



# ASEIC

## Eco-Innovation Watch

e - Newsletter



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ASEAN Ministers release joint statement

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Rapid growth of green credit in Viet Nam

EU plastic recycling project enhances traceability

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## I Policy

### Thai government plans to proliferate the supply of electric vehicles

- The Thai government is getting ready to deploy more policies for electric vehicle (EV) needs, not only to provide measures for greenhouse gas emission reduction in larger cities, but in the countryside, as well.
- In relation to this, the Minister of Energy suggested policies that give EV consumers tax exemptions, discounts, and partial subsidies. Moreover, the Minister claimed that the government will pursue policies for production and supply chain to facilitate the provision of lithium ion energy storages and crucial components of EVs.
- During their meeting with the government, The Electric Vehicle Association of Thailand (EVAT) demanded a more prominent EV proliferation roadmap to catch up to the global EV dissemination trend.
- Since March, 2017, the Thai government has been giving investment incentives to the EV industry to expedite its development. Related to this development, the government proposed to have 1.2 million EVs and 690 charging stations by 2036.
- Nevertheless, recognizing the current initiatives for EVs have been influenced by the production and supply sectors, the Thai government and the industry believes that the EV dissemination project must focus on the demands and potential buyers.

*(Reference: Bangkok Post, "Government readies further EV measures," 29 Aug. 2019: Paultan.org, "Thailand gov't plans several initiatives to promote EVs," 30 Aug. 2019)*

### Joint conference for sustainable economic development in Viet Nam

- The Vietnamese government, the Vietnamese Chamber of Commerce, and the World Bank Group collaboratively hosted the 'Sustainable Development 2019' under the theme "For a Decade of More Sustainable Development" with participation from ministries, sectors, local governments,

and civil associations.

- The conference was held to provide measures for developing human capital, creating an economy that does not produce greenhouse gases, and developing a sustainable economy to boost competitiveness.
- The participants of the conference discussed topics such as circular economy development in the next ten years, the growth model in each sector, the transformation of the principles of using resources, private-private partnership (PPP), and development of human capital.
- The President of the Vietnamese Chamber of Commerce emphasized the need to expand PPP in order to mobilize the private sector in socioeconomic development and suggested the establishment of a law for private-public investment.
- The World Bank (WB) representative for human capital development in the Asian-Pacific region mentioned the need to reduce the gaps among ethnic groups and reinforce the development of workforces for human capital development in Vietnam. The representative also reiterated the need to reinforce the connection between training and business, by improving the tertiary education system and engaging the private sector in education and training

*(Reference: Vietnam+, "National conference on sustainable development held," 12. Sep. 2019)*

### Singapore government establishes a masterplan for waste reduction

- The Singapore government established the Zero Waste Masterplan for solving electronic and food waste problems in order to reduce burden on landfill and provide new opportunities for a circular economy.
- The Masterplan proposed a 30% reduction of incinerated waste by 2030. At the current rate, landfills are expected to be full by 2035.
- The Masterplan also proposed an increase in recycling rate to 70% by 2030, since the recycling rate has remained at 60% since 2012.
- According to the Resource Sustainability Act, which increases the manufacturers' accountability in handling consumer-produced waste, the following obligations are given:

- Companies must report their use and production in packaging from next year onwards.
- Companies must set the plans for reducing their packaging.
- Moreover, companies that produce the most dangerous type of waste - electronic waste - will be targets of the Extended Producer Responsibility (EPR) regulations, which requires them to recycle the consumers' e-wastes.
- The Masterplan predicts that waste recycling will provide an economic opportunity of 40 million SGD and generate 30,000 "high-value" jobs, pushing Singapore to become a regional leader in circular economy.

*(References: Eco-Business, "Singapore's zero-waste plan aims to raise domestic recycling rate from 22 to 30 per cent by 2030," 30 Aug. 2019; CNA, "Singapore to reduce Semakau waste by 30% under first Zero Waste Master Plan," 30 Aug. 2019)*

### ASEAN Ministers on the Environment releases the joint statement

- On October 9th, the 15th ASEAN Ministerial Meeting on the Environment (AMME) in Siem Lep, Cambodia declared a joint statement for the cooperation on environmental protection and problems in the ASEAN region.
- The Ministers of the AMME recognized the importance of collaborative effort on issues such as climate change and marine pollution in the statement. Moreover, the Ministers announced that they would continue cooperating on environmental discussions such as environmental change, sustainable cities, and circular economies between ASEAN and international partners in the ASEAN-EU High-Level Dialogue on Environment and Climate Change.
- The Ministers of the Environment recognized the importance of responding to marine pollution problems and confirmed the implementation of the Bangkok Declaration on Combating Marine Debris in ASEAN Region and ASEAN Framework of Action on Marine Debris.
- They also recognized the progress of marine waste related initiatives such as ASEAN+3 Project on Strengthening Capacity for Marine Debris Reduction in ASEAN region, and Integrated Land to Sea Policy Approach (Phase I) supported by Japan, the ASEAN-PROBLUE Activities on Marine Debris supported by the World Bank, the ASEAN-Norwegian Cooperation Project on

Local Capacity Building for Reducing Plastic Pollution in the ASEAN Region (ASEANO), and the ASEAN-EU Partnership on Circular Economy.

