The Tokyo Initiative on Smart Energy Saving

～ Toward a Smart Energy City ～

May 2012

Bureau of Environment
Tokyo Metropolitan Government

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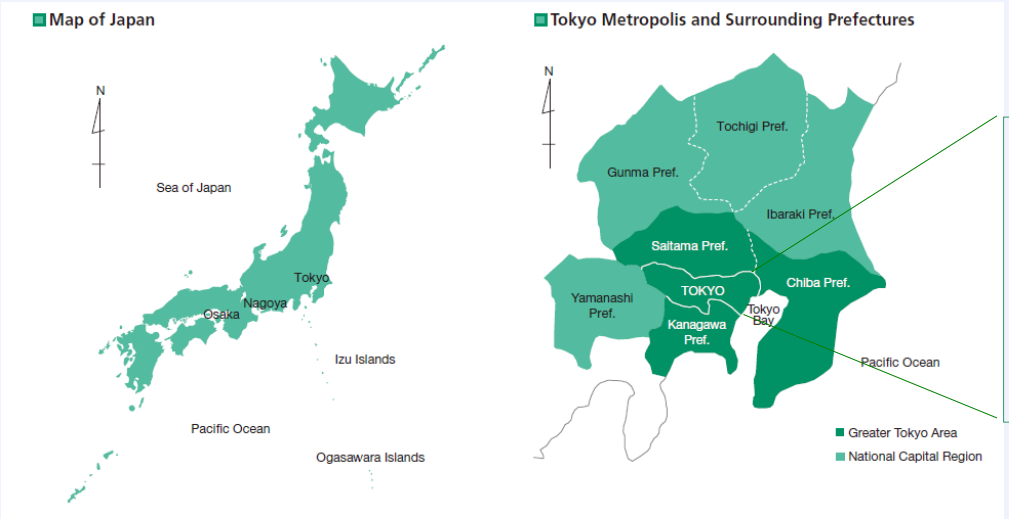
(Measures toward a Future Smart Energy City)

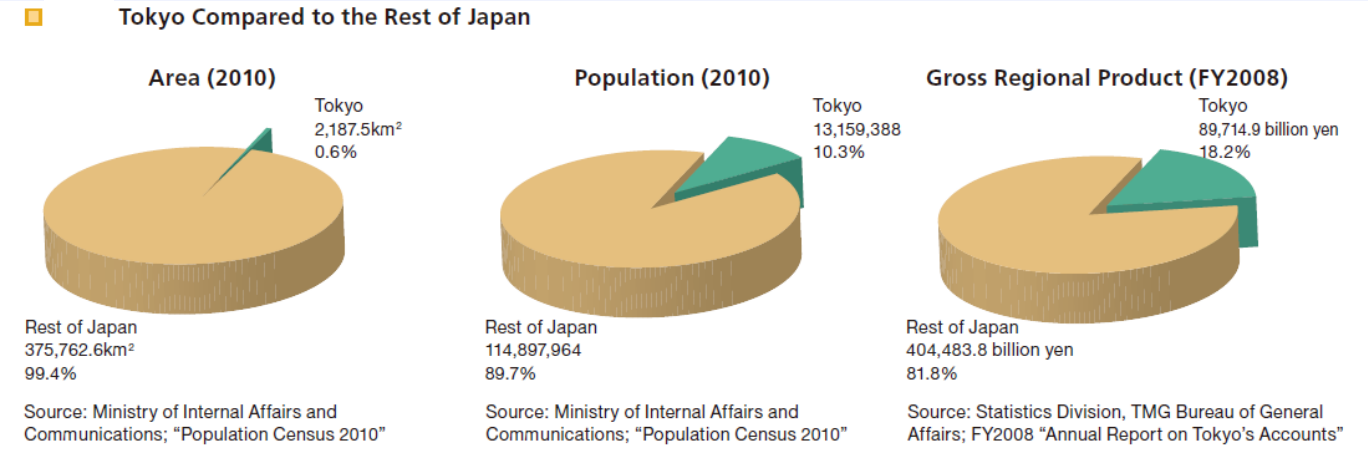
Evolution to a Smart Energy City based on Smart Energy Saving

City Profile



The overall population of Tokyo is about 13.16 million (as of October 1, 2010), and the area is about 2,188 square kilometers.

◆ Tokyo in Comparison with the Rest of Japan



◆ Status of Energy Consumption

		Amount of Consumption (PJ Conversion)				Growth Rate (%)		
		Fiscal 1990	Fiscal 2000	Fiscal 2005	Fiscal 2009	Comparison to Fiscal 1990	Comparison to Fiscal 2000	Comparison to Fiscal 2005
Amount of Energy Consumption (PJ)	Industrial Sector	129	97	69	67	-48.1%	-30.9%	-2.9%
	Commercial Sector	182	246	268	254	39.6%	3.3%	-5.2%
	Household Sector	172	202	207	210	22.1%	4.0%	1.4%
	Transport Sector	213	257	195	193	-9.4%	-24.9%	-1.0%
	Energy Total	696	802	738	725	4.2%	-9.6%	-1.8%

	Amount of Consumption (PJ Conversion)				Growth Rate (%)		
	Fiscal 1990	Fiscal 2000	Fiscal 2005	Fiscal 2009	Comparison to Fiscal 1990	Comparison to Fiscal 2000	Comparison to Fiscal 2005
Fuel Oil	287	285	236	200	-30.3%	-29.8%	-15.3%
LPG	37	33	26	23	-37.8%	-30.3%	-11.5%
City Gas	137	187	211	192	40.1%	2.7%	-9.0%
Electricity	233	296	316	310	33.0%	4.7%	-1.9%
Others	3	2	0	0	-100.0%	-100.0%	-
Total	696	802	738	725	4.2%	-9.6%	-1.8%

Toward a Smart Energy City beyond Power Saving

The Tokyo Metropolitan Government (TMG) has been promoting energy saving and expanding the use of renewable energy through pioneering climate change policy such as the implementation of the Tokyo Cap-and-Trade Program for Large Facilities.

During the power crisis that followed the Great East Japan Earthquake, the TMG implemented emergency measures concerning both power supply and demand by taking advantage of the experience of the climate change policy so far conducted.

In summer 2011, when concerns grew over a supply-demand squeeze, many households and offices made energy saving efforts. As a result, peak power demand in the service area of Tokyo Electric Power Company (TEPCO) was reduced by around 10 GW compared with 2010, enabling us to overcome the power crisis.

