

Japan

Achieving Net Zero Cities by 2050

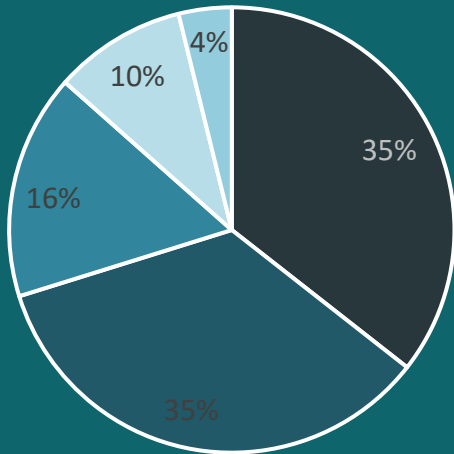
Cities must achieve net zero emissions if we are to limit global temperature rise. Around the world, city leaders are exploring initiatives to raise awareness and engagement in meeting this goal by 2050.

In October 2020, Prime Minister Suga announced during his first policy address to the National Diet that Japan would emit net zero emissions by 2050. **Currently, 749 Japanese Local Authorities have declared an ambition to reach net zero carbon emissions by 2050 (As of June 2022).**

It can be difficult to overcome organizational silos between areas of government and create effective collaboration with businesses and communities. This brochure introduces successful initiatives which have increased actor collaboration in two ICLEI member cities in Japan; Musashino City in the Tokyo Metropolitan area, and Toyota City.



Nationwide Emissions (2017)



■ Power ■ Industry ■ Transport
■ Buildings ■ Agriculture

National Emissions Reduction Targets

Net zero
announcement:
October 2020



Interim target:
-46% from 2013 levels
by 2030



Net zero: 2050

National Context

Japan is the sixth largest GHG emitter in the world. Under Japan's Act on the Promotion of Global Warming Countermeasures, all prefectures and municipalities formulate and implement measures, which account for local natural and social conditions, to reduce their emissions. After support from the Ministry of Environment in 2018, an increasing number of local governments have announced that they will work towards real zero carbon emissions* by 2050.

Priority Areas in Japan

Japan's Ministry of Economy, Trade and Industry (METI) published the "Green Growth Strategy Through Achieving Carbon Neutrality in 2050" on 18 June 2021.

The report identifies 14 key growth areas and industries that will grow during decarbonisation:

Energy

- Offshore wind power, solar power, geothermal power
- Hydrogen and fuel ammonia
- Next-generation thermal energy
- Nuclear power

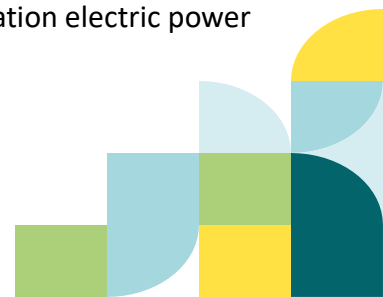
Transport/ Manufacturing

- Automobiles and storage batteries
- Semiconductors and information technology
- Marine vessels
- Physical distribution, flows of people, and civil engineering infrastructure
- Foods, agriculture, forestry and fisheries
- Aircraft
- Carbon recycling, materials

Home/Office

- Housing, structures, and next-generation electric power management
- Resource recycling
- Lifestyles

*Real zero emissions:
achieving equilibrium between emissions
from anthropogenic sources of
greenhouse gases such as CO₂ and its
removal through sinks such as forests.



Musashino City

Musashino City is located almost in the center of Tokyo and has been rated highly in various surveys as a desirable place to live as an attractive city with abundant greenery. Musashino City has declared its goal of becoming a "Zero Carbon City by 2050," aiming to achieve virtually zero greenhouse gas emissions by FY2050.

Greenhouse gas emissions


Approximately 90% of Musashino's greenhouse gas emissions are carbon dioxide, of which carbon dioxide from energy use in the residential and business sectors accounts for 84% of the total. Emissions are on a downward trend, and in FY 2018, the City's greenhouse gas emissions were approximately 588,000 t-co₂, a 10.4% decrease from FY 2013, the base year.

Musashino City Global Warming Prevention Action Plan (Area Policy Section)

Baseline year 2013

The pathway toward virtually zero greenhouse gas emissions: 53% reduction by FY2030, achieving virtually zero greenhouse gas emissions by FY2050

In April 2021, Musashino City established the Musashino City Global Warming Prevention Action Plan 2021 (Area Policy Section) based on the Act on Promotion of Global Warming Countermeasures, which sets targets for reducing greenhouse gas emissions in the city area and outlines measures to achieve these targets. In addition, Musashino City Climate Change Adaptation Plan 2021 was formulated in accordance with the Climate Change Adaptation Act. In line with the October 2021 revision of the national plan for Global Warming Countermeasures, the greenhouse gas reduction targets in the Musashino City Global Warming Prevention Action Plan 2021 (Area Policies) were revised upward in 2022. This plan is formulated as a comprehensive plan to promote the control of greenhouse gas emissions in accordance with the natural and social conditions of the region, based on Article 19, Paragraph 2 of the 'Act on Promotion of Global Warming Countermeasures'. It is also a plan that the 'Musashino City Long-Term Plan' is the upper plan and one of the plans that the 'Musashino City Environmental Basic Plan' deals with across the board.



