Notes de l'Ifri
Asie.Visions 86

The Role of Sub-National Actors in Climate Change Policy

The Case of Tokyo

Hitomi ROPPONGI

June 2016

ifri Center for Asian Studies

The Institut français des relations internationales (Ifri) is a research center and a forum for debate on major international political and economic issues. Headed by Thierry de Montbrial since its founding in 1979, Ifri is a non-governmental and a non-profit organization.

As an independent think tank, Ifri sets its own research agenda, publishing its findings regularly for a global audience. Using an interdisciplinary approach, Ifri brings together political and economic decision-makers, researchers and internationally renowned experts to animate its debate and research activities.

With offices in Paris and Brussels, Ifri stands out as one of the rare French think tanks to have positioned itself at the very heart of European debate.

ISBN: 978-2-36567-581-9

How to quote this document:

Hitomi Roppongi, "The Role of Sub-National Actors in Climate Change Policy: the Case of Tokyo", *Asie.Visions,* No.86, June 2016.

Ifri

27 rue de la Procession 75740 Paris Cedex 15 – FRANCE

Tel.: +33 (0)1 40 61 60 00 – Fax : +33 (0)1 40 61 60 60

Email: accueil@ifri.org

Ifri-Bruxelles

Rue Marie-Thérèse, 21 1000 – Bruxelles – BELGIQUE

Tel.: +32 (0)2 238 51 10 – Fax : +32 (0)2 238 51 15

Email: bruxelles@ifri.org

Website: Ifri.org

Author

Hitomi Roppongi has been researching on various themes of environmental governance ever since she developed an interest in urban sustainability during her master's programme at the United Nations University. Her degree-related fieldworks on urban wetland biodiversity and internship experience in an urban co-benefit project taught her the relevance of governance process, which led her thesis to focus on the policy process in studying the Tokyo's cap-and-trade scheme designed for business facilities. This research resulted in her most recent publication in the journal *Climate Policy*. Her work in the 2015-16Visiting Ifri Fellow - VIF Programme was built onto this study and she hopes to further examine the future potential of policy learning in her doctorate programme. She is now based in London and preparing her PhD in Planning Studies at the Bartlett School of Planning, University College London.

Abstract

Tokyo is known as a pioneer throughout the history of Japan's environmental policy, often being compared to California in the United States or Paris in France. Following the global trend of growing local initiatives tackling climate change, Tokyo introduced a cap-and-trade scheme in 2010 ahead of a national implementation. The Tokyo Cap-and-Trade Program is the first of its kind that regulates CO_2 emissions from all business sectors, where energy consumers are defined in terms of the business establishments they own. Tokyo's initiative is largely seen as a reaction to the modest national commitment, following the tradition of center-local rivalry.

This study first explains the centre-local relationship in the history of Japan's environmental governance. It then analyzes the development of the Tokyo's flagship climate policy and its implications for national and other sub-national governments in Japan. The tactics used by the Tokyo Metropolitan Government to overcome business opposition typically seen in the introduction of GHG control, and future policy challenges are also discussed. The study finds that Tokyo's policy encourages behavioral changes and technological improvement in the business sector, going a step beyond the existing culture of energy conservation in Japan. An emission trading scheme is often associated with the collapse of carbon markets and the "money game", rather than a practical tool to reduce CO_2 emissions, but the Tokyo Cap-and-Trade Program has demonstrated a policy impact that recasts such an image. A known case of policy diffusion to Saitama prefecture, an immediate neighbor of Tokyo with the fifth largest population in Japan, is also discussed to elaborate on the potential domestic diffusion of the policy.

Table of contents

Introduction

While prominent global climate-related agreements are made by national governments, it has been widely recognized that the actual implementation of policies and operation of actions rely on the capacity of sub-national governments. The *de facto* implementation of international and national policies at the sub-national level is one of the key arguments in support of local initiatives in climate change mitigation policies. Local governments are also known to be closer to their constituencies and more flexible in implementing new policies. Therefore, local government as opposed to central government is increasingly being seen as a suitable agent to drive the results of climate change mitigation measures.

Today, 54% of the world's population lives in urban areas, consuming more than two-thirds of the world's energy and accounting for more than 70% of GHG emissions.[1] The magnitude of GHG emissions attributed to cities is unprecedented, and the roles they play in climate change are now well recognized. As a response, local initiatives and a global network of cities tackling climate change have been growing. Following the trend, Tokyo introduced a cap-and-trade scheme in 2010, while the national government has commited itself to "carefully examine" official implementation of a national cap-and-trade scheme. The Tokyo Cap-and-Trade Program is the first of its kind that regulates CO_2 emissions from all business sectors, where energy consumers are defined in terms of the business establishments they own.[2] Lessons had been drawn from the existing national frameworks to design Tokyo's policy, which works effectively with domestic dissemination, as seen in the implementation by Saitama, the fifth largest prefecture in Japan, of a voluntary cap-and-trade scheme in 2011.

Tokyo is known as a pioneer throughout the history of Japan's environmental policy, often being compared to California in the United States or Paris in France. Tokyo's introduction of a mandatory CO_2 emission cap and a local emissions trading scheme (ETS) is, therefore, largely seen as a reaction to the modest national commitment, following the tradition of center-local rivalry. The high reduction achievement of

1. UNDESA Population Division (2014).
2. Actors subject to mandatory emission reduction are called large business facilities, which consume energy of more than 1,500kl in crude-oil equivalent.

23% compared to the base year[3] emissions attracted further attention. To what extent Tokyo's experience could contribute to the growing local development and influence national policy is of interest to policymakers and implementers involved in climate change mitigation. The purpose of this policy paper is to analyze the recent development of Tokyo's climate policy and its implications for national and other sub-national governments in Japan. In this, historical development in Japan's environmental policy is first explained (Section 2) in order to set the institutional context for the Tokyo Cap-and-Trade Program. Section 3 discusses Tokyo's leadership in climate policy, with a particular focus on their flagship policy, the Tokyo Cap-and-Trade Program. Its relation to the broader national climate framework and how Tokyo overcame the policy challenges are also discussed. Section 4 examines the implications that Tokyo's experience has for national and sub-national policies in Japan.

3. Base-year emission is chosen according to the regulated facilities. See Section 3 for details.

Institutional background of Tokyo's climate policy

Sub-national autonomy in Japan's public administration

Local governments in Japan are classified into two-tiered sub-national entities, with prefectures at the top followed by municipalities (cities, wards, towns and villages). Tokyo is one of the 47 prefectures in Japan, consisting of 23 special wards, 26 cities, five towns and eight villages.[4] The history of Tokyo differs from the rest of Japan, because of its unique position as the country's capital during rapid growth and its pursuit of autonomy. Tokyo originally started as 15 wards in 1878, and then experienced rapid expansion, incorporating a further 20 wards by 1932.[5] After decades of struggle for local autonomy, the metropolitan Tokyo we see now was formed when the Local Autonomy Law was enacted in 1947 (effective 1949). The special treatment given to the 23 special wards is a legacy of the 35 wards that led the history of Tokyo as a metropolis.[6]

Under the Constitution and the Local Autonomy Law of 1949, local governments have the autonomy to manage and administer local affairs independently from the national government, and enact regulations within the confines of the law. Any local specific law cannot be legislated by the Diet without the consent of the majority of voters in the local entity. In reality, many administrative functions were imposed on local governments by the national government before the Local Autonomy Law was revised in 1999. Since this revision took effect in April 2000, the hierarchical order between local and national governments changed to a more "equal and cooperative relationship". This means that the top-down imposition by the national government was reduced, and local governments were able to make independent decisions and allocate more resources to their own local administrative tasks.[7]

4. As of January 1, 2016 (TMG, 2016).
5. A total of 35 wards were consolidated into 23 wards in 1947, at the time the Local Autonomy Law was enacted.
6. Tokyo Metropolitan Archives (n.d.).
7. Hayashi & Ishida (2003).

