

APR. 2020 / ISSUE 2

GREEN CIRCULAR CITIES COALITION NEWSLETTER

IN THE LOOP

Content Developer / Yvonne Yang & Hui Qian Editor & Designer / Yuting Chang

Urgent actions are needed to slow down global greenhouse gases emissions, and the circular development pathway can help.

In this issue, we have the privilege to invite Nagano Prefecture, Yokohama, Kyoto and Toyama of Japan to share how the circulating and ecological economy principle is being utilized in achieving decarbonization at the local and regional level.

We will also take a glance at a project in Denmark on possible circular approaches of recycling and/or reusing wind turbine blades and their challenges.

In addition, we are delighted to witness the release of the *Circular Turku* report by the Coalition member Turku, as well as the latest *Circularity Gap Report* by our partner Circle Economy.

We hope you enjoy reading the second issue of *In The Loop* while staying safe and healthy with your loved ones during the global pandemic.

Green Circular Cities Coalition

Managed by the ICLEI East Asia Secretariat

IN THIS ISSUE

Finnish & Japanese Cities Join Hands to Explore Circular Opportunities

Turku study tour to Tokyo and Yokohama

Circular Economy for Climate Neutrality

Local actions in Japan for decarbonization & circularity

Wind Turbine Blades Recycling & Reuse

An option for us?

Circular Turku: How to Kickstart Transition

Learnings from Turku - a blueprint for local governments to kick start circular economy transition

Their Experience, Our Reference

20+ circular policy studies for cities to learn from



Photo / ICLEI East Asia

COALITION UPDATE

To assist cities in Finland and Japan in having a deeper mutual understanding on each other's circular development works, and to identify a common ground for future collaboration and peer-learning, the Coalition and ICLEI Japan co-facilitated a study tour for the Coalition member city **Turku** on 21-24 January 2020, enabling the city's representatives to have a series of workshops, dialogues and bilateral meetings with local government departments and institutes in **Tokyo** and **Yokohama**, as well as making site visits to key local project facilities.

Through the exchange tour, delegates from Turku and the Japanese cities all noticed that the integration of circular economy, climate action and biodiversity is being highly addressed by both sides, with a variety of projects and initiatives having been piloted with the intention to develop systematic solutions. The necessity of residents and businesses engagement is also well acknowledged. In fact, all three cities have highlighted the importance of hearing citizens' voices, understanding their difficulties and challenges, and reacting accordingly.

The study tour has provided an arena for local officials and practitioners to exchange knowledge and have in-depth discussions on topics of their concern. The Coalition, together with partners, will continue to provide member cities with similar opportunities to maximize the impacts of peer-learning.



Ms. Eri Nakajima of Japan's Ministry of the Environment explained the country's circulating and ecological economy principle. Photo / ICLEI East Asia



Site visit to the Tokyo Super Eco Town. Photo / ICLEI East Asia



Site visit to the sludge treatment and recycle facility in Yokohama, which has the biggest egg-shaped digestion tank in Japan. Photo / ICLEI East Asia



Photo / Travelphotographer, Pixabay

CIRCULAR ACTIONS IN CITIES

Cities and regions taking climate actions is becoming a global trend. In the past few years, a growing number of cities and regions are also implementing circular development approaches to achieve the ambitious zero-carbon target and the Sustainable Development Goals (SDGs), as well as to protect the ecological environment.

While some may reckon circular economy perspectives being only applicable to products and substances, the truth is, they can also overturn the paradigm. Recently, low emission actions in line with circular economy perspectives – *redesign, reuse, repair, remanufacture, recycle and recover* – with the intention to regenerate society have swept across Japan.

The Japanese society has long been wrestling with carbon lock-in effects and dependency on fossil fuels which has **significantly increased after the 2011 Tohoku earthquake and Fukushima disaster**. Rather than passively waiting for instructions, a group of Japanese cities have begun exploring the possibility of running their urban system with local renewable energy through redesign, and are eagerly initiating local actions.