- Meanwhile, the joint statement assessed the implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), and reconfirmed each country’s effort and regional cooperation in effectively fulfilling the AATHP.
- The Ministers also agreed to hold the Third ASEAN Conference on Biodiversity (ACB2020) in Putrajaya, Malaysia from May 16th to 19th in 2020.

*(References: ASEAN, “15th ASEAN Ministerial Meeting on the Environment and the 15th Meeting of the Conference of the Parties to the ASEAN Agreement on Transboundary Haze Pollution,” 9 Oct. 2019; Vietnam+, “ASEAN ministers agree on prioritised actions for environmental sustainability,” 10 Oct. 2019.)*

### EU JRC launches new environmental accounts for the WIOD

- EU’s Joint Research Centre (JRC) developed and released the World Input-Output Database (WIOD) environmental accounts, which includes data on the energy use and CO2 emission from 43 countries between 2000-2016.

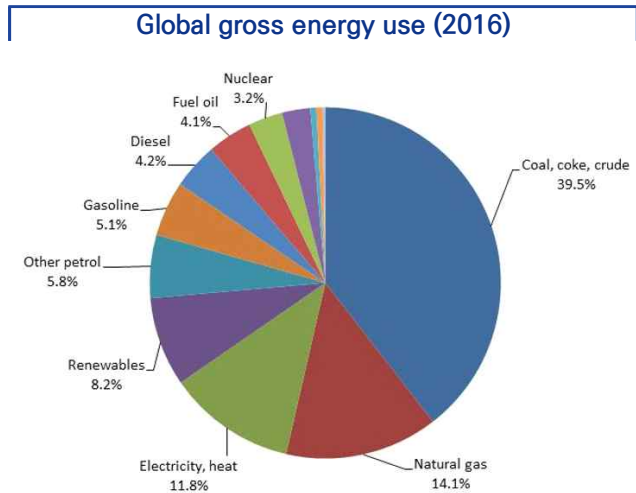
\* The newly released WIOD includes the data of 28 EU countries and 15 countries such as Korea, USA, Japan, China, Brazil, and India.

\* A feature of new account is that the statistics are not geographical, but residence based. This allows policy authorities and researchers can use the account as an index.

- **With the launch, the main content of the database is as the following:**
  - From 2000–2016, the highest consumers of fossil fuels were the USA (19%), China (17%), and the EU (15%), and the highest emitters of CO2 were China (23%), USA (17%), and the EU (13%)
  - During the same period, China and India’s fossil fuel consumption and CO2 emissions increased by two-fold, and the EU’s fossil fuel consumption and CO2 emission decreased.
  - In 2016, the energy produced by coal, coke, and crude oil was 39.5% of the total global energy use. Natural gas was 14.1%, electricity and heat were 11.8%, and renewables were 8.2% of the total energy use.
  - The proportion of energy use from crude oil and gasoline reduced from 12.5% in 2000 to 9.2% in 2016. In the EU, crude oil and gasoline reduced from 14.7% to 7.6% of the total energy use.

○ The trends relating to CO2 emissions are the following:

- The total amount of CO2 emission has increased 43% between 2000 and 2016, and this increase seems to be a trend in developing countries such as China, India, Indonesia, and Turkey.
- On the other hand, there were big reductions in CO2 emissions in EU's Greece, Sweden, UK, Czech Republic, Italy, Portugal, and Belgium.
- In terms of CO2 emission in the EU, electricity, gas, steam, and air conditioning industries were responsible for 30% of the CO2 emission, followed by households which was responsible for 21% of the total emission.



※출처: EU WIOD(2019)

(Reference: EU, "New database to monitor national energy use and CO2 emissions," 11 Jul. 2019)

**Ireland DCCAE announces the 2020 Budget for a sustainable future**

- Ireland's Department of Communications, Climate Action, & Environment(DCCAE) announced a total of 773 million euros as the budget for procuring sustainability and dynamic stability for future generations in Ireland.
- According to the plan announced by the Minister, the prioritized climate actions are as follows:
  - Transition into electronic vehicles: 36 million euros (18 million euros in 2019) will be allocated to support the installation of home chargers and double fast charger-network by 2020.
  - Cheaper energy bills: 146 million euros will be allocated to supply 24,000 households with new heating models, leading to cheaper bills and warmer homes.
  - Decarbonizing energy supply: 3.7 million euros will be given to support the installation of photovoltaic panels in homes, and 9.7 million euros will be given to research and research the potential use of marine energy



- Environmental protection: 59.4 million euros will be allocated to support sustainable development in natural and inland fishery resources.
- For energy transition, just transition, and protecting vulnerable groups:
  - 6 million euros of transition funds will be given to vulnerable groups for just transition. 5 million will be given for bog restoration and rehabilitation. 20 million euros will be allocated to the improvement of communal residence facilities.
  - 52.8 million euros will be given to supply new energy models protecting those who are vulnerable
- Otherwise, the plan will provide digital education to 20,500 people and give Trading Online Voucher schemes to benefit small to middle enterprises.
 