In the autumn and winter through the spring, power demand stayed lower than the pre-earthquake level by around 4 GW. This suggests that power demand has shifted downward as a structural trend.

Moreover, last year's power crisis spurred the creation of new businesses focusing on energy saving and accelerated the construction of low-carbon buildings that make full use of the most advanced technologies. Thus, Tokyo's energy saving initiative has entered a new stage.

In the meantime, regarding the global environment that serves as the foundation of human life, the climate change crisis has been getting worse, with extreme weather events occurring frequently. However, given Japan's growing dependence on thermal power generation, greenhouse gas emissions are certain to increase unless something is done to prevent that. From the perspective of reducing greenhouse gas emissions as well, promoting further energy saving is essential.

In addition, it is a huge challenge for Tokyo to enhance its disaster resistance by diversifying energy supply sources in order to protect the lives of Tokyo residents and preserve the city's critical functions as the Japanese capital in the event of an emergency such as the devastating earthquake expected to occur with the metropolitan area as the epicenter.

At the same time, if Tokyo is to continue to be the competitive business center in Asia, it is essential to ensure the comfortable office spaces and living environments that make it possible to maintain the core element of Tokyo's competitiveness, namely, superior intellectual productivity.

In light of the aforementioned circumstances, Tokyo should aim to eliminate wasteful energy usage and thoroughly implement and enhance “smart energy saving” based on the experiences of last summer. Having done that, Tokyo should transform itself into a “smart energy city” that enhances low carbon capability, comfortable environments and disaster resistance at the same time.

Therefore, in this report, “The Tokyo Initiative on Smart Energy Saving,” we set forth the following:

- Policy for the “smart energy saving” initiative that should be pursued in summer 2012 and beyond
- Measures that the TMG should take in order to transform itself into a “smart energy city” in the future.

As a result of the Great East Japan Earthquake and the Fukushima nuclear power station accident, Japan needs to carry out a fundamental revision of its electric power policy. It is necessary not only to reform the power supply system but also to establish a system to promote energy saving and power demand reduction.

Tokyo is responsible for playing the leading role in national efforts toward energy saving and management.

In the future, the TMG will promote energy saving and management based on the policy set forth here.

§1　Measures Taken So Far and Achievements

～Lessons from the Experience of Dealing with the Power Shortage～

Coping with Power Shortage Caused by the Great East Japan Earthquake

In summer 2011, a significant power shortage of up to 6.2 GW was expected in the service area of TEPCO. Consequently, the national government imposed power usage restrictions on large-lot users based on the Electricity Business Act, requiring a 15% reduction in their power usage compared with the peak usage in the previous summer.

Based on the Tokyo Emergency Power-Saving Program, which was formulated in May 2011, the TMG made every possible power-saving effort in its own activities and encouraged residents and companies to practice energy saving by taking advantage of climate change countermeasures so far taken.

Peak power demand in summer 2011 was reduced by around 10 GW compared with summer 2010 through vigorous efforts by residents and companies in Tokyo, such as reducing the brightness of office lighting; shifting to LED lighting; and keeping consumer electronics and home appliances in energy saving mode. As a result, rolling blackouts were averted.

Major Power Saving Measures Taken by TMG in Summer 2011

Items	Details	Achievement
Power saving advice for large facilities	・Formulated 10 priority power-saving measures ・Held power-saving seminars for building owners and tenants. ・Energy saving experts visited business facilities to provide energy saving advice.	・Number of seminar participants: 1,956 people ・Number of cases in which advice was given: 100 facilities
Energy saving advisory program for small and medium-sized facilities	Technical experts visited facilities to evaluate the status of power and gas usage and presented energy saving suggestions and provide technical advice.	Approx. 490 facilities (586 cases of evaluation and 93 cases of operation improvement advice by the end of fiscal 2011)
Power saving advisory program for households	Approx. 3,000 staff members of organizations managing the energy saving advisory program visited houses as TMG-certified energy saving advisors to provide energy saving advice.	Approx. 330,000 houses (Approx. 520,000 cases by the end of fiscal 2011)
Power saving measures implemented at TMG owned facilities	Implemented such measures as revising the operation method of air conditioning equipment and reducing lighting by half.	Attained the target of a 15% reduction for TMG owned facilities as a whole. Achieved a 29% reduction at the TMG headquarter buildings.

Status of Power Saving in Summer 2011

■The vigorous effort of power saving placed an excessive burden on some facilities.
- 50% of large facilities (factories) made production adjustments.
- Factories bore a burden due to a shift of work to early morning and nighttime hours as well as holidays.
- It is difficult to keep the air conditioner temperature setting at factories at 28 degrees Celsius.

■On the whole, the following effective power saving measures have been taken, mainly at business and commercial facilities, including office buildings, and many business facilities intend to continue to take power saving measures in summer 2012.
- Revision of lighting brightness
  Lighting brightness of 500 lux or less is becoming the mainstream, compared with the previous mainstream level of 750 lux or more.
- Air conditioner temperature setting of 28 degrees Celsius is becoming popular.
  Temperature setting of 28 degrees Celsius is increasingly adopted not only in common areas but also in tenant areas.
- ”Making the measurement of power consumption visible

■According to a citizens' survey, around 80% of respondents support power saving regarding lighting and air conditioning of streets and public facilities.

The Continuation and Wide Acceptance of a Lifestyle of Significant Power Saving since Summer of 2011