Local Production for Local Consumption

The main difference between circular economy approaches and conventional large scale renewable power plants is that the former not only focuses on obtaining renewable electricity, but also lays emphasis on regenerating society with mutual social benefits and financial sustainability.

For instance, through detailed investigations on its renewable potential, the City of **Toyama** has identified solar, small hydropower and biomass as the main sectors where it can further utilize in realizing 'local production for local consumption'. The city's **Low Carbon Farming Village Model** utilizes renewable mix sources to empower agricultural machineries and greenhouses. Vegetables and crops produced in the village are then offered to local schools and welfare facilities, which, in return, raises the awareness of local resources and the surrounding nature.

Regional Cooperation for Higher Renewable Energy Efficiency

Nagano Prefecture, on the other hand, is working on redesigning the interconnection between renewable-rich and renewable-poor cities. With the abundant source of hydropower – especially from snowmelt in springs – Nagano Prefecture is providing renewable energy to Setagaya City of Tokyo under a dedicated cooperation program.



Setagaya, a special ward of Tokyo Metropolis, is densely populated, yet, has limited renewable resources. The cooperation program allows 42 kindergartens in Setagaya to purchase hydroelectricity generated by the two hydropower stations – **Takato Dam** and **Okusobana Dam** – in Nagano Prefecture, through Marubeni Power Retail and its cooperative social energy company Minden. The cash flow then supports Nagano Prefecture to further re-invest in renewable activities. Moreover, site visits to the hydropower plants have been regularly organized for children in the kindergartens, so they can learn about where the electricity they are using comes from.



Takato Dam discharge. Photo / Current

A similar approach can also be found in **Yokohama** – the second populated city in Japan. With the ambition to become a zero-carbon city, Yokohama is utilizing co-benefit mechanisms through the **collaboration with 12 municipalities** in the Tohoku Region of Northeastern Japan, where renewable potential is 4 times higher than the electricity demand in Yokohama.

Governance Redesign for Better Performance and Wider Participation

Local governments in Japan implement the circulating and ecological economy principle through a vast collaboration network of multiple stakeholders, including businesses and residents. This collaboration mechanism can, indeed, be seen as an effort of governance redesign triggered by the intention to realize the SDGs.

Given that every 1 out of 10 people in **Kyoto** is a university student, the municipal government makes an extra effort to work closely with academics in developing decarbonized lifestyle scenarios and water-energy-food nexus implementation within the city. The campaign “**Do You Kyoto?**”, for instance, was developed to boost public engagement by promoting and channeling social solidarity into innovative actions.

Another example, the “**Eco School District**” initiative of Kyoto, is designed to raise awareness and engage households within the same school district – which are usually in close interaction and connection – in circular and decarbonization activities. Led by NPOs, NGOs, schools, businesses and local communities, with the municipal government playing a supporting role, the initiative focuses on voluntary circular and/or zero-carbon actions, such as bio-waste composting and green

walls, that integrate circularity and ecology into everyday life. Representatives of Eco School Districts will also have the opportunity to obtain seats in the **Kyoto Climate Change Committee**, which is composed of experts, practitioners, representatives of academia, businesses, environmental NGOs and the general public.

“Waste as a resource” is the trendiest phrase in the field of circular economy. In a linear economy, not only materials, but also time, human resources and space are possibly wasted. Aware of the potential unintended loss of any kinds, **Toyama** City set up a **sensor network**, which covers 98% of its residential area to support the pursuit of circulating and ecological economy and decarbonization.

The antennas system installed in over 100 schools has allowed local information – such as public transportation usage, irrigation water monitoring, snow depth – to be gathered for immediate responses and actions. For instance, snow plow teams could be deployed in a more effective and efficient manner, as they can now concentrate on areas where snow depth is near or has reached thresholds, minimizing the unnecessary loss of fuels, time and human resources.