*(References: DCCA, “Budget 2020, Giving Ireland a Sustainable Future,” 8 Oct. 2019)*

### Korean Ministry of Environment publishes 2019 White Paper

- The Korean Ministry of environment published the “2019 White Paper of Environment” that includes important information and progress of environmental policies. The white paper is a systematic and historical record of environmental policies and has been reported for 38 years since 1982.
- The White Paper is comprised of two parts. The first part introduces the ‘Environmental Policy Progress Results’ and delineates progress such as 1) establishing a sustainable production and consumption system, 2) reinforcing the environmental use of domestic land, 3) pursuing full-scale microdust reduction, and 4) consolidating the basis of an integrated water management.
- The second part introduces a variety of policies guaranteeing the environmental rights of the public with key words such as public health protection, environmental justice, and green conversion of economic society.
- Based on the progress, the Ministry of Environment chose 7 policy priorities such as reduction of microdust, supplying clean water through integrated water management, and strengthening ecological capacity of the domestic environment in 2019.
- The Ministry will also support the commercialization of small and medium sized enterprises by



aiding field diagnoses and customized consulting, subsidizing commercialization development and promotion, and hosting an investment briefing to procure private funds.

- The Ministry enacted the ‘Framework Act on Resources Circulation (2018)’ in order to strengthen the circular economy of resources. And also developed the promotion strategy and investment direction based on the specific tasks of the four stages of circular economy (production, consumption, waste management, and recycling) by establishing the “First framework plan on resource circulation (2018-2027)”.

(Reference: 환경부, “2019 환경백서 발간...환경정책 주요 정보 한눈에,” 16 Sep. 2019; 환경부, “환경백서,” Sep. 2019)

### Korean government to disseminate EPR for PV waste panels

- The Korean Ministry of Environment, Ministry of Trade, Industry, and Energy (Ministry of Industry), and the Korea Photovoltaic Industry Association (KOPIA) made a business agreement to introduce and implement Extended Producer Responsibility (EPR) to photovoltaic panels from 2023 onwards.
- According to the Korea Environment Institute, the projected waste from old photovoltaic panels is thought to reach 191 tons in 2020 and 9,665 tons in 2023.
- The business agreement sets to introduce the EPR policy to photovoltaic waste panels by 2023, after establishing a photovoltaic waste panel collection and storage system and a foundation for recycling technology development by 2022.
- In terms of recycling photovoltaic waste panels, the collection of useful resources such as glass, aluminum, silicone, and copper is possible. However, there are no clear recycling obligations and the recycling business is not yet vitalized.
- The current producers and importers of photovoltaic panels are paying a waste allotment of 17 won/kg, as per the ‘Act on the Promotion of Saving and Recycling of Resources’

(Reference: 환경부, “태양광 폐패널 재사용 재활용 확대 추진,” 28 Aug. 2019)

### International conference for standardization by Korean Agency

- In order to establish a global standard for hydrogen fuel cell batteries, a work group from International Electrotechnical Commission (ICE) is starting discussions on the second international specification for hydrogen economy devised by Korea.
- Korean Agency for Technology and Standards hosted international conference, international specification experts from Korea, France, China, and Japan participated with the discussion centering around enacting the ‘Technology for Assessing Functionality of Hydrogen Fuel Battery System for Construction’ as the global standard.
- The newly proposed ‘Technology for Assessing Functionality of Hydrogen Fuel Battery System for Construction’ is the second global specification devised by Korea after the first specification on ‘Micro Hydrogen Fuel Battery Power System’ was enacted as a global standard in May.
- The specification regulates the hydrogen fuel batteries applied in construction machinery (e.g. excavators, bulldozers) and the functionality assessment of secondary battery hybrid systems. It offers measures and standards for functionality assessment in a variety of settings in terms of the influence from the vibration and dust of the site.
- The specification is the first to be suggested for hydrogen fuel battery for construction use, and can be used expansively in agricultural machineries (e.g. tractors, containers, lift trucks) and distribution and mining machines.

