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2019 SINGAPORE

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ECOSPERITY 2019
POST-CONFERENCE REPORT

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abc WORLD
WELCOME REMARKS FOR ECOSPERITY WEEK
LIM BOON HENG
Chairman, Temasek Holdings

Preface

The 2019 Ecosperity Conference gathered global business leaders, policymakers, investors, entrepreneurs and academics in Singapore. Themed "Tomorrow Starts Today: From Ambition to Action", the conference focused on actionable pathways to accelerate the transition to a resource-efficient future.

Eminent international leaders in the fields of climate science, energy, water and resource management spoke about the sobering realities of the climate crisis. A common thread in the discussions was the urgent need for governments, businesses, academics and individuals to work together to co-create and deploy innovative solutions at scale. The speakers also shared business approaches and successful collaboration models in implementing circular economy principles, energy transition and water management.

The Ecosperity Conference was co-located with key sustainability events as part of the inaugural Ecosperity Week to drive thought leadership and action on sustainable development. Together with partner events such as World Bank Group's Innovate4Climate, Business China's FutureChina Global Forum, Temasek Foundation's The Liveability Challenge, Singapore International Water Week Spotlight and CleanEnviro Summit Singapore Catalyst, Ecosperity Week welcomed over 3,000 delegates from more than 80 countries.

For more content from Ecosperity, please visit **www.ecosperity.sg**.

Welcome Remarks for Ecosperity Week

Lim Boon Heng Chairman, Temasek Holdings
Victoria Kwakwa Regional Vice President for East Asia and Pacific, World Bank

Bold leadership and collective action to build a clean Earth

"There is no Plan B, because there is no Planet B."

The Earth is at its tipping point. According to the Intergovernmental Panel on Climate Change special report published in 2018, we only have 12 years to reduce our global carbon emissions or risk irreparable damage to the planet's climate balance. We need strong leadership and responsible regulators to pave the way towards a resource-efficient, low-carbon economy with progressive public policies. We also need bold businesses to work with their communities to balance business outcomes with global sustainability goals.

Overturning the effects of climate change will require collective effort. First, our actions need to be informed and well-grounded in science. Organisations need to understand the environmental impact of their operations and be accountable for that impact. The public expects businesses to take the lead. Business leaders should set measurable and transparent targets, informed by climate science.

Second, we must be innovative in developing and implementing sustainability solutions, and help bring promising ground-breaking solutions to market. Third, we need to engage our youths – tomorrow's leaders – on the importance of sustainability, and inspire them to make deliberate decisions that minimise our impact on the planet.

Turning disaster into growth

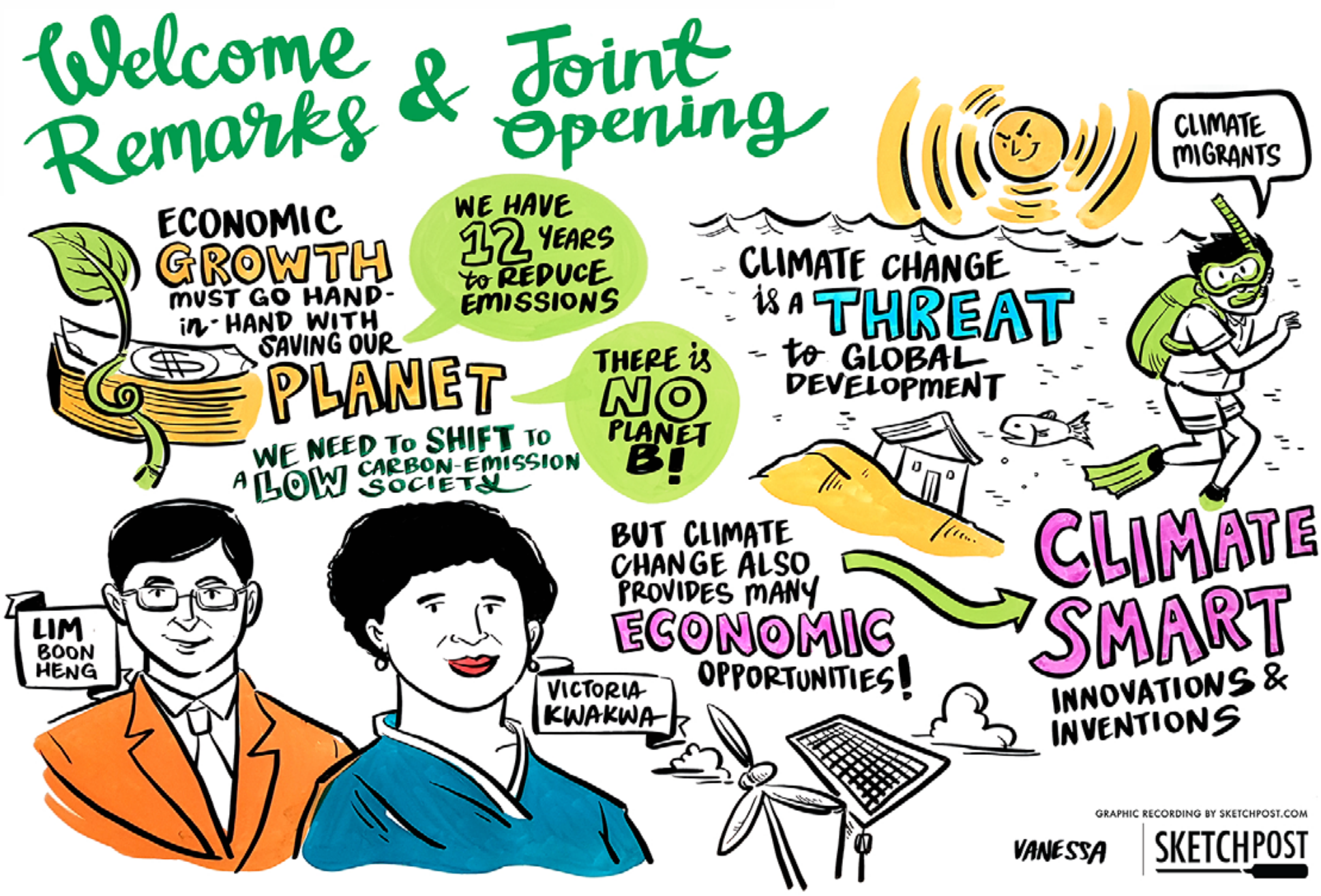
"Through 2030, a shift to low-carbon, resilient economies could bring $26 trillion in economic benefits and create over 65 million jobs."

Climate change jeopardises the well-being of individuals trapped in poverty, who are the most vulnerable as they are financially unable to avoid the adverse impact of unpredictable weather fluctuations. Despite the challenges, action to combat climate change remains a prime opportunity to amplify economic growth.

Cities can be revamped to improve long-term sustainability of land and water resources. Food production systems can be designed to maximise harvest yield to feed the world's ever-growing population.

The effects of climate change reverberate globally, but another kind of change is occurring simultaneously. In particular, the Asian region is a hotbed for innovative sustainability solutions. Embracing these new ideas could lead to a revolution which benefits both the planet and its population.

Visual Summary



Guest-of-Honour Address

Masagos Zulkifli

Minister, Ministry of the Environment and Water Resources, Republic of Singapore

"We must fundamentally change the way we use resources, so that we can thrive in a low-carbon and resource-constrained future."