In practice, local governments are given more public administration-related functions than the national government, and most local activities are governed by national laws.[8] In the context of climate policy, the overall framework is stipulated under the two national laws,[9] and sub-national governments are responsible for its implementation. The draft outline of Japan's Climate Change Plan sets out that the main role of sub-national governments in climate change mitigation is as follows: promotion of measures appropriate to the social and natural conditions in the locality; implementation of measures relevant to one's own administrative duties and operations; and facilitation of activities by local business operators and citizens. This is distinguished from the national government's continued role to lead comprehensive mitigation measures, enhance international cooperation and monitor the concentration of GHGs.[10] The following sub-section outlines the role that sub-national governments played in the historical development of Japan's environmental governance.

The center-local relationship in the history of Japan's environmental governance

By the mid 20th century, postwar economic recovery and rapid expansion had brought severe industrial pollution. Environmental measures largely favored the industrial interest, as economic development was the top national priority at the time.[11] In spite of growing grievances about the exacerbation of industrial pollution, it was challenging to push forward strict controls. In the rapidly growing cities, public discontent about the severe industrial pollution led to a series of anti-pollution demonstrations, particularly in the country's capital. The beginning of official environmental control in Japan dates back to as early as 1949, when the Tokyo Factory Pollution Prevention Ordinance was enacted as a response to growing public concern. It regulated the construction locations of factories through a permission scheme, and business owners were required to install the facilities necessary to reduce pollution "in case there is a danger of industrial pollution" (Article 12). Although this ordinance pioneered environmental governance in Japan, there was no numerical control of gas emissions at this stage. In addition, administrative penalties and criminal sanctions were stipulated in the ordinance, but in practice the conditions and rules to be obeyed were not clearly defined, and there was

8. Ministry of Internal Affairs and Communications: MIC (2009a).
9. See Section 2.3 for more detail.
10. MOEJ (2015a).
11. Speedy economic development was one of the key pillars of the Yoshida Doctrine. Environmental issues were therefore less of a national priority.

no adequate administrative capacity to carry out monitoring, including on-site inspections.

Following Tokyo's action, prefectural governments such as Osaka, Kanagawa and Fukuoka implemented their own pollution prevention measures. Conceptual evolution was seen in the Kanagawa Workplace Pollution Prevention Ordinance (1951), which stipulated the aim of balancing industrial development and citizens' welfare (Article 1). This so-called harmonization clause was later incorporated into the Basic Law for Environmental Pollution (1967) at the national level. Such advancement in local pollution control was possible due to public unrest and continuous anti-pollution campaigns by citizens. Some local governments signed agreements with local business to enforce pollution-reduction measures as well. In remote municipalities where public debate was relatively weaker and victims of severe industrial pollution were isolated, the conflict escalated into lawsuits, as exemplified by four major industrial pollution cases.[12]

By 1967, 18 prefectures had implemented their own anti-pollution ordinances, which continued to grow in number until all 47 prefectures followed suit in 1971. Most notable among these was the Tokyo Metropolitan Pollution Prevention Ordinance of 1969, which implemented a permission scheme and location control for factory installation, and standards for fuel use and factories that were more stringent than the national law. Tokyo's emission control was defined in terms of total emission amount rather than concentration, as in the national law. This ordinance also showed a stand against the pro-industry mentality by including the harmonization clause. The legal implications of Tokyo's progressive ordinance for national law was discussed in the so-called "Pollution Diet" of 1970 (64th Extraordinary Diet Session). In this session, the legitimacy of sub-national measures that surpass national control was recognized. This marked an important step forward in Japan's history of environmental governance, especially since the harmonization clause by then had been removed from the Basic Law for Environmental Pollution. Tokyo's legislation became a model for development in sub-national pollution control thereafter, and sub-national developments paved the way to anti-pollution legislation in Japan.[13]

12. The four big industrial pollution cases were: Minamata Disease in Kumamoto (occurred 1956, lawsuit filed in 1969), second Minamata Disease in Niigata (occurred 1964, lawsuit filed in 1967), Yokkaichi Asthma (occurred 1960s-1972, lawsuit filed in 1967) and Itai-itai Disease (occurred 1910s-1970s, lawsuit filed in 1968). The courts ruled in favor of the plaintiffs, and the industrial sector's responsibility for pollution was clarified (Yoshimura, 1998).
13. Kitamura (2015), Yoshimura (1998).

The center-local friction in environmental governance did not end here. By the 1970s, implementation of the environmental impact assessment (EIA) became an important agenda in Japan, but enactment of a national law was faced with strong opposition from pro-development industries and ministries. As a response to this, in 1976 an EIA Ordinance was enacted in Kawasaki city, followed by prefectural introductions in 1978 (Hokkaido) and 1980 (Kanagawa and Tokyo). Again, local implementation preceded the national legislation by more than a decade (EIA Law, 1997). It is no exaggeration to say that Japan's environmental governance has been driven by local actions stimulating national policy.

Climate change mitigation has become a national agenda in Japan following the Rio Earth Summit in 1992, and particularly after the adoption of the Kyoto Protocol in 1997. The Ministry of the Environment, Japan (MOEJ) and the Ministry of Economy, Trade and Industry (METI) have become the ministries in charge. Legislation dedicated to climate change mitigation was first implemented at the national level in 1998, as necessitated by the international agreement.

Two pillars of the national climate framework

At the national level, Japan takes a demand-side approach to climate change mitigation, and requires the reporting and sharing of emissions information by energy consumers and GHG emitters so as to encourage voluntary reduction. The national framework is defined by two key national pieces of legislations: the Law on the Rational Use of Energy (Energy Conservation Act) of 1979 and the Law on the Promotion of Global Warming Countermeasures (Global Warming Act) of 1998. The former, a response to the oil shock in 1979, sought to facilitate effective and rational use of energy in accordance with the socio-economic environment of energy resources. The amount of fuel, heat and electricity used is regulated according to the type of business or industry.[14] The Global Warming Act is the first legal framework aiming solely to reduce GHG emissions in Japan as a means to tackle global warming. The international framework under the Kyoto Protocol was the main driver leading to its enactment in 1998. The emission of seven types of GHG (CO_2, CH_4, N_2O, HFC, PFC, SF_6 and NF_6) is subject to regulation under this law.[15]

14. Regulated entities are categorized as factories and commercial facilities, transportation, housing and architectural structures, and manufacturers and importers of energy-consuming machine appliances.