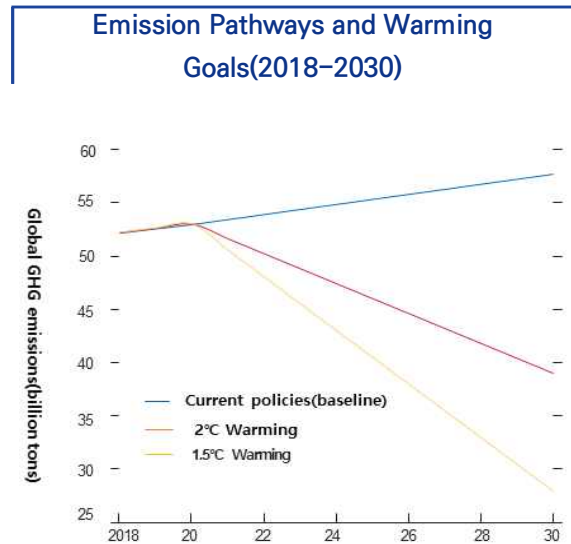
*(References: 통상산업자원부, “대한민국 수소경제 제2호 국제표준 논의 착수,” 2 Oct. 2019)*

### IMF declare carbon tax as the most effective measure for climate crisis

- The International Monetary Fund (IMF) released a report, Fiscal Monitor, and claimed that the most effective policy measure in response to climate change is charging Carbon Tax, and reinforcing the provision of policy alternative through international cooperation.
- According to the report, because CO<sub>2</sub> is the biggest cause of global warming, charging a reasonable amount of carbon tax will render companies and households to find ways to minimize

costs of energy use and change to cleaner energies, which makes carbon tax the “single most powerful way” to fight climate crisis.

- If global warming were to be limited at 2 °C and no other policies, carbon tax must be raised to \$75 a ton by 2030, which means electricity costs will rise 45% over the next decade and gasoline would rise 15% more on average.
- In the case the carbon tax cannot be enforced, applying an emission trading scheme to a wide range of economic activities could foster similar effects as carbon taxing.



※Source: CAT 2018, Fiscal Monitor

- If the carbon tax and the emission trading is not possible, policies such as ‘feebate policies’ (increasing taxes on high emission categories and rebating emissions discharges that are below average) and regulations (setting standards for emission proportion and energy efficiency) can be used, but this will lead to only 2/3 the reduction that can come from carbon taxing.
- The global average for emission costs is 2 dollars per ton, and thus insufficient to reach the 2 °C goal as of now. Subsequently, to fulfill the goals set by the Paris Agreement, the biggest greenhouse gas emitters must choose the carbon price, make an agreement, and provide policy that will transparently verify this process.

*(References: IMF, “Fiscal Monitor-How to mitigate climate change,” 2019.10.10.: Eco Watch, “IMF Says Carbon Tax Is Most Powerful Way to Fight Climate Crisis,” 2019.10.11.)*

### Green Climate Fund Private Investment for Climate Conference

- The Green Climate Fund’s (GCF) Private Investment for Climate Conference (GPIC) was hosted in Incheon, South Korea for three days from October 7th to 9th. 600 private sector investors, government officials, and international finance experts gathered to discuss the activation of

private investments.

- The conference was hosted by GCF to discuss and share knowledge on technology, finance, and standards to expedite investments from private capital for climate change.
- The Executive Director of GDF emphasized that the assets managed by the private sector is up to \$23 trillion, but only a limited amount of assets is being invested into climate change adaptation finance due to various market barriers.
- Recently, private sectors are focusing on e-transport sectors or renewable energy sectors, but investments in adaptation, which includes agriculture and land, are relatively small.
- According to the research done by the Climate Policy Initiative, the finance in climate adaptation sectors reached 22 billion dollars, whereas investments in the mitigation sector reached \$436 billion dollars
- This discrepancy is due to the lack of awareness and knowledge of the climate change threat, domestic policies and regulations, social attitude, and the complexity of investing in adaptation projects. The biggest reason for the discrepancy is the lack of understanding in profit generation.

*(References: IGCF “GCF private sector conference makes business case to lower planet’s climate costs,” 10 Oct. 2019; IPS News, “Global Climate Change Investment Heavily Tilted Towards Mitigation and Low on Adaptation,” 8 Oct. 2019)*

## II Industry

### ABD and DHD agree to establish floating solar PV plant in Viet Nam

- The Asian development Bank (ADB) and Vietnam's Da Nhim-Ham Thuan-Da Mi Power Joint Stock Company (DHD) signed a loan agreement of 37 million dollars to install a 47.5MW scale floating photovoltaic power facility in the Da Mi lake.
- The loan agreement reflects the installation of the first large-scale floating solar photovoltaic power facility and the largest floating photovoltaic power in Southeast Asia.
- The representative from ADB mentioned that this is an innovative project that integrates two clean energy technologies (hydro and solar power), with potential to replicate in Vietnam and in the Asia and the Pacific.
- DHD is a subsidiary of the Viet Nam Electricity Power Generation Corporation (EVN) that operates 4 hydropower plants. The total generation capacity is 642.5MW, which is 1.7% of Vietnam's total power production.
- The funds include a 17.6-billion-dollar loan from the ADB's ordinary capital resources, \$15 million loan from the Canadian government and Canadian Climate Fund for the Private Sector in Asia, and \$4.4 million loan from Leading Asia's Private Infrastructure Fund (LEAP) supported by Japan's International Cooperation Agency (JICA).

