

# Mizuho Economic Outlook & Analysis

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**The Tokyo metropolitan government  
takes a step ahead to fight global  
warming:  
introducing a domestic emissions trading scheme  
for large, high-emission buildings and factories**

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## **1. Introduction**

Since early 2008, discussions have been intensifying on the introduction of a domestic emissions trading scheme in Japan<sup>1</sup>. Behind this trend are several developments surrounding emissions reduction efforts such as the rapid growth of an international market for trading emissions along with the spread of trading facilities and schemes around the world, reflecting the fact that the Kyoto Protocol has entered its enforcement period regarding the reduction of greenhouse gas emissions this year. Furthermore, the government's shared awareness of the need to discuss the introduction of a domestic trading scheme in order to lead discussions on global measures to tackle global warming at the G-8 Summit in July 2008 at Lake Toya led to the creation of expert advisory panels<sup>2</sup> to investigate the feasibility of such a scheme in March 2008. The panels analyzed the effectiveness and potential issues of the scheme as a way to cut greenhouse gas emissions, but went only so far as to propose options for what kind of approach would be feasible, stopping short of clarifying when it might be launched. While Prime Minister Fukuda's initiatives to cut carbon emissions, "In Pursuit of 'Japan as a Low-Carbon Society'" (dubbed the "Fukuda Vision") announced in June 2008, prior to the G-8 Summit and the "Action Plan for Establishing a Low Carbon Society" (approved by the Cabinet on July 29, 2008) propose a trial scheme with voluntary corporate participation tentatively slated to begin in October 2008, its full implementation will have to wait until the results of the pilot run become available, so that the scheme can be fine-tuned to better fit Japan's requirements.

In contrast to the national government which has only started to test the implementation of an emissions trading scheme, the Tokyo Metropolitan Government has decided to introduce mandatory emissions reduction quotas and an emissions trading scheme targeting large office buildings and factories to be implemented from FY2010 through the amendment of its municipal ordinances<sup>3</sup>. These initiatives have been attracting widespread attention. In this research paper, we will first take a brief look at the course of events that led Tokyo to decide to introduce this scheme, along with its actual results. We will then discuss how it compares to the European Union's emission trading scheme (EU-ETS), introduced in 2005.

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<sup>1</sup> Domestic emissions trading refers to a "cap and trade" scheme, in which domestic companies that have reduced more emissions than required by a "cap" (a quota) during a given period are allowed to trade the extra reduction with companies that could not meet their quotas.

<sup>2</sup> Three such panels were established: Prime Minister Yasuo Fukuda's Advisory Panel on Global Warming Issues; the Advisory Committee on Emissions Trading Scheme under the Ministry of the Environment; "Economic Methodology Study Group on Addressing Global Warming," established, as a study group, by the Director-General of the Industrial Science and Technology Policy and Environment Bureau, under the Ministry of Economy, Trade and Industry.

<sup>3</sup> This was approved unanimously by the Tokyo Metropolitan Assembly on June 25, 2008.

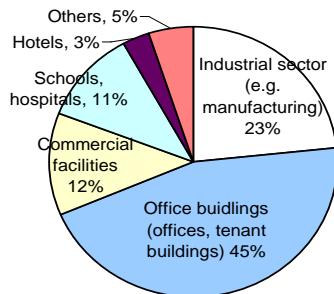
## 2. The events leading to the introduction of an emissions trading scheme

### (1) Existing strategy for addressing global warming, and actual emission levels

Tokyo is a major emitter of carbon dioxide (CO<sub>2</sub>), consuming as much energy as Denmark<sup>4</sup>. Unsurprisingly, the metropolitan government has been making considerable efforts to fight global warming, and gradually enhancing its regulations and institutional schemes, since the year 2000.

Specifically, the city passed the Tokyo Metropolitan Ordinance on Environmental Preservation<sup>5</sup> in December 2000, and launched the *Tokyo CO<sub>2</sub> Emission Reduction Program*, which required that large, energy-intensive business facilities submit plans for reducing energy consumption. This scheme targeted about 1,300 large buildings, factories, and other commercial facilities in Tokyo that consume the equivalent in fuel or electricity of at least 1,500 kiloliters worth of crude oil a year. Manufacturing businesses accounted for only about 20 percent of the target facilities; the service sector (e.g., office buildings, commercial facilities, schools, hospitals, hotels) accounted for the remaining 80 percent (**Chart 1**).