Be decisive in adapting to and fighting climate change

As a low-lying island state, the effects of climate change – notably sea level rise – are existential threats to Singapore. Singapore needs to build its climate resilience, while also doing its part to fight climate change.

Singapore has increased the minimum reclamation levels for reclaimed land to at least four metres above the mean sea level, is developing a national coastal protection framework, as well as building new infrastructure at higher platform levels.

To encourage companies to be more energy-efficient, reduce their carbon emissions – a key contributor to climate change – and adopt cleaner forms of energy, Singapore implemented a carbon tax in 2019, making it the first country in Southeast Asia to do so.

Ultimately, climate change requires urgent global and collective action.

Treat waste as a resource

It is time to shift away from a linear 'take, make and dispose' way of consumption to a circular economy where resources are kept in use for as long as possible, maximising their value and minimising waste. In addition to closing individual resource loops, Singapore will also harness synergies across different resource loops including energy, water, food and materials.

For instance, food waste can be converted into compost and used by local farms, supporting Singapore's local food production needs. Floating solar photovoltaic panels can be deployed on reservoirs to harness sunlight as a source of clean energy in land-scarce Singapore.

A new development called Tuas Nexus will co-locate a water reclamation plant with an integrated waste management facility to harness the synergies between water, waste and energy. Co-digesting food waste and used water sludge can triple biogas yield. The biogas produced will generate more than enough energy to power the Tuas Nexus, potentially reducing carbon emissions by more than 200,000 tonnes annually.

Businesses must embrace circular economy solutions

First, set targets to improve the carbon efficiency of operations. This signals that the company is serious about addressing climate change and will nudge them towards greater use of renewable energy sources and more efficient use of energy, which will in turn reduce carbon emissions and costs.

Second, adopt a triple bottom line framework to evaluate performance. This means looking at the environmental, social and financial results of the business. For instance, DBS Bank has declared that it will stop financing new coal-fired plants beyond its existing commitments and step up financing for renewables.

Lastly, work with the government to co-create innovative solutions to drive sustainability. For example, Nanyang Technological University, JFE Engineering Corporation and the National Environment Agency have collaborated to set up a Waste-To-Energy Research Facility, which allows scientists and companies to test-bed their innovations and prototypes in a real operating environment.

Visual Summary

Our Shared Resources, Our Shared Responsibility

Naoko Ishii CEO and Chairperson, Global Environment Facility

Dr Will Steffen Emeritus Professor, Australian National University;
Senior Fellow, Stockholm Resilience Centre

The science of the Anthropocene

Earth has entered a new geological epoch called the Anthropocene, marked by the impact of human activity on the planet.

For the world to maintain its balance and regulate its processes, we cannot exceed its operating limits, also known as the planetary boundaries. Extreme weather conditions like flooding, heatwaves and desertification are signs that our planet is being pushed to its limits. If pushed past the tipping points, it could have a cascading effect on various interlinked elements, resulting in a situation that our planet cannot recover from.

Challenges of sustainable development

"If tomorrow were today, yesterday is when we should have been acting."

Dr Will Steffen, Emeritus Professor, Australian National University; Senior Fellow, Stockholm Resilience Centre

Observing the rising trends in the carbon emissions curve over the past few decades, it is clear that the many international reports, meetings and climate agreements have had limited impact on our rate of emissions.

To meet the Paris Agreement targets, global carbon emissions must peak in the next two to four years. In other words, we need to act now.

Our pledges towards a sustainable future must be transformed into concrete and viable climate action. Our economic systems must become regenerative by design – minimising the use of resources – in order for us to operate within the confines of the planetary boundaries.

Avoiding the tragedy of commons

As Earth teeters on the edges of irreparable damage, it is critical that corporations alter their business models to become more sustainable in the long term. Our goal as stakeholders of this planet is to create a platform to address these global afflictions.

Right now, the world faces a 'tragedy of the commons'. With no inducement for individuals to avoid over-consumption, people are exploiting Earth's globally shared resources such as forests, land and water as if they were unlimited.

Current economic systems are complex, and the consequences of our actions today may not be immediately seen. Yet, it is critical that we act collectively to reduce the pressure on our global commons. This requires the transformation of four key economic systems: food production; urban; energy; and consumption and production.

Visual Summary

Transitioning to a Low-carbon and Circular Economy is Serious Business

Christiana Figueres

Former Executive Secretary, United Nations Framework Convention on Climate Change;
Founding Partner, Global Optimism Ltd.; Convenor, Mission 2020

Era for regeneration

In the last 50 years, humans have caused as much damage to Earth's systems as they had in the last 10,000 years. The time to change and act is now. We need to seize the opportunity to change the course of human history while we can, and begin a new era of regeneration.

Linear and incremental changes will not get us there. Only with a big bang approach in our thinking and work – in technology, financing, and policy – can we hope to achieve our climate ambitions. However, it needs to be a conscious decision that we make.

The immediate task at hand is to halve carbon emissions by 2030. The ultimate goal, however, would be to continue halving global carbon emissions each subsequent decade until we move from 40 gigatonnes a year to just five gigatonnes a year – a level which our natural systems should be able to absorb so that the world can be at net zero carbon emissions by 2050.

The age of exponential change

The decline of coal is an example of a reverse exponential curve. As people become more aware of the harmful effects it has on the climate and human health, investments in coal are becoming riskier. Thus, an increasing number of financial institutions are divesting from coal.

Today, around a quarter of the world's electric grid is powered by renewable energy sources, and we are on track to generating half of the world's electricity from renewable energy sources by 2030. As the cost of renewable energy continues to drop, its adoption rate will be exponential.

China is leading the world's electric vehicle (EV) revolution. The world's largest automobile market is in the process of developing 20 EV manufacturing towns, and already has close to 500 EV manufacturers today, more than triple the number from two years ago.