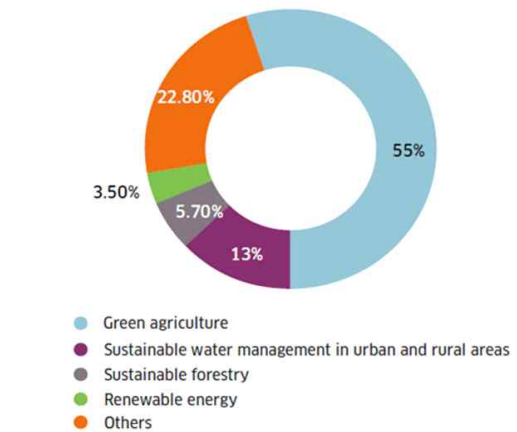
*(Reference: ADB, "ADB, DHD Deal to Provide First Large-Scale Floating Solar PV in Viet Nam," 2 Oct. 2019)*

### Green credit shows rapid growth in Viet Nam

- Green credits play an important role in sustainable socioeconomic and green development. In Vietnam, banks are focusing on green credit as a source of funds followed by the government's development policies

- Recently, the Japan Bank for International Cooperation and Vietcombank signed a loan agreement to procure 200 million dollars for Vietnam’s green energy projects
- Vietnam’s HDBank has been preparing a financial package of 388.5 million dollars in order to increase funds in the clean energy use of companies and household businesses. The scale of this package is predicted to increase depending on market demands.
- The financial package, which was launched a year ago, has successfully supported \$8.6 million for roof-top solar power projects, with a limit of \$423,000 for each project.
- Nam A Bank joined the international networks of Global Climate Partnership Fund - an investment company made by the German government - last December and received technical support for credit activities to settle the green lending activities in Vietnam.
- According to the recent research by State Bank Vietnam, the green credit balance was approximately \$10.5 billion which is a 2% increase in the first quarter of 2019 from last quarter. By the end of 2018, green sector showed 30% growth compared to the previous year.

Vietnam’s green credit balance (2019.3)



※Source: SBV, VET

(Reference: Vietnam Net, "VN Banks now keen on green credit," 23 Sep. 2019))

### Rooftop PV installation proliferated in Cambodia

- Indochina Energy Partners (IEP) based in Singapore declared that they are concentrating on rooftop photovoltaic installation projects in three Asian countries including Cambodia, Vietnam, and Myanmar.
- According to IEP, they are operating under the Build-Own-Operate-Transfer (BOOT) model, and

operate with rent and lease, and they are planning to apply this model in Cambodia and Myanmar markets after Vietnam.

- IEP is installing, maintaining, and conserving photovoltaic facilities to commercial buildings and factory owners and providing financial support solutions, as well.
- The Solar Energy Association of Cambodia claimed that rooftop photovoltaic installations are rapidly expanding after the government permitted private power generation facilities to connect to the national grid in 2018.
- The Cambodian government declared that it will increase solar power energy production to 15% of the total power production by 2020. It is projected that solar power will produce at least 390 MW of energy by next year.

*(References: Khmer Times, "S'pore firm announces plans for local solar sector," 20 Sep. 2019)*

### Innovative venture to solve household wet waste problems in Myanmar

- Myanmar's biggest city, Yangon, produces 2,300~2,500 tons of waste every day. 61% of this waste is from households, 30% from industries, 0.1% from medical sector, and 3% from miscellaneous sources. Out of the waste that is produced by households, 65-70% is wet waste.
- Bokashi Myanmar is providing an alternative to food waste by turning food waste from Yangon into organic soil.
  - \* 'Bokashi' is Japanese for humus soil or fermented organic matter, and is used in the agriculture and horticulture sector worldwide.
- Bokashi Myanmar was established by 5 people from Myanmar, Germany, Belgium, Sweden as an environmental community service project from U Thant Museum and an international school, but now the project has been converted into a commercial venture.
- The venture aims to prove that food waste can be changed into fertilizer and produces humus soil that can be used in the agriculture sector by using effective micro-organisms to compost.
- Myanmar still does not have a strong awareness on sorting waste, so the venture obtain their resources (food waste) from international schools, hotels, restaurants, travel businesses, and fresh



food markets.

- Aside from producing humus soil, the venture also educates citizens about recycling by providing workshops and training course.