15. NF6 was added after the 2013 revision of the Global Warming Act (MOEJ, 2013a).

Reporting is the key obligation under the national climate framework; no reduction targets of energy use or gas emissions are set out in these pieces of legislations. Under the Energy Conservation Act, annual reports on energy use and mid- to long-term plans to rationalize energy use are submitted directly by regulated facilities to the Energy Agency of the METI and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). As for the Global Warming Act, sub-national governments are tasked to set their own implementation plans for global warming countermeasures in their area. The framework is overseen by the MOEJ and the METI, and regulated facilities must submit annual emission reports to them. The MOEJ analyzes the state of sub-national implementation annually, and discloses the results on its website.[16]

The framework under the Global Warming Act involves annual emission reporting to the national government, and local implementation of reporting schemes, whereby regulated facilities submit annual emission reduction plans to sub-national governments. In spite of the dedicated climate legislation, Japan's total emissions of GHGs exceeded the 1990 levels[17] and displayed no signs of reduction during the late 1990s and early 2000s. For the purpose of enhancing national development, the Japan Voluntary Emission Trading Scheme (JVETS) started as a trial scheme in 2005. Its official implementation was continually discussed in ministries and reviewed at the Central Environmental Council, but the trial scheme ended in March 2012[18] (see Section 4.4 for details).

16. MOEJ (2015b).
17. National Institute for Environmental Studies (2015).
18. MOEJ (2012a, 2013b).

Tokyo's leadership in climate policy

Tokyo is one of the largest megacities in the world; its estimated day population amounts to as much as 15.6 million. More than 30% of domestic goods and services are sold in Tokyo, and its prefectural domestic product accounts for approximately 20% of Japan's GDP, which is bigger than the GDP of Holland.[19]

Among the 47 prefectures in Japan, Tokyo is the third smallest (0.6% of the national land area), but 11.5% of domestic business establishments are located in Tokyo. Owing to the concentration of economic activities, Tokyo's annual CO_2 emissions (65.8 million t-CO_{2e}) is about 5.1% of national emissions (1.28 billion t-CO_{2e}), equivalent to Austria's annual emissions.[20] The commercial sector has the largest emissions in Tokyo, followed by housing, transport, and industry (40.5%, 32.4%, 18.5% and 8.5% respectively). CO_2 emissions from Tokyo's industrial sector are nearly a quarter (national: 33%) of the national average, while the commercial sector's emissions are nearly twice the national level (national: 21%). The commercial and industrial sectors combined are responsible for nearly half of the CO_2 emissions in Tokyo.[21]

Tokyo's Basic Environmental Plan of 2008 sets out a goal to reduce GHG emissions by 25% by 2020, compared to the 2000 level. On top of this overall target, two new energy efficiency goals were added in 2014: to reduce energy consumption by 20% by 2020, and by 30% by 2030 (compared to the 2000 level). These additional goals are a response to rising CO_2 emissions; the increase makes it difficult for energy consumers to understand the impact of their own reduction efforts on CO_2 emissions.[22] Tokyo has come up with various voluntary measures to achieve the goals, including guidance on behavioral and technological changes in workplaces

19. TMG Bureau of Industrial and Labor Affairs (2015); TMG Statistics Division Bureau of General Affairs (2014, 2016).
20. TMG Bureau of Environment (2015a).
21. TMG (2015a); TMG Bureau of Environment (2015a).
22. The emission factor was 0.378 in 2010, which increased to 0.519 by 2012. Tokyo's total energy consumption reduced by 16% between 2000 and 2012 (13% reduction in CO2 using 2000 emission factor), but calculation of CO2 emission using the variable emission factor is equivalent to a 12% increase (TMG Bureau of Environment, 2015b).

and homes, energy efficiency labeling of building establishments, labeling of low-pollution vehicles, and promotion of recycling.[23] Most notably, the Tokyo Metropolitan Government (TMG) implemented the world's first mandatory cap-and-trade program at the sub-national level in 2010,[24] and it has become Tokyo's flagship policy for climate change mitigation.

Tokyo Cap-and-Trade Program: mandatory capping and a local ETS

The Tokyo Cap-and-Trade Program is the first urban cap-and-trade scheme targeting business establishments, which differs from the conventional sector-based approach to emission capping. The introduction of the mandatory emission capping and a local ETS ahead of the state attracted the world's attention, especially in the face of gridlock at the national level. More importantly, the acceptance by the business sector of an obligatory scheme to reduce CO_2 emissions has stirred the interest of both scholars and practitioners of climate policy. This sub-section outlines the key components of the cap-and-trade scheme, including a comparison with the EU ETS.

Regulated subjects

Under the Tokyo Cap-and-Trade Program, energy consumers that consume energy of more than 1,500kL crude-oil equivalent are termed "large business facilities". Their key obligations are the annual submission of a GHG Emissions Reduction Plan, improvement of organizational structure, setting ambitious reduction targets, and appointment of a general manager and a technical manager dedicated to energy conservation. If a facility fulfills the large business criteria for three consecutive years, it is obliged to reduce total CO_2 emissions by the assigned compliance factor (see Section 3.1.2 for details). Such facilities with reduction obligations are also known as "compliance facilities".

Energy-derived CO_2 emitted from large business facilities is the only GHG subject to reduction, and the emissions of six GHGs (CO_2, CH_4, N_2O, HFC, PFC and SF_6) are reported in the GHG Emission Reduction Plans. Energy-related CO_2 accounts for 95% of all GHG emissions in Tokyo. Although the emission of GHGs other than energy-related CO_2 (known as

23. TMG Bureau of Environment (2015c).
24. Implemented by the 2010 revision to the Tokyo Metropolitan Environmental Security Ordinance.

"other gases") is not capped yet, the reduced amount of other gases would be added to the fulfillment of the CO_2 reduction obligation.

Large tenants within large buildings are also required to collaborate with the building owners and submit emission reduction plans as a way to effectively reduce energy use. The so-called specified tenants that use over 5,000m² of floor area or over 6m kWh of electricity are also required to report their own reduction plan to the TMG through the building owners.[25]

Calculation of emissions allowance and differential emissions cap

Large facilities are classified into office buildings (I) and factories (II); different compliance factors apply, as shown in Table 1. Category I is divided into two groups, where facilities under category I-2 rely on regional heating and cooling and category I-1 do not.

Table 1: Emission caps according to facility categories

Category		Regional heating and cooling	Compliance factor	
			Period 1 (2010-2014)	Period 2 (2015-2019)
Office buildings: I	I	No	8%	17%
	II	Yes	6%	15%
Factories: II		N/A	6%	15%

Source: TMG Bureau of Environment (2012)

The emission allowance is computed in accordance with the category in which the compliance facility is classified. The TMG has implemented two-tiered emission reduction; the compliance factor in the first compliance period (2010-2014) is raised in the second compliance period (2015-2019). This deliberate measure is intended to gain the confidence of regulated actors in the first compliance period, through achievable goals, which pave the way to greater reduction in the second compliance period. Category I-2 has a lower compliance factor than I-1, as dependence on regional heating allows a limited individual contribution to emission reductions. Factories have lower compliance factors than I-1, because greater efforts are needed to reduce one unit of emission in manufacturing than in commercial offices. These caps are relaxed for top-level facilities accredited by the TMG, by a quarter to half of the compliance factors on

25. TMG Bureau of Environment (2012).

average.[26] Such arrangements were made as a response to concerns raised by the business sector.