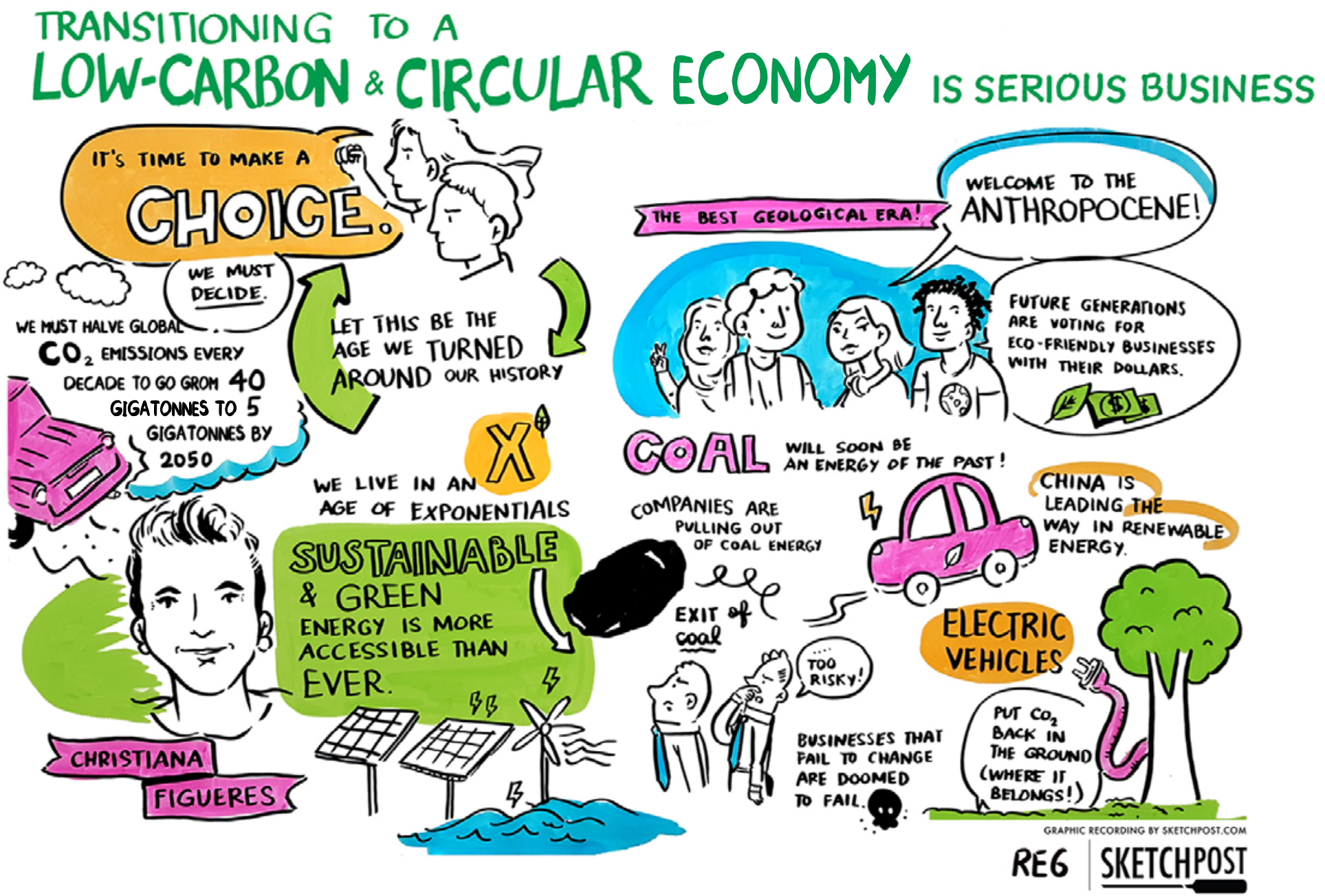
In the finance sector, the number of companies disclosing their climate-related risks and opportunities has grown rapidly. In less than four years, nearly 800 organisations – including top financial institutions with funds over US$110 trillion – have announced their support for the Task Force on Climate-related Financial Disclosures (TCFD).

Relocating carbon

"Climate change is the ultimate real estate enterprise of humanity. It is all about location. Carbon in the atmosphere is bad but carbon relocated to the soil helps regenerate the soil, helping food security and replenishing aquifers."

To mitigate the unprecedented rate of carbon emissions, the world should aim to relocate atmospheric carbon back into the soil while concurrently reducing emissions. The problem, however, is that time is running out. Due to the rate of cumulative carbon emissions, the world needs to relocate carbon at an accelerated pace over the next decade. If we are unable to sequester sufficient carbon by 2030, we may well have decided what the future of our planet will look like for generations to come.

Visual Summary



The Business Case for a Circular Economy

Panellists:

Edwin Keh CEO, Hong Kong Research Institute of Textile and Apparel

Harsha Vardhan Global Environment Manager for Production, H&M Group

Moderator:

Ariel Muller Managing Director, APAC, Forum for the Future

Carbon-negative fashion industry

The fashion industry produces 10 per cent of global carbon emissions today, a figure that is set to rise to 26 per cent by 2050. The reason? Most apparels are produced from non-renewable resources, used for a short amount of time, and then discarded.

Fashion chain H&M aims to change this trend by setting two ambitious targets – it will only buy sustainably sourced or recycled material by 2030, and become a carbon-negative value chain by 2040. There is a business case for this commitment, and that revolves around the availability of cotton – H&M's most important material. As future farmers are more likely to be growing food rather than cotton to feed the growing global population, H&M's next biggest material will be the oil-based polyester. This means potentially volatile material prices, as the cost of polyester will follow the cycle of global oil prices.

Amid looming scarcity, recycled materials offer cheap and high-quality resources for those capable of harnessing it. Hence, building a circular value chain is critical to the company's survival.

Scale up solutions, and quickly

Traditional research methods take too long to bring a solution to market. A 'software approach' to research, where researchers begin market testing from the get-go and refine the solutions iteratively, could shorten research and development from years to months, weeks, or even hours.

To scale up these solutions, the industry needs to collaborate with researchers. Currently, the fashion industry does not have in-depth knowledge on certain subjects such as how materials can be recycled. Researchers, on the other hand, might not understand the needs of customers and suppliers. Only by working together can they develop solutions that are relevant and effective.

CASE STUDY

Making the circular economy fashionable

Speaker:

Arthur Huang

Founder and CEO, Miniwiz Co., Ltd

From coasters to clothes, furniture to building façades, many of the items around us can be created using materials recycled from waste.

Creativity and good design can help to increase the demand for recycled products and in turn, promote recycling and the circular economy. Increasing the appeal of recycled products through art and design can help to change the way consumers perceive the waste that they generate. Bridging the perception gap is important if we want consumers to 'wear their waste'.

In addition, onshore closed-loop systems can also support the adoption of a circular economy by sensitising consumers to the products that can be created from the waste they generate. An example are the Nike retail outlets in Taipei, which had their internal façade cladded and decorated by Miniwiz using recycled products made from locally generated waste.

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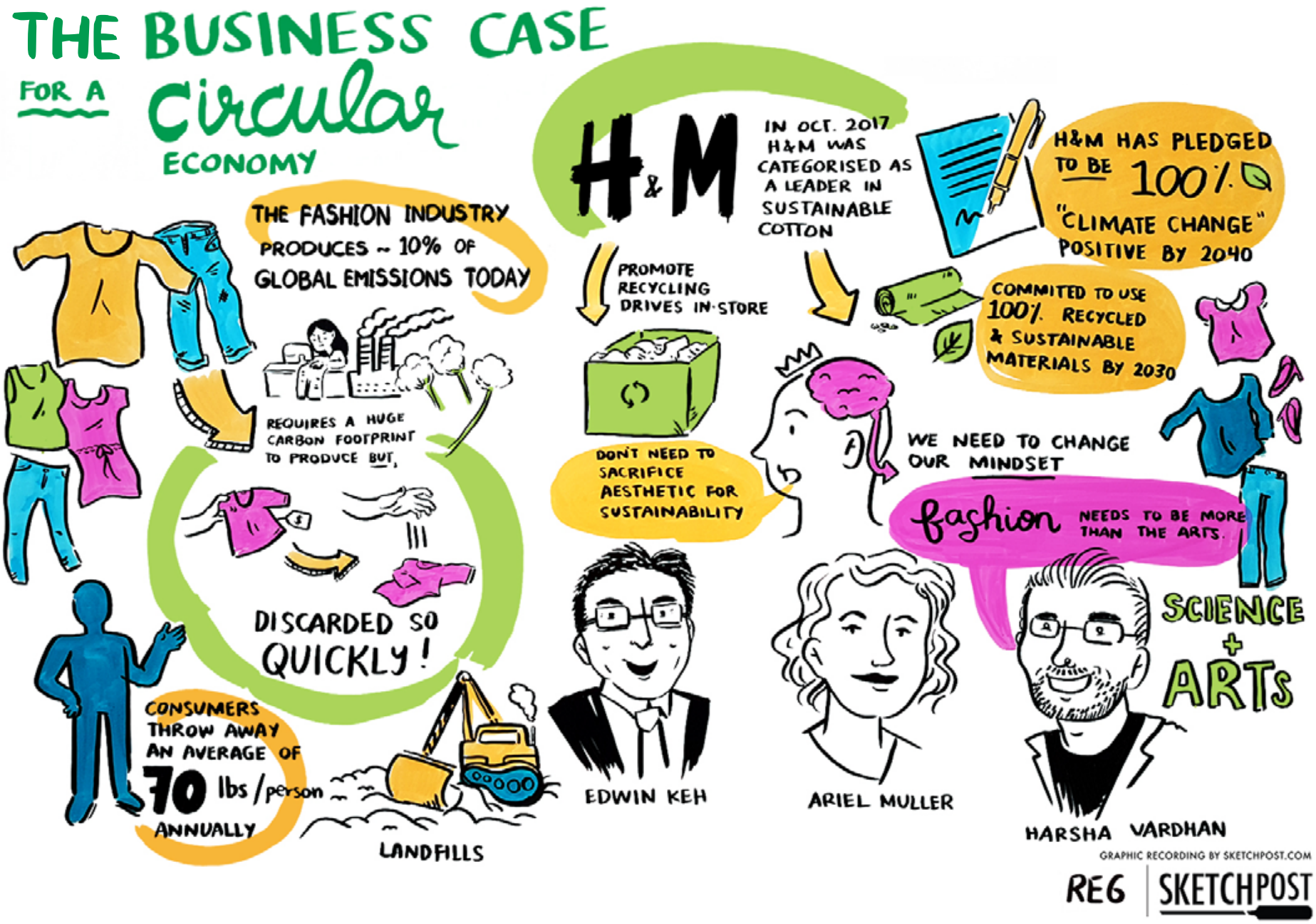

