILDING  
SMARTER COMMUNITIES

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FUTURE SCENARIOS OF  
GREEN TECHNOLOGY  
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ELECTRIC POWER INDUSTRY  
TRANSFORMATION: DRIVING  
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**MIGHT**  
Malaysian Industry-Government Group  
for High Technology

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## TOWARDS SUSTAINABLE GROWTH:

BUILDING SMARTER COMMUNITIES



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myForesight® is a pioneering national level initiative dedicated to the prospecting of technology for business through the field of Foresight. It provides a common Malaysian based platform for the Government, Industry and Academia to share experiences, insights and expertise on the strategic futures issues, both at the local and global levels.

Its key components to its mission are intelligence, research, competency and community. myForesight® raison d'être is to accomplish the following:

1. Shaping Malaysia's future possibilities;
2. Promoting and mainstreaming of foresighting in national, sectoral and corporate planning;
3. Identification of key technologies to support sectoral development;
4. Identification of key and potential industries from technology perspective.

## editor's note

# Initial Thoughts



by **RUSHDI ABDUL RAHIM**  
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Greetings Dear Readers,

It is my sincere pleasure to bring you the latest edition of myForesight® magazine which focus on the topic that have been discussed at various engagements that we are involved in during the past year - Sustainability.

You would also have noticed the inclination toward this word is so great that you cannot miss it – It's there whenever you flip the newspaper; it's on the talk shows and radios, on banners and bunting...everywhere. People are talking about sustainable lifestyle, sustainable economy and growth, sustainable development ...and the list goes on. The latest that is being mentioned by our Prime Minister is “Fiscal Sustainability”. He mentioned this during the Global Science Innovation & Advisory Council held in September this year.

So what is “Sustainability”? Well literally according to the Merriam-Webster dictionary,

sus·tain·abil·i·ty **noun**

sus·tain·able **adjective**

: able to be used without being completely used up or destroyed

: involving methods that do not completely use up or destroy natural resources

: able to last or continue for a long time

Our discussion here at myForesight® simplify the definition of sustainability as “meeting the needs of the present without compromising future”. Sounds familiar? Well this is almost similar to the definition of sustainability which is the cornerstone of Malaysia's New Economic Model. Therefore the discourse involving sustainability have always revolves around the topic of the need of a change of mind-set, change of lifestyle with the words sustainable consumption and production thrown in for good measure. I guess many of us agree that on our current trajectory, future scenarios will be bleak and therefore change is required to ensure sustainability. In this edition, we provide you with the green technology scenarios of Malaysia in 2030 depicting the role of green technology in ensuring the country's sustainability. These scenarios were developed in multiple scenario sessions organized by MIGHT and Ministry of Energy, Green Technology & Water.



The New Economic Model

In various discourse sessions, forums and dialogues, we have stressed before the start of the decade that the key themes of the future of Malaysia will be on mobility, security and sustainability. In fact nothing has happened since then to change our views.

Anyway, the Science Advisor to the Prime Minister kick start this magazine with his view and insight on sustainable development, stressing that maintaining a bio-diverse world is not a hindrance to development – but a fundamental requirement.

Therefore there is a need for us to have different strategies in developing our cities and communities. This edition provides a brief on Malacca Smart City development leveraging on Green Technology and various sustainable development practices. This is complemented by a piece on “Sustainable agro-ecosystem management for rapid and high impact development” the theme for A-Bes 2014 (Agrobiodiversity and Agroenvironment symposium) organized by MARDI.

On a parting note, sustainable development also is a key agenda in Science for Well-Being, a key thrust of Science to Action (s2A) in ensuring that the uptake of science contributes towards the well-being of society and communities.

As usual, we hope you find this magazine beneficial and thought provoking.

We expect you to have your opinion on certain matters. We want to hear them if you are willing to share. We welcome your feedback and contributions.



**“Sustainability ...Meeting  
the needs of the present  
without compromising the  
future...”**

## leader's insights

# The Politics of Biodiversity Loss



by  
**PROF TAN SRI ZAKRI ABDUL  
HAMID**

Science Advisor to the Prime  
Minister of Malaysia / Joint  
Chairman – Government, MIGHT.

If we are to mainstream biodiversity concerns into development planning, we must offer a compelling rationale and demonstrate biodiversity's relevance to wealth generation, job creation and general human wellbeing. Only a persuasive “why” resonating throughout society will successfully get us to urgently needed negotiations of who, what, where, when and how to halt disastrous biodiversity loss.

Experts in a broad span of disciplines – taxonomists, agronomists, social scientists, climate scientists, economists and others – are working together to arm the public and their policymakers with relevant evidence on which to base decisions.

Scientists have authoritatively established links between biodiversity and climate change, food security, water security, energy security and human security.

In 2005, we published the landmark Millennium Ecosystem Assessment, elevating the issues to policymakers and decision-makers as never before. Involving more than 1,000 experts worldwide, it was hailed for its success as a platform to deliver clear, valuable, policy-relevant consensus on the state, trends and outlooks of biodiversity.

A need quickly became apparent for a sustained, ongoing mechanism to bridge the gap between policymaking and the scientific world's ever-accumulating insights.

In response, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) was established in 2012.

IPBES' initial deliverables included a policy-support tool based on the economic values of biodiversity, a fast-track assessment on pollination services and food production,



insights into the sustainable use and conservation of biodiversity, and a global assessment of the overall state of biodiversity and ecosystem services. IPBES also aims to integrate indigenous and local knowledge systems in its work.

The dollar values of biodiversity and ecosystem services are difficult but not impossible to quantify. In 1997, experts estimated the global value of ecosystem services at an average of US\$33 trillion per year. An update this year of that study nearly quadrupled the estimated annual value of those services to US\$125 trillion.

Within that number, for example, is the 2010 estimate by economists that the planet's 63 million hectares of wetlands provide some US\$3.4 billion in storm protection, food and other services to humans each year. And, a large portion of the 640 billion pharmaceutical market relies on genetic resources found in nature, with anti-cancer agents from marine organisms alone valued at up to one billion dollars annually.

The loss of biodiversity through deforestation, meanwhile, is estimated to cost the global economy up to US\$4.5 trillion every year.

The fast-track assessment on pollination services will address profoundly worrisome changes in the health of bees and other pollinator populations, the services of which underpin extremely valuable — some might say invaluable — food production.

The thematic assessment on the sustainable use and conservation of biodiversity will address the ecological, economic, social and cultural importance of mainly harvested and traded biodiversity-related products and wild species. It will assess the potential of the sustainable use of biodiversity for the enhancement of livelihoods, particularly

## **Sustainable development: Maintaining a biodiverse world is not a hindrance to development - it is fundamental**

those of indigenous peoples and local communities.

The IPBES global assessment of biodiversity and its many benefits will build on Global Biodiversity Outlook reports, the latest of which last week, urged the world to step up efforts to meet agreed-upon biodiversity targets for 2020.

We have generated much knowledge and continue to add to it. Achieving our sustainable development goals, however, depends on the successful application and sharing of that knowledge.

A workshop in Kuala Lumpur in November last year concluded that most nations - unanimously committed to protecting biodiversity - nevertheless do not have the capacity to measure and assess their genetic and biological resources, nor to value key ecosystem services that nature has provided them. Helping remedy that capacity shortfall is a core function of IPBES.

Communicating our findings will also be critical in mainstreaming this agenda,

using both conventional and new social media platforms, and framing the issue as one of development rather than of strictly conservation.

Furthermore, all stakeholders must be engaged — the business community, in particular — and innovative private public partnership are needed, most especially.

Finally, we must incorporate biodiversity studies at every education level.

Let me end by quoting the prime minister when speaking of his admiration of Malaysia's towering Cengal tree, our nation's equivalent to the magnificent California Redwood, "Such giants", he said "may take centuries to reach their awe-inspiring height and girth, but can be felled in less than a few hours by an unscrupulous timber contractor with a chainsaw."

Such outstanding monuments of nature are, indeed, so much more valuable than their wood fibre — they engender a sense of pride in our natural heritage.

This appreciation will, I believe and hope, ultimately pique the interest of some of the most brilliant minds in a variety of disciplines, and drive the innovative, nature-based solutions to global challenges on which future generations will depend.

The promising U.N. discussions of post-2015 global development goals should help put biodiversity where it belongs at the heart of the agenda — recognised as a prerequisite for poverty alleviation, good health, food and water security, and more. As we design an age of sustainable development, let us recognise that maintaining a biodiverse world is not a hindrance to development - it is fundamental to development.

*This article was originally published in the New Straits Times, October 18, 2014*

## experts' insights

# The main key Challenges of Foresight Studies in Developing Countries



by  
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Futures studies have enormous effect to reduce the development gap between developing and developed countries. But there are challenges in developing countries that deeply affect foresight activities and diminish its applicable usage. Although future oriented planning usually faces natural difficulties to properly assume all values and assumptions of all stakeholders, but in developing countries some key challenges affect the outputs of the foresight process severely. In this writing these challenges are categorized into four main groups. The first group of challenges refers to Foresight assumptions and context, the second is methodological aspects of foresight, next Foresight stakeholders and networking, and finally technological aspects of foresight and its related challenges.

Foresight programs are growing in recent years in many countries<sup>1,2,3,4</sup>. Researches show that the trend of foresight studies in

developing countries grow rapidly due to the foresight concept of long term planning at national and regional levels<sup>5,6,7</sup>. But these studies are facing serious challenges and foresight practitioners are not approaching the main application that foresight methods have been created for. Some of these challenges directly refer to the context of developing countries and some of them are highlighted as misunderstanding of the foresight methods.

### FORESIGHT CHALLENGES

Foresight challenges are divided into four main areas. First, the challenges that refers to assumptions and context of the study. Next are the challenges that are related to the methodological aspects of foresight. The third part provides the challenges that mainly relate to Foresight stakeholders and networking. And the last part discusses the challenges arising from different technological aspects of foresight in developing countries.



### Foresight assumptions and context

Challenges related to foresight assumptions in the context of developing countries include: short term thinking vs. long term thinking, approaches to identify path dependency, understanding the deep concept of futures studies and freedom to act as a futurist.

### Short term thinking vs. long term thinking

Foresight is considered as long term planning, and long term planning depends on long term thinking<sup>8,9,10</sup>. To run a foresight program effectively, it is necessary to provide long term thinking atmosphere to the participants; particularly governors and official planners. However, in developing countries short term thinking is institutionalized and will affect the whole plan that is being developed for the future. Institutional arrangement is usually not stable and changes in the government are mostly rapid, unanticipated and revolutionary. This culture shapes negative attitude to long term future and creates unsustainability.

### Path dependency

Most developing countries suffer from path dependency that affects all decisions about the future. As planning for future needs to clarify the image of the future, this path dependency should be drawn clearly to assess the probable impacts of future consequences<sup>11</sup>. The “lock-in” effects of institutions in developing countries create limitations on the futures and scenarios of the societies.<sup>12,13</sup> These inefficient institutions are the barriers to planning the futures. Foresight programs need to consider the path dependency in developing

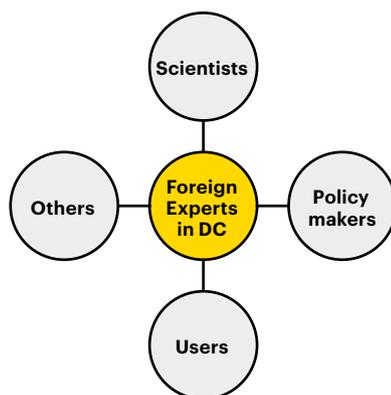


Figure 1: Type of experts in foresight programs in Developing countries (by authors)

countries and social innovation to extend possible and probable futures.

### Understanding the deep concept of futures studies

Foresight as a tool to view the future is against the pre-assumption of superficial religious point of view<sup>14</sup>. Foresight is not going to predict the future, but as all religions has a definition for time, there would always be some misunderstanding on the position of futurist to draw the future. As mentioned before, pioneers of foresight in developing countries do not deeply understand and comprehensively realize the logic of this field and their introduction of foresight causes many misunderstanding in developing countries. As a result, people who are unfamiliar to the foundation of foresight view foresight in contrast to religious believe. This prevents progress of futures studies in some ways or exposes it as magic tools which solve all problems.

## The trend of foresight studies in developing countries grow rapidly due to the foresight concept of long term planning at national and regional levels

### Freedom to act as a futurist

It is not easy to think about the future in developing countries without fear of passing forbidden lines. The nature of intellectual thinking in foresight need to think openly<sup>15,16</sup>, as it may face opposition in developing countries. The opposition could be from political forces, religious leaders or even the general public as foresight may be misconstrued or branded as prophecies. On the other hand, most governments of developing countries are not completely democratic and there are many conflicts in power to accept the basis of human right. Political leaders may look at foresight as a mean to propagate their dreams about the future of society. They may use foresight as instruments to justify their political objectives.

### Methodological aspects of foresight

The method used in foresight studies, qualitative as well as base line studies, would face challenges as developing countries. These challenges are not faced by foresight alone, but by any future oriented studies.

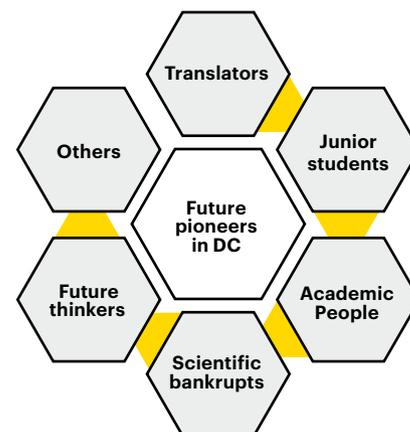


Figure 2: Futurist in developing countries (by authors)

### Qualitative approach in Developing Countries

The qualitative approach in futures studies in developing countries are rarely strong enough to be classified as scientific research. The qualitative approach usually leads to meaningless results and practitioners replace semi-quantitative technique with qualitative technique to avoid the risk of poor results. The qualitative approach need a powerful mental skills as it links to creativity and is tremendously harder than quantitative approach<sup>17,18,19,20,21,22</sup>. The culture of science in developing countries does not easily accept creativity that may shake the recognized paradigm.

### The weakness of previous studies

As the large part of the current science in developing countries was imported from Orientalists, the main base of the qualitative studies does not really represent the baseline situation of the issue. Basically, precise review of the true situation is seldom done even by local researchers as they often rely on previous incomprehensive studies. The problem is compounded when dedicated researchers who are willing to do in-depth research and studies are not welcome by their supervisors.

Almost all field studies need to start from scratch if the intention is to approach the foresight objectives efficiently. Obviously the meta-analyses in this atmosphere is a real hard job.

### Foresight stakeholders and networking

Networking and coordination of stakeholders in foresight studies also create challenges in developing countries. In this regard, “the community of foresight

## experts' insights

experts”, “role of futurist in developing countries”, “networking concept” and “concerns and business essence of foresight” are some of the issues that make up the challenges in foresight studies in developing countries.

### Foresight experts

As one of the main parts of foresight is devoted to participation of stakeholders, the process and concept of this involvement is somehow different in developing countries. If we assume that experts' involvement is one the forth angles of poppers diamond for foresight methods arrangement<sup>23</sup>, there are some mistakes that developing countries are suffering from. The community of experts are divided to mainly three unique groups with different behaviors. These groups are not necessarily considered as experts in foresight processes, but there are no other choices in current way of thinking.

The first group consists of scientists. They are experienced and have proper capabilities. They could be assume as experts in foresight studies, but developing countries with low quality academic centers do not provide strong scientific community thus, they are not seriously involved in the decision making process at the national level.

The second group comprises policy makers. They are assumed as experienced because of years of involvement in decision making at national level. But most of them have political inclinations and their opinions are mostly bias towards maximizing their profits rather than the real science of approaching futures.

The third group is users. They are from the industries and are expected to know frontier of technology and have information of developing technologies. Unfortunately they are not developing new technologies as they are mostly users.

As the so called expert who are expected to bring new insight in futures studies do not play their roles, expert based techniques of foresight may not work properly. The attitude of these groups may lead the study to different directions.

### Futurist in Developing Countries

As the literature of foresight was developed in the west, the translators are usually considered as the pioneers of foresight in developing countries. Actually they are merely transferring the first level of

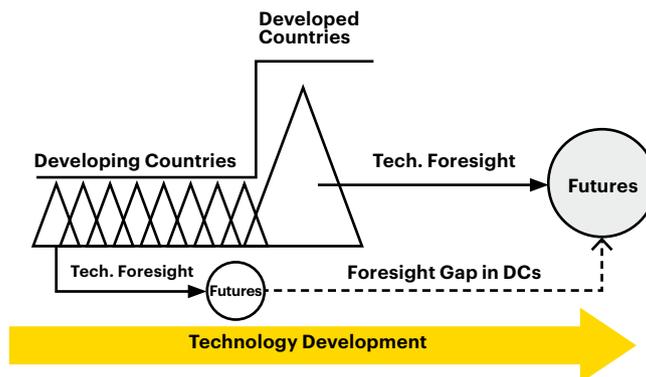


Figure 3: Technology development different approach of countries (by authors)

**In developing countries, short term thinking is institutionalized and will affect the whole plan that is being developed for the future.**

literature without being deeply involved in the meanings and concepts of foresight.<sup>24</sup> This role could easily be played by junior university students too.

There are other groups of futurists: The “paper readers” who accidentally enter to this community by reading the related foresight papers in similar field of study; scientific bankrupts from other fields of study that use foresight to revive their new business or careers; future thinkers who are interested in future ideas, some for recreation and some of them for business opportunities; and academic personalities and practitioners who are interested in foresight studies.

Lack of trained professional futurists is one of the root causes of many misunderstanding of foresight in developing countries that leads to weak results in foresight programs. As a result, the belief in foresight outputs in developing societies crashed easily.<sup>25</sup>

### Networking concept

There are some challenges that are directly related to the networking concept in developing countries. Networking is the core aspect of foresight projects and it needs good coordination between people and organizations.<sup>26,27,28,29</sup> Therefore, it needs partnerships at all levels<sup>30</sup> Good coordination is achievable when the problem of collective action is removed, but

it is generally accepted that most developing countries suffer from this problem. It is necessary to fix the institutional arrangement to solve the collective action problem, but it does not happen easily. This leads to failures in achieving the networking goals of foresight in most developing countries.

### Business essence of foresight

Foresight is recognized as an “applicable tool” and not pure scientific field of study.<sup>31</sup> There are large business institutions that are involved in strategic planning looking for new ideas for the future. Foresight literature would be useful to them as it would not alter their business practices and principles. On the other hand, there are a few powerful companies that run foresight programs precisely on their own but prefer to not publicize their methods to avoid participation of ‘free riders’ into their business. The difference between these two groups depends on their marketing approach.

The winners are those who are able to provide better satisfaction and gain acceptance of customers. This scenario influenced business players to conceal their future plans to avoid competitions. Business institutions are not required to reveal their future plans as there is no global codes of ethics in futures studies.

### Technological aspects of foresight

The involvement in technology development processes is one of the main challenges faced by most developing countries.