Photo / Bright Agrotech, Pixabay

Through these cases, we see local governments' leadership in co-developing and co-implementing activities aligned with the circulating and ecological economy principle to achieve the zero-carbon target. By redesigning the current paradigm to enhance the integration between the economy, local communities and nature, the circulating and ecological economy principle is gradually being mainstreamed in various fields.

By March 2020, 1476 jurisdictions in 28 countries – including Kyoto, Yokohama, Toyama, Nagano Prefecture and other 25 municipalities in Japan – have declared a climate emergency. Though taking place in different cities via various approaches,

all cases presented here are sending the same message to the world that the **circular economy is an efficient approach to pave the way towards a decarbonized future.**

Special thanks to the following officials who have kindly contributed to the content with valuable information:

Eriko Yakushiji, Director-General of the Climate Change Policy Headquarters, Yokohama City

Soichiro Muroga, Associate Director of the Sustainable Energy Policy Division, Environment Department, Nagano Prefecture

Takeshi Shimotsuma, Supervising Director of the Global Environment Policy Office, Kyoto City

Toshiyuki Yamazoe, Senior Advisor for International Businesses Relations, Office of Strategic Planning and Resilience, Toyama City



KNOWLEDGE BOOST

More and more cities and regions have committed to the shift from fossil fuels to renewable energy, of which, wind power has accounted for its share. Whereas the wind itself could be a permanent source of power, wind turbines have an average lifespan of 20-25 years. Most components of wind turbines – the foundation and tower – are recyclable; nevertheless, wind turbine blades still present a challenge for recycling.

Wind turbine blades are generally made from a polymer matrix consisting of glass fiber-reinforced plastics (GFRP), copper, steel bolts and polyethylene (for coating). The complexity of the composite material makes it difficult to reuse, repurpose and recycle, particularly due to the implication on material identification and relevant costs. At the moment, most wind turbine blades are being sent to landfills and incineration for disposal after reaching the end of their lifespan. Yet, neither of them seems ideal from the circular economy perspective.

What are the sustainable and circular options for dealing with decommissioned wind turbine blades? A **joint study**, conducted by the Danish Department of Development and Planning and Siemens in 2012-2016, specifically looked into the experiences, challenges and possibilities of wind turbine blades recycling in a circular economy, with a focus on potential secondary applications.

The outcomes of the study are structured using the circular economy diagram of the Ellen MacArthur Foundation, which illustrates the potentials for a continuous flow of composite materials through the value circle. The secondary applications were developed in respect to 'reuse', 'resize and reshape', 'recycle', 'recover' and 'conversion'. And while the reuse of wind turbine blades was not tried out in the project, such practices have been taken up by a number of cities and regions with careful lifetime monitoring and fatigue testing to ensure their safety.

Summary of methods and applications

	Secondary Applications	Potentials	Barriers / ⌚ Economic ⌚ Time ⚙️ Technical ✓ Standards
Resize/ Reshape	Bridge	– High value end product	– Difficult to assess strength and fatigue ⚙️ – Resize/reshape of blades to meet design needs ⌚ ⌚
	Playground and urban furniture	– Price-wise comparable with other materials	– Availability of blades on demand ⌚ – Design limitations due to the original structure of blades ⌚ ⌚
	Standardized and customized buildings and furnitures	– Increase in material strength	– Design limitations due to the original structure of blades ⌚ ⌚ – Resize/reshape of blades to meet design needs ⌚ ⌚ – Transport of blades ⌚ ⚙️ – Health and safety precautions ⚙️
	Use of re-shaped blade pieces with other materials	– Performance improvement – Material weight reduction	– Identification of effective glue for joining different materials ⚙️
Recycle	Particle board with crushed materials	– Increase in particle board strength	– Difficult to recycle particle board due to the complexity of composite materials ⚙️ – Difficult to mix blades crushed into powder with original particle board ⚙️
	Wall paint improvement for wood protection	– Increase in paint stability and protecting effect	– Extra processing requirements to ensure the homogeneity of dust ⚙️ – Difficult to document chemical composition ✓
Recovery	Fibers as fillers in concrete/cement	– Thermal decomposition for energy generation	– Highly specialized processing requirements ⌚ ⌚
	Fibers as fuels	– Pure fibers without resin and inorganic leftover – Selective cleavage of specific bonds	
Conversion	Conversion of blades into oil with high calorific value		– High processing requirements ⚙️