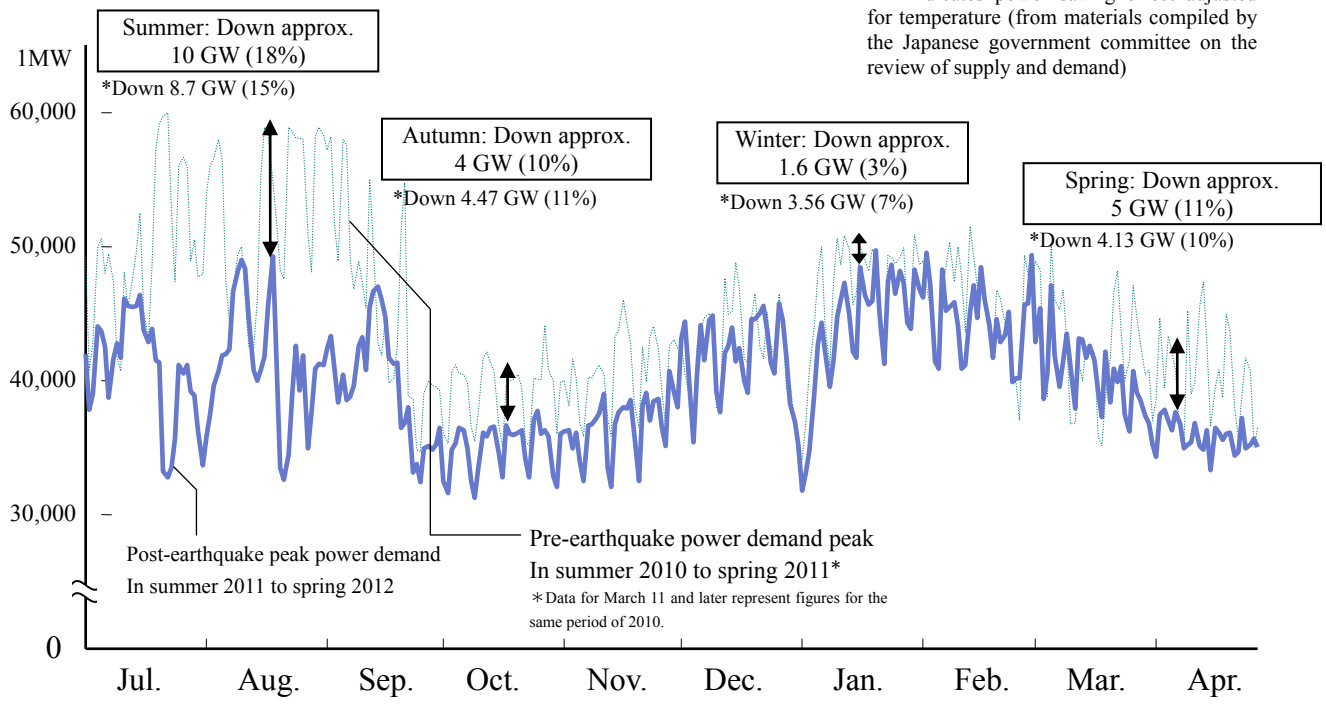
Since the summer of 2011, a lifestyle of energy saving and power demand reduction shows signs of becoming widely accepted, as shown by the continuation of power saving measures such the revision of the brightness of room lighting.

The continuation of significant energy saving represents the achievement of measures taken by many residents and companies in Tokyo.

Changes in peak power demand
(Comparison of pre- and post-earthquake data)

[In the Service Area of TEPCO]

“*” indicates power saving effect adjusted for temperature (from materials compiled by the Japanese government committee on the review of supply and demand)



(Compiled by the TMG based on materials prepared by TEPCO)

Revision of the brightness of lighting in offices and retail stores has brought particularly significant benefits.

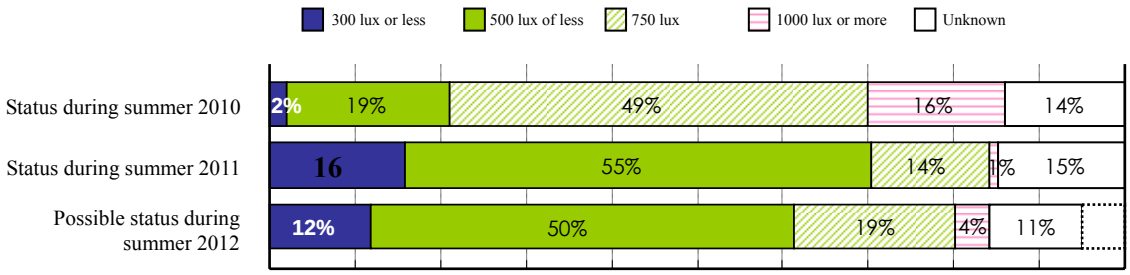
Last summer, the mainstream brightness of lighting in offices and other facilities declined from 750 lux or more to 500 lux or less. According to a survey conducted by the TMG, many business facilities intend to keep lighting brightness at the reduced level.

Lighting brightness of 500 lux or less is becoming the mainstream in office buildings, etc. in Tokyo

- In summer 2010, 50% of business facilities set the lighting brightness at around 750 lux. (Nearly 20% set the brightness at 1,000 lux or more, while around 20% set it at 500 lux or less.).

⇩

- During summer 2011, 70% of business facilities set the lighting brightness at around 500 lux or less.
- During summer 2012, 60% of business facilities intend to keep the lighting brightness at around 500 lux or less.



（TMG survey）

Japan's previous brightness standard was set at an overly high level

- Many Western countries have set the brightness standard of 500 lux or less.
- After the earthquake, the Architectural Institute of Japan presented an emergency recommendation for the lowering of the practical lighting brightness and revision of the lighting brightness standard.
- Through revision of the JIS (Japanese Industrial Standards), the national government adopted a desirable brightness range of 500 to 1,000 lux.

Key points of the emergency recommendation concerning the lighting environment (May 26, 2011, Lighting Environment Managing Committee Architectural Institute of Japan）

・Power saving should be continued until the reduction target for greenhouse gas emissions is achieved, instead of until the post-earthquake power supply returns to normal.

・A lighting brightness level one grade below the current recommended level should be the level of practical lighting brightness. E.g. Brightness in office rooms: 750 lux →500 lux

・Regarding the current energy saving initiative as an opportunity for reviewing the principles of lighting, the government should examine the lighting environment created during the period of power saving and revise the design method and standard of the lighting environment.

Comparison of office building lighting brightness (general brightness standards)