### Involvement in technology development process

Usually developing countries are not serious contributors in “technology

developing community” of the world as they normally act as followers and play catch-up to the development and achievements of developed nations. However, there could be conversions of understanding in foresight studies as the logic of technology foresight is looking for new areas with “out of the box” point of view to prepare a “long view”. However, the reverse usage of foresight forces the users to review the history of the pioneer countries’ payoffs, and this could be a hindrance.<sup>32,33,34,35,36,37</sup>

## DISCUSSION

The followings are some checkpoints that may assist the effort to face the challenges to implement foresight studies in developing countries:

- Whether the country is a pioneer on the exact field of the science that has been targeted by foresight?
- Are the experts properly identified, selected and engaged?
- Are knowledgeable educated futurists leading the studies?
- Is the qualitative approach properly and correctly run?
- Do the studies rely on strong literature?
- Are the concepts and principles of futures studies put in a right place and in the right context?
- Does the effects of path dependencies evaluated precisely in the practice?
- Does the context provide the condition of long term thinking?
- Is foresight a scientific study or a tool to make money?
- Is it possible to think freely in that context?
- Is there any networking infrastructures ready to use or able to establish?

Answering these questions may clear the atmosphere for foresight studies in a given country. However, there are several techniques and skills to avoid these challenges if researchers apply them before starting the foresight process.

The foresight studies faced, are facing, and will continue to face challenges, more so in developing countries. There would be many more challenges than that have been listed, but it is more important to consider the differences between nature and methods of foresight as long term planning tools in technology and other areas in developing and developed countries. However, definitely there is a need for more contemplation and theorization in roots, techniques and applications for foresight to progress in developing countries.

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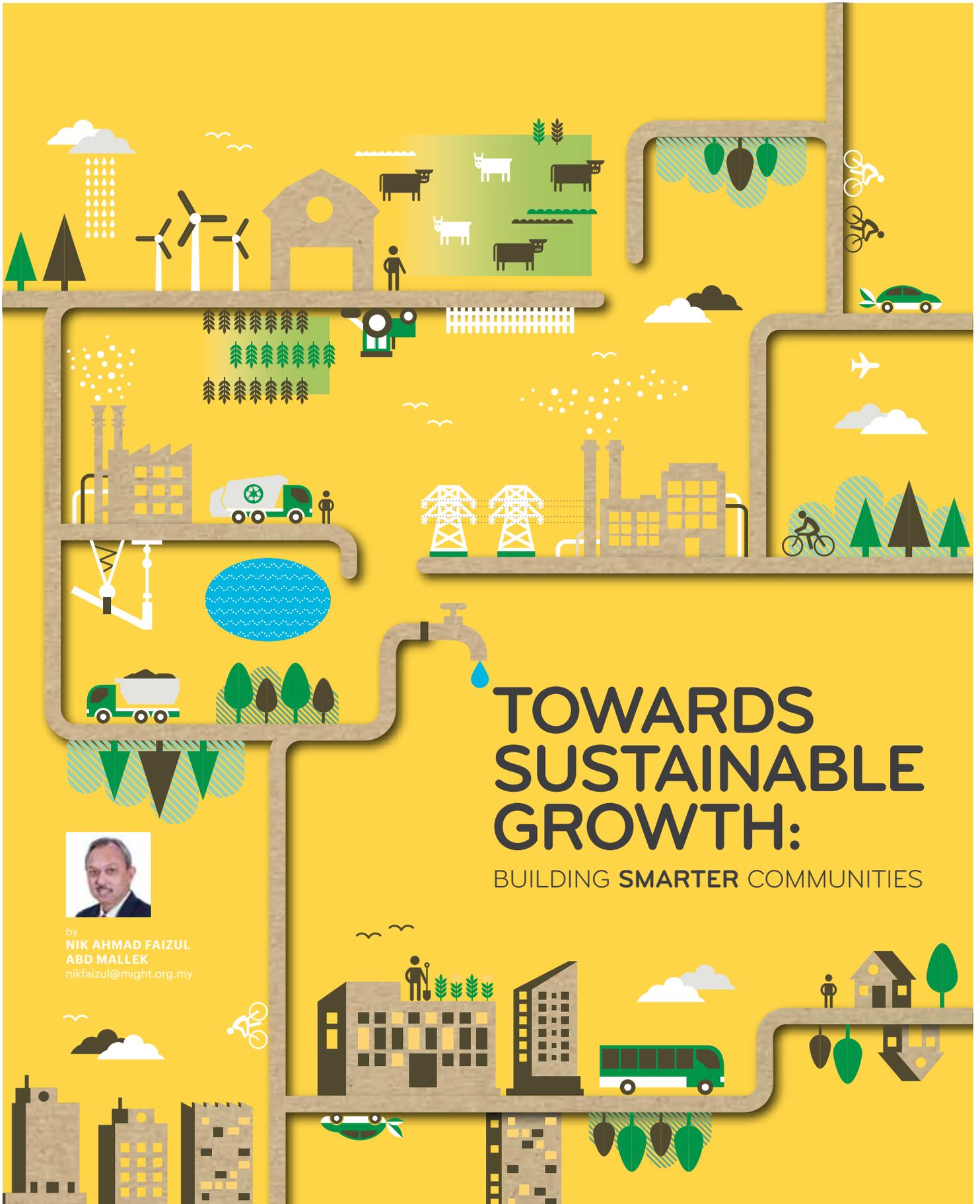
# CONGRATULATIONS



## **DATUK DR. MOHD YUSOFF SULAIMAN**

PRESIDENT & CEO,  
MALAYSIAN INDUSTRY-GOVERNMENT GROUP FOR HIGH TECHNOLOGY (MIGHT)

On the 'Darjah Pangkuan Seri Melaka (D.P.S.M)' award  
conferred by the TYT Yang Dipertua Negeri Melaka in conjunction with  
the Malacca Governor's birthday on 10th October 2014.



# TOWARDS SUSTAINABLE GROWTH:

BUILDING SMARTER COMMUNITIES



by  
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ABD MALLEK**  
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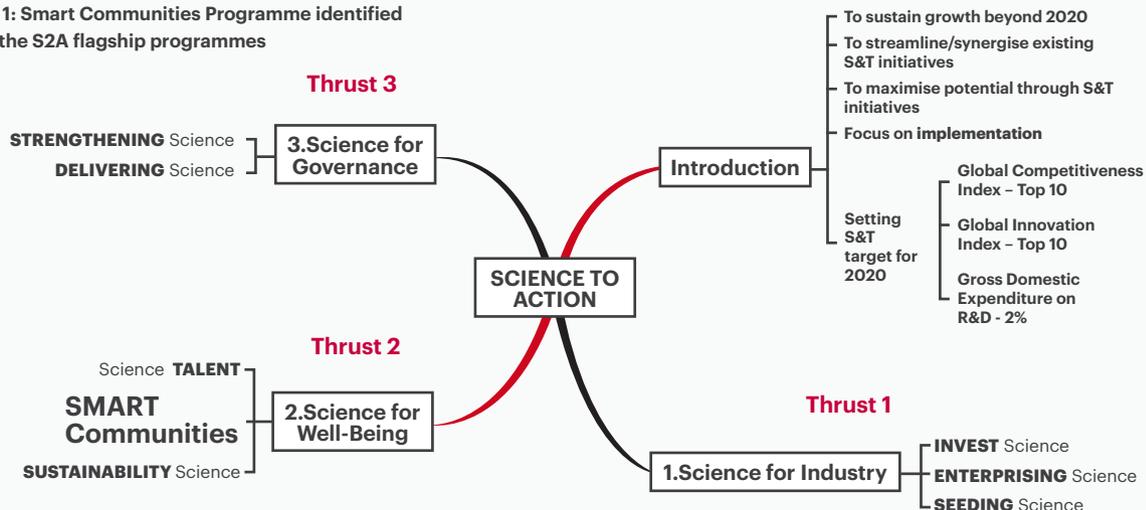


**T**he pledge by the Prime Minister, Dato' Sri Mohd Najib Tun Razak at the United Nations Climate Change Conference 2009 in Copenhagen: *'It is my dream that one day we can live in a clean, healthy and high quality environment where cities, townships and communities are built on the fundamentals of Green Technology'* and *'... Malaysia is adopting an indicator of voluntary reduction of up to 40 percent in terms of emissions intensity of GDP by the year 2020 compared to 2005 levels. This indicator is conditional on receiving the transfer of Technology and Finance of adequate and correspond to what is required in order to achieve this indicator'*; become the launching pad for Malaysia to establish smart communities initiative.

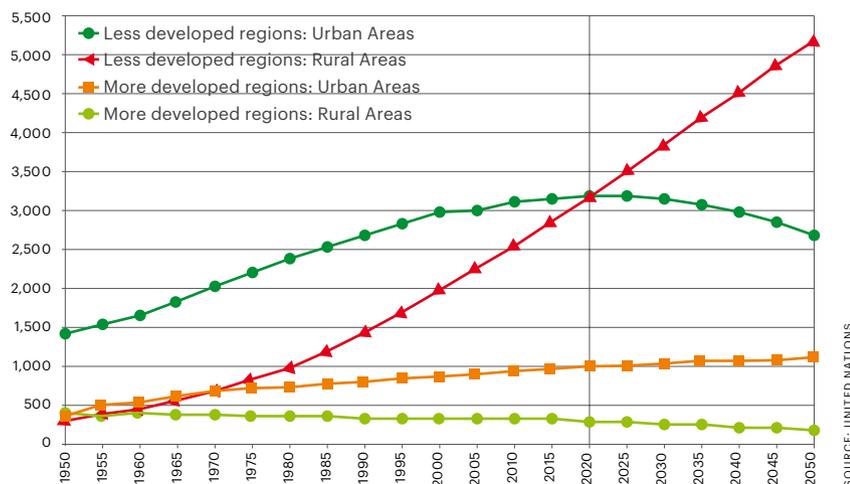
A strategic paper on Smart Communities was presented at the inaugural meeting of the Global Science and Innovation Advisory Council (GSIAC) on 17<sup>th</sup> May 2010, chaired by the Hon. Prime Minister of Malaysia. As an effort to elevate the importance of science and technology in national planning and to sustain growth beyond 2020, the Science to Action (S2A) initiative was subsequently launched by the Prime Minister on 1<sup>st</sup> November

2013. One of the S2A flagship programmes identified is the **Smart Communities Programme** focusing on the Smart City. In line with the S2A's objective to be action oriented with grounded impact, this programme would be industry driven in nature to drive growth, especially in the new emerging industries through the application of science and technology, leading to new implementation and business models.

Figure 1: Smart Communities Programme identified under the S2A flagship programmes



**Figure 2: UN Urban and Rural Growth for Developed and Developing Countries: 1950 – 2050**



SOURCE: UNITED NATIONS

As cities grow, it face a number of challenges namely increase in population, energy consumption, and green house gas emission. Preparing communities against these grand challenges, is now a necessity.



### Why Smart City?

As cities grow, it face a number of challenges namely increase in population, energy consumption, and green house gas emission. Preparing communities against these grand challenges, is now a necessity through the following initial efforts :

- The pledge by Malaysia on adopting an indicator of voluntary reduction of up to 40 percent in terms of emissions intensity of GDP,
- Forecasted Future Investment in Smart City;
- World Bank's Malaysia Economic Monitor 2011;and
- Malaysia's Green Technology Foresight 2030.

### Global Trend on Urbanisation:

The United Nations report on Urban and Rural Growth for Developed and Developing Countries: 1950-2050 indicates that currently more than 50% of world population live in urban areas and would increase to almost 90% in the next 20 years as world population is expected to grow from 6.9 billion to 8.9 billion people, of which, 8 billion will be living in urban areas.

Cities are also responsible for 60 % - 80% of the world's energy consumption and greenhouse gas emissions. Cities have

therefore; become the focal point of engagement with issues of addressing socio-economic needs and sustainability.

### World Bank Economic Monitor 2011 on Malaysia focusing on Smart Cities:

The World Bank Economic Monitor summarises that the requirements to transform Malaysian cities are closely linked to broader structural reforms outlined in the New Economic Model (NEM). Key extracts of the report are:

- Cities are central to Malaysia's aspiration to become a high-income economy: Higher levels of urbanization are associated with higher productivity and overall economic growth. This is because cities create proximity and facilitate the flow of knowledge that drives innovation. Therefore, in order for Malaysia to achieve its goal to become a high income economy by 2020 it needs to make its cities smart;
- The need for reorientation of the development corridors to focus on narrower clusters: Under the Tenth Plan, the role of corridors has been refined to focus on clusters linked to NKEAs. While this is a welcome shift, there must be concerted efforts to maximize the corridors' effectiveness;
- There are ample opportunities for Malaysia's leading universities to unleash

its potential and intensify collaboration with the cities that host them;

- Competition requires a degree of autonomy to local-level decision makers. This is in fact fully equivalent to implementing the New Economic Model (NEAC, 2010), which advocates "Localised autonomy in decision-making (by) empowering state and local authorities to develop and support growth initiatives, and encourage competition between localities"



# viewpoints

Malaysia, as a developing nation needs to ensure that the necessary strategies are deployed into cities through private and public partnership.

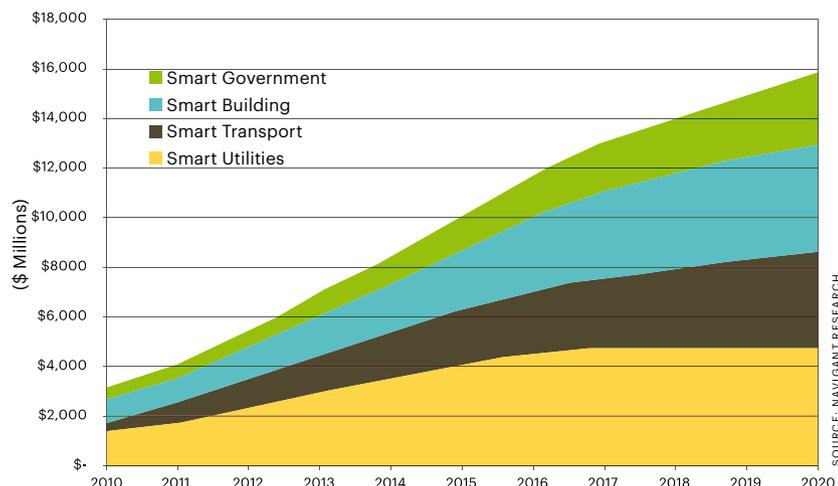
### Forecasted Future Investments:

Globally, the expenditure on technologies to support the Smart City is estimated at USD 100 billion in the next 10 years. The annual expenditure on core technologies is estimated to be at USD 16 billion per annum by 2020.

Malaysia, as a developing nation needs to ensure that the necessary strategies are deployed into cities through private and public partnership involving the following issues :

1. Assist in optimising government investment and maximising outcomes;
2. Accelerate and intensify industry creation on green technology and sustainable development through inter-
3. Induce multi-stakeholders partnership platform to cater for the multiple interests and content;
4. Integrate and optimise funding allocation involving both Operational (OE) and Developmental (DE) Expenditures, to bring the best outcomes through co-sharing of funding, resources and facilities; and
5. Provide new market space for investors (FDIs and DDIs) in the emerging industries with longer term outlook to induce industry participation and investment in green technologies/capabilities to implement sustainable green projects in Malaysia and beyond.

Figure 3: Smart City Smart Infrastructure Investment by Industry, World Markets: 2010 - 2020



## Smart City Projects

### Energy Efficient Buildings



Objective: To promote Energy Efficiency as the 1st Fuel

### Solar Industry Eco-Park



Objective: Solar industry Venue Chain Development involving SME/ SMIs

### Waste Industry Eco-Park



Objective: Waste to Wealth Industry Development involving SME/ SMIs

### Smart Grid



Objective: 2-Way sharing of Electricity utilisation information to citizens via ICT

### Energy Efficient Buildings



Greening the Business Services, Transportation, etc.)

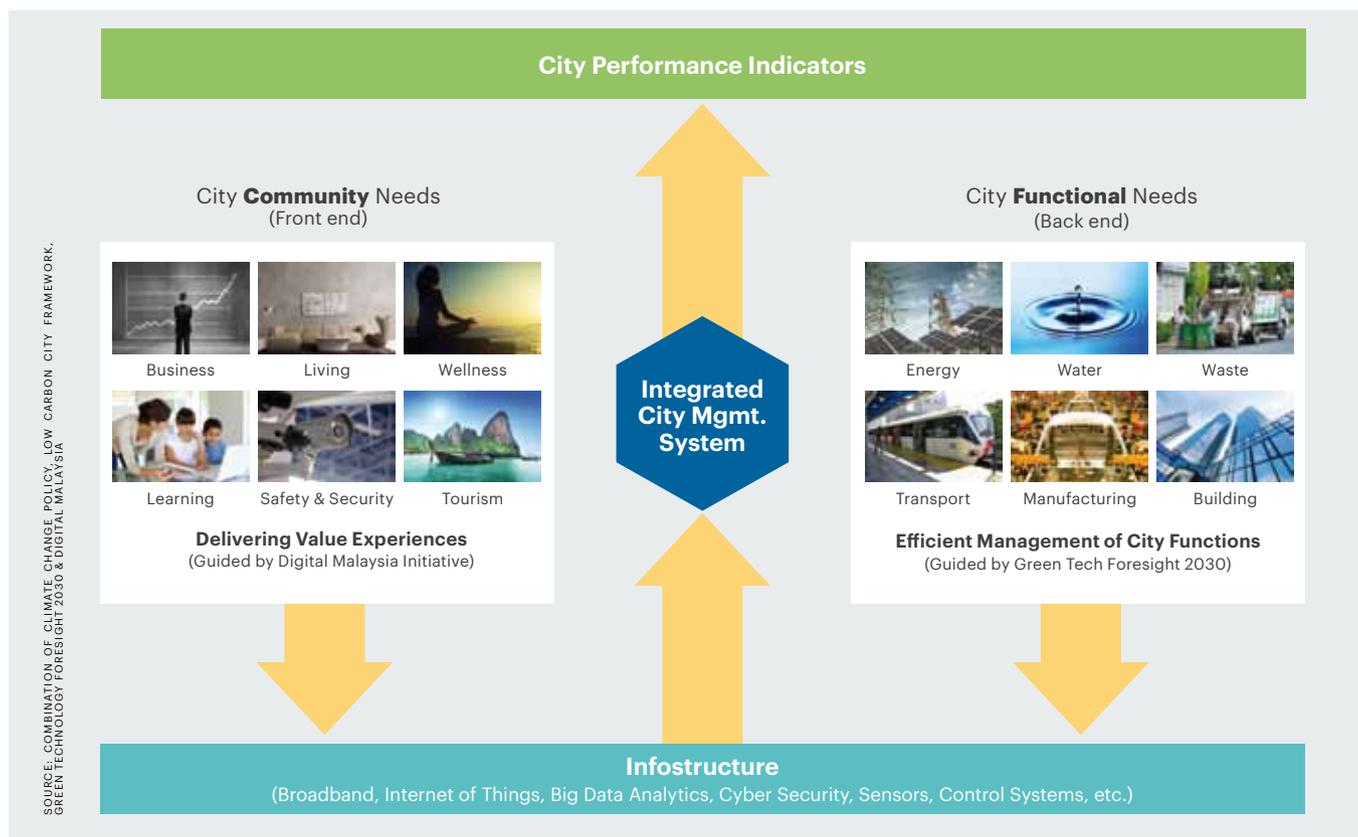
Objective: To Enhance Visitor Experience through Green Technology

### City Info-structure



Objective: To improve City Efficiency & Performance via Command Centre

Figure 4: Overview of City Components



## What is Smart City?

There have been many interpretations and definitions on Smart City depending on multiple perspectives, one of which is 'technological fusion in a strategic way to bring sustainability, citizen well-being and economic development'. There are several national policies and initiatives related to Smart City involving climate change, green technology and ICT.