Lessons for Southeast Asia's Clean Energy Transition

Speaker:

Dr Ernest J. Moniz CEO, Energy Futures Initiative and Nuclear Threat Initiative; Special Advisor to the MIT President; Former United States Secretary of Energy

Moderator:

David Turk Head of Strategic Initiatives Office, International Energy Agency

Choosing the sustainable development scenario

"We need to decarbonise as fast as we can, not as fast as we would like."

Dr Ernest J. Moniz, CEO, Energy Futures Initiative and Nuclear Threat Initiative; Special Advisor to the MIT President; Former United States Secretary of Energy

There are two ways the climate crisis can play out in Southeast Asia. The first is the status quo scenario where countries fail to adopt more aggressive carbon-cutting policies. The use of coal could double, and the region's share of global emissions is expected to rise from 4.1 per cent to 6.5 per cent.

But the region could also go on a path of sustainable development – a scenario which would keep global temperature rise to well below 2 degrees Celsius. In Southeast Asia, the use of renewable energy could close the gap between this sustainable scenario and status quo by 40 per cent, and improvements in efficiency would narrow it further by another 25 per cent.

Finding cohesive solutions amid diversity

As the region looks set to triple its GDP by 2040, it must decouple its economic growth from carbon emissions.

Apart from the electricity sector, the industrial and transport sectors are key. However, the approach will vary across countries in Southeast Asia due to differences in geography and stage of economic development.

For example, solutions that offer massive energy efficiency gains and a hydrogen economy could address cross-sectoral needs for a country like Singapore, where other renewable solutions would be limited due to its small size and lack of land.

Conversely, larger Southeast Asian countries may benefit from large-scale renewable energy solutions. Countries could also consider collaborating on cross-national infrastructure, such as high-voltage electrical lines. In other words, cooperation among Southeast Asian countries and a systems approach is key to collectively achieve emission goals.

Pragmatism and international collaborations are important to realising our carbon neutrality ambitions

A dose of realism and understanding of the energy landscape is crucial to spurring action on climate change, as most countries face complex socio-economic and political realities. 'Magical thinking', such as the unreasonable target of only using renewables by 2030, will divide the coalitions needed for collaborative solutions.

In addition, policymakers should seek to develop every possible pathway to low carbon. While different solutions will be needed for different countries, policymakers should not discount any option due to public pressure, such as in the case of nuclear energy where misconceptions could affect its potential for adoption.

Carbon neutrality cannot take place without carbon-negative technologies. Unfortunately, these technologies do not exist commercially at scale today. International collaboration and innovations in technology, business models and policy are required to commercialise these technologies.

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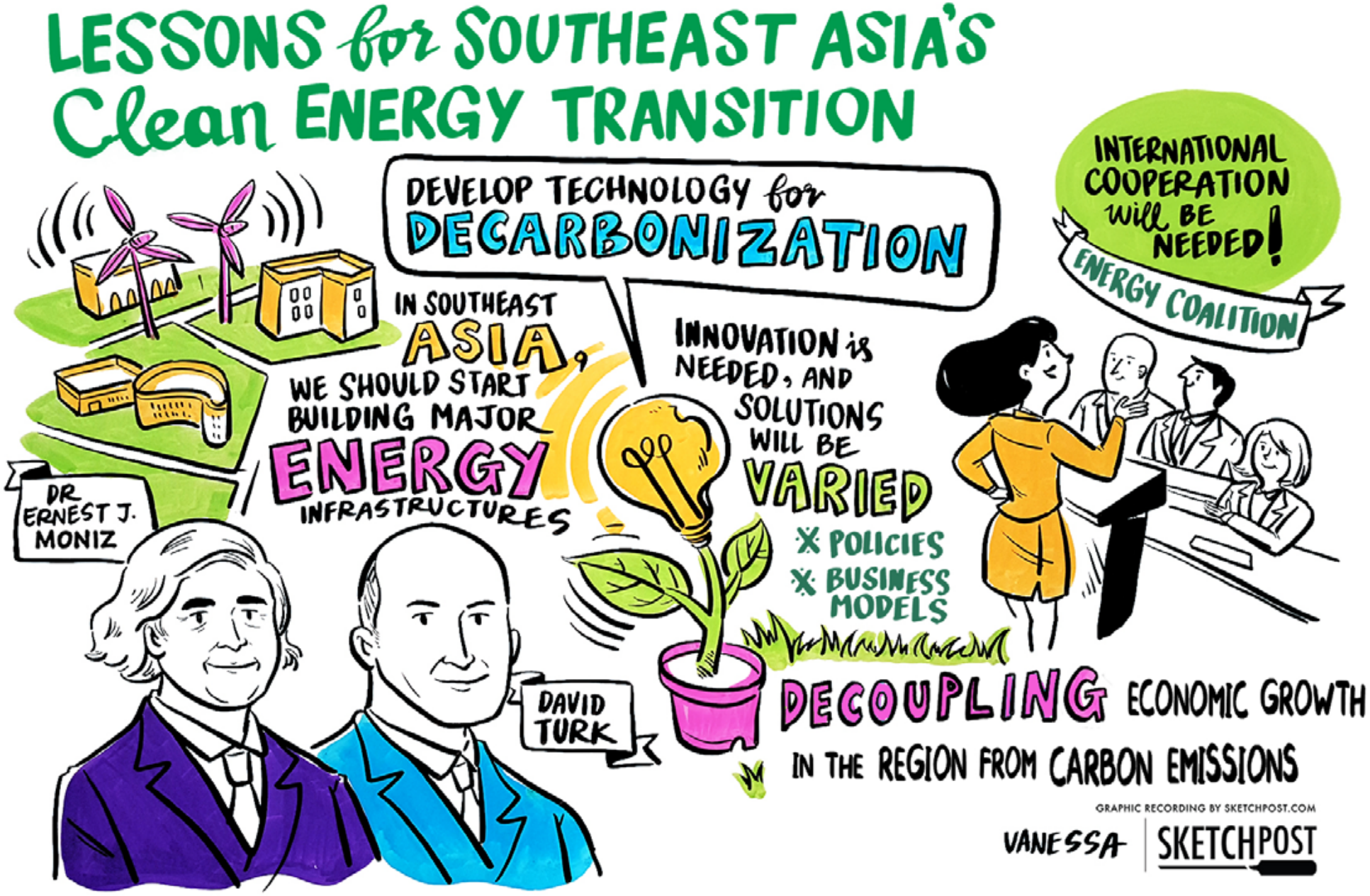