Population: 147,975 (City Statistics 2021)
Population Density: 13,477 (City Statistics 2021)
City Area: 10.98km²

Within Greater Tokyo



Musashino City aims to realize and achieve the "Ideal City Image" and "Reduction Targets" in the plan by promoting the following three basic policies.

Policy 1: Raise awareness and knowledge of citizens, businesses, and city employees

The city will promote environmental awareness programs, etc., using the environmental awareness facility "Musashino Eco Re-sort" as a base.

Policy 2: Efficient Energy Use in the Community

In the business sector, the promotion of zero-energy buildings, building energy management, and the Green Partner Program (green procurement). In the residential sector, the promotion of zero-energy homes, home energy management systems, and V2H, which encourage energy efficient behavior.

Policy 3: Global warming countermeasures outside the energy field

Recycling of waste and resources, conservation and creation of greenery, traffic and vehicle measures, etc.

Efforts in the Refuse Field

Carbon dioxide from waste incineration accounts for 1.7% of all greenhouse gas emissions in the city. Musashino City has also set a goal of reducing carbon dioxide emissions from the incineration of waste plastics by 15%, in response to the government's global warming prevention plan which calls for a 15% reduction of carbon dioxide emissions from non-energy sources by 2030. Musashino City's population is growing, and behavioral changes are essential to reduce the amount of waste per capita.

Musashino Clean Center

The Musashino Clean Center is a waste treatment facility open to the community, designed in consideration of townscape and landscape creation and located in the urban area of Musashino City. Visitors are free to tour the visitor corridor during the hours the facility is open. The visitor corridor is laid out so that it circles the second floor, providing visitors with a realistic view of the waste treatment process through big glass panels. The 'Garbage Pit Bar', where visitors can enjoy eating and drinking while watching the garbage disposal process, received the Encouragement Award of the 13th Industrial Tourism Town Development Awards (sponsored by the National Industrial Tourism Promotion Council and the Japan Travel and Tourism Association).

Energy Production

The Clean Center uses steam and heat from waste incineration to generate electricity, which is then supplied to nearby public facilities. This project was funded by the Ministry of the Environment's 'Subsidy for Carbon Dioxide Emission Reduction Project: Regional Low-Carbon Model Project Using Residual Heat from Waste Incineration Facilities (Feasibility Study)'.

Thus, the Musashino Clean Center serves not only as a waste treatment facility, but also as a place for learning about waste and as a center for energy production.



Forest Projects

Tama Region Forest Protection

Musashino City is enhancing its forest improvement projects with an eye toward carbon offsets. The city of Musashino is home to the Tamagawa-Josui (water supply) and other waterways. This Tamagawa-Josui is fed by water taken from the Tama River. The Bureau of Waterworks of the Tokyo Metropolitan Government has been managing the forests in the upper reaches of the Tama River as water source forests since 1901 in order to ensure a stable river flow of the Tama River and to preserve Okutama Lake.

In this water source area of the Tama River, planted trees have been devoured by deer, leaving the mountainous area bare and facing the danger of soil runoff. Funded by the national forest environment concession tax ,* the city is promoting a forest improvement project. Since 2001, Musashino City has concluded an agreement with Ome City's Futamatao Forest in the upper reaches of the Tama River to preserve and utilize a portion of the forest in the Futamatao area as the `Futamatao Musashino Shimin-no Mori (Musashino Citizen's Forest) '. Since 2004, the city has been working with the town of Okutama on the `Okutama-Musashino Forest Project' to restore forests that had become bare due to deer damage, and a certain degree of recovery has been achieved. The forests of Okutama play a very important role as a place for recreation for urban residents and as a valuable water source for the urban area.

Musashino City has formulated the `Musashino City Policy for Promotion of Utilization of Tama Timber in Public Structures, etc.' to actively promote the use of Tama timber in public structures, etc. in order to promote forest circulation, proper care of forests, promotion of forestry, and revitalization of the timber industry, etc. Tama timber is also used in the facilities of the Musashino Clean Center. Musashino City is working on projects to preserve Tama's forests based on the idea that `forest degradation is not only a problem of the mountain side, but also the urban residents who receive the blessings of the forests need to deepen their awareness and raise their interest' in the issue. At the Futamatao Musashino Shimin-no Mori (Musashino Citizen's Forest), educational activities to learn about forest conservation are conducted, bringing urban residents and local residents together. In FY 2008, the project was recognized by the Ministry of the Environment as an outstanding example of an environmental education project.

**This is a national tax instituted in 2019 (to take effect in 2024) to improve forests and promote the use of domestic timber in urban areas, and is an annual tax of 1,000 yen per resident. The money is used to protect forested areas. Musashino City is taking a regional approach to enhancing the metropolitan area's carbon sink..*



Toyota City

Toyota City is a manufacturing hub and a green city. It is divided into urban and mountainous countryside. 70% of the area of Toyota City is forested. The city has been tackling environmental issues from early on.