An absolute emissions cap is applied to the total baseline emissions amount calculated separately for each large facility. The baseline emissions amount is the average of the chosen three consecutive years between 2002 and 2007, which is multiplied by five to compute the emission allowance for the entire compliance period. This is also a measure implemented as per discussions with the business sector, so that regulated facilities have some freedom to choose favorable base years. Each compliance facility is obliged to keep its emissions amount below the allowance within the five years of the compliance period. If a large facility does not meet the reduction target by the end of the compliance period, there is a redemption period of one year following the end of the compliance period to comply through the use of the Tokyo ETS.

Tradable credits

If compliance facilities cannot meet the reduction obligation through self-reduction efforts, the emissions amount in excess of the allowance can be offset by five types of credits (see Table 2). The credits available for offset are all ex-post credits, in order to avoid speculative trading. During the stakeholder meetings, the main criticism concerning the implementation of a cap-and-trade scheme was the risk of falling into a "money game", as seen in cases internationally, particularly in relation to the EU ETS. The TMG responded to the concerns raised by the business sector, and much effort was dedicated to explaining the difference between the Tokyo ETS and the EU ETS, and what measures are available to prevent speculative trading. Therefore, it is very unlikely that Tokyo will consider a linkage with external governments.

26. Facilities that meet the Standards for Certifying Top-Level Facilities are accredited as top-level or near-top-level. The certification standard assesses general management and operation, the energy performance of buildings and equipment, and energy management on mandatory, general and additional items based on a scoring system. This scheme was introduced to recognise low-carbon measures that were already in place prior to the start of the TMG's program (TMG Bureau of Environment, 2012).

Table 2: A list of tradable credits under the Tokyo Cap-and-Trade Program

Type of credit	Description
Exceeding credit	Emission reduction amount that exceeds the yearly obligation can be traded from the second year of the compliance period.
Small and mid-sized installation credits within the Tokyo area	Emission reduced by small and mid-sized facilities in Tokyo through energy-saving measures can be purchased by specialized facilities without limit.
Renewable energy certificates	Credits issued through the state-led green certifications and the TMG-certified environmental value calculation can be used for offset.
Outside Tokyo credits	Emission reduced through energy-saving measures by large facilities with base year emission of less than 150,000 tonnes outside of Tokyo can be purchased by specialized facilities, up to a third of base year emission amount.
Saitama credits	Credits certified by the Saitama prefectural government on emission reduction by small and medium-sized facilities in Saitama and large facilities with the base year emission of less than 150,000 tonnes in Saitama.

Source: TMG Bureau of Environment (2012).

Moreover, assuring the equivalence in carbon credit value would be a challenging task if the Tokyo ETS were to link with another ETS. It was an issue discussed at the time of talks about credit exchange with Saitama, and was resolved by putting a limit on the amount of credits exchanged between the two prefectures. The national J-VER credits are accepted in Saitama but not in Tokyo, because J-VER deals with forest absorption, and

the credit value cannot be matched with the emission activities in a highly urbanized area such as Tokyo.[27]

Differences between the Tokyo ETS and the EU ETS

Since the period of policy-making, the TMG analyzed the criticisms and shortcomings of the EU ETS in order to discuss and design an agreeable program for Tokyo.[28] Therefore, despite the common typology, the Tokyo ETS differs from the biggest and pioneering ETS, of the EU, in several aspects.

One of the most important differences is the role of the ETS in the climate policy of the jurisdiction. The Tokyo ETS is not a primary method to reduce carbon emissions, but rather a complementary mechanism to achieve the reduction obligation in case individual reduction efforts do not suffice. In fact, behavioral and technological changes, such as changing light fixtures and adjusting air-conditioning temperatures, thus far have lowered CO_2 emissions beyond the cap for nearly 90% of the compliance facilities. For this reason, trading volume is still very low in the Tokyo ETS, and low volumes are expected in the fulfillment of the first compliance period.[29] Moreover, carbon credits cannot be issued for trading prior to actual emission reduction. This is a feature to prohibit speculative trading under the Tokyo ETS, in view of the carbon-market collapse in the EU ETS due to oversupply of carbon credits.

The business (commercial and industrial) sector is responsible for half of Tokyo's CO_2 emissions, and the large business facilities emit nearly 40% of it. In other words, 20% of Tokyo's CO_2 emissions is attributed to the small number of large business facilities (0.2% of total business facilities in Tokyo). The Tokyo ETS covers the entire business sector with large physical buildings in Tokyo,[30] while the EU ETS regulates sectors that are limited to a list of sub-sectors within the business sector. See Table 3 below for a more detailed comparison.

27. Interview with Saitama officials on 17 November 2015.
28. TMG Bureau of Environment (2008).
29. Verification of the emission amount for 2015 will be confirmed in spring 2016. Some trading for offset may take place in the fiscal year 2016 to meet the obligations for the first compliance period.
30. Note that mandatory reduction only applies to compliance facilities, but other business facilities of any size could participate in the Tokyo ETS by supplying credits for offset.

Table 3: Comparison between the Tokyo ETS and the EU ETS

Component	Tokyo ETS	EU ETS
Participating administration	Tokyo Metropolitan Area	27 EU member states, Iceland, Liechtenstein, Norway
Regulated sectors	all large facilities that use energy equivalent to 1,500kL of oil a year	Electricity, refining, iron and steel, cement, glass, ceramics, pulp and paper (phase 1); + nitric acid (phase 2); + petrochemicals, ammonia, aluminium and aviation (phase 3)
Emission coverage	about 20% of total Tokyo emission	45% total EU emission
Time scales	2010-2014 (compliance period 1); 2015-2019 (compliance period 2)	2005-2007 (phase 1); 2008-2012 (phase 2); 2013-2020 (phase 3)
Reduction goals	20% below 2000 levels by 2020	40% below 1990 levels by 2030
Emission cap	6% or 8% (compliance period 1); 15% or 17% (compliance period 2)	21% lower than 2005 by 2020; 43% lower than 2005 by 2030
Allocation method	Free allocation by grandfathering	Free allocation by grandfathering, benchmarking, auctioning (max 10%); from 2013 more than 40% by auction, which is to increase each year.
Characteristics of trading	Trading of exceeding credits is only allowed on reduced amount in excess of mandatory obligation, offsetting limited to the unachieved reduction amount	Trading of emission allowance is allowed prior to emission reduction achievements
Compliance period	5 years (+1 year to fulfill obligation)	1 year
Penalty system	Governor's order, fines up to 500,000 yen, publication of the breach, surcharge collected in proportion to the failure to fulfill the obligation	Delivery of the non-delivered allowances in the next period + 100 euros penalty per ton
Offsets	Exceeding credits, outside of Tokyo credits, SME credits, renewable energy certificates, Saitama credits	Kyoto Protocol JI and CDM allowances within limits

Sources: European Commission (2016); TMG Bureau of Environment (2012); Perdan & Azapagic (2011).

Why was Tokyo able to implement the cap-and-trade scheme?