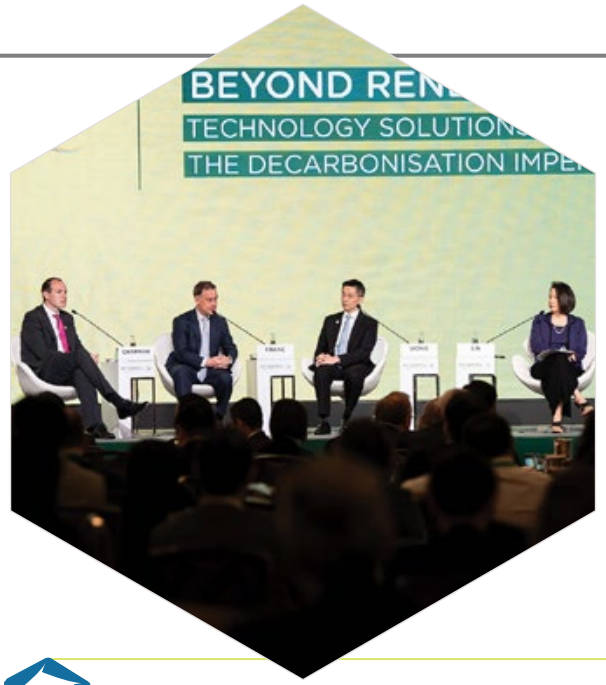
Beyond Renewables: Technology Solutions Addressing the Decarbonisation Imperative

Panellists:

Ian Chapman CEO, UK Atomic Energy Authority
Pierre-Etienne Franc Vice-president, Hydrogen Energy World Business Unit, Air Liquide
Wong Kim Yin Group CEO, Singapore Power Limited

Moderator:

Janice Lin CEO, Strategen Consulting



Decarbonising our energy demand requires a multi-pronged, multi-sectoral approach

Decarbonisation requires a holistic approach to the way we produce, store, distribute and consume energy, in high emissions sectors such as the power, transportation and industrial sectors.

Many countries are increasing the proportion of renewables in their energy portfolio, but few are planning how to manage the intermittency. The development of long-term energy storage media is often overlooked in favour of producing more renewables.

In addition to decarbonising the way we produce energy, we must also consume and distribute energy more efficiently. This involves adopting innovative solutions such as district cooling, where chilled water is produced centrally and piped to surrounding buildings for air-conditioning. District cooling could cut energy consumption for cooling by up to 42 per cent. This solution is particularly important because demand for air-conditioning will rise as urbanisation continues to intensify globally.

Is hydrogen the energy carrier of the future?

Hydrogen holds the answer to many of the challenges that hinder the uptake of renewable energy. It can serve as a storage medium to cater for periods of high energy demand, such as during winters. One reliable way to store massive amounts of energy for a long time is to convert it to hydrogen via electrolysis.

Hydrogen can also be a medium in which renewable energy is transported. Countries around the world have unequal access to renewable energy, but hydrogen can change that. It could be used as a vector that allows energy generated by renewable sources to be transported the way fossil fuels are. Increasingly, advancements in technology and infrastructure is allowing hydrogen to become an energy vector for transportation and industrial processes, providing a solution to decarbonise these once hard-to-abate sectors.

The potential of a hydrogen economy is not currently realised due to infrastructure and cost barriers. However, this vision could become reality in the medium term.

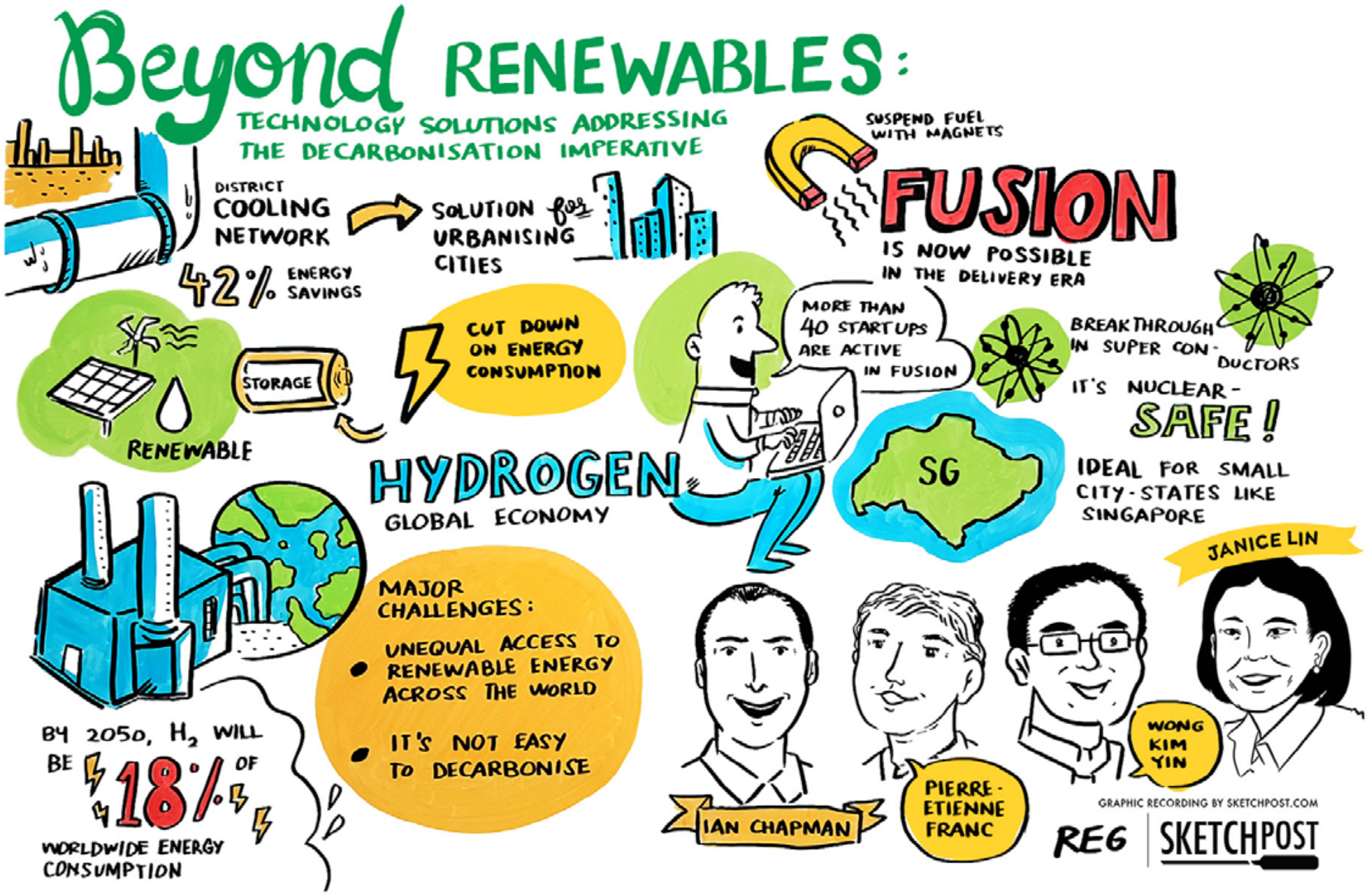
The future of nuclear fusion

Nuclear fusion involves combining isotopes of hydrogen to release huge amounts of energy. It is a clean, safe, and virtually unlimited fuel source. A fusion plant is also a space-efficient option for land-scarce countries like Singapore.