The diagram on Smart City components as described in Figure 4 is an initial effort to consolidate and synergise these policies under this programme.

Integration across city systems is important to make cities smarter through 3 key components :

- City functions to ensure more effective city operations through green technology applications
- City community needs through providing value experiences in e-services
- City performance monitoring and reporting

**Integration across city systems is important to make cities smarter through 3 key components City functions, City community needs and City performance monitoring and reporting.**



A successful Smart City development implements and strengthens policy coordination to provide strategic direction and demand creation industry driven with government facilitation; enabling programmes in providing conducive market and implementation environment

to facilitate project delivery as well as high impact projects and supply chain readiness to deliver grounded outcomes.

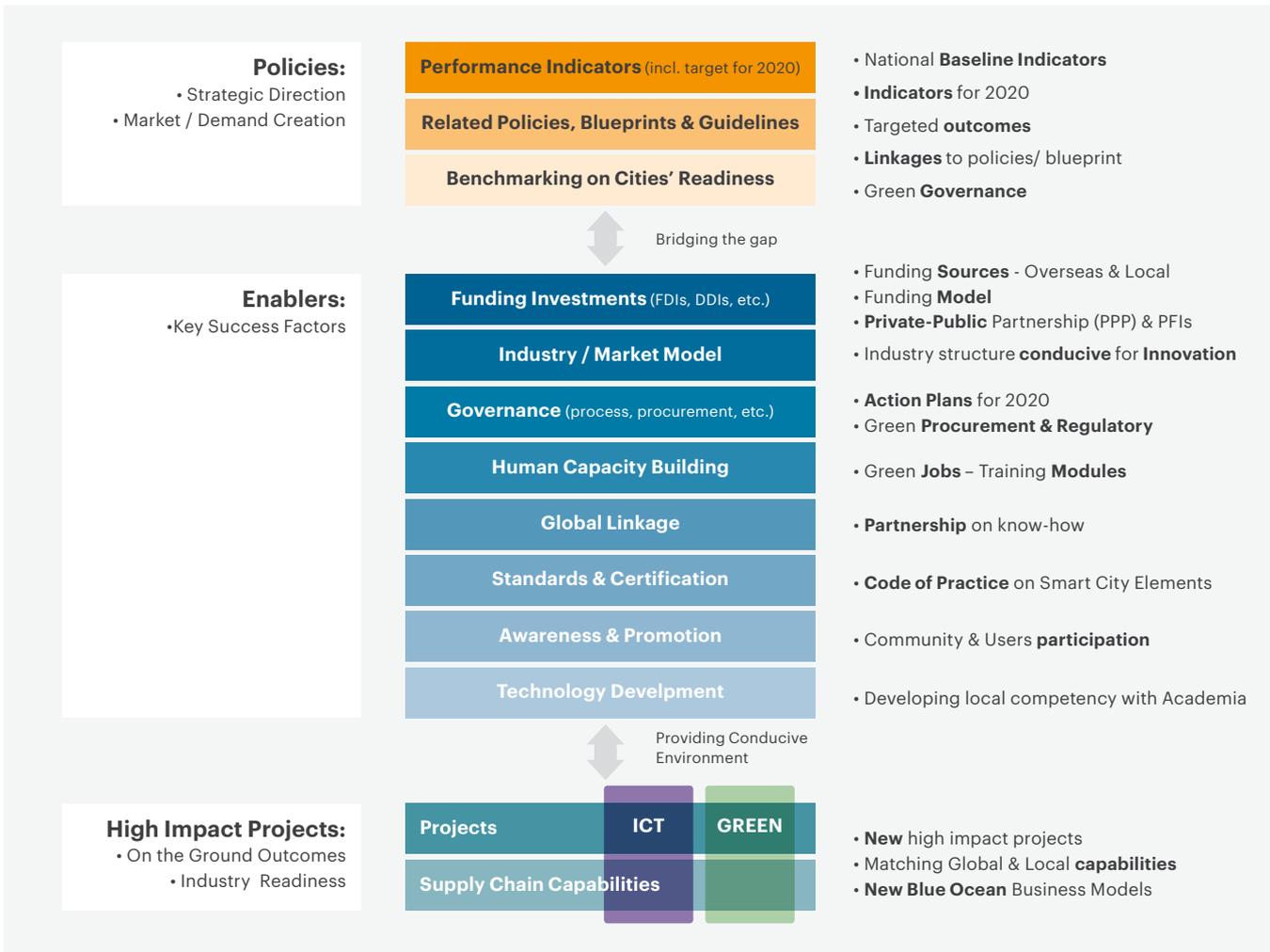
Underlying the Smart City components is the strategic content to support the implementation of Smart City which consists the following :

- **Policy** coordination to provide strategic direction and demand creation (Government driven with industry input).
- **Enabling** programs are the key success factors in providing conducive market and implementation environment to facilitate project delivery (Government and Industry partnership).
- Implementation of **high impact projects** and supply chain **readiness** to deliver grounded outcomes through introduction of new business model and value chain (Industry driven).

The interplay and coordination in between these areas are crucial to ensure smooth implementation of the Smart City programme to meet its high level objectives.

# viewpoints

Figure 5: City Strategic Content



As part of the effort to re-energize economic growth, in the thematic areas of 'Cities as Growth Poles', 'Urban Transformation' and 'Green Growth' have been identified as part of the strategic initiative new growth areas.



## 11th Malaysia Plan

In the 11th Malaysia Plan, a 5 year macro-economic planning of the Malaysian Government (2016-2020), city development surface prominently. As part of the effort to re-energize economic growth, in the thematic areas of 'Cities as Growth Poles', 'Urban Transformation' and 'Green Growth' have been identified as part of the strategic initiative new growth areas. Investing in Smart City Programme in the 11th Malaysia Plan will provide the following strategic benefits as follow :

- i. To add value to the current planning of the 11MP through the early incorporation of strategic Smart City Programme (as cross cut element) to **synergise** some of current elements of 11MP in order to optimise government investment and maximise outcomes;
- ii. To accelerate and intensify **industry**

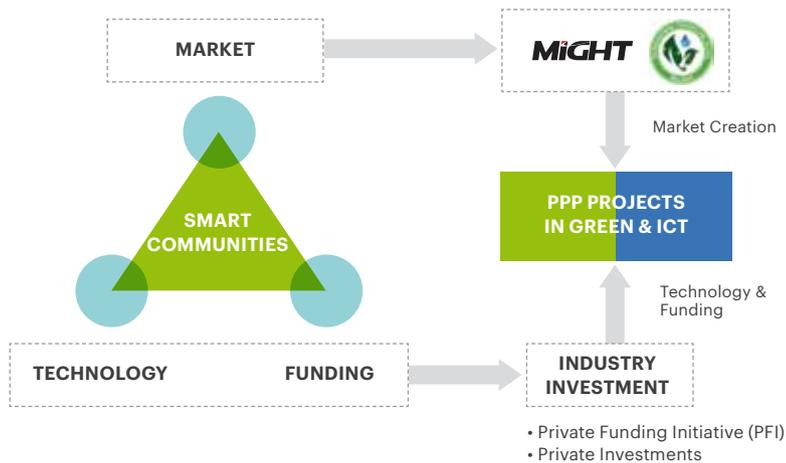
**creation** on green technology and sustainable development through inter-ministerial, inter-agency and inter-industry association coordination;

- iii. To induce multi-stakeholders **partnership** platform to cater for the multiple interests and content;

- iv. To integrate and **optimise** funding allocation for 11MP involving both Operational (OE) and Developmental (DE) Expenditures, to bring the best outcomes through co-sharing of funding, resources and facilities;

- v. To provide **new market space** for investors (FDIs and DDIs) in the emerging industries with longer term outlook to induce industry participation and investment in green technologies/ capabilities to implement sustainable green projects in Malaysia and beyond.

Figure 6: The implementation model for Smart City Programme



### Implementation & Business Models

Bridging the market, technology and funding is key to the success of in any industry driven Smart City projects. Hence, implementation model through Private-Public Partnership (PPP) is key to the success towards creation of industry driven projects as depicted in Figure 6.

In sustaining the growth momentum for these PPP projects for Smart Communities program, there need to be a sustainable Business Model that induces partnership between the Supply and Demand providers. In this manner and with sustainable market, it will propel branding, capacity building development as well as industry driven R&D.

Such Implementation and Business Model would elevate industry in strategic areas of Green and ICT, to potentially become national and global champions.

**In accelerating the Industry Driven Smart City projects, it is also crucial to adopt the right implementation and business models which are conducive for the industry to invest through PPPs**



### Conclusion

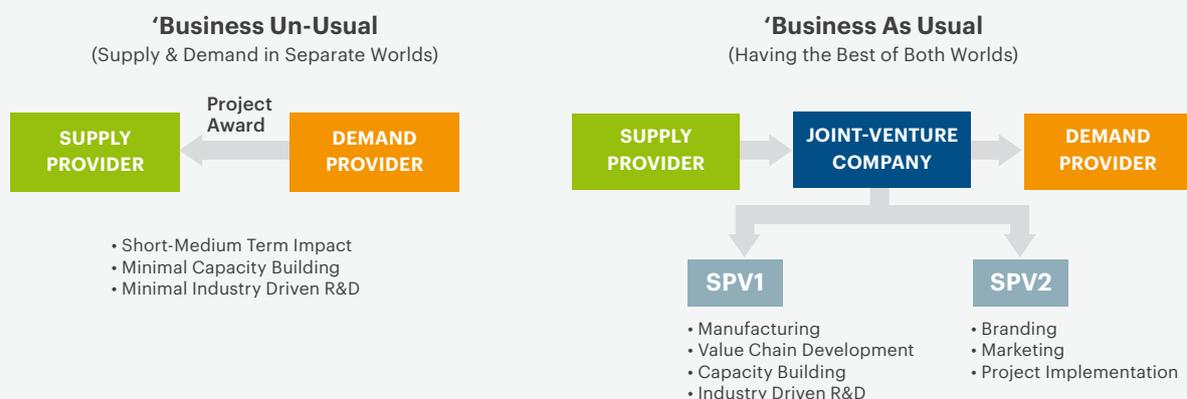
Putting all the puzzle pieces together, smart city is ideal platform towards synergising and aligning multiple nation-building efforts leading to sustainable growth.

In accelerating the Industry Driven Smart City projects, it is also crucial to adopt the right implementation and business models which are conducive for the industry to invest through PPPs that involve new value chain development, as well as value add to the locality in terms of businesses to SME/ SMIs, job opportunities, etc.

It is also fundamental that the governance on projects implementation supports the interest of the industry in terms of timely decision making and facilitative in nature. Governmental platform in on the green agenda is a necessity at state level, in strengthening green governance, supported by industry led Task Force in strategic areas.

The key challenge in most countries now (including developing nations) is addressing the enablers for Smart City, in facilitating industry investments into these new emerging areas. It is expected that the market will pick up in 2016 onwards. Hence, the global rat race in Smart City has started since 2010 and the country that manages to accelerate and organise itself in addressing these Enablers will be the front runners to reap the initial global market leadership.

Figure 7: Business Model for Smart City Project



viewpoints

# Future Scenarios of Green Technology in Malaysia



by  
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The Green Technology Foresight 2030 (GTF 2030) is a joint initiative between Ministry of Energy, Green Technology and Water (KeTTHA) and MIGHT to paint alternative futures of Green Technology in Malaysia by year 2030. It is the second of a three-phase programme to develop the Green Technology Masterplan which attempts to answer the question 'where do we want to go?'. Through this initiative, MIGHT systematically develops and assesses plausible scenarios on Green Technology development and its impact on the identified sectors which are important to Malaysia up to 2030, and to prioritize the list of green technology areas in line with the National Green Technology Policy Mission and Objectives.

The basis for initial work of GTF 2030 was derived from the stock-take exercise by KeTTHA and The National Green Technology Policy formulated in 2010 for the national context. In terms of global context, considerations are given to both Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). Strengthening and updating the information available, MIGHT conducts Horizon Scanning on both external and internal factors that would influence the movement of green agenda in the future.

There are a number of interpretations of green technology. However, KeTTHA as the main stakeholder in this field interpret it as follows:

*'...the development and application of products, equipment and systems used to conserve the natural environment and resources, which minimises and reduces the negative impact of human activities'*

It refers to products, equipment, or systems that satisfy the following criteria:

- It minimises the degradation of the environment;
- It has a zero or low green-house gas (GHG) emission;
- It is safe for use and promotes healthy and improved environment for all forms of life;
- It conserves the use of energy and natural resources; and
- It promotes the use of renewable resources.



### Malaysia interprets Green Technology as the development and application of products, equipment and systems used to conserve the natural environment and resources, which minimizes and reduces the negative impact of human activities.

The policy on green technology cuts across multiple sectors. The focus is on nine sectors namely energy, waste, transport, manufacturing, water, building, agriculture, information and communication technology (ICT), and forestry.

1. **Energy:** Energy sources, power generation and the transmission, and distribution of energy.
2. **Waste:** Municipal solid waste, medical/clinical waste, hazardous/schedule waste, agriculture waste, and e-waste. This sector derives its green technology areas through the various parts of the waste value chain, such as generation, storage, collection and transport
3. **Transport:** Transport-land use planning, advanced public transport systems, traffic

management, and enforcement and vehicle technology.

4. **Manufacturing:** Manufacturing processes, input materials and resources, as well as fundamental and applied technologies.
5. **Water:** Resource management, treatment, storage and distribution of water, water usage, and wastewater treatment and recycling.
6. **Building:** Design, site-planning and management of building materials, the construction of buildings, operation and maintenance of constructed buildings. A total of eight technology areas were identified under these categories.
7. **Agriculture:** Input, production, processing, storage or distribution, and consumption of agriculture products.
8. **ICT:** Green of ICT that focus on energy efficiency of ICT equipment, and Green by ICT that relates to resource efficiency and sustainability attributed by ICT applications.
9. **Forestry:** Planting and improvement of trees, forest management, production and process of forestry products and end-of-life management.

After updating, combining and extending MDGs target for 2030 David Griggs, in his

## viewpoints

article ‘sustainable development goals for people and planet’, proposed six SDGs: Thriving lives and livelihoods, sustainable food security, sustainable water security, universal clean energy, healthy and productive eco-systems and governance for sustainable societies. The six components have direct impact on the sectors identified for GTF 2030 initiative. Thus, they were used as perspectives in building overarching (contextual / establishing the background) scenarios.

### Factors Shaping the Future of Green Technology in Malaysia

More than 20 consultations were conducted with related stakeholders from the nine sectors. More than 300 participants from Government, industry, non-government organisations, and academia gave full support to the initiative by sharing their ideas and perspectives about the future in the context of green activities and technology. The stakeholders were in agreement that the future development of green technology in Malaysia would be influenced by the following factors:

- a) **Policy specific and integration.** Currently there are more than 20 policies related to green technology and sustainability under different ministries and agencies. A serious thought for policy specific and integration is crucial in driving the growth of green technologies.
- b) **Economic Infrastructure and Facilities.** It includes both physical and non-physical infrastructure and

### Sustainable development goals include thriving lives and livelihoods, sustainable food security, sustainable water security, universal clean energy, healthy and productive eco-systems and governance for sustainable societies.

facilities. It covers incentives, subsidies, tariff e.g. Feed In Tariff (FiT), RE fund, carbon trade, Offset program (technology transfer, global market penetration and local contents). Physical infrastructure support such as ports, charging station, rail tracks and others to be provided by the Government.

- c) **Institutional Framework.** Green technology approach involves crossed ministerial/agencies and sectors. In the case of Malaysia, this is being coordinated by related ministries such as Ministry of Energy, Green Technology and Water (KeTTHA); Ministry of Natural Resources (NRE); Ministry of Science, Technology and Innovation (MoSTI); and the national level committee – the National Green Technology and Climate Change Council.
- d) **Cost and Efficiency.** Economic development and the expanding world

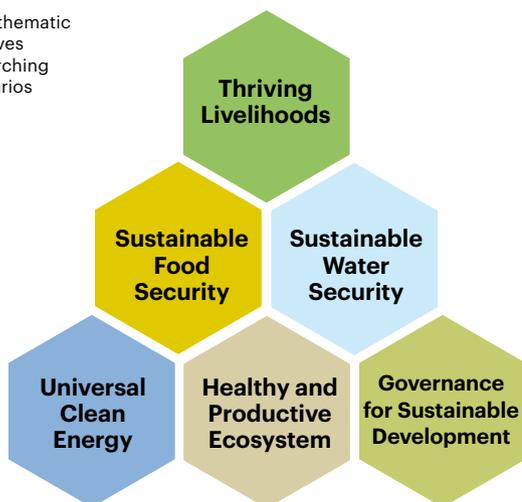
population continue to put pressure on earth’s resources. Mobility of population increases urbanisation and creates new cities. Intensive human activities and energy consumption in urban areas lead to concentration of emissions of air pollutants and generation of waste and heat resulting in multiple adverse impacts on the environment, especially air quality.

- e) **Energy Prices.** Future energy prices are greatly influenced by the global economic performance. The current rate of energy consumed for building operations; the associated greenhouse gas emissions; and the uncertainties in future price of coal, natural gas and electricity can be a cause of concern for policy makers and industry players.
- f) **Economic Growth.** Apart from consistent progress of economic growth, particularly ASEAN region, regional economies have been gearing up to pursue market integration amidst gloomy global economic outlook.
- g) **Technology Advancement and Innovation.** Technology advancement and innovation plays crucial role in developing knowledge and innovation based economy. Many countries are also focusing on the development of low carbon economy and intensifying their low carbon technology. However, Malaysia is still in the infancy stage. The government of Malaysia strives to gradually establish a market-oriented system for technological innovation and commercialisation as well as proliferating basic and applied scientific research.

h) **Climate change.** Continuous climate change will have negative affect on the economic development of the nation. It is a global phenomenon that causes natural disasters such as floods, drought and wildfires. However, apart from natural activities such as biotic processes and volcanic eruption, certain human activities such as industrialisation, deforestations and pollution also contribute to climate change.

i) **Environmental Degradation.** It occurs when resources are depleted due to socio-economical, technological and institutional activities. Forest logging, overuse of fertilizers and mining of minerals are some of the activities

Figure 1: Six main thematic used as perspectives for building overarching (contextual) scenarios



that contribute to the environmental degradation and others negative externalities. In addition, the increasing trend of human population, urbanisation and economic growth has become an additional factor towards environmental degradation.

j) **Resource Scarcity.** Continuing global crisis and scarcity of critical natural resources has hampered the progress of development. Much discussion has focused on the dependency on natural resources for population growth and economic development. Proper management of resources is necessary. Efficient resources usage practices are being encouraged, alternatives for current resources are explored, and models for securing supply are being introduced and implemented to avoid resources depletion.

k) **Accessibility and Security.**

Growing population, coupled with the urbanisation rate, contributes to the high demand for energy, food and water in Malaysia. It is crucial for the rakyat (citizen) to continuously have accessed to these basic needs at affordable rates. Human behavioural patterns and various types of accessibility have broad implications on the economic activities, resource usage, planning and designing of human environments and degradation of natural environment.

l) **Awareness, Education and Employment.**

Public empowerment is seen as an important force in the move towards green practices. Inculcating public empowerment in the society would enhance people's responsibility where all parties would be involved in environment conservation. People such as decision makers, leaders in industry and the general public would be highly motivated to participate in green practices on any platform, resulting in the emergence of green minded society.

m) **Public Health and Risks.** Public health and risks refers to all organised measures to prevent disease, promote health and prolong life among the population as a whole. It is an activity to encourage healthy and quality lifestyle. The emergence of demographic trends such as ageing population and acute diseases are the examples of risks facing the country. The risks



**Scenarios are developed to help the interested parties to get the feel of the situation and analyze the sort of opportunities and threats that could arise in the future, and assist them to anticipate the technologies required to capitalized on the opportunities and mitigate, or even, address the threats.**

directly harm the growth of economy, cause low productivity, and threaten food and water security. Measures to positively manage public health and risks are compulsory to support greener environment.

n) **Mobility.** Mobility management can be described as the management of movement of people and freight that supports and encourages a change in attitude and behaviour towards sustainable modes of transport (walking, cycling, and public transport). The trend with rising mobility would be transformational, impacting lifestyles and opening up new areas of demand

for mobility-related goods and services. Important consideration must be given to the fact that the projected increase of income over the next decade would enable more people to travel by motorised vehicles rather than by foot and bicycle.