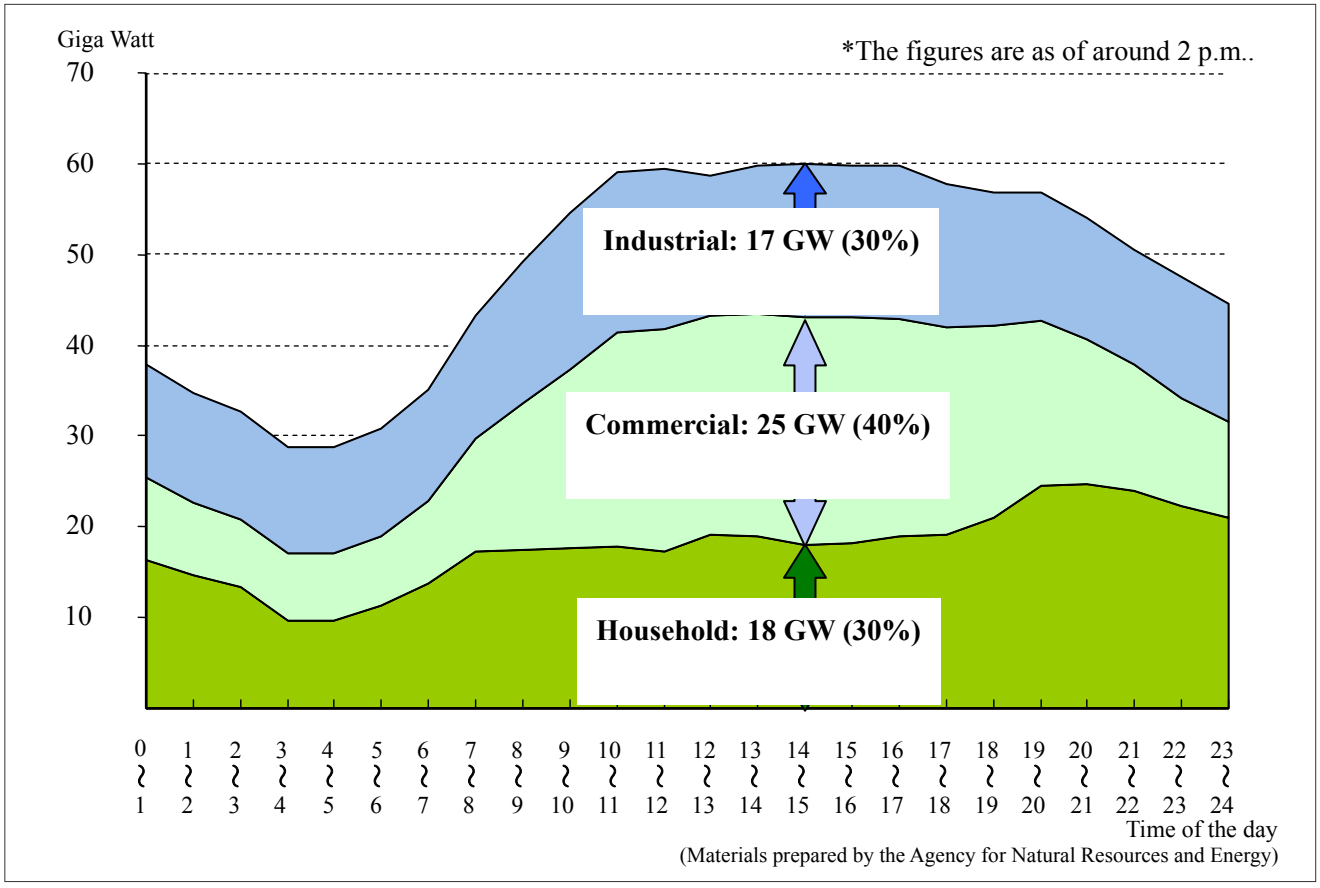
Unit: Lux

	Office
Japan (JIS)	**750***
US. & Canada	**200-500**
France	**425**
Germany	**500**
Australia	**160**

(Source) IEA/OECD.LIGHT'S LOBOUR'S LOST Policies for energy-efficient lighting. 2006

＊In May 2011, the government revised the JIS and adopted a desirable brightness range of 500 to 1000 lux in lux in addition to the recommended brightness of 750 lux.

Reference: In the service area of TEPCO: Demand curve on the day of the power peak demand in summer (2010 pre-earthquake)



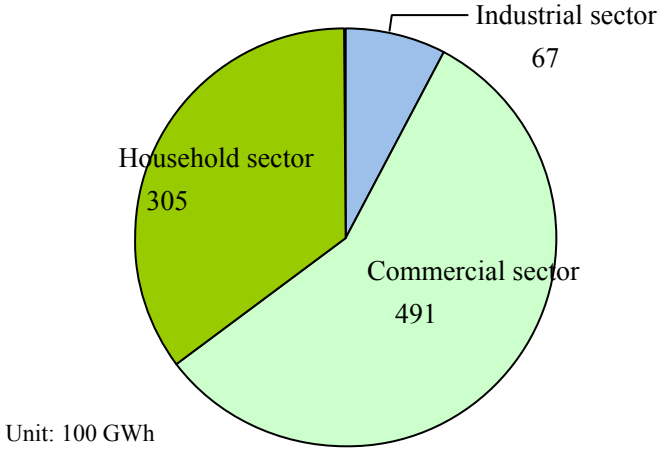
(Materials prepared by the Agency for Natural Resources and Energy)

Reference: Notable features of power consumption in Tokyo

In Tokyo, the commercial and household sectors account for 90% of overall power consumption.

What is notable about power demand in Tokyo is that the ratio of power demand in the household sector and the commercial sector (offices, stores, etc.) is high. These two sectors account for 90% of overall power consumption.

Breakdown of power demand by sector
(Tokyo, fiscal 2009)



Unit: 100 GWh

(Statistics on energy consumption by prefecture)

New Stage of Tokyo's Energy Saving Initiative

Through the experience of power saving implemented on a massive scale during summer 2011, which might be called a "grand social laboratory experiment," we have learned where energy is wasted, what energy saving measures are effective and what measures cause an excessive burden. Through frequent trial and error, we have also learned that the conduct of power saving measures that were previously seen as unlikely to gain acceptance as permanent measures is feasible.

This has been recognized not only by government officials but also by many residents and companies. New ways of doing business are emerging based on the experience of overcoming the tight power supply-demand balance.

Now that Tokyo's energy saving initiative has entered a new stage, what we should do for the moment is ensure the initiative will continue as a permanent effort.

§2 Policy for Promoting Energy Saving In and beyond Summer 2012

～"Smart Energy Saving" Based on Based on the experience of the Summer of 2011

As shown in the previous chapter, the pattern of power consumption in Tokyo has changed since summer 2011 due to measures such as the revision of lighting brightness. Power consumption has been kept at reduced levels from the autumn and winter through the spring.

The basic principle of energy saving in and beyond summer 2012 is to take advantage of the achievements made through measures taken by many residents and companies in Tokyo and at the same time eliminate wasteful energy usage and ensure that the lifestyle of "smart energy saving" becomes widely accepted as a permanent initiative.