While fusion takes place easily in the stars, it is difficult to replicate similar reactions on Earth. Here, hydrogen isotopes must first be heated to some 150 million degrees Celsius before colliding them for nuclear fusion to occur. In early experiments, the heating process often consumes more energy than the fusion reactor produces.

However, the ITER facility being built in Provence, France, brings hope for a breakthrough. Set to begin operations in 2025, ITER is predicted to produce 500 megawatts of power through fusion for every 50 megawatts of power used to heat up the hydrogen fuel.

Visual Summary



Creative Solutions to Bridge the Water Supply Gap

Panellists:

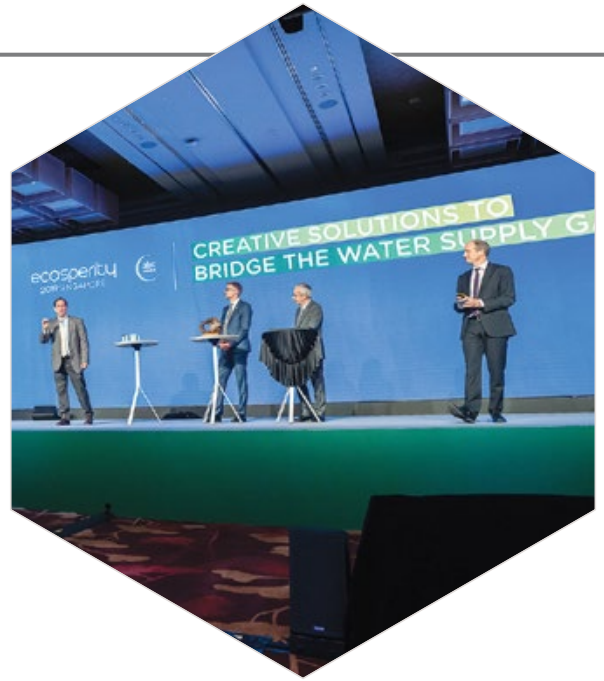
Dr Helge Daebel Investment Director, Emerald Technology Ventures

Francois Fevrier CEO, Water Asia, SUEZ Asia

George S. Hawkins Esq. Founder and President, Moonshot LLC and Moonshot Partners

Moderator:

Dr Piers Clark CEO and Chairman, Isle Group Ltd



Smart leak management

Pipelines transporting water can be as ancient as the cities they serve. Be it old wooden pipes used in the 19th century or modern steel pipes, water transport systems are prone to leaking and bursting. Replacing these pipes have always been expensive and disruptive, as streets have to be dug up and repaved, with large amounts of water lost in the process.

With the right technologies, utility operators can detect the faulty areas more accurately and install the necessary replacements with minimal disruption. For example, pipe monitoring can be done using ball-shaped sensors that follow the flow of water in pipes.

These sensors allow operators to monitor the condition of pipes, and know precisely the location of faults. By targeting these areas during maintenance work, operators can save up to 80 per cent in costs.

Finding value in wastewater

Today, waste management is seen as a necessary burden. But tomorrow's treatment plants could churn out valuable products. The key to achieving this is similar to the process of panning for gold – finding hidden treasures in wastewater.

Organic waste is one such source of wealth. Wastewater contains many different types of contaminants, but they also contain nutrients such as phosphorus.

In the past, wastewater operators used to spend money to remove phosphorus from wastewater and dispose it in landfills. However, industry players now recognise phosphorus as an essential element that supports life and a valuable resource that can be recovered.

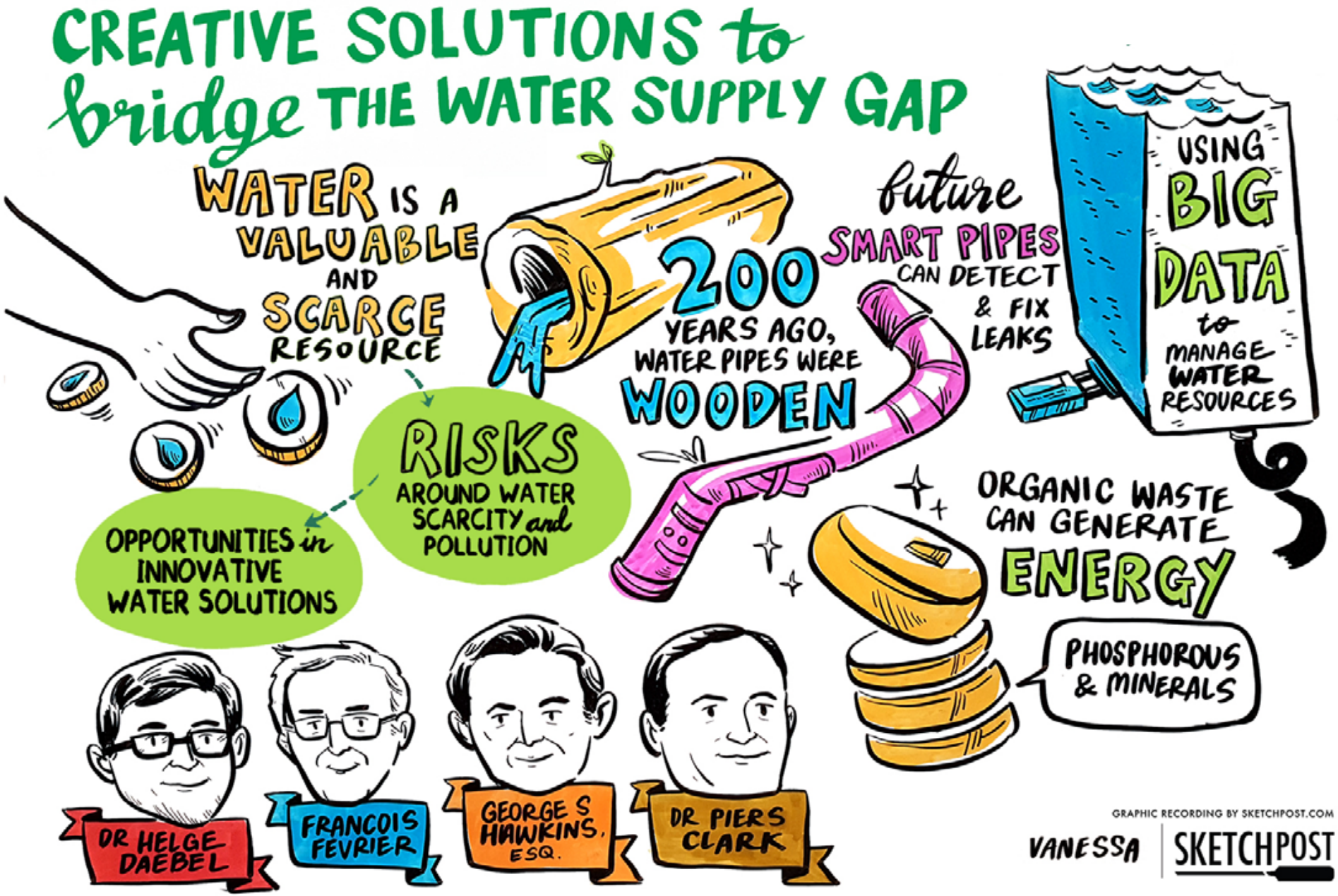
This change would allow for many profitable uses of organic waste, such as manufacturing plant fertilisers or generating power.