*(Reference: Myanmar Times, "On a mission to turn Yangon's food waste into organic soil," 3 Sep. 2019)*

### EU plastic recycling project with blockchain technology

- EIT RawMaterials, along with Circularise (blockchain technology startup), DOMO (polyamide production company), and Covestro (an engineering plastic company), announced their new Circularise PLASTICS project to increase plastic circularity by using blockchain technology.
- The aim of this project is to establish an open standard for sustainability and transparency of circularity within the plastic industry. EIT RawMaterials support the protocol for data exchange within Circularise.
- A new feature of the project is that it does not expose sensitive or confidential information of the company during data exchange through blockchain technology called 'smart questioning'.
- If the industry could establish a single standard for transparency and traceability to origin, then it will have a huge impact on circularity in the plastic industry.
- There are three goals to this project: Choose Circular, Produce circular, Make Circular.
- Circularise, which is a company from the Netherlands, will enable transparency and communication in global supply chain through blockchain technology Zero-knowledge proofs, with the support of EIT RawMaterials.

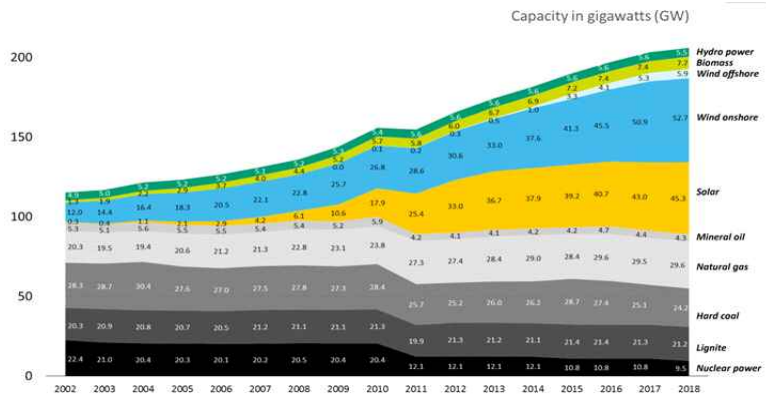
*(Reference: EIT, "EIT RawMaterials supported start-up works on full plastic traceability," 10 Oct. 2019)*

### German renewable industry looks for solutions by end of guarantee

- As per the Renewable Energy Act (EEG) in 2000, Germany has been supporting investment in the renewable energy sector through policies such as Feed-in-Tariff.

○ The guaranteed remuneration was available for 20 years, and investments towards first pioneer projects are ending in 2021. With this, businesses operating solar power or wind power facilities are looking for new ways of operation that will guarantee profitability.

Germany's installed power generation capacity (2002–2018)



※Source: Fraunhofer ISE 2018, Clean Energy Wire

- In 2018, Germany's renewable power production of 118GW, with 34.9% of the country's total energy production.
- The German government is planning to increase renewable energy power production to 65% of the energy supply by 2030. In order to reach this goal, renewable energy power production must increase 215-237GW.
- The following operation options are available after the end of the 20-year remuneration period and if the old facilities are not closed down:
  - Repowering: replacing old renewable installations with newer and generally more powerful models
  - Direct Marketing: Large-scaled renewable companies can directly sell their electricity to the electricity exchange. Small-scaled renewable companies can contract direct marketers that pool the electricity production of their various customers and sell it to the electricity exchange or sell it directly
  - Power purchase agreements: renewable energy producers can either install a grid themselves or sell their electricity on a grid through a long-term contract
  - Blockchain and community solutions: renewable energy producers could use blockchain solutions to sell energy through peer-to-peer power supply
  - Own consumption: own consumption of electricity will only be possible if it meets certain legal conditions

(Reference: Clean Energy Wire, "20 years on: German renewables pioneers face end of guaranteed payment," 16 Sep. 2019)

## Korea Hyundai Motor Group plans large-scale investment strategy

- Hyundai Motor Group announced that they will be spending \$35 billion on self-driving and alternative mobility ventures over the next five years.
- Hyundai's investments are a part of the Korean government's initiative to commercialize self-driving transports.
- The recent announcement includes self-driving, connected, and electric vehicles that can be used in ride sharing networks
- Hyundai plans pursuing commercialization of self-driving cars by 2027, and plans to test-drive flying cars in 2025.
- Meanwhile, Hyundai announced that it will establish a joint form with the self-driving vehicle tech company Aptiv and form a \$1.6 billion joint venture with Kia Motors and Hyundai Mobis in September.
- However, analysts claimed that other major vehicle companies experience difficulties in developing self-driving cars and pointed out that Korea's capabilities in artificial intelligence, sensors, and logic chips are behind the current global standards.