Outlook on Power Supply and Demand in Summer 2012

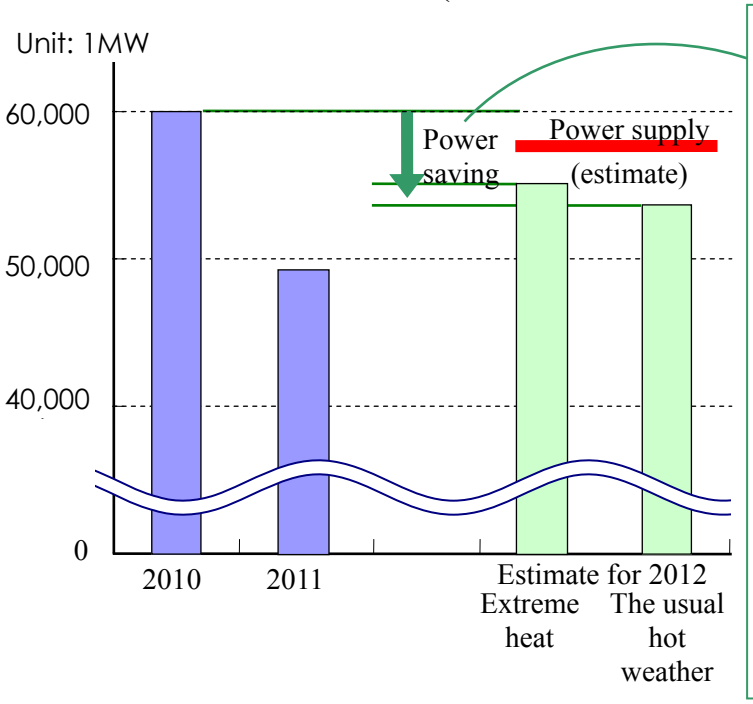
According to a report issued by the governmental committee on the review of power supply and demand (May 12, 2012), power supply and demand in the service area of TEPCO in summer 2012 is estimated as follows:

Unit: Mega Watt

Supply capacity *Before power provision to other regions	5,771	
Peak power demand *Adjusted for power saving effect	In the case of an extreme heat wave	In the case of the usual hot weather
	55,200	53,600
Gap with supply capacity	2,510	4,110

Summer Power Peak Demand (results in 2010-2011 and estimate for 2012)

(in the service area of TEPCO)



By promoting wide acceptance of power saving :
4 GW
(saving effect due mainly to revision of lighting brightness)

+

Air conditioning management in summer: 2 GW
(Reducing the summer-time power demand for air conditioning of approx. 20 GW by 10%*)

It is estimated that the power saving effect of 6.1 GW compared with the 2010 summer level that is assumed by TEPCO can be achieved. ⇩

*For example, power saving can be done as follows:
Office and commercial buildings: Raising the room temperature setting by 2 degrees Celsius (from 26 degrees to 28 degrees Celsius) cuts power consumption by approx. 8.5%
Households: Raising the room temperature setting by 2 degrees Celsius (by 26 degrees to 28 degrees Celsius) cuts power consumption by approx. 20% (raising the setting by 1% achieves a 10% cut)

(TMG estimate)

Even during an extreme heat wave, a power supply-demand squeeze may occur only on limited days and in limited time zones.

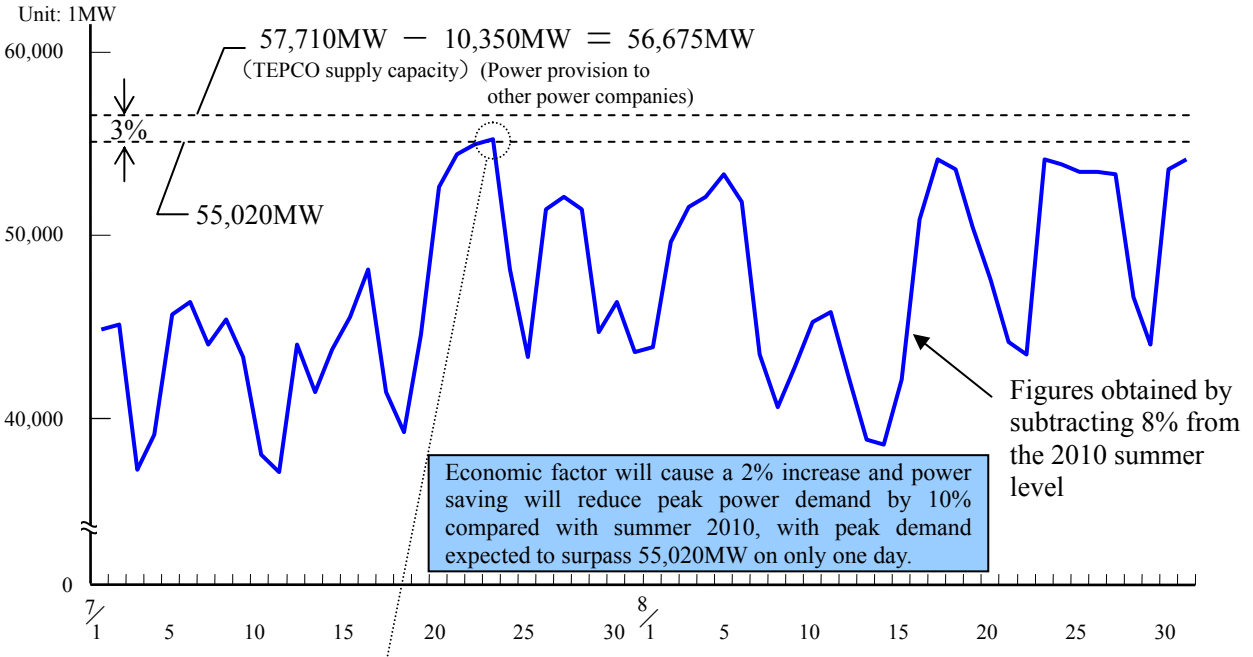
Even during an extreme heat wave, a power supply-demand squeeze which reduces the reserve ratio of the total amount of TEPCO's power supply below 3%, seen as the minimum level necessary for absorbing demand fluctuations, will not occur every day provided that we eliminate wasteful energy usage and steadily make reasonable power saving efforts. Even if such a squeeze occurs, it will be confined to limited time zones.