Using big data to manage water

Tropical countries have the most rainfall in the world, which is both a boon and a bane – more water for the population but also higher chances of flooding disasters. In these countries, effective management through data can turn the deluge of water from threat to resource.

Singapore is a country that has invested heavily in water technology to overcome its strategic vulnerability. PUB, Singapore's National Water Agency, installed sensors in storm drains to track the water level in them. The data helps PUB to gauge rainfall patterns, and conduct flood management. Similar sensors are used to track the water level in the Marina Barrage. If there is too much water in the barrage, the excess water would be released into the river. Otherwise, the water collected would be treated and piped into reservoirs to serve as a water supply.

Visual Summary



Ecosperity Showcase

The showcase at Ecosperity Week 2019 featured some of the latest innovations in food production, circular economy and energy.

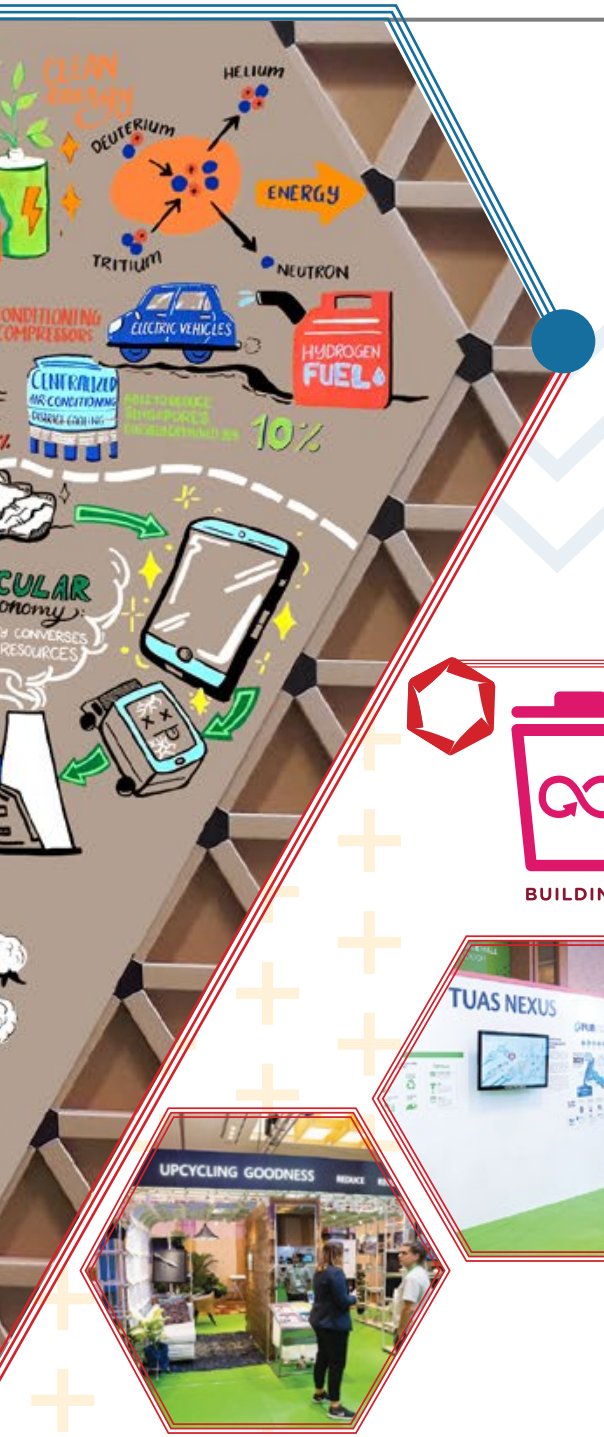
FROM LAB TO LUNCH

SUSTAINABLE FOOD PRODUCTION

Producing food that is nutritious, safe, affordable and with minimal environmental impact will be critical to sustain a growing urban population. New approaches are needed to satisfy the growing protein demand in a more affluent society.

The "From Lab to Lunch" zone showcased **Sustenir** and **Apollo Aquaculture's** approaches to intensifying agriculture and aquaculture to improve the amount and quality of food produced.

Impossible Foods and **Shiok Meats** showcased alternative ways to satisfy the growing protein demand through plant-based substitutes and clean meat.



THE FUTURE OF ENERGY

CLEANER. BETTER. SMARTER.

Lowering the carbon footprint of our energy demand is key to achieving our climate ambitions. This can be achieved without sacrificing economic growth and development.

In the near term, energy use can be optimised through centralised and more efficient cooling technology, such as **SP Group's** district cooling and **ST Engineering's** smart outdoor cooling technology.

In the long term, increased use of renewable energy can help decarbonise our energy systems. Examples at the "Future of Energy" zone were **Sunseap's** solar energy systems, and **Temasek Polytechnic** students' hydrogen-powered eco car.

TOWARDS ZERO WASTE

BUILDING A CIRCULAR ECONOMY

We need a fundamental shift away from current systems of production and consumption to become more resource-efficient.

Transitioning to a circular system will help reduce the carbon footprint associated with resource extraction from virgin sources. A circular economy is a force multiplier for climate action.

At the "Towards Zero Waste" zone, Singapore's **SP Group, Tuas Nexus, TES** and Taiwan's **Miniwiz** showed how they are helping to reduce and repurpose various types of waste like municipal solid waste, food, water, electronic and plastic waste.

Ecosperity Dinner Keynote Address

Ban Ki-moon

President & Chair, Global Green Growth Institute

"I thank Mr Dilhan Pillay, CEO of Temasek International for your very kind introduction. I'd like to also recognise the presence of Ms Ho Ching, CEO of Temasek Holdings, Minister Chan Chun Sing and many other distinguished guests. Ladies and gentlemen, it is a great honour and pleasure for me to say a few words before we begin our dinner.

I was introduced as a keynote speaker, but I did not intend to have a long keynote speech. I would just like to say a few words about the importance of taking action, as we have seen in the video[1]. This is one of the most powerful messages that has already been delivered to you. Rather than saying what needs to be done, I may be raising more questions to all of you for the purpose of encouraging you and urging all of you to take some action. I'm not giving you answers, because everybody knows the answers.

I know that Mr Robert Swan will be talking about his expeditions to Antarctica. I myself have visited the Arctic twice and Antarctica once, and have visited many places around the world where I was able to witness (climate change) with my own eyes. As Secretary-General (of the UN), I stood on the melting ice and spoke about the urgency of climate action.