**Chart 1: Breakdown of Target Facilities for the *Tokyo CO<sub>2</sub> Emission Reduction Program***



Note: Based on large facilities targeted by the *Tokyo CO<sub>2</sub> Emission Reduction Program* during 2005 – 2007 (as of February 2008).

Source: Bureau of Environment, Tokyo Metropolitan Government.

During the first phase (a 3-year period from FY2002 to FY2004), the city mandated that target business facilities calculate and report their greenhouse gas emission levels, set

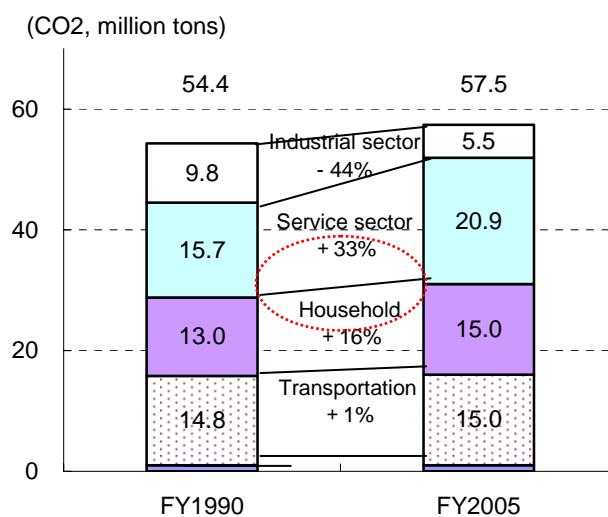
<sup>4</sup> According to Tokyo Metropolitan Government's Bureau of Environment.

<sup>5</sup> Officially, "Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area."

reduction targets, and devise and announce their reduction plans. In 2005, the city revised the ordinance so that, during the second phase (a 5-year period from FY2005 to FY2009), the city government can provide feedback and guidance on business facilities' reduction plans, and also assess and publicize their reduction efforts.

While the Tokyo government strengthened its effort to fight global warming, the city as a whole emitted 57.5 million tons of greenhouse gases in FY2005, approximately a 5.7% increase compared to 1990. The significant portion of the increase came from the service sector (e.g., office buildings), whose CO<sub>2</sub> emissions rose by 33% from 1990 (**Chart 2**).

**Chart 2: Tokyo's CO<sub>2</sub> Emissions Trend by Sector**



Source: Bureau of Environment, Tokyo Metropolitan Government.

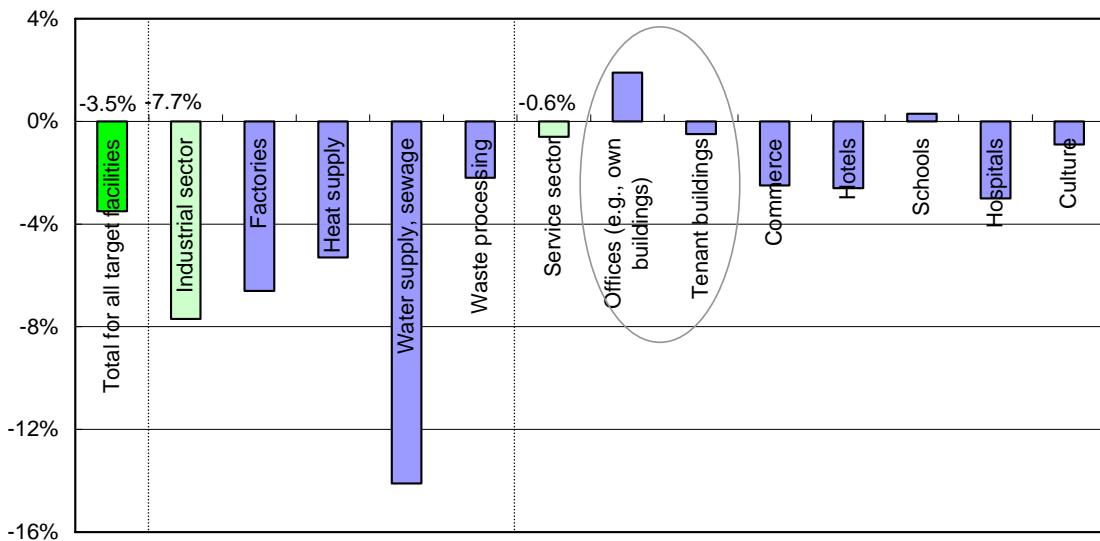
## (2) Achievements and pending issues of the *Tokyo CO<sub>2</sub> Emission Reduction Program*