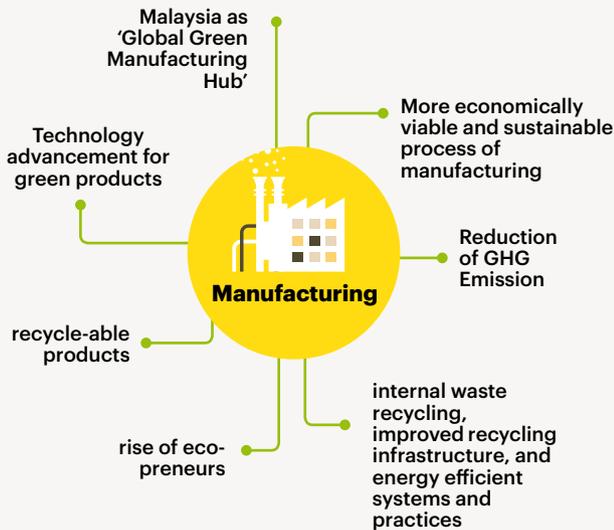
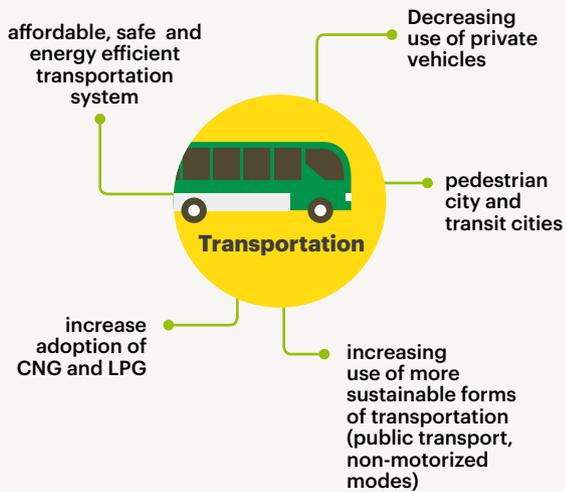
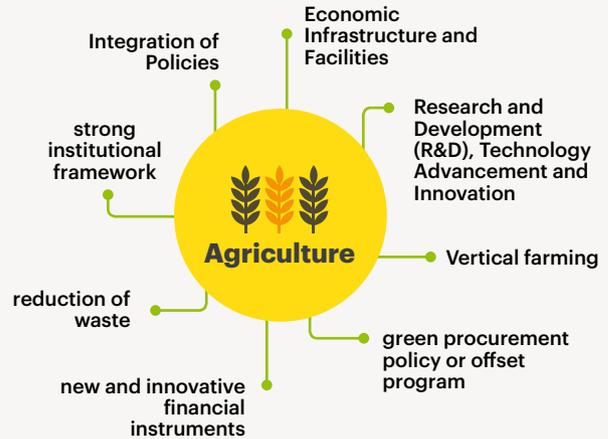
#### **Future Scenarios of Green Technology**

The scenarios are developed using archetype approach which was constructed in three profiles, namely 'better than expected', 'less than expected' and 'different than expected'. In order to project the big picture, the overarching scenario or the contextual is painted through six main thematic mentioned earlier.

'Better than expected' would mean all sectors would be mobilized to perform green element in all activities throughout their supply chain. This scenario would be difficult to achieve, making it necessary to develop the second scenario - 'less than expected' - to anticipate factors that may lead to downside path. The third scenario, 'different than expected', would prepare stakeholders for surprising futures (wild-cards).

These scenarios are developed to help the interested parties to get the feel of the situation and analyze the sort of opportunities and threats that could arise in the future, and assist them to anticipate the technologies required to capitalized on the opportunities and mitigate, or even, address the threats.

# MALAYSIA 2030: SCENARIOS OF GREEN TECHNOLOGY

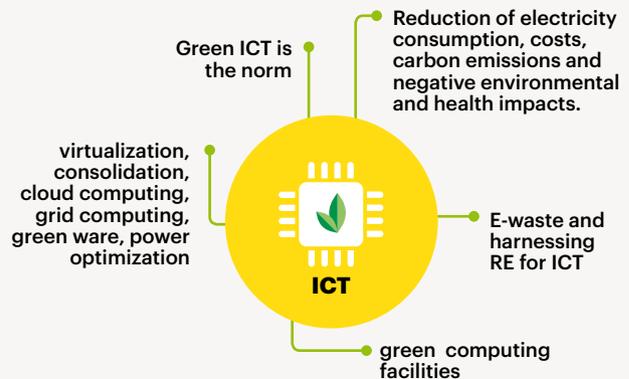


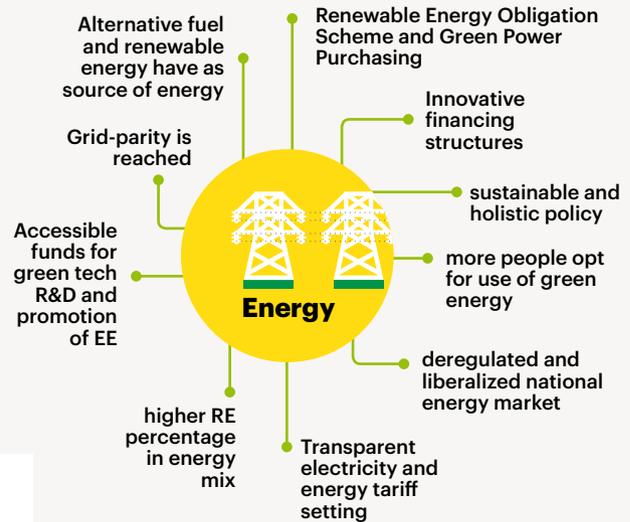
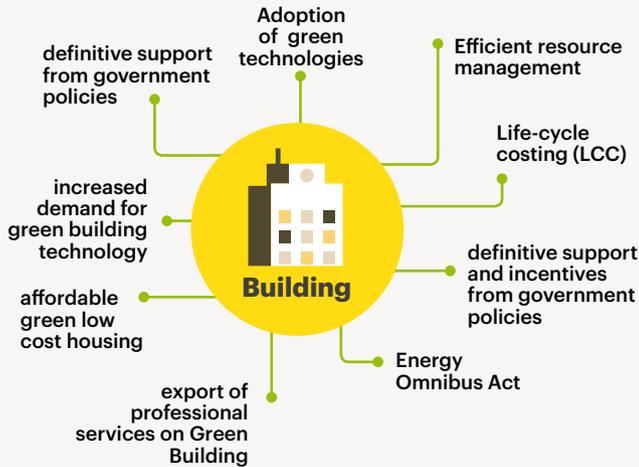
### Thriving Livelihoods

The **Green culture** is a new norm of daily life whereby **ICT & related technologies enable green applications** to every consumer products, houses, buildings, coupled with an integrated transportation system. In the same time, **Green education and training driven by high demand of green workers** as well as increasing number of young "ecopreneurs".

### Universal Clean Energy

**Energy supply is adequate** to cater for current and future capacity requirement as the new or **additional demand is supported by renewable energy**. There is also growing important of **municipal solid waste and agriculture waste** as a source of energy. Power generated from power plant and individual house/building are distributed **effectively through smart grid**.





**Sustainable Food Security**

Foods supply are continuously available, accessible and affordable by all Malaysian. This is due to the widespread of advanced farming in cities with minimal land and water usage. Best agriculture practices also drive the high quality food. Waste generated is recycled to help lowering cost and source of energy generation.

**Sustainable Water Security**

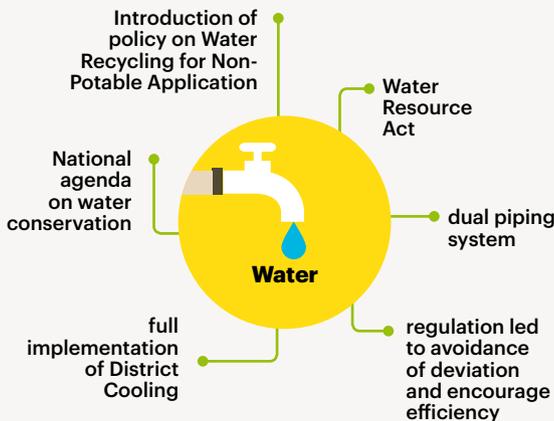
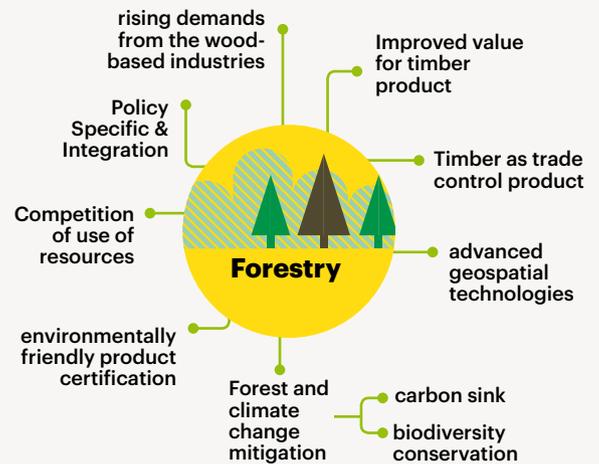
Sources of water both conventional and alternatives are secured for future sustainable consumption. Smart grid systems resulting high availability distribution to all resident & commercial places. An integrated monitoring & mapping system reduces NRW loss & ability to forecast accurately weather pattern and rain fall.

**Healthy & Productive Eco-system**

Malaysia continues to maintain as one of world's mega biodiversity. Deforestation has been kept below the permitted international standards through an integrated approach, precision planning and appropriate regulations and the application of technologies. In the same time, advancement of science and technology continuously driving the usage of alternative materials to address resource scarcity.

**Governance for Sustainable Development**

Malaysia's strong commitment towards green-oriented growth demonstrated through its national priorities, policies and future investment. These national level initiatives is to complement the shifting towards sustainable and green practices that has been steadily pushed with full cooperation from stakeholders. The Government continues to facilitate green growth through mixed policy instruments.



## viewpoints

# Future Of Malaysia Agriculture: Sustainable Agroecosystem Management For Rapid And High Impact Development



by  
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## An Overview of Malaysian Agriculture

Malaysia has been very successful in developing the country through organized and focused economic development plans. Globally, Malaysia has been ranked sixth in 2014 on Ease of Doing Business, 20th in the Global Competitiveness Index (GCI) 2014-2015, 33rd in the Global Innovation Index (GII) 2014 and 56<sup>th</sup> in the World Happiness Index (2013). These indicators have proven that Malaysia is capable to promote a new orientation of development focusing

towards sustainability and inclusiveness.

The development of a nation relies on its citizen's wellbeing. One of the important factors of citizen's wellbeing is food production. Food is the backbone of the society.

Realising this, the Malaysian government has taken steps to ensure that there is enough food for its population. The

emphasis is on self-sustainability. The agro-ecosystem management and agricultural planning has been revamped to ensure sustainability and to include green-friendly values and equitable and inclusiveness of all stake holders.

Sustainable development must be inclusive enough to cater and address the population's wider needs for food, feed, fuel, fibre, furniture, pharmaceuticals and felicity. Constraints such as high implementation cost, and pressing health and environmental concerns require governments to plan their agriculture development towards being trim, mean, focused, not wasteful, savvy, and

compliant to the global environmental and health standards.

### **Agro-ecosystem Management Challenges**

Malaysia is blessed with fertile soil and abundance of rain since it is located on the world tropical belt. However, to meet the agriculture development objectives Malaysia has to face and overcome social, economic and environmental challenges

**Social challenge** - Malaysia's population stands at 30,061,121 and is increasing at the rate of 1.8 percent per annum. Increased population increases food demand. Malaysia has not been able to be self-reliance in terms of food supply and still has to depend on import. Current, approximately RM34.5 billion is spent on food import.

**Economic challenge** - Malaysia targets to be a high income nation with annual per capita income of RM48,000 by 2020. In 2013, Malaysia's per capita income is RM33,010. The agriculture sector is seen as one of the major contributors towards achieving this target. The government has allocated RM3 billion annually in an effort to encourage the development of agribusinesses and manage the supply of agricultural commodities, besides creating job opportunities and reduces unemployment which currently stands at 3 percent. The amount allocated includes food subsidy.

**Environmental challenge** - Climate change is another challenge that effects agriculture development. Every year Malaysia spends an average of RM3 billion to mitigate natural disaster, particularly flood. In Peninsular Malaysia alone, 29,000 square km of land area has been identified as flood prone, affecting approximately 4.82 million peoples.

Apart from natural disaster, Malaysia is also facing shortage of land for agriculture production. Urbanisation has increased competition for land. Of the total land area of 328,550 square km only 78,700 square km is allocated for agriculture, and only 5.48 percent of which is reserved for plantation development.

### **National Priorities on Agro-ecosystem Management**

Agriculture has been identified as one of the sectors that can contribute towards Malaysia's development. Several initiatives to reflect to the importance of sustainable agro-ecosystem management have been

included in major national programmes.

**Global Science & Innovation Advisory Council (GSIAC)** - GSIAC is a strategic platform that aims to bridge the gap between local and international players. One of the GSIAC initiatives is to help Asian countries achieve an environmentally-sustainable high-income economy driven by knowledge and innovation. Malaysia is using this initiative to develop its agriculture sector by focusing on high-technology; market



### **Sustainable development must be inclusive enough to cater and address the population's wider needs for food, feed, fuel, fibre, furniture, pharmaceuticals and felicity.**

expansion and good agriculture practices which has been identified as the three important thrusts in the effort to transform agriculture into a source of high income for the nation.

**National Science and Research Council (NSRC)** - NSRC is mandated to ensure Malaysia's investment in science and technology makes the greatest possible contribution to a high-value economy through an increase in productivity, environmental quality, stimulation in R&D and enhancement of skills of the workforce. One of the main focus areas in NSRC is agriculture sciences. NSRC has tabled fifteen top national food security research priorities clustered around four themes as

suggested in Global Food Security: Strategic Plan 2011-2016.

**Economic Transformation Programme** - The programme aims to transform the industry from small-scaled production-based operations into large-scale agribusinesses that generate sustainable economic growth. This transformation is based on an integrated and market-centric model that comprises four key themes: capitalizing on competitive advantages, tapping premium markets, aligning food security objectives with increasing GNI, and participating in the regional agricultural value chain. The transformation programmes have identified seventeen projects that cover from dietary and herbal development to transformation of "Pasar komuniti" (community market) which are believed to give high impact to Malaysia.

### **The Way Forward in Agro-ecosystem Management**

The World Economic Forum's new vision for agriculture establishes three goals: (i) Food security, (ii) environment sustainability, and (iii) economic opportunity; and sets specific decade-by-decade milestones for each goal. Malaysia gives full consideration on all the issues and challenges in planning its agriculture development.

#### **(i) Food security**

Food security requires increased agricultural production, better food distribution, reduced food waste, improved access to and participation in the global food system by the poor, and consumer education to promote healthy food choices. The vision clearly states that the ideal of food security is to meet nutritional needs while providing affordable food choices.

#### **Issues and challenges in Food Security**

**Demographic** - By 2050, it is estimated that 60 percent more calories are needed to feed the projected 9 billion world population. The population of Malaysia at that particular time is estimated to be 43 million. History has proven that lack of food production due to inefficiency in agriculture management caused 950 million world populations to face hunger during the food crisis of 2012.

**Managing agricultural yield** has been identified as one of the major constraints that need innovative approaches in order to achieve food security. Maintaining agriculture yield required the ability to overcome changing climate. Climate change can reduce agricultural yield up to

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20 percent in many areas of the world, and this gives serious impact to food production.

Lack of skilled workers also affects agriculture production as it creates inefficiency in managing agriculture yield.

**Managing food waste** – The average food wastage in Malaysia was 450 tonnes a day in 2009. The amount increased to 15,000 tonne a day in 2013.

Food waste is a global issue. It has been estimated that 24 percent calories of food produced for people are not consumed. This type of wastage can be avoided if the management of food distribution is done in a proper and effective way.

### **Opportunity in Food Security**

Realizing the changing trends and understanding the problems facing food security can create opportunity for better frameworks and plans.

It is estimated that almost 1 billion of the world population are depending on farming for their livelihood and source of food and nutrition. This intensifies the need for the development of the agro ecosystem by implementing new ideas for better produces, such as biotechnology in agriculture.

Malaysia has invested RM86.8 million in biotechnology to improve crop yield and increase resistance to environment stress. Malaysia's target is to scale-up and strengthen productivity of paddy farming from 4MT/ha/season (4 metric tonne per hector per season) to 8MT/ha/season by 2020 by utilising improved mechanisation in paddy farming through biotechnology.

### **Technology in Food Security**

**Global Positioning System (GPS)** – the idea of using GPS is to allow farmers to work during low visibility field conditions such as rain, dust, fog, and darkness by giving the position of the agriculture land. GPS helps in three aspects of production, namely data collection of information input through satellite data, grid soil sampling, yield monitoring and remote sensing.

**Geographic Information System (GIS)** - GIS enables the coupling of real-time data collection with accurate position information, leading to efficient manipulation and analysis of large amounts of geospatial data. These data assist farmers



## **Food security requires increased agricultural production, better food distribution, reduced food waste, improved access to and participation in the global food system by the poor, and consumer education to promote healthy food choices.**

to make informed decisions and to be more efficient in agriculture activities.

**Inter Cropping** - Growing of two or more crops simultaneously on the same field. This approach helps to reduce both time and space utilization. However, inter cropping requires skilled labourers as it deals with two or more crops.

**Hybrid seed** - Hybrid seed is being introduced to increase the efficiency and optimizing productivity of plant, as well as to ensure the sustainability of plant production and to create friendly environment.

### **(ii) Environment sustainability**

Globally, agriculture contributes 17-30 percent to Greenhouse gas (GHG) emissions. To lessen the agricultural impact on environment, steps are taken to grow quality and quantity of natural resources

that could reduce emissions per tonne of production and optimize overall water usage.

### **Issues and challenges in environment sustainability**

**Green House Gas** – Agriculture production, especially meat produce, causes greenhouse gas impact on the environment. Research has concluded that if current trends continue, food production alone will reach, if not exceed, the global expectation for total GHG emissions in 2050. As the world's population increases and diet preference shifts towards meat-heavy, particularly in western diet, the effect of greenhouse gas emissions could accelerate faster than expected to harm the environment and human.

**Resource utilization** – it is estimated that cropland will expand by 42 percent by 2050. However, the expansion would not bring any benefit if not effectively utilised and managed. Currently, it has been identified that 198 million hectare of land – about the size of Mexico – is used to produce food that are not being consumed.

