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UNU-IAS

Institute for the Advanced Study of Sustainability

Summary of Case Studies:

Global and EU Trends on Carbon Neutrality and Digitalisation

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I. Purpose of the Study

This report summarises case studies conducted by the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) as part of the FY2021 Research Project on Partnership Facilitation and Civil Society Participation towards Realisation of Regional Circular and Ecological Sphere (Local SDGs). The project is supported by the Ministry of the Environment of Japan, and it is part of an initiative led by IDEA Consultants Inc. to analyse best practices in realising a carbon neutral and sustainable society through digitalisation.

The project aims to contribute to accelerating policy discussion towards achieving the SDGs at the local level, and capture the latest trends in global discussions and European Union (EU) policy on carbon neutrality and digitalisation.

II. International Trends on Carbon Neutrality and Application of ICT Tools Towards a Green and Just Society

1) Net-Zero Emissions Commitment and Current Policies

The global decarbonisation movement is accelerating, with 136 countries committed to achieving net-zero greenhouse gas emissions (as of February 2022), according to the Net Zero Tracker (2022).[1] Aggregate net-zero targets cover 88% of global greenhouse gas (GHG) emissions, 90% of GDP, and 85% of the population. On the other hand, according to the Climate Action Tracker (2021),[2] the global temperature has already risen by 1.2°C as of 2021 and current policies will result in a 2.7°C temperature rise by the year 2100. There is an urgent need to set mid-term targets and implement more ambitious policies in order to achieve net-zero emissions by mid-century.

[1] Net Zero Tracker (2022) https://zerotracker.net/
[2] Climate Action Tracker (2021) https://climateactiontracker.org/global/cat-thermometer/

2) Recent Developments Under the UNFCCC

The Glasgow Climate Pact was adopted as an outcome of the 26th Climate Change Conference (COP26) held in 2021 in Glasgow, UK. It emphasised the need to limit the global temperature rise to 1.5°C. COP26 featured several relevant side events, which were held in a hybrid format:

① Future Lab: Just Climate Action — The Great Recovery[3]

- This Talanoa interactive session engaged 12 participants including environmental activists, youth, writers, and politicians, who shared their personal experiences and discussed the importance of just transition, an equitable process that addresses the needs of marginalised people.

② Local Government Association: Frontline — Climate Action on the Ground[4]

- The session was organised by the British Council of Local Authorities, a national organisation of local authorities and related agencies in England and Wales.
- The event focused on the role of local governments in climate change action, emphasising the importance of local government efforts in addition to national government initiatives.

③ Unlocking Net Zero in Cities Through Sustainable Digital Transformation and Innovative Solutions[5]

- Organisations including UNFCCC and UN-Habitat held a side event to discuss the role of digital technologies in net-zero efforts in urban areas.
- The event emphasised the need to incorporate digital technologies, as revealed by the COVID-19 pandemic, into long-term urban planning to promote systemic change. It also underlined the need for innovation, not only in the digital context, but also in policies, partnerships, business models, and the importance of cities to serve as hubs for such innovation.

3) The Importance of Just Transition

While decarbonisation is becoming the global norm and cannot be achieved without the involvement of all sectors and stakeholders, there are some sectors that will be negatively impacted in the process of decarbonisation. Just transition, one of the key principles of the

[3] UNFCCC (2021) https://unfccc-cop26.streamworld.de/webcast/futures-lab-just-climate-action-the-great-recovery
[4] UNFCCC (2021) https://unfccc-cop26.streamworld.de/webcast/local-government-association-frontline-climate-act
[5] UNFCCC (2021) https://unfccc-cop26.streamworld.de/webcast/unlocking-net-zero-in-cities-through-sustainable-d

Paris Agreement, is a concept seeking to ensure that the transition to a decarbonised world leaves no one behind and addresses the needs of workers in sectors disadvantaged by the transition, such as the fossil fuel sector. Early commitment to a just transition can minimise the negative impacts of climate change. In 2015, the International Labour Organization (ILO) published its "Guidelines for a just transition",[6] followed by an accompanying user manual in 2021,[7] with the aim of bringing about a sustainable economy and society, and decent work for all while achieving decarbonisation.