Following the introduction of the *Tokyo CO<sub>2</sub> Emission Reduction Program*, most of the target buildings and factories developed plans for reducing emissions. On the other hand, about three quarters of the facilities set a reduction target of only 3 to 4%, on average, for the plan period. According to the figures published by the Tokyo government in April 2008, the target facilities as a whole cut their CO<sub>2</sub> emissions by approximately 430 thousand tons in FY2006,<sup>6</sup> which is a 3.5% reduction compared to the base emission level of 12.26 million tons (i.e., the average emission level during FY2002 – FY2004).

<sup>6</sup> “Tokyo CO<sub>2</sub> Emission Reduction Program: Results of Emissions Reduction Efforts by Large, High-Emission Facilities in Fiscal 2006 (Interim Report)”  
 ( URL:[http://www2.kankyo.metro.tokyo.jp/ondanka/data/h17tyukannhoukousyo/tiji-hyousyou-press-release\(4.23\).pdf](http://www2.kankyo.metro.tokyo.jp/ondanka/data/h17tyukannhoukousyo/tiji-hyousyou-press-release(4.23).pdf) )

While the industrial sector was able to achieve a 7.7% cut, the service sector's reduction was only 0.6%. As shown in **Chart 3**, the reduction rates were low for office buildings ("offices" and "tenant buildings" in the chart), which accounted for a large portion of the total emissions. This is mainly because floor space has increased in office buildings over the years. In fact, for "offices" (which include the company's own buildings), emissions actually increased in FY2006.

**Chart 3: Large Facilities' CO<sub>2</sub> Emissions Reduction Rate by Facility Type (FY2006)**



Note: The base emissions level is the average of the emissions during FY2002 - FY2004. The values in the above graph indicate the reduction rate in 2006 compared to the base emissions level.

Source: Bureau of Environment, Tokyo Metropolitan Government, "Tokyo CO<sub>2</sub> Emission Reduction Program: Results of Emissions Reduction Efforts in FY2006 (Interim Report)"

### (3) Proposal for further improvement and events leading to its approval

Given this situation, the Tokyo Metropolitan Government announced, in June 2007, the *Tokyo Climate Change Strategy* whose aims include the fulfillment of the medium-term goal, formulated in December 2006, of reducing greenhouse gas emissions by 25% by 2020.

The *Tokyo Climate Change Strategy* proposes that a new scheme – obligatory reduction quotas for large, high-emission facilities, and an emissions trading scheme – be introduced in FY2010 (the year after the current period expires); an acknowledgment that voluntary initiatives are no longer sufficient to achieve higher levels of emissions reduction. Subsequent to the proposal's announcement in June 2007, extensive

discussions on the scheme design were held in the Tokyo Environmental Council and stakeholders' meetings<sup>7</sup>. The final report on the ordinance revision was submitted by the Tokyo Environmental Council at the end of March 2008. The revised ordinance was then put to a vote, and approved, at the second regular session of the Tokyo Metropolitan Assembly.

### **3. Overview of the new *Obligatory Reduction Quotas and Emissions Trading Scheme***

An overview of the new scheme, which is slated to take effect in FY2010 and is expected to have multiple phases of about five years each, is summarized in **Chart 4**. The target businesses will be determined on the basis of the current *Tokyo CO<sub>2</sub> Emission Reduction Program*. The mandatory quota for each target facility will be calculated as follows: “base emission level” × “obligatory reduction rate.” The “base emission level” is the average amount of energy used over a given number of years. The “obligatory reduction rate” takes into consideration: (1) each facility’s capacity for further emissions reduction; and (2) Tokyo’s greenhouse gas emissions reduction target. The calculation of obligatory reduction quotas will also take into consideration the facilities’ past emissions reduction efforts: for those that have undertaken advanced-level reduction initiatives, obligatory reduction quotas will be lowered, and their actual reduction results under the current scheme applied toward their results under the new scheme.