Resources management is not only about effective utilisation, but includes the management of activities to avoid harming the environment. For example, efficient usage of water in farming, and the usage of fertilizer, pesticide and herbicide that improves agriculture production but does not pollute the environment.

### **Opportunity in Environment Sustainability**

High awareness in green agriculture or environmental friendly approach in agriculture activities is the best way to keep the environment clean and sustainable. Adopting green technology in agriculture would create sustainable agriculture practices and promote agro-ecology and sustainable ecosystems. The effort to raise public awareness on sustainability, and public participation in activities such as food health literacy, green life style and waste to wealth, could contribute to achieving environment sustainability.

### **Technology in Environment Sustainability**

**Vertical farming** - Vertical farming is cultivating plant or animal life within a skyscraper greenhouse or on vertically inclined surfaces. Advantages for vertical farming include no weather-related crop failures due to droughts, floods, pests and all vertical farming food are grown organically with no herbicides, pesticides, or fertilizers.

**Integrated farming and waste management** to reduce erosion, increase crop yields, nutrient recycling, strengthen environmental sustainability. An integrated farming system consists of a range of resource-saving practices that aims to achieve acceptable high profits and sustained production levels, while minimizing the negative effects of intensive farming and preserving the environment.

**Aquaculture:** *Aquaponic* is a sustainable food production system that combines conventional aquaculture with modern methods of raising aquatic animals such as fish, crayfish or prawns in tanks. In aquaculture, effluents accumulate in the water, increasing toxicity for the fish. This water is led to a hydroponic system where the by-products from the aquaculture are broken down by nitrogen-fixing bacteria, then filtered out by the plants as nutrients, after which the cleaned water is recirculated back to the animals

**Smart Sprinkler and Drip Irrigation System** - Smart sprinkler and drip irrigation system is an approach to reduce production cost as smart systems use water only when needed. The system also save production time as the irrigation installer has programmed the site data into the smart system, where the controller adjusts the watering schedule based upon local

conditions and/or soil moisture and by zone.

### **(iii) Economic opportunity**

Agro ecosystem management could lead to better economy for the nation. This could be achieved through investment to reduce poverty and improve production and efficiency. Growth of commercial agriculture could deliver approximately 40 - 50 percent of needed productivity increases, contribute to economic activity, and scale up sustainable practices. But foreign investments, if there is a need for them, must be balanced against fear of land grabs and concerns about the safety of new technologies.

### **Issues and challenges in economy**

Agriculture sector contribution to Malaysia GDP has shown declining trends since 1970 to 2010, from 28.8 to 7.3 percent, respectively. However this phenomenon is normal in the cycle of development. The main contribution towards this trend is the lack of employment in the agriculture sector. This condition is being experienced globally where employment in the agriculture stands at only 37.3 percent of total employment. As for Malaysia, only 13.3 percent of total employment is in agriculture, forestry and fishing. Lack of involvement of youth is one of the reasons for the lack of labour in this sector. Youth are not interested to make agriculture as their career due to "poor man's sector" mindset. This leads to the increased of foreign workers in the country.

### **Opportunity in Economy**

The World Business Council for Sustainable Development estimates the potential additional sustainability-related business opportunities will generate annual value of USD1.2 trillion from agriculture and food sector by 2050.

Youth participation is crucial for the development of the agriculture sector. Opportunity to attract youth should be intensified as current statistic has shown increased interest - 15 percent of 826,000 agripreneurs are youth. The government has to create infrastructure and support system to encourage this development. For example, the establishment of Halal Hub to promote and produce halal food and standardization like MyGAP that helps to bring the agriculture produce into the more lucrative markets. Besides, there are a lot of future opportunities in agriculture across other sectors that could be explored,

such as Agriculture cities and integration, and agriculture related industries such as tourism, education and construction.

### **Technology in Economy**

Although agricultural contribution to GDP declined over the years to 7.3 percent in 2010, current trends, technology and new initiative in this sector could provide opportunity for Malaysia's economy. Opportunities from technology such as energy efficiency, low-emission energy supply, precision farming, and robotics and automation are a few examples to generate economic opportunity to Malaysia.

**Energy Efficiency** - Energy inputs in agriculture sector are found in every stage of production - from applying chemicals (e.g. pesticides, fertilizers), to fuel tractors that harvest crops, to supplying electricity for animal housing facilities. Inefficiency in using these energy inputs would lead farmers to bear the high energy costs. Inefficiency would also create volatile energy market fluctuations that impact fertilizer costs.

**Low-Emission Energy Supply** - Technology that helps reduce the impact on environment by shifting energy supply from fossil fuels to less polluting alternatives such as solar, wind, nuclear and hydropower for electricity generation or using biofuel as direct sources of energy.

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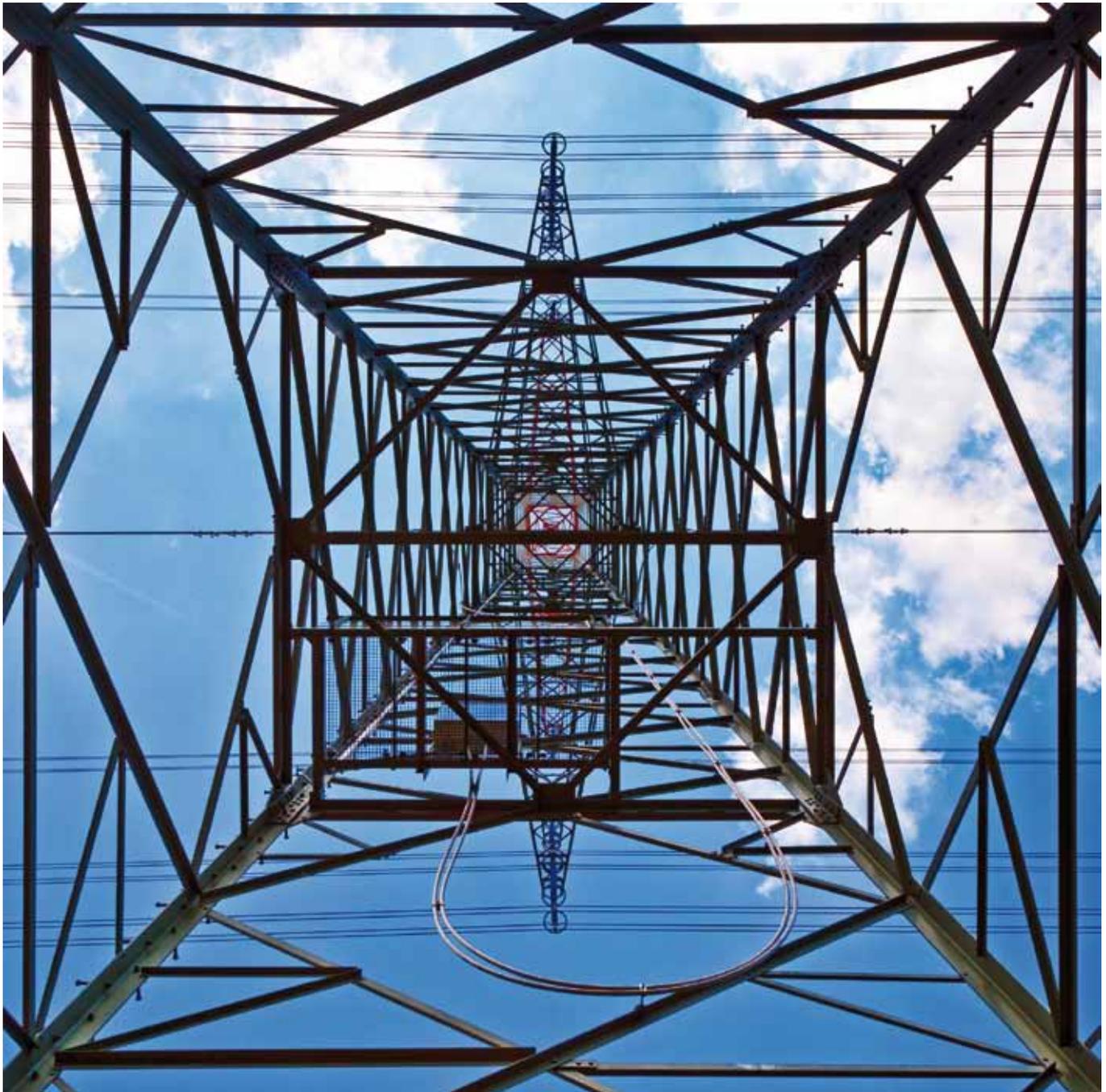
# Developing The National Smart Grid System



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SOURCE: AT&T RESEARCH

Today, the national electrical grid system utilizes traditional distribution method where electricity generated from respective power stations is delivered to consumers via the transmission and distribution cable lines. In Peninsula Malaysia, electricity generation, transmission and distribution are operated and owned by Tenaga Nasional Berhad (TNB). In Sabah, the operation belongs to Sabah Electricity Sdn. Bhd. whilst Sarawak Energy Berhad has a full authority on the electricity supply in the Sarawak.

In time, this ageing national grid system will not be able to sustain supply and meet the increasing national power demand. Beside that, the concern on the issue of global warming influences the government to give additional attention to the development of renewable energy technologies in search of alternative electricity generation. These challenges and issues amplified the need for high technology rejuvenation on the existing national grid system. This would lead to the evolution of smart grid system.

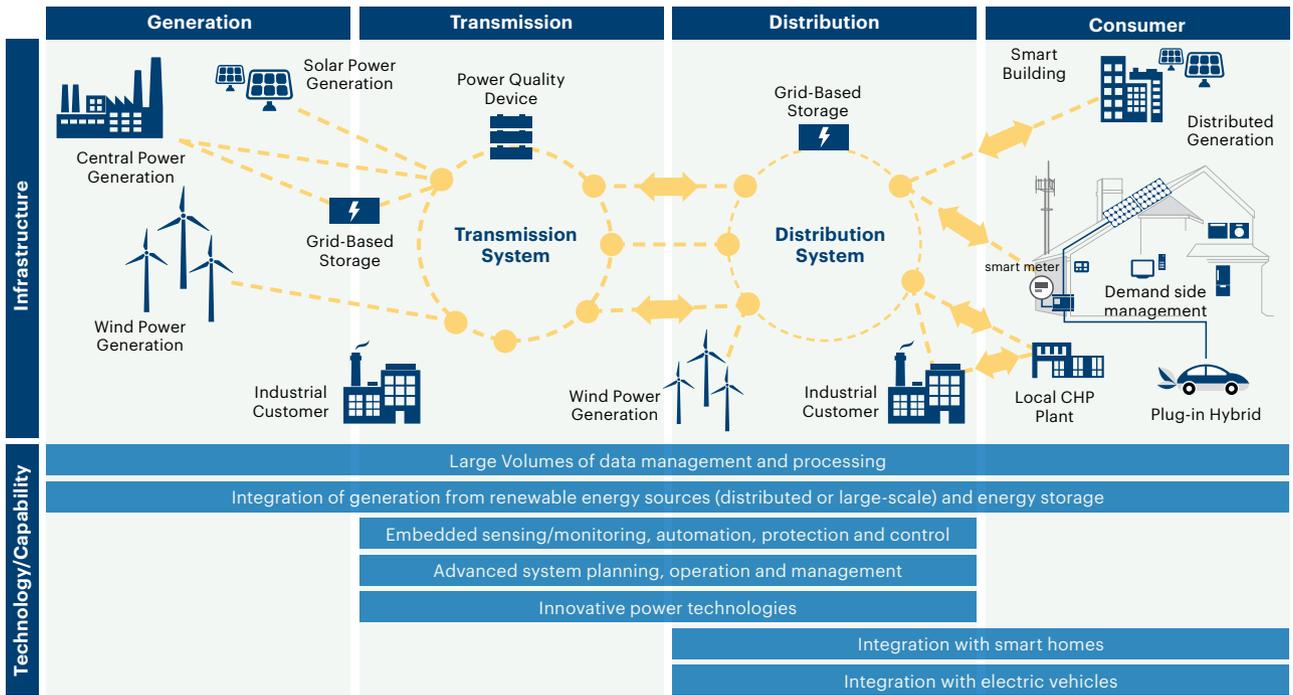
Typically, in the conventional grid system the electricity generated at the power station is stepped-up into high voltage before being delivered through the transmission cable to the substations. At the substations, the voltage is stepped-down and the electric energy is delivered through the distribution cable to end users at the stipulated allowable voltage value. This grid system is centralized; one directional of electricity supply from power station to consumer, one communication from energy meter to the utility provider and is based on manual monitoring.

**Figure 2: Present & Future Flow Electricity Grid System**



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Figure 3: The concept of smart grid



On the other hand, future smart grid system is supported by distribution stations that generate electricity, potentially from commercial fossil and renewable energy sources such as wind farm, solar panel etc. Smart grid system is self-monitoring and self-healing, and the electricity supply is bi-directional of power and information with total integrated device network. Through the two-way flow of information, consumers are exposed to the demand response knowledge, particularly on the price incentives in order to reduce their consumption during the times of peak demand. Smart grid system also leads to environmental friendly technology with the introduction of renewable energy source which reduces CO emission.

Furthermore, smart grid systems offers advantageous performance electrical systems in terms of capacity, reliability, efficiency, environmental friendly, secure and sustainability as the implementation of grid modernization requires comprehensive transformation of high technology system covering on the Grid Infrastructure, Metering and Power Line Communications (PLC). Introduction to sophisticated hardware and software tools are needed specifically on the Circuit Breaker, Protection Relay, Data Concentrator, Gas Meter, Heat Meter, Power Quality, Smart e-meter, AMR/AMI, Water Meter and

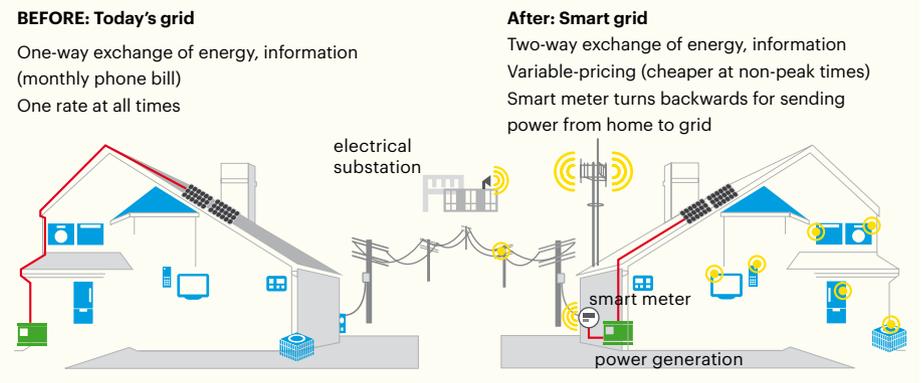
Power Line Communication Modern.

- Capacity: Meet the growing national electrical energy
- Reliability: High quality electrical energy
- Efficiency: Reduce losses in transmission and distribution
- Environmental friendly: Reduce carbon footprint due to the energy saving approach
- Secure: Able to withstand with the physical and cyber threats

- Sustainability: Integration of power from renewable energy sources

As Malaysia moves towards being a developed and high-income nation the demand for energy would inevitably increase, thus increasing the need for implementation of smart grid system. The system is also essential for the development of smart cities that emphasize on green technology across the nation. However, successful industrial development of national smart grid requires committed cooperations among the government representatives, national stakeholders, and industrial players.

Figure 4: Integration of smart home and smart grid system



# Electric Power Industry Transformation

## Driving Forces Creating New Model



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The longstanding, overarching business model in the electric power industry involves a combination of power generation, power distribution, and retail sales over a common electric grid. Rising demand for power and high credit ratings have enabled capital investments in new capacity with reliable long-range payback through a combination of regulated and unregulated income.

Now, despite the fact that global demand will continue to grow, a variety of technical and societal drivers are poised to create major disruption of this business model. In 2013, PwC conducted its 13th Annual Global Power & Utilities Survey with senior leaders

from 53 power and utilities companies in 35 nations of Europe (including Russia), the Americas, Africa and the Middle East, and the Asia Pacific region.

Based on the results of this survey and other sources, this brief examines the forces driving change in the global power industry, potential outcomes, and implications for governments and the greater business community.

### Driving Forces

Although they serve a well-established global market experiencing increasing demand, an overwhelming 94% of power and utilities executives surveyed by PwC

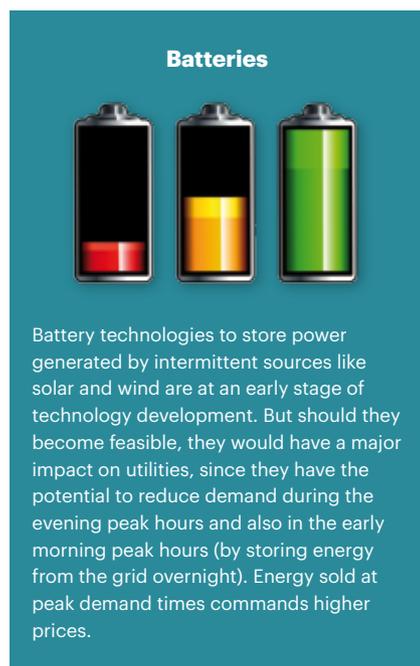
expect “complete transformation or important changes to the power utility business model.” Transformational change is most widely expected in Asia, followed by Europe, and least expected in the Middle East and Africa. A variety of driving forces are poised to disrupt the status quo.

**Rise of renewable energy sources.** Lower prices for solar panels and higher prices for electricity mean that solar power generation will become economically viable without subsidies. According to UBS Investment research, up to 18% of electricity demand in Germany, Italy, and (with a time delay) Spain could be met by unsubsidized solar. “On our estimates for 2020, electricity bills could

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be reduced by 20–30%, and the payback time would be 5–6 years for commercial solar systems and 10–11 years for residential systems.” According to a September 2012 report from Citi Research, “Solar is already competitive versus domestic electricity prices for many countries, with many more to follow soon.” In Europe, demand for conventionally generated electricity from the grid is also being reduced by subsidized renewable electricity generation (wind and biomass) and by energy efficiency programs.

**Rise of distributed energy generation.** While growth of distributed energy generation in Europe has been supported by subsidies, improving economics mean “we are likely to move into a phase where take-up is commercially and market-led.” According to the Edison Electric Institute, emerging technologies that could compete with utility-supplied power include solar photovoltaics, fuel cells, geothermal energy, wind, microturbines, battery storage, and electric vehicle enhanced storage. “As the cost curve for these technologies improves, they could directly threaten the centralized utility model.” (In the US currently less than 1% of total electrical load has been lost to distributed energy generation.) Two-thirds of PwC survey participants (including 82% of those in North America and 77% of those in Asia) expect that future energy demand will be met by a mixture of centralized and distributed generation.



**Distributed energy generation creates price pressure.** One of the key technical challenges facing distributed generation is the need to provide steady power even though most distributed sources operate intermittently. Meeting this challenge adds costs, creating a business challenge: prices rise for consumers who continue to use central electricity sources. (Often, under current regulatory schemes, distributed-energy customers are effectively subsidized by other customers.) There is the danger of a vicious cycle, as rising prices drive more consumers to distributed power solutions, making the grid more complex and further raising costs and prices.

**Energy efficiency, demand-side management, and smart grids,** along with falling prices for solar panels, are among the technologies survey respondents rate as having the greatest impact on their market. The Edison Electric Institute notes increasing interest in demand-side management on the part of customers, regulators, and political bodies in the US. A 2012 report from GTM Research argues that the addition of big data and analytics technologies gives smart grid technology the potential to completely reinvent the utility industry.