4) The Importance of Using ICT Tools in Transition to a Green and Just Society

In recent years, digitalisation has been rapidly advancing, further accelerated by the COVID-19 crisis. Digitalisation is crucial to achieving a decarbonised economy, and it is expected that digitalisation will accelerate decarbonisation. In the energy sector, the "three Ds" — decarbonisation, decentralisation, and digitalisation — are recognised as essential. Research shows that by promoting the adoption of digital technologies such as mobility, global carbon emissions can be reduced by up to 20% by 2030.[8] A study by Global e-Sustainability (GeSI) estimates that the adoption of digital technologies will allow the economy to continue to grow while reducing carbon emissions.[9] In addition to reducing GHG emissions, digitalisation also has the advantage of making information about environmental impacts more transparent and of enabling optimisation of production volumes through a more accurate understanding of consumer demand with the use of AI. On the other hand, it should be noted that digital technologies accounts for 4% of GHG emissions[10] and that digitalisation tends to significantly increase electricity consumption. Therefore, decarbonisation of electricity is also necessary.

5) Recovery from the COVID-19 Pandemic: From "Green Recovery" to "Great Reset"

In addition to the impacts of climate change, the world is facing major challenges related to COVID-19. The pandemic has had enormous political, economic, and social consequences, and has drastically changed the conventional approach to decision-making. The World Economic Forum proposed the idea of a "Great Reset" at Davos 2021 as a new concept for recovery.[11] In order to recover from the impacts of the pandemic, it is necessary to "reset" the idea of capitalism, rather than aiming for a return to conventional society. There are three elements: (i) a stakeholder economic system and fair decision-making achieved under the government initiative, (ii) securing investment to achieve common goals including

[6] ILO (2015) https://www.ilo.org/wcmsp5/groups/public/---ed_emp/--emp_ent/documents/publication/wcms_432859.pdf
[7] ILO (2021) https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_826060.pdf
[8] Science Business (2021) https://sciencebusiness.net/climate-news/news/digital-tools-could-change-pace-decarbonisation-if-used-right
[9] World Economic Forum http://reports.weforum.org/digital-transformation/enabling-the-transition-to-a-sustainable-world/
[10] ESCP (2021) https://escp.eu/news/reduce-your-digital-carbon-footprint-shape-greener-future
[11] World Economic Forum (2020) https://www.weforum.org/agenda/2020/06/now-is-the-time-for-a-great-reset/

sustainability and equity, and (iii) addressing welfare, health, and social issues by leveraging investments into innovations of the 4th Industrial Revolution.

6) International Trends on the Global Food System

Climate change issues are closely related to food security issues. As the world's population grows, there is a need to ensure adequate food supply. The first UN Food Systems Summit (FSS) to discuss sustainable food systems was held online on 23–24 September 2021. The Summit focused on five topics including (i) food security in terms of both quality and quantity, (ii) sustainability of food consumption, (iii) promotion of environmentally compatible agriculture, (iv) income security in rural areas, and (v) resilience of food systems. The outcome of the summit included a Chair's Summary and Declaration of Actions by the UN Secretary-General. The Chair's Summary emphasised the importance of recognising that the transition to sustainable food production systems is an essential solution for food production, which is vulnerable to the impacts of climate change and biodiversity loss, and the need to invest in science and innovation to achieve this transition. Follow-up meetings will be held every two years.

The Tokyo Nutrition for Growth Summit 2021 was held on 7–8 December 2021, bringing together Heads of State and Government, ministers, and leaders from the private sector, civil society, and academia from more than 30 countries. The summit covered five topics including (i) the integration of nutrition into universal health coverage, (ii) building healthy and sustainable food systems, (iii) combatting malnutrition in vulnerable situations, (iv) data-based accountability, and (v) securing funding to improve nutrition. Throughout the Summit, governments, businesses, and civil society pledged more than USD 27 billion for nutrition. The summit's outcome document, the Tokyo Declaration on Nutrition, states that the impacts of climate change and conflicts are the biggest contributors to the global increase in hunger and malnutrition, that climate change is making food systems more vulnerable, and that adaptation to climate change is necessary, including increased investments in climate-smart agriculture and the use of relevant science, technology, and innovation. The need for a sustainable and resilient food system was also emphasised.