(Reference: Forbes, "Hyundai Unveils Massive Self-Driving Investment As South Korea Looks To Lead In Autonomous Tech," 15 Oct. 2019.10.15.: etnews, "문 대통령 '2030년 미래차 경쟁력 1위 도산... 현대차 41조원 투입 '화답', 15 Oct. 2019)

### III Technology

#### Toray's project creating fiber from recycled plastic bottles in Japan

- Japan's Toray chemicals recently launched their recycled fiber project brand '&+ (andplus)' that makes fiber from plastic bottles as raw material, and announced that they will be available in markets from January 2020.
- With its new theme "Together, We are the New Green," the project developed a high value recycled fiber that may win the empathy of consumers who are interested in environmental problems. The project aims to contribute to the realization of a circular society in which the producer, collector, and consumer are all connected.
- The company also deliberated that they improved the fashion, functionality, and reliability of the standard recycled fiber, thus expects the new and improved fiber to be used in high functioning sportswear and day-to-day clothes.
- Previous recycled fibers were limited in use because of difficulties in producing due to impurities, difficulties in adjusting thinness, and discoloration. Meanwhile, the new fiber is available for use in diverse settings and come in white. This is due to the cooperation between Toray and recycling companies to obtain high quality raw material and unique fiber production technologies.
- Furthermore, Toray established a unique recycling discrimination system using special additives and the Toray recycling system, which tracks the distribution process.

*(Reference: 東レ株式会社, "新たな繊維事業のブランド「&+」の展開について," 5 Sep. 2019: Sustainable Japan, "東レ、ペットボトル・リサイクル繊維事業「&+」を新設。再生素材の品質向上," 9 Sep. 2019)*

#### Sweden e-mobility company develops urban 3-wheel transport pod

- Sweden's e-mobility company, Clean Motion, developed an innovative design and manufacturing approach appropriate for urban transport by revealing the three-wheel electric Pod, 'Zbee'.

- Zbee is innovatively and practically designed, with modular manufacturing principles and a battery swapping program.
- Clean Motion, which was created 10 years ago, always aimed to create energy-effective transport, and thus developed the Pod, which is a cross between a car and a bike
- Because the production approach is innovative, it can only be produced on a new type of platform in Sweden. Nevertheless, the company is planning to produce their cars in places around the world.



※Source: Clean Motion

- In order to minimize the production cost, the design is as minimal and multipurpose as possible. Each process takes the minimum resource required to manufacture. The Pod consists of 270 parts, and can be assembled like a Lego as it is built on modular architecture.
- Furthermore, the energy consumption is only 0.04kWh/km, thus decreasing the need for resource-heavy batteries. It is able to operate 30 km with 8 hours of charging.

(References: Forbes, "This Is Zbee, An Inventive Electric Urban Three-Wheel Pod By Clean Motion," 30 Sep. 2019: Clean Motion, [Homepage](#))

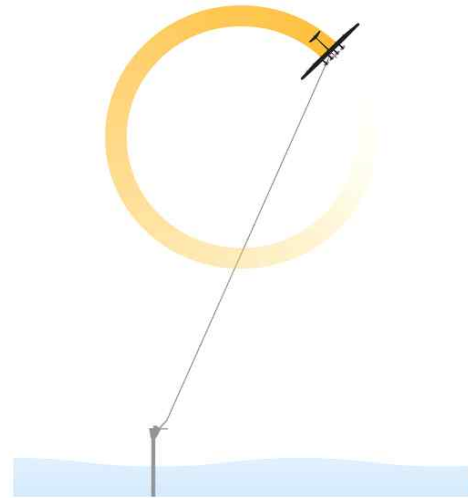
## New airborne wind turbine project generating electric power

- Makani, a subsidiary of Alphabet (Google's parent company), started pursuing a project on airborne wind turbines on kite.
- The aircraft like kite with the wind turbines is structured, as it is connected to the ground with a rope. Through this rope, the kite wind turbine sends energy to the electric grid on the ground.
- Makani developed the airborne wind turbine with support from Google X and the U.S.

Department of Energy office of ARPA-E, and is working with Shell to test the kite over the sea.

- Wind energy has the potential to produce more than 100 times the energy the whole world can use, but only 4% of total global energy production comes from wind power.
- Makani's wind power aircraft system is cutting edge technology from space engineering, material engineering, and autonomous control, and can be installed anywhere.
- Makani's test-run started in 2015, and the prototype generated a maximum of 600kW of electricity. The onshore wind power production system was successfully tested in 2019.

Offshore airborne wind power system



※Source: Makani

- In the future, Makani will optimize the floating platform and the mooring system in cooperation with Shell, levitate the kite, minimize the need for manual control, and connect the aircraft to the grid.

*(Reference: Makani, Homepage: Nauticus Live "Shell's partners 'Makani' have successfully conducted First Offshore Airborne Flight with their Energy Kite," 22 Aug. 2019)*

**Technologies to develop cheap and non-polluting alternative energy**

- With the current state of climate change, there is a variety of research trying to develop sustainable and cheap alternative energy, and the challenge of developing technology that does not rely on fossil fuel continues.
- Canadian scientists have found out how to extract pure, non-polluting hydrogen from waste oil or oil wells for only a portion of the price of gasoline.