**Chart 4: Overview of Emissions Trading Scheme by Tokyo Metropolitan Government**

Item	Overview
Target business facilities	Buildings and factories with large greenhouse gas emission levels (To be determined based on the target facilities, under the <i>Tokyo CO<sub>2</sub> Emission Reduction Program</i> , that use the equivalent of at least 1,500 kiloliters worth of crude oil a year in fuel, heat, or electricity).
Plan period	E.g., Phase 1: FY2010 – FY2014; Phase 2: FY2015 – 2019
Main obligations	An obligatory reduction quota for greenhouse gas emissions (“base emission level” × “obligatory reduction rate”). Submission/disclosure of various documentation, e.g., reduction action plan, status update report.
Base emission level	Calculated from the amount of energy used by each facility during the base years (i.e., average over multiple years during FY2005 – FY2009, or 3 years during FY2002 – FY2004). For facilities with prior emissions reduction history, however, the base year can be set at an earlier year.

<sup>7</sup> Stakeholders' meetings (meetings for the exchange of opinions) were held three times in total to discuss the *Tokyo Climate Change Strategy* as well as the revision to the Tokyo Metropolitan Ordinance on Environmental Preservation. The stakeholders present at the meetings included representatives from business facilities, environmental NGOs, Tokyo citizen/consumer groups, and experts.

Reduction obligation level (two points to be considered)	Facility's capacity for further reduction by implementing reduction initiatives. Tokyo's greenhouse gas emissions reduction target (25% reduction from the 2000 level).
Consideration for previous reduction efforts	<ul style="list-style-type: none"> <li>- Facilities that have already undertaken emissions significant reduction initiatives → lower obligatory reduction quotas.</li> <li>- Facilities that have already achieved emissions reduction under the current scheme → apply reduction results under the current scheme to reduction results under the new scheme.</li> </ul>
How to meet reduction obligations	<p>Target facilities are expected to reduce emissions on their own, e.g., by replacing their devices and equipment with energy-efficient alternatives. Additionally, they can buy reduction credits from other facilities (trade)</p> <ul style="list-style-type: none"> <li>(1) Amount of extra reduction achieved by other facilities beyond their obligatory caps.</li> <li>(2) Amount of reduction achieved by small and medium-sized facilities.</li> <li>(3) Purchase of a green electricity certificate.</li> </ul>
Penalty for not meeting reduction targets	<ul style="list-style-type: none"> <li>- Tokyo Metropolitan Government orders the purchase, from other facilities, of as much as 1.3 times the amount of emissions short of the targets.</li> <li>→ Non-compliance with this order will result in a fine (up to 500 thousand yen) and a payment to cover the cost for the city to purchase as much as 1.3 times the “short” amount.</li> </ul>

Source: Various materials, including a speech titled “Tokyo Climate Change Strategy: Obligatory Emissions Reduction Quotas and Emissions Trading Scheme” by Teruyuki Ohno, Senior Director, Urban and Global Environment Division, Bureau of Environment, Tokyo Metropolitan Government.

Buildings and factories are expected to meet obligatory emissions reduction quotas by their own initiatives, such as installing energy-efficient devices and equipment. As a supplementary measure, however, if they fall short of their quotas, they will be allowed to buy reduction credits from other business facilities that were able to cut their emissions above and beyond their reduction quotas (more on this later). To introduce an emissions trading scheme, the city will investigate how to certify actual reduction levels by using a third-party organization.

Those facilities that do not meet the quotas will be required to purchase, from other facilities, as much as 1.3 times the amount of emissions they have fallen short. Failure to comply with this requirement brings a fine of up to 500 thousand yen, and a charge for the cost to the city of purchasing the shortfall.

#### 4. Features of the Tokyo metropolitan government’s scheme

When the Tokyo government designed the new scheme, it took into consideration the frequently-cited criticisms of the EU-ETS. It also considered the lessons learned during the initial phase (2005 – 2007) of the EU approach. In the section below, we shall shed light upon the characteristics of Tokyo’s new scheme by a comparison to the EU-ETS.

## **(1) The service sector comprises 80% of the target facilities.**

As we state above, the service sector accounts for roughly 80% of the 1,300 target facilities under Tokyo's new scheme. The EU-ETS, which began in 2005, targets energy-intensive facilities (about 11,500 locations), such as power plants, oil refineries, steel mills, and cement factories. Tokyo's approach will be the first in the world to make it mandatory for the service sector to meet emission quotas.