7) International Trends of Biodiversity Conservation

In solving climate change and food issues, it is crucial to identify ways to use natural capital in a sustainable way. The 15th Conference of the Parties (COP15) to the Convention on Biological Diversity was postponed for more than a year due to COVID-19, with its first session eventually held in a hybrid format on 11–15 October 2021, resulting in adoption of the Kunming Declaration. The Declaration contains 17 commitments, including strengthening a comprehensive approach for biodiversity in addition to climate change,

sustainable food production, and One Health. The second session of COP15 is scheduled to be held in Kunming, China in August 2022, and expected to adopt a new international framework for biodiversity.

In March 2019 the UN General Assembly designated the decade from 2021 to 2030 as the UN Decade of Ecosystem Restoration, as requested by COP14. The UN Environment Programme (UNEP) and the UN Food and Agriculture Organization (FAO) are leading implementation efforts.

III. Trends in Europe on Green and Just Transition

1) The European Green Deal

The European Union (EU) has developed the European Green Deal, a growth strategy aiming to realise a fair and prosperous society within its borders. The EU's objective is to reach net zero by 2050, and to set up a modern, resource-efficient, and competitive economy, in which the efficient use of resources will significantly boost economic growth.

The European Green Deal focuses on three targets: (i) to incorporate its objective of reaching net zero by 2050 in the European Climate Law, (ii) to clarify in the European Climate Pact that the whole of society will be mobilised to participate in climate change action, and (iii) to formulate in the EU Strategy on climate adaptation that the EU will become a climate-resilient society by 2050.

2) Efforts for a Fair Transition in the European Union

As part of the Just Transition Mechanism package, in January 2020 the EU released the European Green Deal Investment Plan to set the blueprint for implementing financial support mechanisms necessary for the fair delivery of the European Green Deal.

The European Green Deal Investment Plan aims to mobilise EUR one trillion to be invested in the public and private sectors over ten years. Moreover, to apply the principle of leaving no one behind in the Fair Transition Mechanism, the plan also aims to inject a total of EUR 100 billion into areas affected by the transition to help mitigate negative impacts.

The EU plans the following induced investments: (i) EUR 30–50 billion is expected from the establishment of a Fair Transition Fund (for human capacity building and for creating

new opportunities for start-ups and small and medium-sized enterprises); (ii) EUR 45 billion from InvestEU to accelerate the private sector's investments in clean energies and transportation; and (iii) EUR 25–30 billion from the European Investment Bank to finance the public sector's transition (heating systems, infrastructure renovation, etc).

Furthermore, the EU launched The Initiative for Coal Regions in Transition to assist the transition toward a low-carbon economy in a just and fair manner. For example, in 2016 Poland was dependent on coal for 50% of its energy supply and for 80% of its electricity. Between 1990 and 2014, 40 of its 70 coal mines were shut down while the Polish workforce affiliated with the coal industry was reduced by a quarter between 1990 and 2015. As of 2021, Poland still has around 90,000 coal industry workers (out of a total population of 38 million) and is therefore expected to be the largest recipient of the Fair Transition Fund (receiving an estimated EUR 3.5 billion).

3) EU policies on Green and Just Transition and Application of Digital Technologies

The EU's digital strategy aims to promote digitalisation to benefit all people. The strategy therefore includes policies on expanding business opportunities, building a more open society and using it to combat climate change. Digital technologies have been identified by the EU as an essential tool for achieving carbon neutrality by 2050, and are particularly important in areas such as energy, agriculture, transportation, and buildings. Specific policies include the development of an EU industrial strategy that promotes both green economy and digitalisation, the Destination Earth initiative for more accurate forecasting of natural disasters, the goal of achieving carbon neutrality in data centres and ICT infrastructure by 2030, and the EU rules on green government procurement to make government procurement more sustainable.

IV. Case Studies on Digitalisation of the City and Carbon Neutrality

1) Europe: SMARTER TOGETHER

SMARTER TOGETHER is a smart city project implemented during 2016–2021 under the Horizon 2020 funding scheme with Lyon, Munich, and Vienna as the lighthouse cities, followed by Santiago de Compostela and Sofia, and with Kiev and Yokohama as observer cities. The five focus areas of the project included (i) establishment of a data management platform, (ii) use of renewable energy electricity, (iii) renovation of buildings, (iv) e-mobility, and (v) citizen and stakeholder participation.