**Changes to conventional power generation.** When decentralized energy generation reduces peak demand, conventional energy generation can become unprofitable; this is already an issue in Germany. UBS forecasts that the increase in installed solar capacity in Europe will reduce the load factor on lignite coal plants from 72% to 59% by 2020, on hard coal plants from 47% to 31%, and on gas plants from more than 40% to less than 20%.

**Shale gas and tight oil.** The growth of the shale gas supply in North America is forcing revision of peak oil forecasts, allowing increased US coal exports, and putting North American energy independence within reach. One consequence has been lower European coal prices, making operating margins for coal plants in Europe higher than margins for gas-fired plants, and exacerbating forces leading to the closing of gas-fired power plants in Europe. Many other countries have shale gas resources, but the rate at which they are exploited will depend on local energy policies, economics, and politics.

**Regulations.** Globally, 68% of participants say that regulated energy tariffs are too low

### Regional Differences - North America



North American respondents to the PwC survey stood out from the global average in some noteworthy ways.

- They were most likely to believe that the growth of distributed energy will force major changes to business models.
- They expect the top technological impacts on the industry to come from shale gas and electric vehicles.
- They were more likely than those in other regions to see distributed energy generation as a threat (though 70% still saw distributed generation as an opportunity).
- They were least pessimistic that energy investments needed to slow global warming would prove too expensive for governments.
- Along with South Americans, they were most likely to see current energy policy as a source of uncertainty that deters investment.

to cover the cost of new generation capacity, while 62% say that political and regulatory uncertainty are deterrents to developing large-scale new capacity. According to survey respondents, the most important policy approaches to ensuring that demand is met in future decades are “a regulatory environment that encourages network investment,” “increased interconnection,” and “fast-track planning and permitting for strategic infrastructure.”

**Energy-saving, energy-generating consumers.** Only 9% of respondents currently see customers actively engaged in energy saving and/or energy generating, yet 41% believe their customers will be engaged in these activities 10 years from now.

### Power Industry Impact

These forces are poised to drive substantial change in the electric power industry. The good news is that fully 82% of PwC survey respondents regard distributed power

generation as an opportunity; only 18% see it as a threat.

### Business challenges

These driving forces are creating substantial business challenges; three challenges will have the most significant impact.

- **Balancing cost, security, and the environment.** As PwC points out, these three considerations are simultaneously growing in importance and are often in conflict. In particular, complex grids balancing distributed, intermittent power with central power sources may be more prone to blackouts, and shale gas production raises fresh environmental concerns.
- **Regulatory and other uncertainty.** Some 55% of PwC survey respondents (and 67% in North America) agree that energy policymakers “have produced a significant amount of policy uncertainty that is undermining investment.”

### Regional Differences – Europe



PwC noted, “Europe is where the current environment for power utilities is proving most disruptive.”

- Like respondents from Asia, the Middle East, and Africa, European respondents expect top technological impacts on the industry to come from energy efficiency.
- They were most likely to see opportunity for utility companies to reduce cost bases and increase efficiency.
- They were most likely to anticipate the growth of energy-conserving and energy-generating customers. They were least likely to anticipate that distributed power generation will force business model changes. (PwC speculated that some Europeans believe such changes are already underway.)
- They were least optimistic about a new era of energy abundance.

- **Business model disruption.** Technology, regulatory, and consumer forces will require electric power companies to adopt new business models in order to remain relevant and competitive.

### Possible Outcomes

Major changes are anticipated for an industry that once was stable and changed slowly.

- **Changing sources of power.** PwC notes that falling prices for distributed power generation and increasing supplies of shale gas could work in synergy, with on-demand gas-fired power production used to complement intermittent distributed sources. According to Citi Research, “shale and renewables could be the making of each other” and “gas is a transition fuel to a lower-carbon world,” because renewable energy—particularly solar and wind energy—is rapidly becoming cost competitive in many parts of the world. (PwC notes that coal could serve a similar role where regulations permit.) According to the US Energy Information Administration’s 2013 Annual Energy Outlook, new capacity added in the US through 2040 will be primarily natural gas power and renewables (predominantly wind and solar).

- **Revenue pressure.** For the US, the Edison Electric Institute notes that current forces will tend to reduce revenue and shareholder return; this will in turn reduce creditworthiness, making capital for system improvements and expansion more difficult to obtain.

- **More frequent blackouts.** As already noted, failing to meet the challenge of providing steady power availability—as an increasing percentage of power generation shifts to distributed, intermittent sources—raises the likelihood of power blackouts. When asked how current trends in their own power market are impacting the likelihood of power outages, 37% of respondents are neutral, 37% believe risk is increasing, and 26% believe risk is decreasing.

- **Efficiency improvements.** Some 65% of survey participants believe that there is opportunity for power companies to achieve cost reductions and efficiency improvements of more than 10%; 31% of respondents think improvements of more than 20% are feasible. In the view of PwC, the role of efficiency improvements is to

### Regional Differences – Asia



Asian respondents to the PwC survey also stood out from the global average in some noteworthy ways.

- They were most likely to expect utility business models to be transformed by 2030.
- They were least likely to anticipate significant market impact from shale gas.
- They were most optimistic that current market changes were decreasing the risk of blackouts.
- They were most optimistic about a coming era of energy abundance.

create “strategic headroom,” giving power companies time and resources to adjust to long-term shifts in business models.

- **Regulatory changes.** Responding to the survey results, PwC notes, “There is a feeling that regulation is at a crossroads” and that, going forward, regulatory certainty will be valued more highly than liberalization of regulations, as major capital investments will be needed to accommodate an era of distributed generation and renewable energy.

- **Business model transformation.** While it’s not possible to specify future business models, key strategic questions include:

- Where are the most attractive revenue opportunities?
- How far and how fast will distributed power generation grow?
- What will be the role of natural gas in the shale gas era?
- What roles will transmission-system and distribution-system operators adopt in response to smart energy grids, demand-side management, and distributed generation?
- How can energy companies improve

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**Table 1: Responses on the five scenarios about the future of the power industry**

Scenarios	Low Probability	Medium to High Probability
1. Technological advances and new sources such as shale gas will dramatically reduce dependence on oil- and gas-rich countries, and change the power balance between buyers and sellers	33%	67%
2. Power utility companies need to become much more tariff-clever, perhaps learning some bundling and 'free allowance' tricks from mobile telephony.	36%	64%
3. In the coming decades, we could see the death of the current energy retailing business model in some major world markets because of the rise of distributed generation.	52%	48%
4. In the future, concerns about energy security will become a thing of the past due to technological changes and new sources of energy.	45%	54%
5. The nuclear/ renewable investments needed to avoid significant global warming (two degrees or less) will prove too costly for governments to support.	32%	68%

operational efficiency to free up resources and buy time to respond to change?

– How can power companies best partner with energy-conserving and energy-generating customers?

• **Decline into irrelevance?** The PwC report is clear that the very survival of power industry companies depends on their ability to adapt to forces of change. “How companies respond to these changes will determine whether they will be part of the future or join the ranks of companies from other industries whose business models have been eclipsed by technological and market change.” The rise of distributed energy generation “could shrink the role of unwary power utility companies to operators of back-up infrastructure.”

### Future Scenarios

Participants in the PwC survey were presented with five scenarios about the future of the power industry and asked to evaluate their probability. (Refer Table 1).

Particularly noteworthy are the relatively high probabilities assigned to scenario 3, the death of current business models in some markets; scenario 4, forecasting a new era of energy abundance; and scenario 5, suggesting that economic issues will prevent governments from successfully limiting global warming.

### Business Implications

The changes coming to electric utilities will have implications for a wide variety of businesses and organizations.

- As renewable energy, especially solar, becomes cost competitive with grid-supplied electricity, organizations of all kinds should consider supplying some of their power needs on-premises. Global organizations should anticipate the crossover points at which self-generation becomes economically viable in each of the countries in which they operate.
- In the shorter term, organizations should anticipate that the advent of distributed generation could put upward pressure on conventional energy prices. Within this context, organizations that fail to adopt distributed generation or move to it late could suffer higher than necessary energy costs.
- With the growth of distributed generation widely anticipated in many markets, companies that can develop and supply infrastructure and information technology to enable distributed generation should find growing markets.
- Demand-side management strategies are also expected to grow in importance. Businesses will find that there are real incentives to optimize their energy demand across various times of the day and days of the week. Big data analytics

may help larger organizations optimize their energy usage and costs. There will also be opportunities to provide businesses and consumers with tools, software, services, etc. for demand-side energy management. One important question for energy and related firms is whether they will be the ones to innovate in this space—or if startups (e.g., Nest Labs) and infotech firms (e.g., Google) will identify and capitalize on these emerging opportunities first.

- The continued availability of shale gas is assumed in the PwC survey and analysis. An environmental disaster or other unexpected event that interrupts the growth of shale gas could change some of the possible futures described here. Organizations should consider what such a wildcard would do to their energy costs and availability.
- A significant minority of survey respondents believes that current developments in the electric power industry are increasing the risk of blackouts. Organizations may wish to update their contingency plans for power outages at key facilities.
- As distributed generation grows, power providers will be looking for ways to partner with customers on energy strategies. Organizations should remain open to partnerships with utilities to optimize their energy usage. Organizations should also anticipate a wider variety of usage plans and payment options from “tariff-clever” utilities

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# Natural Fiber Composite Usage Towards Sustainability



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The growing global environment and social concern, high rate of depletion of petroleum resources, and new environmental regulations have forced the search for new composites and green materials compatible with sustainable resources. Over the past years, sustainable eco-efficient practices and product have gained attention and the use of natural fibres as reinforcement for polymers has been increasing rapidly. The natural fibre composites, so called bio-composites, are subject of many scientific and research projects, and many commercial programs.

Bio composites can be defined as a material formed by a resin and reinforcement of natural fibers (usually derived from plants or cellulose). There is a variety of natural fiber available in Malaysia such as kenaf, abaca, oil palm empty fruit bunch, corn stalk, sugarcane bagasse, pineapple leaves, banana, kapok and coir. These fibers are biodegradable and renewable resources which can be used to ensure sustainable resources and environmental friendly. Such fibers can generally be classified into three types, says Prof. Lawrence Drzal, director of the Composite Materials and Structure Center at Michigan State University (East Lansing, Michigan). "Bast" fibers, such as jute, abaca and kenaf are noted for being fairly stiff when used as a composite reinforcement. Leaf fibers, including sisal, pineapple leaves and banana are noted for improving composite toughness with somewhat lower structural contribution. Finally, seed or fruit fibers – kapok, and coir – demonstrate elastomeric type toughness, but are not structural.<sup>1</sup> Locally, among natural fibre with high potential use is kenaf, scientifically known as *hibiscus cannabinus* sp. is a jute-like plant from the hibiscus family that can be used as a raw material to make multitude of products like high quality paper, biocomposites for automotive door trimmings and interior shelving, bioplastics industry, and building materials like medium density fiberboards.



Kenaf Plant

**There is a variety of natural fiber available in Malaysia such as kenaf, abaca, oil palm empty fruit bunch, corn stalk, sugarcane bagasse, pineapple leaves, banana, kapok and coir.**

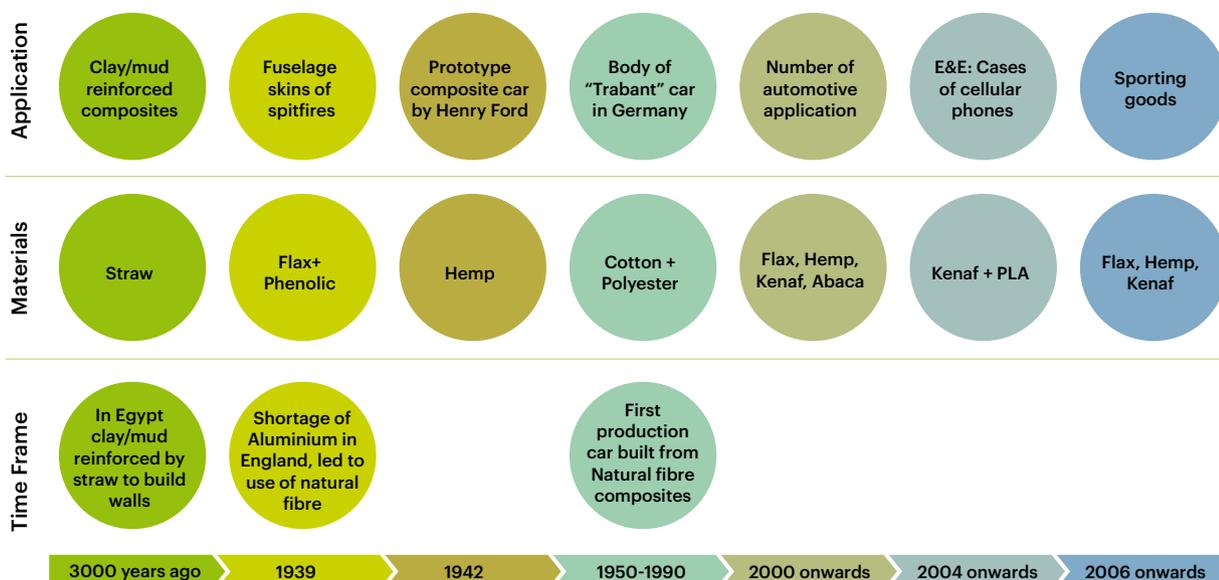
The beginning of composite materials may have been the bricks fashioned by the ancient Egyptians from mud and straw. The ancient brick-making process can still be seen on Egyptian tomb paintings in the Metropolitan Museum of Art.

Commercialization of the composites could be traced to early century when the cellulose fibers were used to reinforce phenolic, urea and melamine resins. Composites in the world of today have wide range of applications, wherever high strength-to-weight ratio remains an important consideration for use. Increasingly, the application has expanded to industrial scale production to produce car components, insulator, containers, and interior decoration. Its principal use is found in transportation and construction.

In majority of cases, the requirement of high performance in the transportation and construction industries reduces the usage of natural fibers or being used as fillers only. However, today Natural or

## viewpoints

### Evolution of Natural Fibre Composites



SOURCE: TAMRAT YIMER, JULY 2013

Bio-fiber composites are emerging as viable alternative to glass fiber reinforced composites, especially in automotive application. Natural fibers, which traditionally were used as fillers for thermosets, are now becoming one of the fastest growing performance additives for thermoplastics. Advantages of natural fibers over man-made glass fiber are: Low cost, low density, high stiffness, competitive specific mechanical properties, reduced energy consumption, carbon dioxide sequestration and biodegradability. Natural fibers offer a possibility for developing countries to use their own natural resources in their composite processing industries.<sup>2</sup>

In automotive industry, these raw natural fibers could be processed and turned into short fiber or long fiber, depending on application and purpose. Composite formation begins when these fibers, which are blended with other material and resins, go through manufacturing process of injection molding, extrusion, pultrusion and thermoforming into sheet, mat or profiles forms. The commercialized natural fibers composite such as door panels, seat backs, headliners, package trays, dashboard trunk liners and other interior parts has become low cost and low weight alternatives due to the increasing of oil price.<sup>3</sup> Our local manufacturers, like PolyComposite Sdn Bhd, are producing thermoformed interior trims; package tray, door panel and speaker

shelf for local automotive players; Perodua, Proton, Honda, Hyundai and Naza (Kia).

The application of Natural fiber composite in construction are decking, flooring, ceiling, wall, grating, cladding and other interior application. Composite materials are widely used in the construction field for the last 20 years. In Malaysia, composite materials are utilized extensively only after the introduction of the Industrialized Building System (IBS). The Composite Building System is a part of IBS that is applied recently due to its easier installation, light weight and ease in handling and is extensively used because the conventional building system is unable to cope with the huge demand in the construction industry.

Duralite Sdn Bhd, Everise Crimson Sdn Bhd, KPC Manufacturing, IRM Composite and Kencana Fiber Composite Sdn Bhd are local companies involved with composite construction. They produced panel and profile from wood wool fiber and kenaf fiber

**In Malaysia, composite materials are utilized extensively only after the introduction of the Industrialized Building System (IBS).**

which are applicable in today's levels. It is ideal for external and internal walls, roof decking and concrete shuttering with cost effective, high thermal insulation value, fire resistant and acoustic properties.

As a strategy to enhance efficiency and productivity, the Government is committed to embark on IBS more rigorously and this has been approved by the Cabinet. The implementation of IBS in Malaysia is to address issues associated with foreign labors, increasing price of raw materials, and the reduction of energy for future sustainability.

In Malaysia, **The Fibre and Biocomposite Development Centre (FIDEC)** was established in September 2006 to spearhead the development of the fibre and biocomposite industry. It acts as a focal point for information on pre-commercialisation activities and coordination of Research & Development (R&D), exclusively for the biocomposite industry in Malaysia.<sup>4</sup>

The Ministry of Plantation Industries and Commodities aims to develop kenaf into a new sustainable source of growth to diversify Malaysia's commodity sector. As initiatives to develop natural fiber composite, the government had allocated RM2 million for kenaf research under the Seventh Malaysia Plan (1996-2000), RM 3.8 million under the Eighth Malaysia Plan (2001-2005), and

RM 10 million under the Ninth Malaysia Plan (2006-2010) to East Coast Economic Region (ECER) development plan to attract industrial player to invest in kenaf.

In line with the East Coast Economic Region (ECER)'s plans to promote kenaf, the country's first kenaf Collection, Processing and Marketing Centre (CPMC) was established on a 0.5 hectare in Beris Lalang in collaboration with the National Kenaf Tobacco Board (NKTB). The centre is be operated and managed by Symphony Advance Sdn Bhd (SASB) together with several other companies<sup>5</sup>.

Under ECER the target area for kenaf is about 10,000 ha. In his speech, the Plantation Industries and Commodities Minister Tan Sri Bernard Dompok announced that Kenaf cultivation would be extended to outside the tobacco growing areas. For a start, a total of 2,210ha of land has been allocated for kenaf cultivation including 1,000ha in Pahang. Another 1,210ha spread out in other states such as Kelantan (500ha), Terengganu (600ha), Kedah (50ha), Perlis (50ha), Perak (5ha) and Sabah (5ha).

Symphony Advance Sdn Bhd is exploring opportunities with Samsung Group and other multinational companies to build kenaf polymer factory in Kertih, Terengganu. Other local companies that have taken part are Integral Wood Sdn Bhd, KEFI Malaysia Sdn Bhd, Kenaf Natural Fibre Industries Sdn Bhd and Malaysian Newsprint industries. In the meanwhile, Malaysia has sent a first consignment of 1000 tonnes of kenaf powder to Korea and the objective was to increase the amount to 2000 tonnes a month. The former Prime Minister, Tun Abdullah Ahmad Badawi, mentioned in his speech that Malaysia is looking into a good future prospect with Korea for the next ten years to see a growing economic opportunities and more bilateral connection between the two countries<sup>7</sup>. These Malaysian and multinational companies have agreed to invest in kenaf downstream activities and take participate in research and development, fiber separation processing, production of kenaf powder until commercialization.

The National Commodities Policy has stipulated the need to enhance the development of kenaf downstream industry and promote the utilization of kenaf in relevant product development and manufacturing. Manufacturing of

kenaf composite automotive parts could be the desired downstream activities. Fibre produced from the stem of kenaf has great potential in various automotive parts and components composite applications. The advent of energy-efficient vehicles (EEVs) drives more automakers to look for ways of reducing their vehicle weight and kenaf composites offer a viable solution. Currently, kenaf reinforced composites are used in automotive trim components such as door panels, seatbacks, headliners and package trays certain parts has used in Proton and Perodua.