In 2009, the city was designated as an Environmental Model City and in 2018 it was selected by the national government as one of the SDG's Future Cities.

Greenhouse gas emissions

By 2019, the city had been reducing emissions by approximately 20% compared to 2013. While national CO2 emissions from the industrial sector account for about 30% of the total, **it accounts for about 60% in the city.**

Urban Decarbonisation Plans

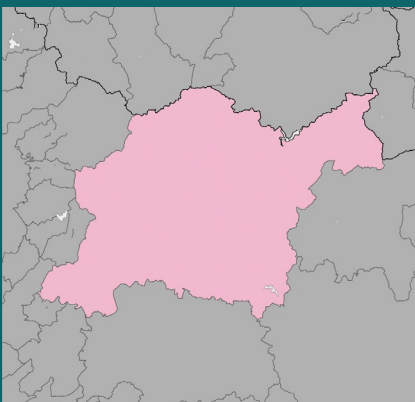
The city has published its decarbonisation plan in its 8th Comprehensive Plan and the Global Warming Prevention Action Plan.

Announced Net zero
ambition: November
2019

Net zero: 2050

Population: 418,284 (2022)
Population Density: 456per km²
City Area: 918.32km²
City type: A city with two sides:
urban and mountain village

Toyota City



The following three initiatives have been set by the city as the direction of the efforts to achieve 'CO2 virtually zero emissions by 2050'.

The first is to further accelerate the initiatives of the Environmental Model Cities that have been undertaken so far, such as the net Zero Energy House, the spread of Smart Towns, and the improvement of the health of planted forests.

The second is to involve businesses and citizens as much as possible, mainly through the three platforms of the 'Toyota City Connected Society Demonstration Promotion Council', 'Oiden-Sanson Center', and 'Toyota SDGs Partners', and to strengthen cooperation ever further than before.

Third, we believe that future 'dramatic technological innovation' will hold the key to achieving zero CO2 emissions, and we must take the lead in introducing new technologies.



Toyota Zero Carbon Bank

In June 2021, the Toyota Zero Carbon Bank was registered under Japan's J Credit system. J credits are a system that allow companies and local governments to buy and sell carbon credits for the installation of energy-saving and renewable energy equipment and forest management initiatives.

The Toyota Zero Carbon Bank is the global warming countermeasure project for citizens who have installed household fuel cell systems (ENE-FARM) whereby CO₂ emission reductions are calculated from the amount of electricity generated by the fuel cells in each household and compiled by Toyota City and converted into environmental value (credits) using the national credit system. The ENE Farm is a system that uses city gas to generate electricity and simultaneously supply hot water to each household.

The way the project works is that, firstly, citizens transfer the rights of J-credits to the city in exchange for the city's subsidy scheme for ENE-FARM. Next, the ENE-FARM manufacturer reports the aggregated ENE-FARM power generation results to the city using IoT technology. The city then applies for J credits from the government. These are sold to companies in the city and the proceeds are used for projects that contribute to the reduction of CO₂ emissions in the city.

The scheme has connected different stakeholders in the city and enabling residents and the private sector to benefit. Through the Toyota Zero Carbon Bank, Toyota City has created a model whereby the environmental value of CO₂ reduction is circulated in the region.



*Toyota City is incentivizing both residents and businesses
through the Toyota Zero Carbon Bank*

Technological Innovation Collaboration with business

Toyota City has developed a good working relationship with business actors in the city. The city wants to be a test bed for new technologies which help society move towards a decarbonized society.

Demonstrations of new technologies are being conducted mainly through the activities of the **Toyota City Connected Society Demonstration Promotion Council**, which is actively using AI and IoT to solve local issues. The council has 89 registered members (as of March 2022). In addition to achieving net zero carbon through the local production for local consumption of resources and energy, the Council is also looking at addressing the challenges of an ageing society and road safety issues. The technologies are introduced at the 'Toyota Ecoful Town' an SDGs dissemination center.

The '**Monozukuri (Manufacturing) Creative Base SENTAN**' in Toyota City, provides comprehensive support for 'new business development, 'innovation creation' and 'human resource development in manufacturing sector'. The Monozukuri Creative Base SENTAN brings together three support organizations: 'Toyota Innovation Center', 'Toyota City Next Generation Industry Division', and 'Toyota City Monozukuri Support Center'. It provides business and product development support, engineering education programs, and subsidies to business.

In 2019, technology to extract hydrogen from magnesium was developed as part of a human resources development project and patented by Toyota City as a method of hydrogen production that does not emit carbon dioxide.





Achieving Net Zero Cities by 2050

Each city will reach net zero carbon differently. Though cities can learn from each other, they must find solutions that fit with the local context. Both Musashino and Toyota City are building on their strengths and successes as they develop their decarbonisation pathways.

Importantly, the councils are maintaining and strengthening the working relationships they developed through previous environmental initiatives. For Musashino City, this is the history of citizen participation in the area. For Toyota, the council is supporting the business sector to find new opportunities for technological innovation.



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