The key for office buildings, which account for nearly half of the service sector facilities, to meet their reduction quotas will be whether building owners and tenants can cooperate and devise effective energy-saving strategies. In light of this, the city requires that all tenants help their building owners design reduction strategies. It also requires that larger tenants who emit above a given threshold submit their own action plans. That way, the city government can give advice directly to tenants also. The threshold is calculated based on tenant floor space and energy consumption in comparison with the total space and emission levels of the buildings they occupy.

## **(2) Allotting fair reduction quotas**

In the initial phase (2005 – 2007) of EU-ETS, the governments that had set reduction quotas lacked data such as CO<sub>2</sub> emission levels for the target facilities. As a result, the potential for reduction was not sufficiently considered and the overall reduction quotas were set at rather lenient levels. Moreover, facilities in some industries were assigned unfair quotas. Given this European experience, Tokyo strove to ensure a fairer allotment of reduction quotas. For instance, the base emission level is to be calculated from each target facility's actual emissions during multiple years between FY2005 and FY2009. However, those facilities that have already achieved emissions reduction can use their actual emissions during an earlier period (FY2002 – FY2004) as their base emission levels; a recognition of previous efforts. The mandatory reduction rate, too, can be set at an appropriate level for each target facility, based on its capacity for further reduction, because the city has detailed information on each facility's CO<sub>2</sub> emission levels and the efficiency of its devices' and equipment's, obtained through the *Tokyo CO<sub>2</sub> Emission Reduction Program*, launched in FY2002. The calculation and validation of the base emission levels are to begin around the summer of FY2009.

### **(3) Securing a low-cost reduction method – introducing an emissions trading scheme**

As we noted above, businesses that cannot meet their quotas will be allowed to purchase credits from those that were able to reduce emissions above and beyond requirements. This allows them to choose the least costly option to achieve their targets. One thing to note here is that, while EU-ETS allows target facilities to trade their reduction quotas even before their actual reduction has been confirmed for a target year, Tokyo's scheme allows only the excess reduction above the quotas to be traded, and only after actual reduction has been confirmed. In other words, Tokyo's emissions trading scheme is based on the actual need for reduction credits by businesses unable to meet quotas by their own efforts. This may limit the volume of trades, but since the trades will be based on actual demand, speculation will be minimized and rapid fluctuations in emissions credit prices prevented.

There are four methods under consideration for emissions trading. First, facilities that have reduced their emissions more than required by their quotas can trade the excess reduction directly with other facilities, or through a third-party business involved in energy conservation. Second, emissions reduction achieved by small and medium companies affiliated to a target facility, but not required to reduce emissions themselves, can be traded directly with those small and medium companies, or bundled together and traded through an energy-conservation business or a financial institution. Third, target facilities can purchase green energy certificates<sup>8</sup>, for the renewable energy they used, from natural energy providers. Fourth, target facilities can purchase emissions reduction credits from facilities outside of the Tokyo metropolitan area, but this will be limited in order to give priority to emissions reduction in Tokyo.

Once this trading scheme is introduced, target facilities will be able to weigh the cost of fulfilling their quotas through their own reduction efforts against the cost of purchasing reduction credits from other facilities, and choose the cheaper option. This will lead to a lower economic burden overall on the target facilities in meeting their quotas. At the same time, small and medium companies will be encouraged to reduce their emission levels, and the use of renewable energy will also be promoted.

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<sup>8</sup> The “green energy” certificate scheme enables trading of environmental value-adds, such as CO<sub>2</sub> emissions reduction achieved by renewable energy, e.g., wind power, solar power, biomass. Specifically, under this scheme, green energy (certified by a green energy certification organization) is sold to companies; then certificates are issued, and green energy providers receive payments from the purchasers of the certificates.

## 5. Future prospects and issues

Tokyo plans to flesh out details of the scheme by the end of FY2008. Lastly, we will point out possible issues that the city may encounter, as it works out the details of the scheme, and actually puts it in practice.