- This technology pumps oxygen-enhanced air and water into a reservoir with tar, bitumen, and coal, increasing the temperature to 500 °C which causes the hydrocarbons to fracture. The patented technology filters the hydrogen and the carbon is left in the ground.
- Proton technologies, which commercializes this system, mentioned that even Alberta alone has the potential to supply Canada's entire electrical supply for the next 330 years. The extraction cost is 10 to 50 cent per kg, and this is only a portion of the extraction costs for gasoline.
- With the vitalization of hydrogen research, certain researchers are saying that hydrogen will replace global natural gas supply in the next 30 years.
- Meanwhile, researchers from the UK and Denmark announced that theoretically, the wind power in Europe could supply global energy use until 2050.
- When looking at the geographical information of the wind atlases, 46% of Europe is able to accommodate wind power infrastructures. If wind power is installed in all of these available areas, then these infrastructures can generate 100 times more than the current wind power production.

*(References: Climate News Network, "Plentiful renewable energy awaits the world," 29 Aug. 2019)*

### Technology extracting CO<sub>2</sub> from air to produce fuel

- Canada's Carbon Engineering purifies CO<sub>2</sub> extracted from the air, which is compressed with water and energy. The compressed CO<sub>2</sub> can be combined with hydrogen produced with non-fossil fuel, and produce low carbon hydrocarbon fuels.
- Squamish, the company's pilot project has been extracting CO<sub>2</sub> from 2015 in British Columbia, Canada. The extracted CO<sub>2</sub> has been transformed into fuel since 2017.
- The company is receiving support from Canadian Natural Resources Limited, Occidental Petroleum, and Chevron.
- Currently, Carbon Engineering's Direct Air Capture system can remove 1 ton of CO<sub>2</sub> for \$100. Each system has shown to remove about a million tons of CO<sub>2</sub> per year.



- If the technology can produce synthetic liquid fuel and obtain hydrogen from water or nuclear energy, it will be able to establish itself as a carbon neutral fuel production technology.
- Furthermore, if the fuel can be produced for less than \$4 per gallon, while it will be slightly more expensive than fossil fuel, it will be similar to the cost of biofuel, and thus competitive with any fuel.



※ Source: Carbon Engineering

- The biggest advantage of this technology is that it does not require a large surface area or water compared to biofuel and is unrestrained by weather and geographic location.

*(References: Forbes, "Carbon Engineering - Taking CO<sub>2</sub> Right Out Of The Air To Make Gasoline," 8 Oct. 2019; Carbon Engineering, "Carbon Engineering expanding capacity of its commercial Direct Air Capture plant to provide negative emissions to customers", 17 Sep. 2019)*

## IV ASEIC NEWS

### Ecothon (competitive exhibition of ideas) held in Cambodia

- ASEM SMEs Eco-Innovation Center (ASEIC), the Ministry of industry and Handicraft of Cambodia, and Germany's Hanns Seidel Foundation hosted 'Ecothon for Cambodia's sustainable production and consumption' for two days on September 17th, 18th in Phnom Penh, Cambodia.
- The event was formatted as a competitive exhibition of ideas and provided a platform for international professionals from Cambodia, Korea, Europe to coach nine domestic prep entrepreneur teams and startups on Corporate Social Responsibility (CSR) and Sustainable Consumption and Production (SCP).
- Each team explained their business model in the final presentation. At the end of the event, first place went to TeraX Team (Cambodia's Kirirom Institute of Technology), which used IoTs to develop an app that systematically manages household electricity, water, gas use. Second place went to Ecocup team (Royal University of Phnom Penh) who produced a paper cup that uses cassava and biodegradable PBS coating. Third place went to ITLab (startup), which is a company that develops smart farm solutions by using IoT and AI to remotely control irrigation channels.
- The Vice-Minister of Industry and Handicraft explain the policy on startup incubation system in the technology sector. He mentioned that he would refer this event to for government programs that nurture technological startups and the pursuit of other policies supporting startup.

Ecothon in Cambodia



## ASEIC hosts workshop in Myanmar for reinforcing waste water treatment

- On September 18th, ASEM SMEs Eco-innovation Center (ASEIC) hosted a workshop on capacity building for industrial waste water treatment capacity in Yangon, Myanmar.
- The workshop was hosted in cooperation with Myanmar's Ministry of Industry and introduced waste water treatment technologies and facilities operation for 85 SMEs in Myanmar.
- In 2018, Myanmar's waster water treatment market was 76.2 billion won. In the industrial waste water treatment sector in China has a high share of 31.2%, and Korea has a share of 2.7%.
- ASEIC built up the cooperation with selected companies in order to increase export of Korean SMEs by one-to-one coaching.
- In Yangon's industrial complex, 5.41% waste water is treated, and most of it is being discharged. In response to this problem, the Myanmar's Ministry of Environment provided guidelines criteria for industrial discharge water in 2015, but the capacity and awareness of companies towards waste water is still relatively insufficient.

Myanmar's capacity building workshop