The study concludes that secondary applications that make use of the composite materials have a higher value (reuse/repurpose/reshape) as the strength and properties of wind turbine blades are obtained, whereas environmental and economic impacts are minimized.

However, the need for open information on the conditions of material used and the most advanced design requirements, as well as the diverse sizes, compositions and conditions of blades have imposed constraints on the standardization of secondary applications. Although the volume of end-of-life blades is expected to be stable and available worldwide, the wide variety of blades has, indeed, become another barrier for economies of scale to occur. The study also makes a special note on the problem regarding documentation of chemicals, which may still need to be addressed for all applications in the circular economy.

The findings shed light on the importance and potential of business partnerships – collaboration between product design and technologies in particular – and regulations for secondary markets

afterlife and upstream suppliers including design and materials selection of blades. In this regard, local governments can play a supporting role in connecting and facilitating dialogues between industries.



ICLEI CIRCULAR WORKS UPDATE

ICLEI and Turku released the report *Circular Turku: A blueprint for local governments to kick start the circular economy transition*, to showcase how the circular economy can support ambitious climate actions through concrete pathways that other local governments can replicate. The report also offers a deep-dive into pioneering circular economy practices from the Coalition 6 thematic areas, and provides valuable and practice-oriented insights into the governance model and participation mechanisms needed to make the circular transition happen.

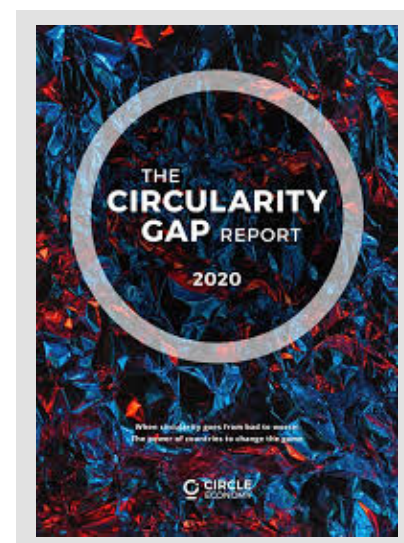


PARTNERS NEWS

Cities and municipalities need cases and examples as a guidance to learn from each other and pave the way towards the circular transition. The Ellen MacArthur Foundation has completed **more than 20 policy case studies from cities** around the world, with a particular focus on large and megacities which are often considered as a challenge for transition due to their dynamic and huge population. The case studies cover a wide range of sectors – from transportation to building – and measurements, which can serve as a virtual library for local governments to obtain relevant knowledge and information.



Circle Economy launched the **Circularity Gap Report 2020** during The World Economic Forum's Annual Meeting in Davos. The report highlights the world is currently only 8.6% circular and the trend is negative. It also shows how local and regional governments can and should make high-impact choices to improve the circularity of their economies.



The Green Circular Cities Coalition is a peer-to-peer exchange platform to facilitate accelerating circular development in Europe and East Asia. Operated by the ICLEI East Asia Secretariat, with strong support from the ICLEI World and European Secretariat, and the Japan Office, the Coalition has received endorsement from 6 cities and a number of knowledge partners, including Circle Economy, the Ellen MacArthur Foundation, TORMA, etc.

The Coalition is open to any local and subnational governments, and partners committed to empowering and accelerating transitions towards a sustainable and circular future. For more information, please contact

Ms. Yvonne Yang at yun.yang@iclei.org or Mr. Merlin Lao at merlin.lao@iclei.org.