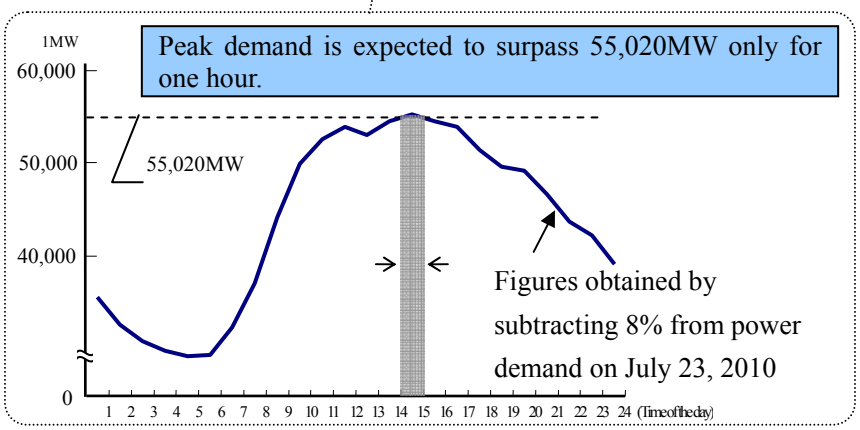
<Assumption 1>
Some power (1,035MW at the maximum) will be provided out of TEPCO's supply capacity (57.71 GW in August) to Western Japan to ease supply power constraints in the region, leaving 56,675MW available in the service area of TEPCO. Deduction of the capacity equivalent to the reserve ratio of 3% (allowance necessary for absorbing demand fluctuations) from this figure leaves 55,020MW.

→If peak power demand surpasses 55,020MW, the reserve ratio will fall below 3%.

<Assumption 2>
Economic factors will increase peak power demand by 2% in 2012 (adjusted for power saving effect) compared with 2010, when the summer heat wave was extreme, while power saving will reduce it by 10% (Report by the Japanese government committee on the review of supply and demand).

→If the heat wave is as strong as in 2010, peak power demand is estimated to be 8% lower than in 2010.





The reserve ratio will fall below 4.5%* (demand will surpass 54,230MW) only on three days and only for a total of five hours.

* Keeping the reserve ratio at or above 4.5% is seen as necessary for the moment. But the committee on the review of supply and demand recommended that the minimum necessary ratio should be reviewed with a view to reducing it to 3% or higher when the predictability has improved.

Philosophy (Core Concept) of "Smart Energy Saving"

The peak power demand estimated for this summer in light of the effects of the power saving measures so far taken is lower than the supply capacity. However, if we are to prepare for the possibility of providing some power to other regions to ease their power supply constraints or the possibility of a power shortage or another emergency occurring in Tokyo itself, we need to continue power saving measures.

Moreover, energy saving and power demand reduction are important in order to deal with an increase in CO2 emissions arising from the operation of thermal power plants with low efficiency.

Measures that need to be taken this summer and beyond are not those that would place an excessive burden on users, such as requiring factories to change their operating hours. What is needed is "smart energy saving" that eliminates wasteful power usage and enables flexible response to a supply-demand squeeze while maintaining the benefits of urban life and the comfortable environments of offices and households.

Three Principles of Smart Energy Saving

1. **Implement "continuable (easy to continue with little effort) energy saving measures" without causing an excessive burden while eliminating wasteful power usage**

   We should continue the new lifestyle of power usage adopted as a result of last summer's review in order to elimimate wasteful power usage. At the same time, we should make sure to implement and enhance energy saving measures that bring economic benefits while also taking the perspective of CO2 emission reductions into account and ensure that they are entrenched in society.

2. **Identify the peak demand and save power (peak-cut) as needed (peak cut).**

   Even if the summer heat wave is intense, a power suppy-demand squeeze may occur only on limited days and in limited time zones. We should prepare energy saving measures that should be taken routinely and additional measures (peak cut measures) that should be taken in the event of a supply-demand squeeze.

3. **In normal times, avoid the implementation of measures that undermine economic activities, the benefits of lively urban life and the comfortable environments in offices and households.**

   We should avoid the implementation of measures that would impose an excessive burden on economic activities, such as requiring factories to change their working days and hours. In addition, in order to promote measures to develop and maintain comfortable office and living environments while saving energy, we do not assume the implementation of measures that would not significantly reduce peak power demand while placing an excessive burden on residents and office workers.

Seven Principles of "Smart Energy Saving" at Business Industrial Facilities

1. **Make sure to keep the lighting brightness at 500 lux or less, eliminate wasteful energy usage and continue the revision of lighting brightness as a permanent measure.**

As a measure that can be continued all year around, reduction of lighting and revision of lighting brightness, which were implemented in Tokyo in summer 201,1 should be accepted widely as permanent measures (desktop brightness should be 500 lux or less [around 300 to 500 lux]).

2. **Take care to keep the room temperature from rising above 28 degrees Celsius**

<Ensure a comfortable environment by managing humidity as well>

Take the following measures in order to manage the office room temperature:

① Check the actual room temperature.
② Circulate indoor air using air-circulating equipment (electric fans).
③ Make effective use of blinds (simultaneously make use of sunlight and reduce heat by keeping the blind blades in a horizontal position).
④ Reduce the intake of outdoor air through appropriate management of the indoor CO2 concentration.
⑤ Manage humidity as well: when humidity is high, the room temperature should be kept relatively low.

3. **Make sure to keep OA equipment in energy saving mode**

Make sure to take energy saving measures regarding OA equipment that can be continued all year around, including reducing the stand-by power consumption of personal computers and printers and lowering the display brightness.

*Brightness: Brightness of the display

4. **Share benefits of power saving and encourage universal saving effort by "making power consumption "visible".**

<Identify peak power demand via demand-monitoring equipment>

Use demand-monitoring equipment and building energy management systems to keep track of power usage and identify facilities that consume power on a large scale. Identify the benefits of power saving measures and ensure that business operators, building owners, tenants and customers work together to effectively save energy and reduce peak power demand.

5. **Save energy by improving equipment efficiency without undermining the office environment.**

Ensure efficient operation of facilities and equipment through such measures as discontinuing venting of elevator machine chambers and electric equipment chambers and revising the temperature setting (set at above 30 degrees Celsius or higher) and ensuring appropriate maintenance and management including periodic filter cleaning.

6. **In normal times, avoid the implementation of measures that cause an excessive burden compared with benefits, such as suspending the operation of elevators.**

In normal times, avoid the implementation of measures that excessively undermine the comfortable working environment. The measures to be avoided include: suspending the operation of elevators and escalators in office buildings and railway stations; keeping the train temperature at 28 degrees Celsius or higher during rush hours; keeping the factory floor temperature at 28 degrees Celsius or higher; switching off road and sidewalk lighting at nighttime; shifting factory operation to night hours and holidays; and excessively restraining the use of air conditioning on extremely hot days.

7. **Prepare additional measures that may be taken if a warning regarding a power supply-demand squeeze has been issued.**

Prepare additional measures that may be taken in response to a power supply-demand squeeze according to the seriousness of the squeeze (e.g., suspending the operation of elevators and escalators).