Given the magnitude of economic activities in Tokyo, how the TMG obtained consent from the business world to implement mandatory control on CO_2 emissions in the midst of an economic slowdown in Japan is of great interest for governments facing similar problems. The TMG overcame business opposition typically seen in the introduction of GHG control through a combination of tactics.

Administrative leadership

The strong aspiration of the TMG leadership was widely acknowledged by stakeholders as a key factor behind the policy implementation.[31] It may be explained by a few reasons. First, the so-called Tokyo's DNA of being progressive in environmental governance has been passed on to the current generation, thanks to the long rivalry between Tokyo and the national government. Secondly, success in implementing and consequently influencing national policy on diesel control injected TMG officials with confidence and motivation. In addition, Tokyo was bidding for the summer Olympics of 2016 at the time of discussing the Tokyo Cap-and-Trade Program. As Tokyo aimed to host a "carbon minus Olympics", emissions reductions of CO_2 had become a city-hall-wide policy goal, with fund allocation.[32] All these factors contributed to the TMG's motivation and aspiration, both at leadership level and amongst officials.

Gradual policy development

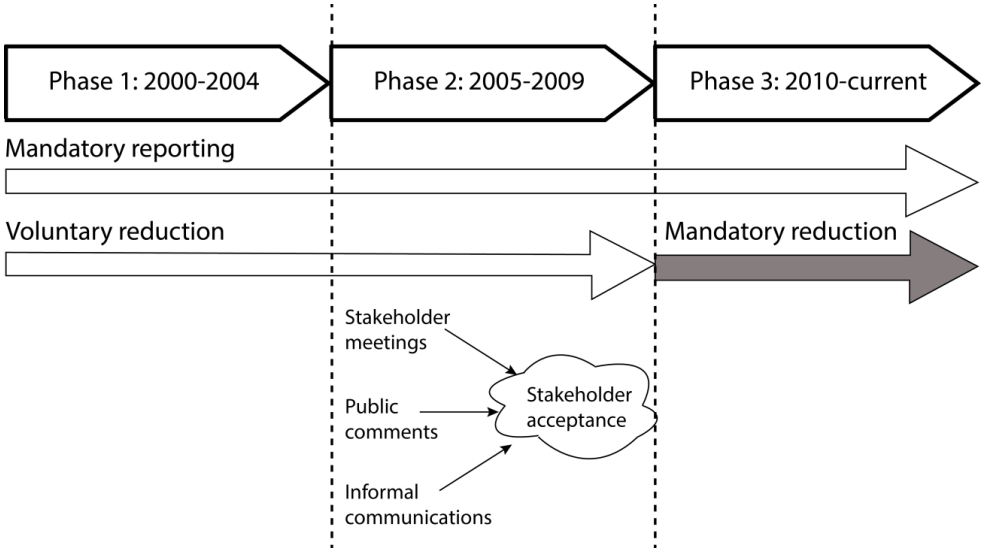
Before the introduction of the Tokyo Cap-and-Trade Program, the TMG implemented a mandatory emissions reporting scheme when the Environmental Security Ordinance was enacted in 2000 (see Phase 1, Figure 1). Thus, the TMG had access to years of emissions data from business facilities, and the regulated facilities had experienced a period of voluntary reduction through reporting, where significant progress was lacking.[33]

As an attempt to better understand the situation of energy conservation and assist facilities to improve energy performance, interaction between the TMG and business facilities deepened in the

31. Roppongi *et al.* (in press)
32. Aoki (2010); Ohno (2013).
33. Ohno (2013).

second phase of the policy development (see Phase 2, Figure 1). This included free energy-saving consultations by the TMG, which specialized in energy conservation and heating surveys. Since the first phase of the policy development, TMG officials paid many visits to business facilities to analyze and advise on ways to improve energy conservation. Trust was built between the facilities and TMG officials through such interaction, and the business facilities were aware that TMG officials had an understanding of their business operations and their challenges in energy conservation.[34] Emissions reporting and consultation based on the reporting helped facilities to visualize their energy use, which paved the way to energy conservation.

Figure 1: Three phases leading to the implementation of the Tokyo Cap-and-Trade Program



Source: Roppongi et al. *(in press).*

Most notably, a series of stakeholder meetings organized by the TMG were held in 2007 to openly discuss the potential to introduce a mandatory cap on CO_2 emissions and a local ETS in Tokyo.[35] Factual data collected through the mandatory reporting since 2000 was used when the TMG analyzed and presented the need for more ambitious control beyond voluntary efforts. In addition, the stakeholder meetings involved supporters and opponents from various sectors, including manufacturing, energy, transport, medical and environmental NGOs. Both sides of the argument were presented at public meetings, and the TMG was able to argue for the implementation, with the support of environmental NGOs.[36]

34. Interviews with TMG officials on 18 December 2013 and 16 November 2015.
35. TMG Bureau of Environment (2008).
36. Roppongi *et al.* (in press).

In addition, the aftermath of the Fukushima nuclear disaster in 2011 forced everyone in the greater Tokyo area to cut down energy use so as to survive the energy crisis. At the time of planned blackouts and energy shortages, the experience of monitoring energy consumption and planning future reduction through the Tokyo Cap-and-Trade Program worked positively for the facilities covered, as they already knew the areas of potential improvement. An increase in energy prices since the incident also created more energy-awareness in the business sector, and many understood the co-benefit of cost reduction.

Flexible and tailored reduction

The TMG-led official stakeholder meetings provided opportunities to lay out the concerns and needs of business facilities in open discussions. Major concerns – such as the recognition of facilities that had already implemented energy saving measures, and the difference in the value of reduced carbon emissions – were taken account of in the design of the climate schemes. Top-level certification, the freedom to choose the base years to calculate a baseline amount of emissions, and differentiated compliance factors between the categories are examples of TMG's response to the concerns raised by business facilities. Such measures have allowed reduction obligations to be tailored to each facility.

Unique definition of target actors

It is important to recall that Tokyo is a commercial hub and the industrial sector accounts for less than 9% of the total CO_2 emissions in Tokyo. The main domestic opponents, such as the steel manufacturing, petrochemical and electric power sectors, do not operate their facilities in Tokyo, which makes negotiations less tense compared to those relating to national-level implementation. Interestingly, small and medium facilities favored the Tokyo Cap-and-Trade Program, as they were not the target of the mandatory cap but were able to supply carbon credits. Therefore, the Tokyo Chamber of Commerce and Industry, of which the majority of members are small and medium facilities, showed support for implementation.[37]

37. Aoki (2010a).

Challenges ahead

There are several ways the current policy could develop in the future, yet not without challenges. One is to expand the coverage of regulated subjects under the Tokyo Cap-and-Trade Program in the post-2020 policy discussions. For instance, as small and medium business facilities at present are subject to mandatory or voluntary reporting, depending on their energy consumption, they may become subject to mandatory capping. However, this would be more challenging as more than 99% of business establishments in Tokyo are small and medium facilities, which often have limited resources and therefore are less willing (or unable) to meet the requirements of the Tokyo Cap-and-Trade Program. The Tokyo Chamber of Commerce and Industry may be in favor of the current scheme, but could withdraw support should the mandatory capping be extended to small and medium businesses. In fact, a new building evaluation scheme started in 2014 for small and medium business facilities. Introducing stricter emission controls would add further burdens, which is expected to be opposed by the business sector.