In Lyon the project was implemented for the area of Lyon Confluence, an urban redevelopment project with a total area of 600,000 square meters. An interview with Mr Etienne Vignali (Coordinator, Lyon Confluence), the coordinator of the SMARTER TOGETHER in Lyon was conducted.

- The SMARTER TOGETHER project ran for five years including three years of implementation and two years of monitoring and evaluation. Considering the time required for administrative approval and building consensus, the timeframe was short for a project of this scale.
- In the Lyon Confluence project, building consensus through direct dialogue was key. The project built a good relationship with local residents through consistent and targeted communication.
- With regard to inclusiveness, the project focused on economic and social aspects and preventing inequalities, such as the exclusion of low-income groups, and a decline of population.
- In Vienna, one factor in the success of SMARTER TOGETHER was the establishment of a cross-sectoral team within the city administration, enabling streamlined decision-making.

2) State of Hawai'i, the United States of America

The State of Hawai'i aims to become Clean, Equitable & Resilient — the state's strategy is to take culturally responsive adaptation and mitigation measures to achieve carbon neutrality. In line with the Paris Agreement, Hawai'i has established the Hawai'i Climate Change Mitigation and Adaptation Commission, which focuses on two areas: reducing greenhouse gas emissions from land transportation and adapting to sea-level rise (including disaster prevention). Furthermore, the State of Hawai'i has passed legislation to decarbonise 100% of its electricity supply by 2050, followed by other USA states such as California, Massachusetts, and New York.

This study included an interview with Ms Kelly King, a councilmember in Maui County and a member of ICLEI — Local Governments for Sustainability. The main points are as follows:

- Ms King participated in the 26th UN Climate Change Conference (COP26) and noted the firm commitment of local governments to climate action, including those from countries that have withdrawn from the Paris Agreement.
- There is a level of instability in Hawai'i as the state's economy is highly dependent on the tourism industry and many areas rely on imports. The local government is focusing efforts on creating a circular economy that utilises local resources and creates job

opportunities for residents, starting with the agricultural sector. This will also contribute to a fair transition to a clean, equitable, and climate-resilient society.

- Even though the COVID-19 pandemic has had a major negative impact on the local tourism industry, it has also become an opportunity to develop various collaborations due to enhanced online communication tools.
- As a local government member, Ms Kelly King emphasised the importance of challenging her own perspectives, working in partnership with diverse stakeholders, collaborating with experts, and approaching agendas in a data-based scientific manner.

V. Key Findings and Recommendations

1) Setting Mid-Term Targets

The Glasgow Climate Pact states that carbon neutrality should be achieved by 2050 and that the world needs to limit the global temperature rise to 1.5°C. Considering that the global temperature has already risen by 1.2°C as of 2021, effective measures need to be taken in the medium term, by around 2030. Japan currently has a mid-term target of reducing GHG emissions by 46% by 2030 compared to the 2013 level. Local governments need to set mid-term goals that are consistent with this target. Munich's initial target was to reduce per capita GHG emissions to 0.3 tons CO2 equivalent by 2050, but the city has strengthened its target to achieve this goal by 2035. This is in accordance with the commitment of the German federal government, which is in line with the Paris Agreement. Local governments need to be aware of the Paris Agreement and set targets that are consistent with it. Hawai'i has its own mid-term target to reduce GHG emissions by at least 26–28% by 2025 and 50–52% by 2030, compared to 2005 levels. Hawai'i is also committed to achieving carbon neutrality by 2050. Aside from economy-wide targets, it also has targets to achieve net-zero emissions from buildings by 2030, and 100% of new lightweight vehicle sales to be zero emission by 2035. There is an urgent need for local governments to set mid-term targets, in addition to committing to achieve carbon neutrality by 2050. Ms King stated that in Hawai'i setting a target had led to a major transformation of society, including high-emission industries, and accelerated decarbonisation efforts.