### (1) Difficulty in setting reduction rates

Once the scheme is introduced, each target facility's emission level will be restricted by its quota. The industrial community is concerned about what the actual reduction rates will be. As stated earlier, roughly 80% of the target facilities are in the service sector. Unlike factories, which can install energy-saving equipment to reduce emissions, service sector facilities may struggle to meet quotas. Many buildings in the Tokyo metropolitan area already have energy-saving features, so it is not clear what scope there is for further reductions. Also, as **Chart 5** shows, different types of buildings have different CO<sub>2</sub> emission intensities. Setting fair emissions reduction quotas among target facilities may become an issue.

**Chart 5: CO<sub>2</sub> Emission Intensity of Tenant Buildings (Excerpt)**

		(kg/m <sup>2</sup> /yr)
Government and public offices	Prime Minister's Office	130.8
	Ministry of the Environment, Ministry of Health, Labor and Welfare	91.6
Media	TV Asahi, Head Office	261.2
	Yomiuri Shimbun	196.6
Department stores	Mitsukoshi, Main Store's Main Building	206.2
	Isetan, Main Store	196.8
Hotels	Hotel Okura Tokyo	203.4
	Hotel New Otani	181.8
Average for tenant buildings (159 members of Tokyo Association)		106.9

Note: This was compiled by the Tokyo Building Owners and Managers Association from action plans submitted to the Tokyo Metropolitan Government for the Tokyo CO<sub>2</sub> Emission Reduction Program.

Source: "Global Warming Strategy and Issues Seen from Building Management Viewpoint" by Keiji Okamoto, Standing Director, Japan Building Owners and Managers Association.

The Tokyo Chamber of Commerce and Industry recognizes the city government's effort to introduce the new scheme. It has requested, however, that the city discuss the details of the scheme, such as obligatory emissions reduction rates, and coordinate with relevant parties prior to its launch<sup>9</sup>. The plan will require cooperation with the industrial

<sup>9</sup> For "Opinions on the Revision of Tokyo Metropolitan Ordinance on Environmental Preservation," May 8, 2008, by the Tokyo Chamber of Commerce and Industry, see <http://www.tokyo-cci.or.jp/kaito/teigen/2008/200508-1.html>.

community, and designing a fair and reasonable scheme will be the key to getting its understanding.

## **(2) Issue of “carbon leakage” to other prefectures, and necessity for coordination between schemes**

Mandatory reduction quotas may push business facilities to other prefectures, causing “carbon leakage.” In other words, the problem is just shifted somewhere else. Saitama Prefecture (north of Tokyo) and Hyogo Prefecture (western Japan) are also looking into introducing schemes similar to Tokyo’s. If many prefectures decide to follow suit, carbon leakage can be prevented, since reduction requirements will be basically the same wherever businesses operate. To do that, however, all prefectures will need to standardize their scheme designs, a difficult hurdle to overcome.

It is a welcome development that different prefectures are looking to implement ways to reduce greenhouse gas emissions, but, at the same time, having various schemes in place can mean multiple regulations, which can increase the burden on companies. If an emissions trading scheme at the national level is fully introduced in 2013 or later, and if it differs from the Tokyo government’s in target facilities, enforcement period, reduction rate, trading method, and emissions reduction validation method, then coordination will be required between the two schemes.

## **6. Conclusion**

While it is not clear yet what levels of reduction will be made mandatory for target facilities, ongoing energy-saving efforts and actual reductions achieved prior to the introduction of the new scheme will be recognized. Thus, it is important for businesses to move ahead with energy-saving initiatives and to keep records of their achievements in view of stricter regulations on greenhouse gas emissions in the coming years.

If in fact the new scheme is successfully launched in Tokyo in FY2010, it will mark the implementation of the very first obligatory CO<sub>2</sub> emissions quotas in Japan, ahead of a national government initiative. Furthermore, in March 2008, the Tokyo government signed an agreement with the U.S. State of California about cooperating on an emissions trading scheme. Tokyo has also approved its participation in the International Carbon

Action Partnership (ICAP)<sup>10</sup>, established in October 2007 by 21 countries and states in the European Union, the United States of America, and Canada for the purpose of establishing a common set of rules for an international emissions trading market. These developments indicate that Tokyo's scheme will be linked to overseas schemes. We need to continue to keep a close eye on how the new Tokyo scheme turns out.

- End -

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<sup>10</sup> The Japanese Government participates in ICAP as an observer.

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