CITY CASE STUDY

COUNTRY	CITY	POPULATION	EMISSIONS REDUCTION TARGET	CO_2 EMISSIONS FROM TRANSPORT IN 2018
JAPAN	TOKYO	14,000,000	-50% GHGs FROM TRANSPORT BY 2030 (BASE 2000); NET ZERO BY 2050	9.64 $MtCO_2$

Hydrogen fuels the flame of the Tokyo Olympic Games

In 2017, Japan was one of the first countries to adopt a national hydrogen strategy in which mobility is the core concept. In two years, the government has doubled its investment in hydrogen research and development to $300 million. Japan has set a target of putting 320 hydrogen stations and 200,000 fuel-cell electric vehicles (FCEVs)[a] into operation by 2025. As of 2020, 116 hydrogen stations were already operational across Japan.

Japan's national 'hydrogen economy' project

In Tokyo, mobility accounts for 17% of total CO_2 emissions, 80% of which is from road transport. Transport emissions in Tokyo have already decreased by 45% between 2000 and 2018. As part of its Zero Emission Strategy, the Tokyo Metropolitan Government (TGM) wants to establish 150 hydrogen stations by 2030. To this end, it has established the Research Centre for a Hydrogen Energy-Based Society (ReHES) at Tokyo Metropolitan University, which brings together multi-sectoral researchers to develop a hydrogen-based society. In 2020, the Fukushima Hydrogen Energy Research Field (FH2R) launched the world's largest green hydrogen[b] production project. A collaboration between the New Energy and Industrial Technology Development Organization (NEDO) and Toshiba Energy Systems & Solutions Corporation, Tohoku Electric Power and Iwatani, the 10 MW project uses 20 MW of solar power generation capacity on a 180,000 square meter site. The project was partly used to supply energy for the Olympic Games this year, and is expected to generate 200 tonnes of green hydrogen each year.

The 2021 Olympics as the start of a "hydrogen society"

The 2020 Summer Olympic and Paralympic Games Organising Committee has set itself the goal of supplying the Games with 100% renewable electricity, and of having them contribute to the creation of a "hydrogen economy" in the long term. The TMG has therefore set up a ¥40 bn (~$360 mn) fund to support efforts leading up to the Games. As an official partner of the Games and the world leader in FCEVs, Toyota has provided a fleet of 500 Mirai models, identical to the one used at the International Olympic Committee's headquarters in Switzerland, to help transport staff between the different parts of the Olympic site. To fuel these vehicles, the TMG has set up 35 hydrogen stations around the city. Some of the Olympic flames and cauldrons were co-combusting with the hydrogen and propane normally used. During the Olympics, hydrogen produced in the FH2R is also used to power the Relaxation House; after the Games, the village is to be transformed into a hydrogen-powered mini-community, including flats, a school and shops.

However, despite the efforts made, the Olympic Games, which were initially intended to demonstrate the potential of hydrogen, highlighted the fragility of this energy, whose initial investment costs remain high. Of the 100 Sora buses (with a capacity of 79 passengers) that were supposed to transfer athletes and visitors, only a few were able to be put into service, and on shorter routes than those originally planned. This is because installing a hydrogen refuelling station costs about five times as much as a conventional refuelling station, while a fuel cell bus as supplied by Toyota costs four to five times as much as a diesel bus and has a much shorter lifespan. Reducing costs to increase the competitiveness of hydrogen remains a major challenge at the moment and Japan is trying to stimulate interstate cooperation to create an international supply chain.

a Mobility is said to be "clean": in the fuel cell, hydrogen reacts with oxygen to produce a stream of electricity, releasing only water as a waste product.

b Produced by electrolysis using renewable energy .

CO_2 EMISSIONS PER SECTEUR IN TOKYO IN 2018

Source : Tokyo Metropolitan Government, 2021