2) Application of ICT tools

The world is rapidly being digitalised, and decarbonisation and digitalisation have become global megatrends. On the other hand, digital technologies currently account for

about 4% of the world's GHG emissions, and since accelerated digitalisation is expected to increase electricity consumption, decarbonisation of electricity is extremely important. Digitalisation can be an accelerator in achieving decarbonisation, especially in the energy sector, with the use of AI and IoT. According to a study by the Global e-Sustainability Initiative (GeSI), it is estimated that global GHG emissions can be reduced by up to 20% by 2030.[12]

In Nottingham, UK, the lighthouse city for the REMOURBAN project, a real-time energy map system has been installed in 40 residences. Enabling residents to visualise their own energy usage is expected to lead to a reduction in their energy consumption. This project is an example of using ICT tools for decarbonisation. It would be useful for Japan to start this kind of initiative as a pilot project and then expand it.

3) Industrial Diversification, Self-sufficiency and Global Supply Chains

COVID-19 has had a particularly large impact on the tourism sector and the Japanese economy, which aims to grow its tourism industry. Hawai'i's economy is also heavily dependent on tourism, and there have been significant negative impacts. It became clear that depending on a single industry is unsustainable. Hawai'i is committed to increasing the state's self-sufficiency rate to 20–30% by 2030. It is crucial for local governments to encourage industrial and economic diversification to promote both decarbonisation and economic development, building a more resilient economy, and advance progress on the SDGs at the regional level. In addition, Japan is an island nation that depends on imports for its energy resources — decarbonisation can be further accelerated by promoting local production and consumption in the energy and agricultural sectors, reducing GHG emissions from transportation. Furthermore, considering recent global developments and conflicts, local energy and food sources are important for building a sustainable local economy.

4) Local Businesses and Employment

Decarbonisation has become a global goal, and society needs to undertake a major transformation to achieve this in a just manner. Rather than simply excluding high-emitting sectors from the economy, it is important to give due consideration to the industries that will be replaced by decarbonisation and to ensure the development of industries and employment. In Lyon, the lighthouse city of the SMARTER TOGETHER project, a local business Lyon Confluence, was fully involved as a coordinator. The involvement of local businesses in decarbonisation projects contributes to the creation of sustainable industries and jobs. Local development, production, and consumption are key factors in advancing decarbonisation and local progress on the SDGs, as stated by Ms Kelly King. In Munich,

[12] GeSI (2021) https://www.gesi.org/research/smarter2030-ict-solutions-for-21st-century-challenges

energy consumption decreased by more than 9% as of 2017 compared to 1990, while the population grew by 25% during the same period. This illustrates that sustainable development is feasible.

5) Collaboration between Governments at Different Levels and Local Leadership

These case studies show the value of partnerships and collaborations between the different levels of government — such as the national government and municipalities — or between municipalities. In Munich, the local government proactively addressed the challenge of improving energy efficiency in buildings and provided a municipal subsidy system while ensuring consistency with the national government subsidy system, through close cooperation between the national government and local governments. At the EU level, there is a framework for cooperation between local governments called the EUROCITIES Network. Through this framework, cooperation between local governments on specific projects has been promoted. There was a movement at COP26 to collaborate at the municipal level even among countries that are not Parties to the Paris Agreement, and such collaboration between municipalities can be a major driving force in achieving a carbon neutral society.

6) Citizen-driven Actions

The participation of citizens and citizen-led development are critical in achieving decarbonisation and the SDGs at the local level. As the case of Hawai'i shows, forms of citizen participation are changing with the acceleration of digitalisation. This enables exchanges of information online, regardless of distance. Good use of ICT tools is expected to promote citizen's participation and contribute to proactive engagement of citizens with their communities. In Munich, although many services are provided in a digital format, all services are also provided offline to address the issue of the digital divide. To encourage citizen participation, it is crucial to build a good relationship with them. In Lyon, face-to-face dialogue played an important role in building trust among residents. The study shows that it is important to provide appropriate support for those who cannot access ICT tools and the Internet, and to take time to discuss projects with citizens, enabling them to have ownership. Partnerships between local governments and citizens are key to successful decarbonisation and digitalisation projects.

7) Areas for Future Study

One area for future study could be to consider how the elderly, low-income groups, and vulnerable groups should be involved in decarbonisation and digitalisation. Since

decarbonisation requires all stakeholders to be actively involved, it is important to research policies around just transition and consider decarbonisation measures in countries and regions that are geographically disadvantaged, such as remote islands. To address the challenges that the world faces today, it is necessary to respond in a comprehensive way, and consider issues of natural capital management, biodiversity, human rights, and inequality. In future research must focus on how to achieve a sustainable and resilient society from a broader perspective.