Examples of Excellent Practices

■ Reduced power consumption by 18% by revising lighting brightness through cooperation between building owners and tenants (20% total reduction for all measures)

～An example case at a large tenant building～

■ Reduced power consumption by up to 20%, more than was required by the government's order for power usage reduction in summer 2011.

■ 90% of the consumption reduction is estimated to have been achieved through lighting-related power saving measures.

＜Implemented power saving measures＞

Common areas	・ Reduced lighting by up to 80%. *Kept lighting brightness relatively high on floors used mainly for retail space and kept it relatively low on floors used mainly for offices by using a floor-by-floor lighting adjustment system. ・ Discontinued air conditioning in passageways
Tenant areas	・ Requested cooperation from with tenants. - Kept the air conditioning temperature setting at 27-28 degrees Celsius. - Reduced fluorescent lighting by around 20% in order to keep the brightness at 400 lux or less. *Patiently negotiated with tenants in advance concerning lighting reduction.

Frequent exchange of information with tenants

・Semi-annual meetings with tenants
・Exchange of opinions on an as -needed basis

Listen to tenants' requests and make adjustments according to each tenant's circumstances

Introduced after the earthquake

■ Reduced power consumption by 33% by managing power demand through real-time "visualization" of power usage

～An example case at a mid-size factory～

■ Introduced a service that enables existing power usage monitoring equipment to provide real-time display of power usage and past data on power demand and usage.

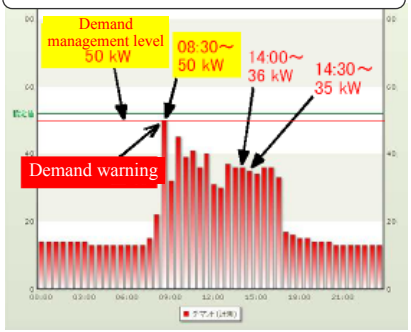
■ Took appropriate measures in light of the analysis of the data, which showed that most power consumption resulted from lighting and air conditioning, rather than from use of production machinery (around a quarter resulted from the use of production machinery).

<Implemented power saving measures>

・ Reduced the overly bright ceiling lighting by between one half and two thirds.

・ Measured the temperature at various places in the factory, including the air intake areas of air conditioners and remote areas, so as to keep the air conditioning temperature setting at an optimum level.

Demand graph



Reduced the contracted power usage by 33% and the actual power usage by 38%.

Comparison between July 2010 and July 2011

Excellent practices adopted at facilities in Tokyo are available for viewing on the TMG website.(In Japanese)

① **March 12 Nikkei Environmental Symposium "Toward a Smart Energy City beyond Power Saving"**
Smart energy saving measures implemented in office buildings, universities and other facilities during summer 2011 and planned for the future are shown (available for viewing now)

② **Examples of energy saving at large facilities**
Example cases explained at seminars on energy saving and power demand reduction will be shown (to be available for viewing from mid-May).

③ **Examples of energy saving at small and medium-size facilities**
Examples explained at briefings on excellent examples are shown (available for viewing now)

④ **Examples of energy saving at facilities during summer 2011**
Reports based on hearings of specifically how energy saving measures were taken in workplaces will be shown (to become gradually available for viewing from mid-May)

Seven Principles of "Smart Energy Saving" at Households

1. **Make sure to keep the refrigerator cooling strength at "medium" during summertime.**
   Implement a measure that saves energy and reduces power demand continuously with one setting change.

2. **Make sure to put the TV into energy saving mode.**
   Implement a measure that saves energy and reduces power demand continuously with one setting change, such as putting TVs into energy saving mode and lowering display brightness.

3. **Replace incandescent lamps with LED lamps or fluorescent lamps.**
   Implement a measure that saves energy and reduces power demand continuously with a one-time replacement.

4. **Make effective use of air conditioners and electric fans so as to keep the room temperature from rising above 28 degrees Celsius.**
   <When humidity is high, energy can be saved more effectively if the room temperature is kept lower.>
   To ensure effective use, implement the following measures:
   (1) Frequently clean the filters.
   (2) Circulate air by using electric fans.
   (3) Block the sunlight with bamboo blinds and "green curtains."
   (4) Clear the area around the compressor unit.
   (5) Cover the compressor unit with a bamboo blind.
   (6) Avoid the use of the humidity reduction mode and frequent switching on and off.
   (Keep the air conditioner on when you go out for only half an hour or so.)

5. **Do not excessively restrain the use of air conditioners on extremely hot days.**
   Avoid power saving efforts that may undermine human health on extremely hot days in light of the risk of heatstroke.

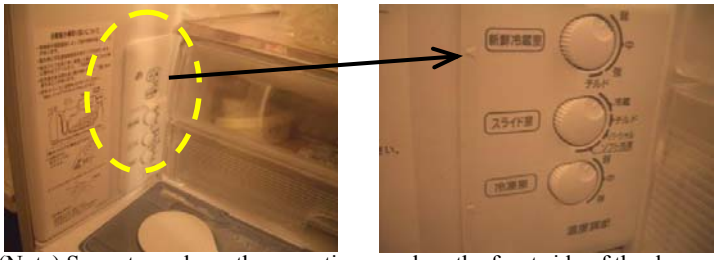
6. **Practice meticulous energy saving regarding consumer electronics and home appliances.**
   Switch off the TV when it is not being watched. Switch off lighting during the daytime and keep it to a minimum during nighttime. Unplug consumer electronics and home appliances which are not in use; reduce water usage; minimize the time when the refrigerator door is open; avoid overstuffing the refrigerator; and replace vacuum cleaner bags frequently.

7. **Avoid using power-hungry consumer electronics and home appliances during the peak demand time zone around 2 p.m. on weekdays. This principle should especially be followed when a warning regarding a power supply-demand squeeze has been issued.**
   Avoid using particularly power-hungry consumer electronics and home appliances, such as IH cooking heaters, microwave ovens, electric pots, irons, bathroom driers and laundry driers, in the time zone around 2 p.m. on weekdays. Avoid using two or more power-hungry consumer electronics and home appliances at the same time: for example, when using the microwave oven, switch off the air conditioner.