The significant advantage offered by kenaf fibre is its low cost compared to synthetic glass and carbon fibres. It is biodegradable. Hence, parts made from kenaf-reinforced composite are easily disposed.

The National Automotive Policy drive for local EEV manufacturing will open up larger market opportunities for the kenaf industry. Kenaf composite applications in EEV components are expected to increase, especially with the advent of plug-in hybrids and full electric vehicles in the near future. To date, Malaysia has launched a local EEV, Proton Iriz.

In this respect, the Malaysia Automotive Institute can be the focal point for automotive industry players and kenaf-related stakeholders to come together to formulate action plans to enhance kenaf utilization in the local automotive scene.

The growing concern on the environment in the developed markets, the green image of the industry will be promoted through the utilization of non-wood fibres and biocomposites, and encourage manufacturers to attain international environment standards, for example ISO 14000<sup>8</sup>.

The economic crisis, depletion of petroleum and environment concerns helped bio-composites to gain importance. Many studies regarding bio-composites are in development. Subjects like: fiber architecture, (fiber geometry, orientation, and volume fraction); fiber impregnation; fiber-matrix compatibility; maximum quantity of the fiber in the resin system, the optimum quantity of fiber to achieve desired product (mechanical properties), etc. are being explored. In line with the technology advancement in processing and innovation, the natural fiber-based products could be the future of the manufacturing industry.

**Malaysia Automotive Institute can be the focal point for automotive industry players and kenaf-related stakeholders to come together to formulate action plans to enhance kenaf utilization in the local automotive scene.**

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viewpoints

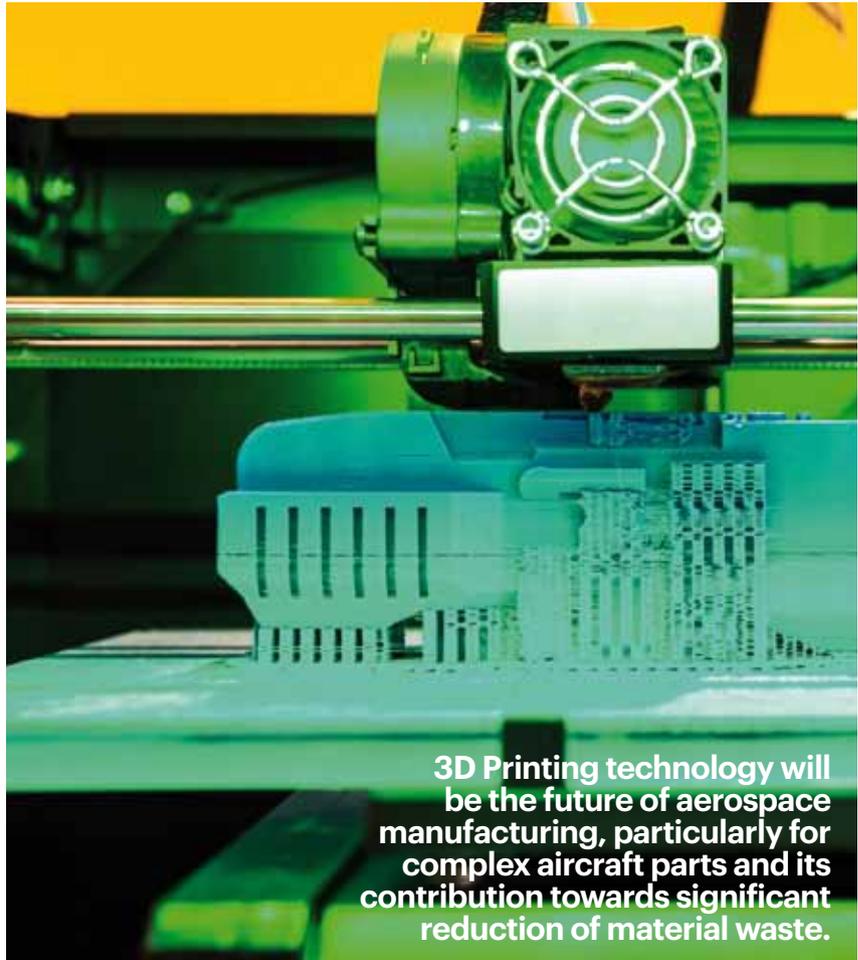
# Future of 3D Printing in Aerospace Industry



by  
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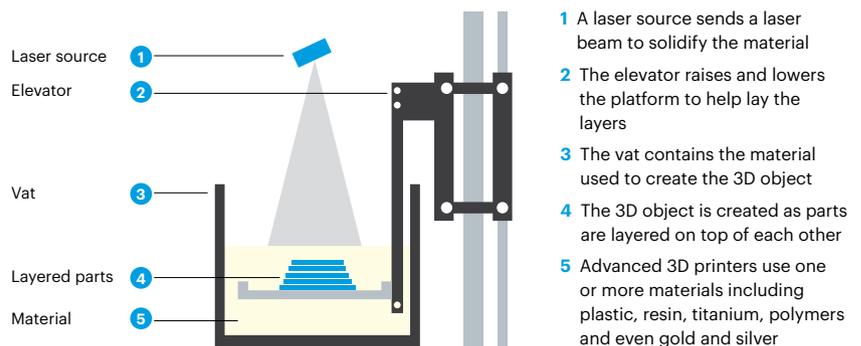
**3D Printing technology will be the future of aerospace manufacturing, particularly for complex aircraft parts and its contribution towards significant reduction of material waste.**

**3D printing**, also known as **additive manufacturing** or **solid freeform fabrication**, creates three-dimensional objects by depositing feedstock material layer by layer and bonding it into a final product. The method is also known as “fixture-less” manufacturing because it makes it possible to create objects without the intermediate step of creating dies or molds. 3D printing technology, along with 3D scanning and computer-aided design makes it possible to design, create, and even duplicate complex three-dimensional shapes and objects. This technology review will look into how this emerging technology can impact the aerospace industry per say.

**How it Works**

The material used is most often plastic, but can also be metal, resin, or ceramic. A variety of techniques has been implemented for 3D printing. Either a nozzle deposits a layer of material in the desired pattern, or a binding agent or a laser beam selectively solidifies a complete layer of powdered material.

3D printers work like inkjet printers. Instead of ink, 3D printers deposit the desired material in successive layers to create a physical object from a digital file



**Figure 1: Basic 3D printing works**

SOURCE: T. ROWE PRICE

## Current Development

Despite the current limitations, the aerospace industry seems to gradually adopt the technology as advanced fabrication techniques such as laser melting, electron

beam melting (EBM), and other 3D printing applications are being accepted. 3D printing has emerged as a viable technology in the future:

Tech Organisation	Progress	How?
 Airbus	A new technique that has the potential to revolutionize the current-generation production methods is being evaluated for use across Airbus.	Technology demonstrators as struts and pipes are already made and the first A350 XWB component – a door bracket for the A350-1000 – is in the manufacturing stage
 Rolls-Royce	3D printing would enable Rolls-Royce to create better lightweight structures and slash lead times.	Using build up layers of molten plastic to create highly intricate and accurate designs for the manufacturing of large components of jet engines.
 Boeing	Boeing (BA) uses the process to make plastic air-conditioning ducts for its 787 Dreamliner jet and Stratasys's 3D printers to make some components. The airline company has even built an entire cabin using one of Stratasys's 3D printers.	Uses 3D printing technology to rapidly fabricate tools to make composite parts.
 GE	GE plans to produce 100,000 3D-printed components for the next-generation GE9X and Leap models. The GE9X will be the driving force behind the new Boeing 777X, the next evolution of the 777 which will begin production in 2017	Each Leap engine will contain 19 metal 3D-printed fuel nozzles. The part is lighter and more durable than the traditional part. Will be 'the most advanced fuel-efficient commercial aircraft engine ever built'.
 Pratt & Whitney	Pratt & Whitney Rocketdyne of Canoga Park, Calif., the prime contractor for the J-2X engine.	Uses an advanced 3-D printing process called Selective Laser Melting or SLM to create an exhaust port cover for the engine. SLM uses lasers to fuse metal dust into a specific pattern to build the cover, which is essentially a maintenance hatch for the engine's turbo pumps.
 NASA	Testing a prototype 3D printer. The task at the moment is just to check whether it can work in space.	NASA wants to be able to use one to print replacement parts for the space station as and when required.
 Stratasys	This one-piece rocket engine injector is ready in just 40 hours by using a sophisticated 3-D printing machine at Marshall's Advanced Manufacturing Facility.	Built each part by layering metal powder and fusing it together with a laser, a process known as selective laser melting. The end result was an injector with 40 individual spray elements, all printed as a single component rather than manufactured individually.
 BAE Systems	3D printers could be so advanced by 2040 they could create small unmanned aircraft.	UAV could be created by super hi-tech onboard 3D printers, an additive layer and robotic assembly.

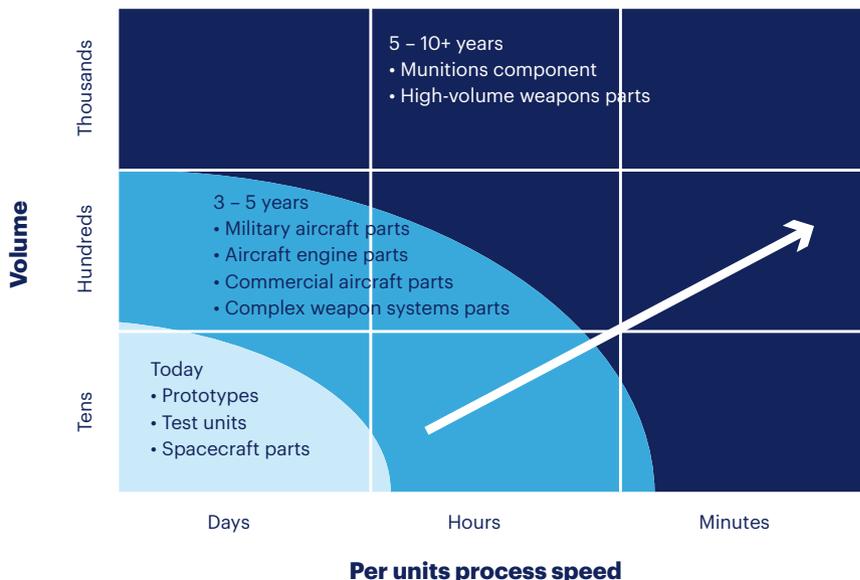
*BAE Systems are looking at the possibility of aircraft parts that can heal themselves in minutes, even during flight.*

## viewpoints

### Game Changer for Aerospace Industry

- Reduce cost and use of material and labor, the ability to produce goods on demand without the need for inventories and bringing the production closer to the consumer.
- It is an additive process rather than a subtractive one, thus 3-D printing creates much less waste than traditional manufacturing which will not only save costs but used resource efficiently and reduce environmental effect.
- It would have taken much longer to manufacture the same part through traditional techniques, whereby 3D printing can welding multiple parts together.
- 3D printing allows us to look at test data, modify parts or the test stand based on the data, implement changes quickly and get back to testing for prototype.
- 3D printing speeds up the whole design, development and testing process and allows us to try innovative designs with less risk and cost to projects.
- On-demand customization of shapes, colors, text, and other variables through 3-D printing adds tremendous value.
- Products could be printed on demand without the need to build-up inventories of new products and spare parts.
- The implications for on demand production, mass customized product lines are vast. Manufacturer currently sending prototype models into a manufacturing location, where the goods are made and packaged and then shipped into many countries worldwide. This model is likely to change into sending design files of the product into the countries directly where the goods are being made locally, avoiding reliance on global supply chain altogether. This will not only reduce the carbon footprint, but allow mass customization in a large scale.
- Further macroeconomic implications are already visible in developed country like the US where the government is bolstering their support on 3D printing initiatives and this could reduce their dependence on developing countries like China for their domestic industries. This will narrow countries' focus on innovation and intellectual properties issues.

Figure 2: 3D printing - adoption map



### 3D Printing in Malaysia's Aerospace Industry

3D Printing technology is relatively new to Malaysia's aerospace industry. Generally, metallic aerospace parts and components produced in Malaysia are manufactured based on machining technologies. Industry players seem to be cautious to make changes as they have already invested heavily in modernizing their manufacturing capabilities through the acquisition of manufacturing technologies as well as enhancing their manufacturing processes.

However, the advancement in 3D Printing technology cannot be denied. Therefore, specific study and industrial research need to be conducted to analyze and determine the right approach and strategy for technology migration. Close relationship with aircraft and engine OEMs is a key factor in ensuring the new process to be adopted by the industry players meets the technical standard and specification required by the customers.

This shall not be limited to the 3D Printing technology alone, but also the technical competency of the current workforce and, most importantly, the material to be used in the manufacturing process.

There is no doubt that 3D Printing technology will be the future of aerospace

manufacturing, particularly for complex aircraft parts and its contribution towards significant reduction of material waste. The adoption of the 3D Printing technology would elevate Malaysia aerospace industry to a higher level of the global supply chain as we can offer higher value added services to our customers, not only for parts and components manufacturing but also complex repair processes

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# SMART COMMUNITIES

## Translating Science into Action



### PROGRAM OBJECTIVE

To accelerate the greening of cities as engine for **Industry Driven** Economic Growth through Investment, Jobs and Innovation, with the introduction of new **innovative Business Models** in Green and ICT to spin-off new high impact, high technology industry **Value Chains** and Industry Driven R&D

### PROGRAM HIGHLIGHTS

Energy Efficient Buildings, Solar Industry Eco-Park, Waste Industry Eco-Park, Smart Grid, Green Tourism and City Info-Communication.

### WHO SHOULD PARTICIPATE

City Authorities, Technology Providers, Market Providers, Utility Providers, E-Services Providers, Investors, Syndicators, Academia and Research Institutes



A FLAGSHIP PROGRAM OF NATIONAL SCIENCE TO ACTION (S2A) INITIATIVE

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viewpoints

# Changing Families



by  
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## Map: Home and Family Life in Asia



SOURCE: ASIA FOUNDATION REPORT

The basic size and structure of families are changing in many parts of the world. In developed countries, delayed marriage and childbirth, and more divorces are leading to smaller families, single-parent families and people living alone. In developing countries and less developed nations people are moving away from traditional extended family structures towards smaller families with fewer children. Globally, the fertility rate is falling, resulting in fewer births and smaller families.

Smaller families cause the ageing of the world population and the changing of the structure of many societies where old family bonds are being replaced by new non-familial social ties.

Changes in population patterns and economy have significantly affected the Malaysian families. Over the past five decades since independence, economic development, modernization, and rural-

urban migration together altered family ties and attributed to more fragmented family structures. There was a corresponding steady and noticeable decline in the average size of the family in Malaysia over the same period.<sup>1</sup>

### Trend summary

The falling global fertility rate is one of the most basic drivers of changing families. In 1950, the global rate (number of children per woman) was 5.02. By 2000 this had dropped to 2.65 and by 2050 it is expected to be only 2.05, below replacement.<sup>1</sup>

In developed countries, the long-term drop in fertility is continuing as parents choose to postpone the birth of their first child. For example, in the UK there are now more first-time mothers in the 30–34 age group than in the 25–29 age group.

In Malaysia, the marrying aged trend differs between males and females. Whilst males

## In developing countries and less developed nations people are moving away from traditional extended family structures towards smaller families with fewer children.

are seen to opt for earlier marriage – the average age of first marriage for males dropped to 28.0 years from 28.6 years in 2000 – females are opting to marry later, at the age of 25.7 years compared to 25.1 years in 2000.<sup>3</sup>

Fertility rates in developing countries and the third world are falling due to a variety of factors including rising education and income levels, government efforts to encourage smaller families (“one child” policies), and increased awareness of and access to contraception. These factors are exemplified in the declining fertility rates of China and India. China’s fertility rate dropped from 6.2 children per woman in the 1950s to 1.6 children per woman in 2004. Similarly, India’s fertility rate dropped to 3.1 in 2000–2005, from 5.9 in 1950–1955.<sup>4</sup> In Malaysia, the nation’s total fertility rate (TFR) dropped from 3.0 children in 2000 to 2.1 in 2012.

The drop in TFR caused the population growth rate to decline. Population growth is expected to decline further to 1.0 percent for the 2020 to 2030 period. This caused the percentage of the elderly population aged over 60 to increase. Consequently, Malaysia is expected to become an aged nation by 2030 when 15 percent of the population is made up of senior citizens.

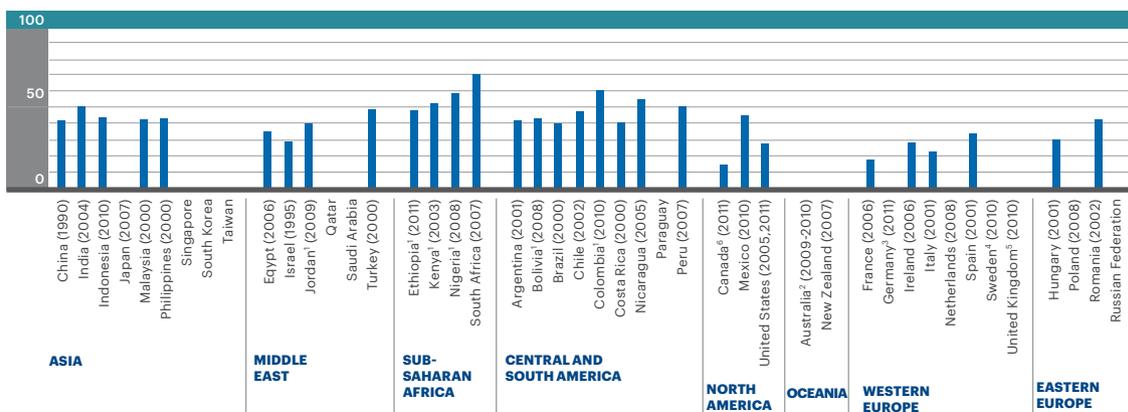
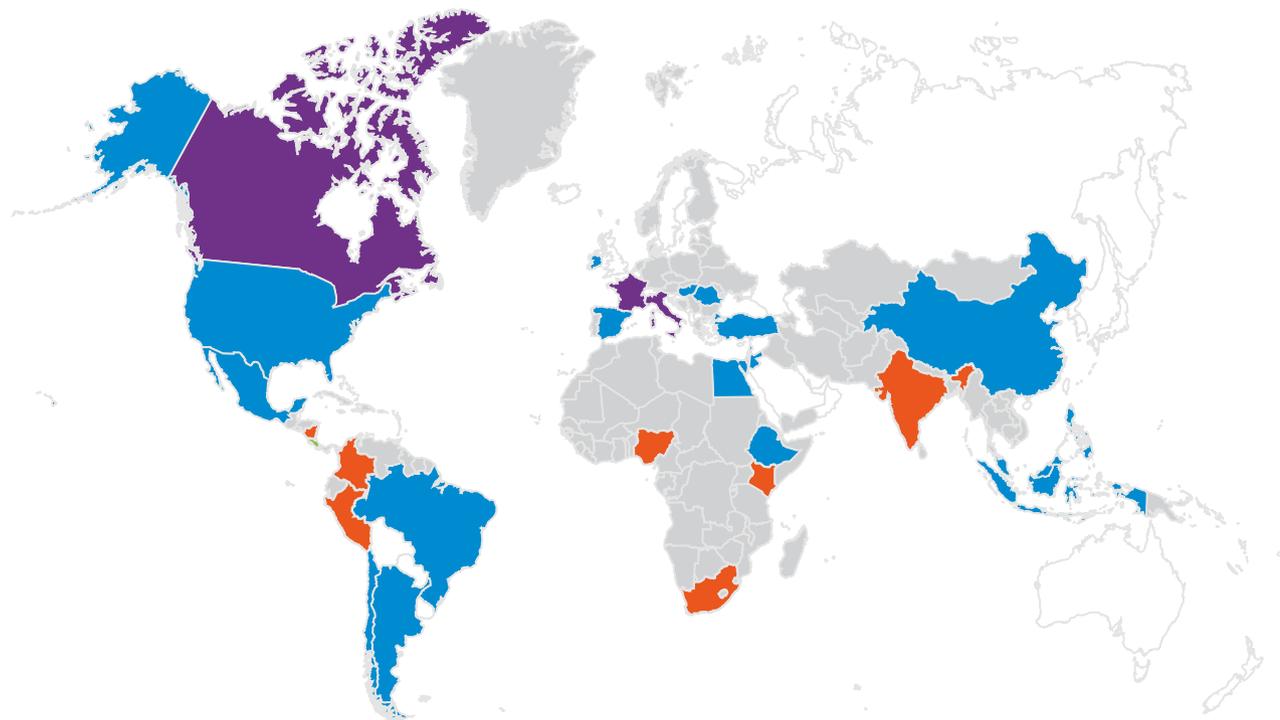
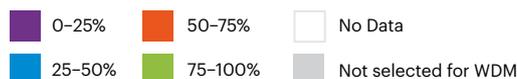
Societal aging may affect economic growth and create many other issues including the sustainability of families, the ability of states and communities to provide resources for older citizens, and international relations. Population aging strains social insurance and pension systems and challenges existing models of social support. It affects economic growth, trade, migration, disease patterns and prevalence, and fundamental assumptions about growing older.