Moreover, inclusion of the housing sector has a potential policy impact, as it would increase the policy coverage to 80% of Tokyo's total emissions. However, a new policy development is required for this to happen, as the housing sector requires the involvement of citizens who may have limited know-how about energy saving. Technological improvements in appliances may be encouraged further by subsidizing energy efficient products (known as "eco-products"), but such a policy is better suited to national implementation.[38]

Another approach is to continue the existing Tokyo Cap-and-Trade Program after the end of its second compliance period. This seems more realistic, as the program is already in operation and the policy achievements are visible. In addition, the regulated facilities by then would have nearly a decade of experience in the mandatory capping environment, and thus have further suggestions about how the policy is designed or operated. Another set of stakeholder meetings, including the business sector and NGOs as in 2007, would be beneficial for the post-2020 discussions. It will be interesting to see to what extent the Olympics could influence the low-carbon policy development.

38. For instance, MOEJ implemented Eco-Point System between 2009 and 2011, which boosted technological improvement in electronic appliances and public awareness towards energy conservation.

In any case, expansion of the scheme also means the need for greater resources within the TMG, so political support is essential to secure funding for the policy. Especially if the number of actors covered were to expand, emissions monitoring and building face-to-face relationship with regulated actors would necessitate more resources.

The prospect of diffusing Tokyo's experience

Implications for national climate policy

It is important to note that developments in Japan's local climate policy would not have been possible without the historical accumulation of sub-national actions in environmental governance and the revision of the Local Autonomy Law in 2000. The national climate framework also paved the way to the local developments, as Tokyo carefully studied the two national laws when designing its own low-carbon scheme. Tokyo's low-carbon policy influenced the national policy during the development phases as well, such as the revision and expansion in the definition of the regulated actors.

The national government of Japan has indicated a commitment to examine the potential to introduce a nationwide ETS since the start of the century, which is also reflected in the latest draft outline of the Climate Change Plan. The Tokyo Cap-and-Trade Program attracted both domestic and international attention when it was implemented, but public discussion of a nationwide ETS lost momentum after the pilot JVETS was discontinued. One of the key reasons could be persistent industrial opposition from sectors including petrochemical, steel manufacturing and electric power. Rising hopes for alternative approaches, such as development of hydrogen technology and recommissioning of nuclear reactors, have shifted the discussion of emissions reduction in a different direction. In addition, there have been 15 environment ministers since 2001, of whom five have taken office since the 2011 earthquake; naturally, it is difficult to drive a strong momentum for national implementation in the midst of political instability.

At the ministerial level, some members at the joint meeting between the MOEJ's Central Environmental Council and the METI's Industrial Structure Council clearly argued against the national ETS,[39] while the MOEJ's advisory panel[40] does not explicitly suggest implementation of the national ETS. Nor is there any evidence of an approach by the national

39. MOEJ (2015c).
40. Kiko hendo choki senryaku kondankai (MOEJ, 2016).

government to either Tokyo or Saitama in this regard. The usefulness of a carbon pricing mechanism is recognized, but the choice of an ETS is still at the stage of review in a climate where strong support for a national ETS is absent. Though both Tokyo and Saitama have been proposing that the national government implement a national cap-and-trade scheme that matches the local schemes, it is unlikely to happen at present, given the current environment.

Implications for other sub-national climate policies in Japan

As of 2015, 30 out of 47 prefectures in Japan have implemented a prefectural reporting scheme (see Figure 2). As Tokyo's experience has illustrated how an emissions reporting scheme is an essential step in developing a cap-and-trade scheme, the expansion of reporting schemes at the sub-national level is encouraging for the potential development of cap-and-trade schemes elsewhere. There is potential for these prefectures to step up to the next phase, following Tokyo and Saitama, given the shared institutional foundations under the national climate framework and sub-national autonomy in climate policy. Those who have not yet implemented a reporting scheme could start with a local emissions reporting scheme.

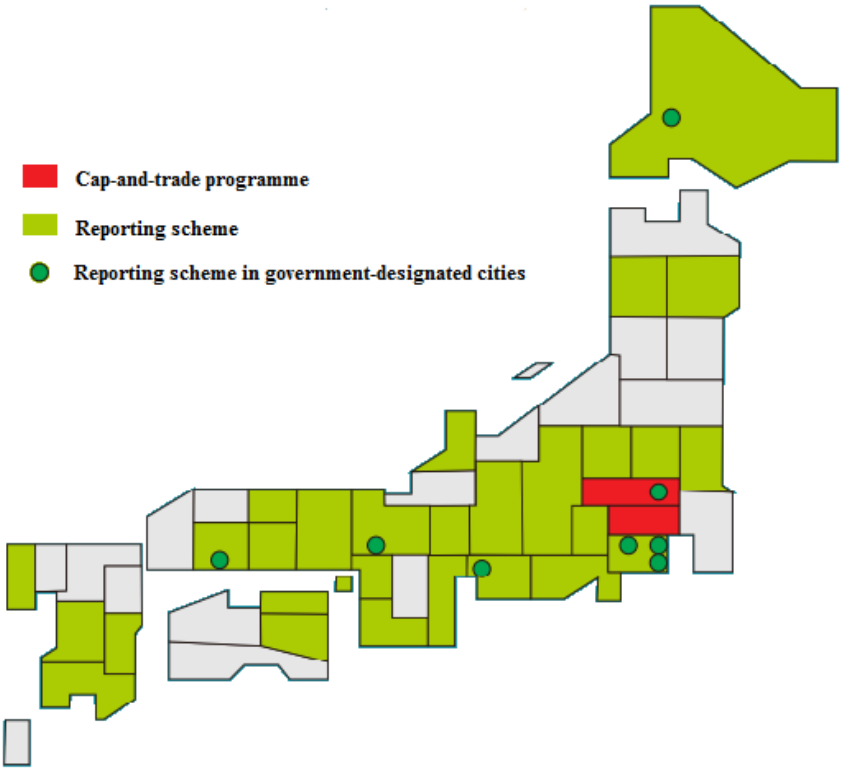
However, on average, the industrial sector is the dominant sector in other prefectures and thus the problem of leakage would arise if CO_2 emissions were to be capped in other prefectures. For this reason, attaining an agreement from the business sector will be very challenging. It is no exaggeration to say that the case of Saitama (Box 1) is rare; studies have shown passive views in regard to potential diffusion to other prefectures in the current environment.[41] Nevertheless, attempts have been made to connect sub-national governments through meetings, seminars and direct communication upon request.

Given the expected burden added on top of the national frameworks, collaboration between the national and sub-national governments is indispensable for discussing and designing a nationwide, uniform reporting scheme. Implementation of multiple schemes that require separate commitments in different formats would only increase the burden of emitters, and might obstruct the potential to enhance energy conservation. In fact, concern about such a burden was expressed by large facilities during the stakeholder meetings and after implementation.[42]

41. Aoki (2010a, 2010b); Baba (2010).
42. TMG Bureau of Environment (2008), Roppongi *et al.* (in press).

Tackling this issue involves both national and sub-national governments, yet the approach has largely been one-sided. Since the start of local initiatives, both Tokyo and Saitama have continually proposed to the national government that nationwide mandatory carbon emission reduction and an ETS matching the existing local cap-and-trade schemes be implemented.[43] An MOEJ-led study group for sub-national governments has been working since 2013, and information and knowledge are exchanged amongst the government officials.[44] To what extent the MOEJ's initiative reflects its willingness to adapt local needs is unknown, yet the communication platform initiated by the MOEJ raises hope for future changes.