We agreed on the climate change agreement in Paris on December 12. It's not a perfect one – nobody believes it is perfect, but that was the level at which all 195 state parties, at that time, were able to agree upon. As you may know, the decision-making process is quite absurd and not the right one. Without any exception, all 195 states should have agreed absolutely unanimously. If there had been one country who had said no, then the voice and position of the other 194 would have been killed (off). It was a very difficult process.

Despite the many climate sceptics at that time, we were very fortunate that all 195 states said yes, and we pushed the agreement through on December 12, 2015, just one year before I was about to retire. It was even more fortunate that the agreement came into effect on November 4, 2016 – barely two months and a few days before President Trump was sworn in on January 20, 2017.

"If we are not able to limit global temperature rise, coastal cities like Singapore will be under water by 2050. I think we need to work much harder."

Looking back, you may smile, but we didn't know then that the United States would announce their withdrawal from the Paris Agreement, which had been hard fought for.

The Kyoto Protocol came into effect in 2005. It took 13 years. Countries were divided into Annex 1 and 2. Most countries, including Korea, were not obliged to take any action. The Kyoto Protocol was an empty shell. Under such circumstances, the United Nation led a very hard fight. There are many sceptics and deniers – that is why I have been travelling to places where I can see the impact of climate change.

I think we need to do much more. The IPCC (Intergovernmental Panel on Climate Change) has announced that we must limit global temperature rise to 1.5°C. Otherwise, we will have no home. If we are not able to limit global temperature rise, coastal cities like Singapore will be under water by 2050. I think we need to work much harder.

[1][2] Watch the Ecosperity 2019 opening video at **www.bit.ly/ecosperity2019-video**

Now, ladies and gentlemen, I'd like to pose several questions. By 2050 or 2060, will young people read about how we, the current generation, rallied to work together and compromise on our differences to courageously sign treaties and pass laws and regulations necessary to significantly reduce greenhouse gases and deter the rise of sea levels?

When I went to Antarctica, I saw breaking ice, the size of Manhattan, New York. They are just melting away. If all of Antarctica melts, the sea level rise could be between 60cm and 3m. The video[2] said 1m – 100cm by 2050. This is quite alarming.

Will our young generations applaud us for having come together to successfully replenish the global climate fund, Green Climate Fund, which the members of the OECD have promised to raise? US$100 billion per year, starting next year.

Will they be grateful to us for the innovative ideas and technologies we developed and employed for alternative sources of energy, to leave them a healthy planet Earth with smart green cities and inclusive communities?

Or will they be migrating farther inland to avoid the rising waters and judge us after 50 years, as having been too selfish and too nationalistic to save the commons and eventually fail to institute a multilateral framework for tackling greenhouse gas emissions?

Will their era be an era without the Green Climate Fund and other public and private funds, to invest in green bankable projects, and an era that is plagued by a greater divide between the North and the South? Or will they be living in a world where the vast majority suffers from chronic asthma and other diseases and illnesses as a result of air and water pollution, because we are not brave enough to kick our addiction to coal, oil and plastic goods, and find better, more creative solutions?

"The Asia Pacific countries must fully cooperate and strengthen regional cooperation to improve our air – which is transboundary in nature. We live in the same breathing community. There is no difference regardless of who you are; whether you are a president, minister, chairman of a big company or a poor person, we breathe the same air."

In spite of the worsening environmental signs all around us, and the resulting health effects, there have been some encouraging milestones.

In October 2018, the IPCC published their special report (on the impacts of global warming of 1.5°C above pre-industrial levels). When we were negotiating for the Paris Agreement, we fought for global temperature rise to be contained within 1.5°C. But most of the European countries, European Union, China, United States were against it. I saw many leaders – presidents and prime ministers of small island developing

states – crying in frustration, because their countries may soon be submerged underwater.

It is fortunate that after four years, the IPCC has presented their scientific report. Even though they are recommendations and not legally binding, I think we must abide by their recommendations.

The Global Commission on Adaptation was launched to accelerate adaptations. This Commission, which I chair together with Bill Gates and CEO of World Bank Kristalina Georgieva, is supported by about 25 countries, heads of states and governments. It is a part of two policy responses: mitigation and adaptation. We have done some things on mitigation, but we have to do much more

to take adaptive actions before we regret it. We have to invest much more in infrastructure and do much more to develop smart, sustainable cities.

The Global Green Growth Institute, which I also chair, started with only 12 member states. It has now grown to 32 countries in various stages of development. The Green Climate Fund is almost an empty shell. I do not know how the OECD member states can provide the US$100 billion they promised. Starting from 2021, they have to mobilise this money.

In many countries in this part of Asia Pacific, people are suffering from bad air quality. Recently, because of the deteriorating air quality in my country and in Northeast Asia, I was given a governmental job to lead the National Council on Climate and Air Quality. The Asia Pacific countries must fully cooperate and strengthen regional cooperation to improve our air – which is transboundary in nature. We live in the same breathing community. There is no difference regardless of who you are; whether you are a president, minister, chairman of a big company or a poor person, we breathe the same air.

I am very much encouraged that air quality in Singapore is very good. We have to share technologies, lessons and measures taken. On May 31, in Bangkok, UNESCAP (the United Nations Economic and Social Commission for Asia Pacific), adopted a resolution encouraging member states of Asia Pacific to strengthen regional cooperation to address these long range, transboundary pollutants, so that we will be able to enjoy the same kind of good air quality.

"We cannot celebrate World Environment Day just one day a year. We have to mark every day, 365 days a year, as if they were all World Environment Days."

Ladies and gentlemen, I arrived early this morning from China, where I was taking part in the 45th World Environment Day, which was held together with China and the UNEP (UN Environment Programme) in Hangzhou. For 45 years, every year on June 5, people have been celebrating and marking the day while at the same time continuing to add more and more greenhouse gases into the atmosphere.

Today, we are doing even more than we did in 1974, when this day was designated. We are continuing to produce, continuing to consume and dispose of plastic goods into our rivers and oceans, and we are continuing to clear vast amounts of forests – nearly one-sixth of the Amazon rainforest has been destroyed in the last 45 years.

We cannot celebrate World Environment Day just one day a year. We have to mark every day, 365 days a year, as if they were all World Environment Days. Continuing business-as-usual does not make any sense nor give hope to us and our succeeding generations.

Ladies and gentlemen, we must act now. We need to act together. Nobody, no country, however powerful and however resourceful, can do this alone. We have to work together. This is the message we are hearing from our nature.

In April, I was honoured to be received by Pope Francis. He is one of the leaders who has really supported the climate negotiations, issuing his own Laudato si'[3] – the pope's decree. I was told the pope has never issued any decree on the United Nation's agenda, or any other international organisation's agenda. The pope has been issuing decrees in his own capacity as a religious leader, but for the first time, he released the Laudato si' to 2 billion Christians, Catholics, trying to encourage them to be part of this process.

Ladies and gentlemen, our succeeding generations will judge us by our successes or failures. The pope told me that God always forgives. Human beings sometimes forgive. But nature, never forgives. This is the message that nature is sending us: we cannot negotiate with nature, and we have to follow what nature tells us to do. So let us work together, listen to the voices of nature, to make this world healthier and better for our succeeding generations of humanity and our planet Earth, the only planet Earth we are living in. I thank you for your commitment and leadership. Thank you very much. ❞

[3] Pope Francis' encyclical on the environment and human ecology, published in June 2015.

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