Other factors – beyond the demographic trends – are also helping to reshape families. For example, the social notions of family are changing; high rates of divorce and remarriage in developed nations have

## viewpoints

### Living Arrangements, 1990 - 2011

Percentage of children living with probable extended family (adults in addition to parents)



SOURCES: WWW.WORLDFAMILYMAP.ORG

made “blended families” composing half-siblings and step-parents common.

In developing and less developed countries, more complex social changes are taking place, changes that occurred years earlier in developed countries. Smaller families are being fostered by urbanization. As people move to cities to find opportunity, sustaining their traditional family structures becomes harder. Familial bonds are strained as people leave behind parents

and grandparents, aunts, or cousins. In some cases, children are left behind as well. In China, internal migration to cities has resulted in 70 million children in the countryside waiting for parents who are away looking for work in the cities.<sup>5</sup>

Income growth is fostering a move away from traditional extended families. There is a demonstrated link between a growing middle class and smaller families. Simply put, these rising social cohorts tend to have

fewer children, driven by factors such as higher education levels.<sup>6</sup> Education about family planning and increased access to contraceptives is also producing smaller families in developing nations. This family planning knowledge is not only reducing family size, it is seen as contributing to economic growth.<sup>7</sup> The nuclear family – consisting of two parents and at least one unmarried child – remains the predominant family arrangement in Malaysia.

### Global trends

The evolution of families is occurring across the globe, but it is being manifested in different ways. Trend in developed countries is mature; families have moved past the preeminence of extended and nuclear families and are now moving into a post-nuclear family phase. This is marked by more diversity in family structures and includes more singles living on their own or with friends for extended periods of time, same-sex partnerships and parents, blended families, and even people creating networks of friends to “replace” their families. In 2005, Europe was expected to have 14% fewer nuclear families than in 1995.<sup>8</sup>

In developing world, the trend is less advanced and is enmeshed with the trends of rising middle classes and urbanization. In this region, the change is the result of falling fertility, the formation of nuclear families, and the moving away from extended families. These will increase as modernization and urbanization continue and as incomes in these regions rise. The trend towards single-person and female-headed households is emerging as well, often as a result of the male head of household leaving to find work away from home.<sup>9</sup>

### Business sector relevance

Much consumer activity takes place in the context of the family. As such, the changing-families trend bear significance for a variety of business sectors, from construction to leisure. New family structures will mean fewer babies, with each at the center of even more family attention. Parents and grandparents will devote themselves to the happiness and welfare of the child. The “Little Emperors” – the pampered only children born since the 1980s in China – are an example. This may develop a market for more luxury purchases for babies and children. In developing countries the shift to nuclear families, often living farther apart, means that new ways are needed to keep families in touch.

More families in developing countries feature dual wage earners. With both spouses and/or parents working, smaller households will be particularly receptive to products and services that offer convenience and help deal with accelerated lifestyles.

A significant trend that has and continues to affect Malaysian families is the rate of female participation in the labor force.

Malaysia has the lowest female labor force participation level in the Asean region. World Bank observed that Malaysia’s female labor force participation was only at 46 per cent and lower than the middle-income country’s neighbors like Singapore (60 per cent) and Thailand (70 per cent), and significantly lower than high-income countries like the UK (70 per cent) and Sweden (77 per cent).<sup>10</sup>

Increasing female labour force participation requires balancing their competing responsibilities within the family and the workplaces. Flexible time arrangements at work, safe and high quality childcare facilities as well as ‘teleworking’ will support increasing women’s labour force participation.

The growing number of smaller households in developing countries would mean more per-capita spending on household equipage such as appliances and furniture. In many areas, change in family size is being driven by delayed marriage. This means that people are extending the life stage between education and family formation – living by themselves, or with friends, for years. These single-person and group households have different consumer characteristics and needs than those of married couples and families; for instance, having multiple decision-makers under one roof, buying smaller servings or sizes for personal consumption, and having potentially more time and disposable income than most families do.

Families are the nation most important resource. They are society’s most enduring basis for raising children, caring for family members, providing and receiving love and support, and for transmitting values, culture, language and traditions between generations. Family well-being is a concept that goes beyond economic prosperity to include things such as physical and emotional health and safety, social connectedness and quality relationships. While Malaysia is moving towards a developed nation by 2020, family well-being should contain an assumption that families work best and contribute optimally to society when there is a balance of economic and non-economic factors. While the task of deciding on that balance is a matter for each family to some extent, and is ongoing as circumstances change, it also reflects the dynamics of the social environment.

**Family well-being is a concept that goes beyond economic prosperity to include things such as physical and emotional health and safety, social connectedness and quality relationships.**

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## happenings



### Pre-Convention: Asean Youth Leaders Summit 2015

8TH OF AUGUST 2014  
KUALA LUMPUR

The year 2015 is indeed going to be a significant year for the region and Malaysia. Malaysia will assume responsibility as the ASEAN Chairman, a succession from Myanmar; and it is at this platform that the ASEAN Community is targeted to be realized. In preparation of this big agenda, Malaysian Youth Council and Committee of ASEAN Youth Cooperation, in collaboration with the Ministry of Youth and Sports, Malaysia organised "Pre-convention: ASEAN Youth Leaders' Summit 2015" in conjunction with ASEAN Day on the 8<sup>th</sup> of August 2014 in Kuala Lumpur. The pre-convention aimed to disseminate knowledge and publicize the ASEAN Community 2015 among the youth. It is a networking opportunity to develop smart partnership among youth in the region.

myForesight® was invited as an expert panel to share insights and viewpoints to develop a concrete substantive action plan towards 2015 ASEAN Chairmanship. The discussion aimed to enlighten representatives from ASEAN youth on the knowledge and concept of ASEAN Community 2015. Three parallel sessions emphasizing on ASEAN pillar namely: Politics and Security, Economic, and Socio-culture were conducted during the one and a half day event. The interactive dialogue session encouraged representatives from participating countries to share their thoughts and ideas. All resolutions from the dialogues will be used as a basis to enhance the formulation of ASEAN Youth Action Plan which will be elaborated and debated in ASEAN Youth Leaders' Summit next year.



### NRE School of Leadership (SOL) Programme

26 AUGUST 2014  
BAYVIEW HOTEL, MELAKA

Amongst the positive traits of a good leader is being accountable on one's decision for the future, apart from other attributes such as forward looking, proficient, agile, high self-esteem and etc.

The trend now is to raise interest in foresight practises from both the private and public sectors. This is based on studies and researches conducted in other countries on foresight's significant contributions towards future sustainable living.



### Futures Thinking & Scenario Planning Workshop

FACULTY OF ECONOMY AND MANAGEMENT,  
UNIVERSITI KEBANGSAAN MALAYSIA (UKM)  
27-28 AUGUST 2014



Acknowledging this fact, the Ministry of Natural Resources and Environment (NRE) organized a 4-days workshop to refine the leadership skills among its officers by inculcating foresight practices in the ministry. The workshop was attended by 30 officers of grade 48-54. Nine speakers were invited to share their insight and experience.

myForesight® was allocated a slot on futures thinking to promote the understanding of foresight. It was done through lectures and practical approaches to the participants. The sessions are expected to increase the foresight profile among senior officials in the ministries in their aspiration to deliver the national mandates.

An initial collaboration between The Faculty of Economy and Management of UKM and myForesight® of MIGHT was established on 27-28<sup>th</sup> August 2014 through a two-day interactive workshop. Around 20 researchers who are currently conducting studies on "Palm oil" participated in the workshop to better understand the method of applying Foresight practices in their studies.

Mohd Afzanizam, who represented myForesight®, imparted his experiences and knowledge based on his involvement in various National Study and Researches. The live sharing experience session was indeed an eye opener to the participants. A continuous knowledge sharing initiative is expected as a follow through from this collaboration.

## Tapping the Power of Mind

15 September 2014  
MIGHT Building

The school holiday was back, and it was time for MIGHTy Kids Club Day. This time we organized a mind development programme for kids. 36 young MIGHTians between the ages of 4 to 14 joined the fun activities held on 15<sup>th</sup> September, at MIGHT Building.

The program revealed to both the parents and children the power of human's mind and how to utilize and implement the technique in daily life.

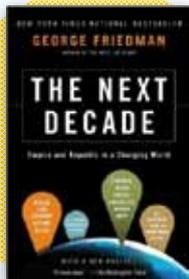
In conjunction with Malaysia Day celebration on 16<sup>th</sup> September, the event started with an assembly and singing of the National anthem

"Negaraku" and patriotic song, "Jalur Gemilang" by the staffs, young MIGHTians and their parents. This was significant as it did not only inculcate the spirit of patriotism, but also to foster unity among the staffs.

The older children acquired the Unconscious Signals and Congruence and Dream surfing skills which are useful in decision making process. The later part of the program was filled with many fun yet challenging psychic games for the children to test their ability in applying the techniques. Points were taken to measure each child's adeptness in using the skill.



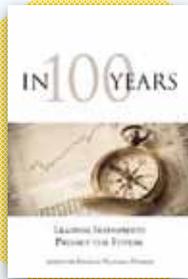
# myForesight® BookClub



## THE NEXT DECADE: EMPIRE AND REPUBLIC IN A CHANGING WORLD

**Author:** George Friedman  
**Publisher:** Anchor  
ISBN-10: 0307476391  
ISBN-13: 978-8129119803

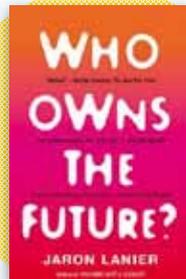
In the long view, history is seen as a series of events—but the course of those events is determined by individuals and their actions. During the next ten years, individual leaders will face significant transitions for their nations: the United States' relationships with Iran and Israel will be undergoing changes, China will likely confront a major crisis, and the wars in the Islamic world will subside. Unexpected energy and technology developments will emerge, and labor shortages will begin to matter more than financial crises. Distinguished geopolitical forecaster George Friedman analyzes these events from the perspectives of the men and women leading these global changes, focusing in particular on the American president, who will require extraordinary skills to shepherd the United States through this transitional period. *The Next Decade* is a provocative and fascinating look at the conflicts and opportunities that lie ahead.



## IN 100 YEARS: LEADING ECONOMISTS PREDICT THE FUTURE

**Author:** Ignacio Palacios-Huerta  
**Publisher:** The MIT Press  
ISBN-10: 0262026910  
ISBN-13: 978-0262026918

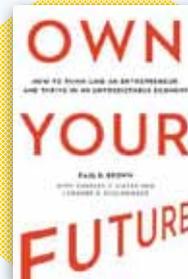
This pithy and engaging volume shows that economists may be better equipped to predict the future than science fiction writers. Economists' ideas, based on both theory and practice, reflect their knowledge of the laws of human interactions as well as years of experimentation and reflection. Although perhaps not as screenplay-ready as a work of fiction, these economists' predictions are ready for their close-ups. In this book, ten prominent economists -- including Nobel laureates and several likely laureates -- offer their ideas about the world of the twenty-second century. In scenarios that range from the optimistic to the guardedly gloomy, these thinkers consider such topics as the transformation of work and wages, the continuing increase in inequality, the economic rise of China and India, the endlessly repeating cycle of crisis and (projected) recovery, the benefits of technology, the economic consequences of political extremism, and the long-range effects of climate change.



## WHO OWNS THE FUTURE?

**Author:** Jaron Lanier  
**Publisher:** Simon & Schuster  
ISBN-10: 1451654979  
ISBN-13: 978-1451654974

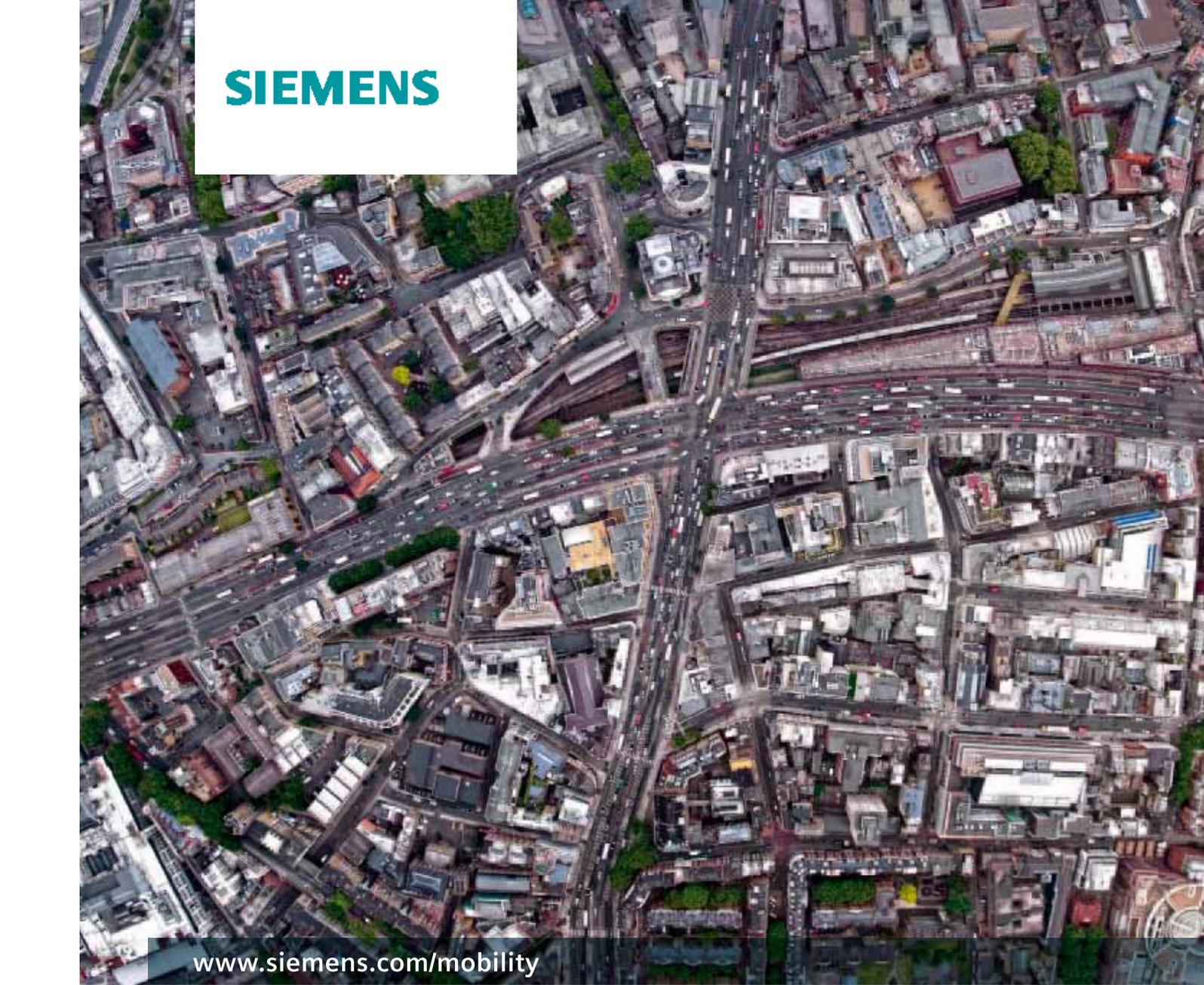
Jaron Lanier is the father of virtual reality and one of the world's most brilliant thinkers. *Who Owns the Future?* is his visionary reckoning with the most urgent economic and social trend of our age: the poisonous concentration of money and power in our digital networks. Lanier has predicted how technology will transform our humanity for decades, and his insight has never been more urgently needed. He shows how Siren Servers, which exploit big data and the free sharing of information, led our economy into recession, imperiled personal privacy, and hollowed out the middle class. The networks that define our world—including social media, financial institutions, and intelligence agencies—now threaten to destroy it. But there is an alternative. In this provocative, poetic, and deeply humane book, Lanier charts a path toward a brighter future: an information economy that rewards ordinary people for what they do and share on the web.



## OWN YOUR FUTURE: HOW TO THINK LIKE AN ENTREPRENEUR AND THRIVE IN AN UNPREDICTABLE

**Author:** Paul B. Brown with Charles F. Kiefer and Dr. Leonard A. Schlesinger  
**Publisher:** AMACOM  
ISBN-10: 0814434096  
ISBN-13: 978-0814434093

When it comes to dealing with uncertainty, nobody handles it better than successful entrepreneurs. That's why you want to take the same approach they do! Based on extensive research and interviews, *Own Your Future* shows how to apply the simple model they use - Act. Learn. Build. Repeat - to reinvent the way you maneuver in an unpredictable job market. Here's how it works. Instead of picturing your perfect career and working backwards, simply begin with the direction you want to go and take a small step. Thinking alone will never change your life - you must ACT. Then evaluate the lessons you learn from that first step, build on them, and take another step in your desired direction. Repeat this process until you have achieved your goal. When you consider that your job - perhaps even your industry - may disappear, you have no choice but to take control. Filled with stories of professionals of all kinds who have profited from this proactive approach, *Own Your Future* gives you the tools you need to succeed - no matter what comes your way.



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# MAP THE FUTURE

As a strategic policymaker or stakeholder, you can help map out a desired future for Malaysia.

This is an invitation by myForesight® to build a collective future. Do you find this magazine thought-provoking? Do you think we could have done better? Perhaps you would like us to cover a specific angle in the study of Foresight.

Or maybe, you would like to contribute articles to the myForesight magazine? Send your feedback and articles to [foresightinternal@might.org.my](mailto:foresightinternal@might.org.my).

Website: [www.myforesight.my](http://www.myforesight.my).

We look forward to hearing from you.

myForesight® team