Figure 2: Map showing local climate policy in Japan



Source: TMG (2015a).

43. TMG (2015b), Saitama Prefecture (2015b).
44. Interview with TMG officials on 16 November 2015.

Policy diffusion case: voluntary cap-and-trade program in Saitama prefecture

The Saitama prefecture is an immediate neighbor of Tokyo within the greater Tokyo area, and has a CO_2 emission reduction target of 21% by 2020 based on the 2005 level. As per the national framework under the Global Warming Law, Saitama created a local climate change mitigation plan in 2009. This coincided with the news of Tokyo's local cap-and-trade scheme, and Saitama felt it could learn from that new scheme. In fact, Saitama adopted a good portion of the design of the Tokyo Cap-and-Trade Program. Saitama was aware that the TMG's policy was well thought out and developed over a decade, and adoption of the neighbor's design was preferable to starting from scratch. More importantly, Saitama did not want to overburden the regulated facilities with offices in multiple prefectures, including in Tokyo, and thus took a user's approach when learning from Tokyo's practice.[45] A credit exchange was also agreed between Tokyo and Saitama as part of the carbon offset mechanism in both prefectures; this was possible due to the similarity of policy design between them.[46]

Differences can be found in the degree of obligation and the credit available for offset. About 80% of regulated facilities under Saitama's voluntary cap-and-trade scheme are factories, amounting to nearly 600 facilities. After discussions with the business sector and scholars, consensus was reached on establishing a voluntary rather than mandatory scheme. The emphasis was therefore on the Saitama government setting an emissions-reduction goal so as to encourage energy conservation. As of fiscal year 2013, total CO_2 emissions from large facilities reduced by 22% compared to the base year, while 81% of the compliance facilities have already met the target reduction.[47]

45. Interview with Saitama officials on 17 November 2015.
46. As of 30 January 2016, no credit has been exchanged between the two prefectures. This may take place after the emission amounts are verified for the first compliance period in spring 2016.
47. Saitama Prefecture (2015a). Saitama's target reduction factor is equivalent to Tokyo's compliance factor. It is two-tiered and differentiated according to the compliance period and classification of the facility.

Conclusion

Being a net importer of energy, Japan has a tradition of energy conservation embedded in its society, known as the "sho-ene" culture. The energy conservation concept has existed in Japanese society since the aftermath of the oil shock in the 1970s. The sho-ene concept is well-accepted in the business sector as well, as it has driven technological innovation in favor of business. The national government has led successful energy conservation programs involving behavioral changes – known as "Cool Biz" and "Warm Biz" – nationwide since 2005[48]. These campaigns led by the MOEJ are taking hold in society, which recognizes the co-benefits of climate change policy. Given the development of an energy conservation culture within society, Japan's performance in climate change mitigation cannot simply be evaluated through the declared international commitments and total volume of emissions.

Tokyo took an additional step by implementing a policy that further encourages behavioral changes and technological improvement in the business sector. An ETS is often associated with the collapse of carbon markets and the "money game", rather than a practical tool to reduce CO_2 emissions, but the Tokyo Cap-and-Trade Program has demonstrated a policy impact that recasts such an image. Although the national government has maintained its stance about examining the implementation of an ETS, the current debate seems to be shifting toward different methods of carbon pricing. Even if a national ETS may not be implemented in the near future, the fact that the Tokyo Cap-and-Trade Program was implemented based on stakeholder agreement and demonstrated effective CO_2 reduction has raised hopes for sub-national climate actions.

To what extent other governments could learn from the Tokyo's experience primarily depends on the interest of the host government. There are expectations for cap-and-trade schemes to diffuse in Asia following developments in South Korea and China, but it is difficult to evaluate the degree of influence that Tokyo may have.[49] Policy diffusion of

48. Cool Biz involves setting air-conditioning systems at 28 degrees C and dressing down (e.g. no tie, no jacket, half-sleeves) in summer. Warm Biz, introduced following the success of Cool Biz, involves wearing warmer clothes and keeping the heating at 20 degrees C in winter.
49. Interview with an NGO on 19 November 2015.

the Saitama type is deemed more feasible for Japan's other local governments due to the shared institutional foundation, but it is only one of many forms of policy diffusion. Partial diffusion, such as the concept of local autonomy or of including tenants in building energy management, could be implemented elsewhere in the absence of a cap-and-trade scheme. Whoever the host may be, policy diffusion requires a match between interests and the contents of shared information, followed by adaptation into the host situation. It is hoped that this study will contribute to the sharing of knowledge about Tokyo's experience and policy learning.

References

Aoki, K. (2010a). Tokyo to CO2 soryo sakugen gimu haishutsuryo torihiki seido ni miru seisaku hakyu no kanosei: jichitai seisaku katei ni okeru goi keisei sayo wo tegakarini [Potential of policy diffusion for Tokyo's CO2 emission reduction and ETS: clues from consensus building in the sub-national policy process]. *Kankyo kagaku kaishi*, *23*(4), 321-331.

Aoki, K. (2010b). Senkuteki na jichitai ondanka boshi taisaku no seihi wo meguru seisaku katei bunseki [Policy process analysis on the success and failure of the pioneering local climate change mitigation policies]. *Toyama daigaku keizai gakubu todai keizai ronshu, 56*(2), 129-163.

Baba, K. (2010). Effectiveness and diffusion of local climate policy: a case of GHG emission reporting system. *Journal of Japan Society of Energy and Resources, 31*(2), 1-9.

European Commission (2016). The EU Emission Trading System (EU ETS). Retrieved from http://ec.europa.eu.

Hayashi, A. & Ishida, M. (2003). Kenpo yoron [Summary of the Constitution]. Tokyo: Keibundo.

Mathieu, C. & Cornot-Gandolfe, S. (2015). *Japan's Energy and Climate Policy: Towards Dispelling the Uncertainties*. Paris: IFRI. Retrieved from www.ifri.org.

Isono, Y. (1972). Gyosei hogakusetsushi ni miru kogai gyosei, 3 [Legal history of pollution administration: Part 3]. *Horitsu jiho, 44*(6), 122-129.

Kitamura, Y. (2015). Jichitai kankyo gyosei hou [Local environmental law and policy]. Tokyo: Daiichi Hoki.

MIC (2009a). *Local autonomy in Japan: Current situation & future shape*. Tokyo: MIC. Retrieved from www.clair.or.jp.

MIC (2009b). Chihou kokyo dantai no kubun [Classification of sub-national public entities]. Retrieved from www.soumu.go.jp.

MOEJ (2012a). *Kokunai haishutsuryo torihiki seido no hoteki kadai ni tsuite: Dai ichiji – dai yoji chukan hokoku* [First to fourth interim reports by the Investigative Commission for legal matters associated with JVETS]. Tokyo: MOEJ. Retrieved from www.env.go.jp.

MOEJ (2012b). Todofuken no hokoku seido [Reporting scheme in prefectures]. Retrieved from http://ghg-santeikohyo.env.go.jp.

MOEJ (2013a). Chikyu ondanka taisaku no suishin ni kansuru horitsu no ichibu wo kaisei suru horitsuan no kakugi kettei ni tsuite (oshirase) [Announcement of the Diet's decision to revise the Law on Promotion of Global Warming Countermeasures]. Retrieved from www.env.go.jp.

MOEJ (2013b). *Kokunai haishutsuryo torihiki seido ni tsuite* [About the national emission trading scheme]. Tokyo: MOEJ. Retrieved from www.env.go.jp.

MOEJ (2015a). Shiro 3: Chikyu ondanka taisaku keikaku kosshian [Material 3: Climate Change Plan draft proposal]. Retrieved from www.env.go.jp.

MOEJ (2015b). *Chiho kokyo dantai ni okeru chikyu ondanka taisaku no suishin no kansuru horitsu shiko jokyo chosa kekka houkokusho* [Report on results of survey on implementations of global warming countermeasures by sub-national entities]. Tokyo: MOEJ. Retrieved from www.env.go.jp.

MOEJ (2015c). Sanko shiryo 2: Iin kara no goiken [Reference material 2: Opinions from the members of councils]. Retrieved from www.env.go.jp.

MOEJ (2016). Kiko hendo choki senryaku kondankai [Advisory panel for a long-term climate change strategy]. Retrieved from www.env.go.jp.

National Institute for Environmental Studies (2015). National greenhouse gas inventory report of Japan: April, 2015. Retrieved from www-gio.nies.go.jp.

Ohno, T. (2013). *Jichitai no enerugi senryaku* [Municipal energy strategy: US and Tokyo]. Tokyo: Iwanami Shoten.

Perdan, S. & Azapagic, A. (2011). Carbon trading: current schemes and future developments. *Energy Policy*, *39*(10), 6040-6054.

Roppongi, H., Suwa, A. & Puppim de Oliveira, J. A. (in press). Innovating in sub-national climate policy: the mandatory emissions reduction scheme in Tokyo. *Climate Policy*.

Saitama Prefecture (2015a). Mokuhyo settei gata haishutsuryo torihiki seido ni okeru onshitsu koka gasu no sakugen jokyo nit suite (Heisei 25 nendo haishutsuryo) [Situation of GHG reduction under the voluntary cap-and-trade program: FY2013 emission amount]. Retrieved from www.pref.saitama.lg.jp.

Saitama Prefecture (2015b). Kuni no seisaku [National policies]. Retrieved from www.pref.saitama.lg.jp.

TMG Bureau of Environment (2008). Stakeholder Meeting. Retrieved from: www.kankyo.metro.tokyo.jp.

TMG Bureau of Environment (2010). Tokyo Cap-and-Trade Program: Japan's First Mandatory Emissions Trading Scheme. Tokyo: TMG.

TMG Bureau of Environment (2012). Tokyo cap-and-trade program for large facilities: Detailed documents. Tokyo: TMG. Retrieved from www.kankyo.metro.tokyo.jp.

TMG Bureau of Environment (2015a). Toni okeru saishu enerugi shohi oyobi onshitsu koka gasu haishutsu soryo chosa: 2012 (Heisei 24) nen jisseki [Comprehensive study of the final energy consumption and GHG emissions in Tokyo, FY2012]. Retrieved from www.kankyo.metro.tokyo.jp.

TMG Bureau of Environment (2015b). Tokyo to no aratana shoene mokuhyo: 2030 nen made ni Tokyo no enerugi shohiryo wo 30% sakugen [Tokyo's new energy efficient goal: 30% reduction in Tokyo's energy consumption by 2030]. Retrieved from www.kankyo.metro.tokyo.jp.

TMG Bureau of Environment (2015c). Tokyo to kankyo hakusho 2015 [Tokyo Environment White Paper 2015]. Retrieved from www.kankyo.metro.tokyo.jp.

TMG Bureau of Industrial and Labor Affairs (2015). Industry and employment in Tokyo: A graphic overview 2015. Tokyo: TMG. Retrieved from www.sangyo-rodo.metro.tokyo.jp.

TMG Statistics Division Bureau of General Affairs (2014). Tokyo-to no tokei [Statistics of Tokyo]. Retrieved from www.toukei.metro.tokyo.jp.

TMG Statistics Division Bureau of General Affairs (2016). Heisei 25 nendo tomin keizai keisan [Report on the economic calculation for Tokyo in FY2013]. Retrieved from www.toukei.metro.tokyo.jp.

TMG (2015a). *Tokyo green biru report 2015* [Tokyo Green Building Report 2015]. Retrieved from www.kankyo.metro.tokyo.jp.

TMG (2015b). Kuni no shisaku oyobi yosan ni taisuru teian yokyu [Proposals and requests concerning national measures and budgets]. Retrieved from www.seisakukikaku.metro.tokyo.jp.

TMG (2015c). Cap & trade seido 4 nenme no sakugen jisseki hokoku [Report on the reduction achievement in the 4th year of the cap-and-trade scheme]. Retrieved from www.metro.tokyo.jp.

TMG (2016). Tonai kusichoson map [Map of Tokyo's municipalities]. Retrieved from www.metro.tokyo.jp.

Tokyo Metropolitan Archives (n.d.). Daitokyo 35ku monogatari 15ku kara 23ku he: Tokyo 23ku no rekishi [The Great Tokyo 35 ward story from 15 wards to 23 wards: History of Tokyo's 23 wards]. Retrieved from www.soumu.metro.tokyo.jp.

UNDESA Population Division (2016). 2014 Revision of World Urbanization Prospects. Retrieved from http://esa.un.org.

UNFCCC (2015). Submission of Japan's Intended Nationally Determined Contribution (INDC). Retrieved from www4.unfccc.int.

Yoshimura, R. (1998). Kogai-kankyo shihoshi kenkyu joron (1) [Introduction to the history of pollution and environmental law (1)]. *Ritsumeikan hogaku, 261*, 780-809.

The latest publications

- Elsa Lafaye de Micheaux, « La Malaisie de Najib Razak, solidité économique sur fond de tension politique », *Asie.Visions*, No.85, April 2016.
- Takashi Nagatsuji, « Determinants of Japan's ODA Allocation in Africa », *Asie.Visions,* No.84, March 2016.
- Jean-François Heimburger, « Tokyo face aux désastres naturels : leçons, enjeux et défis », *Asie.Visions,* No.83, March 2016.
- Sophie Boisseau du Rocher, « Scientific Cooperation in the South China Sea: a New Vector for China's Security Diplomacy in Southeast Asia? », *Asie.Visions,* No.82, February 2016.
- Nancy Snow, « Japan's Challenges in Public Diplomacy, An American Vision », *Asie.Visions,* No.81, February 2016.
- Gilles Verniers, « The BJP and State Politics in India: A Crashing Wave? », *Asie.Visions,* No.80, December 2015.

institut français
des relations
internationales