Tips for “Smart Energy Saving” in Households

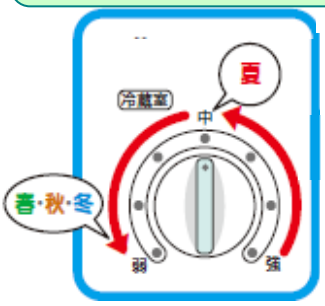
■How to change the refrigerator temperature

When the temperature adjustment dial is located in the refrigerator chamber:



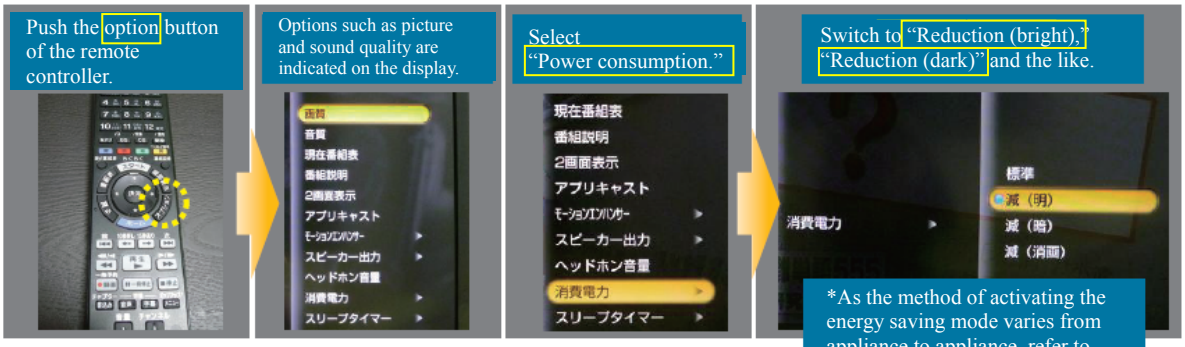
(Note) Some types have the operation panel on the front side of the door panel.

Keep the cooling strength level at “medium” in summer and at “low” in other seasons.



■How to put TV into energy saving mode

～When reducing the brightness of the LCD display:



■How to select LED lamps

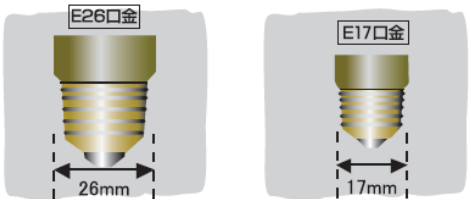
Power consumption of an LED lamp is a sixth to a quarter of that of an incandescent lamp and the former’s operating life is around 40 times as long as that of the latter. Be sure to check the brightness and the outlet size when shifting to LED lighting for the first time. The brightness of LED lamps is universally measured in lumen (lm).

Point 1 **Check the brightness.**

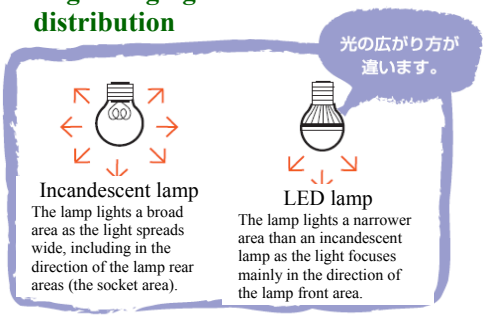
The larger the lumen value, which represents the amount of Light emitted from the lamp the higher the brightness is.

Point 2 **Check the socket size.**

Broadly speaking, there are two socket sizes, E26 and E17. Choose the appropriate socket size.



Regarding light distribution



Brightness benchmarks: Watt (W) and lumen (lm)

	Incandescent lamp	Compact fluorescent lamp	LED lamp (E26 outlet)	LED lamp (E17 outlet)
Category	W type	W type	Total luminous flux (lumen)	
Bright	100W type	25W type	1520 lm	1430 lm
	60W type	15W type	810 lm	760 lm
	40W type	10W type	485 lm	440 lm
Dark	25W type	—	—	230 lm

(Source) Guidelines established by the Japan Electric Lamp Manufacturers Association

TMG's Measures toward Ensuring "Smart Energy Saving" as a Permanent Initiative

■Measures for large facilities

■ Promoting excellent practices and smart measures by holding seminars on energy saving and power demand reduction

The TMG will promote the implementation of smart energy saving measures by large facilities, which are covered by the Tokyo Cap-and-Trade Program (Mandatory carbon reduction program to reduce the total volume of CO2 emissions in Tokyo) based on the Tokyo Metropolitan Environmental Security Ordinance. The TMG will use such occasions as a seminar on energy saving and power demand reduction for building owners and tenants and a conference held to announce example cases of energy saving by top-level business facilities to explain excellent practices, smart measures and measures that may be improved to further reduce energy consumption in light of the implementation status during summer 2011.

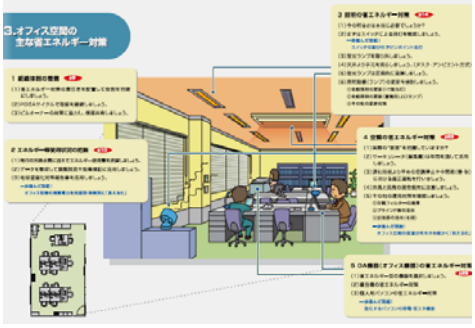
■Measures for small and medium-size facilities

■ Energy-saving advisory program by the Tokyo Metropolitan Center for Climate Change Actions (Cool Net Tokyo)

The Tokyo Metropolitan Center for Climate Change Actions (Cool Net Tokyo) implements the free energy-saving advisory program (around 600 cases are handled annually) and provides advice on concrete energy saving and power demand reduction measures. In addition, it holds industry-specific seminars and joint seminars on energy saving and power demand with municipalities in preparation for the summer.

Publication of texts on energy saving suited to specific industries and holding of seminars

Cool Net Tokyo compiles texts on energy saving suited to specific industries in cooperation with associations of small and medium-size enterprises and holds seminars, thereby supporting the implementation of concrete energy saving measures.



<Industry-specific texts on energy saving>

- Offices
- Gas stations
- Convenience stores
- Game arcades
- Beauty parlors
- Nursing facilities
- Hotels
- Fitness clubs
- Printing factories
- Cleaning service
- Confectionary factories, etc.

*All 21 industries are indicated on the following website:

(URL) http://www.tokyo-co2down.jp/seminar/type/text/(in Japanese)

■ **Promoting excellent practices and smart energy saving measures by holding seminars**

At a seminar for facilities covered by a mandatory carbon reduction reporting program for small and medium-sized facilities (more than 30,000 facilities submitted reports in fiscal 2011) based on the Tokyo Metropolitan Environmental Security Ordinance, the TMG will explain smart energy saving and power demand reduction measures taken in light of the implementation status in summer 2011 (around mid-June 2012).

■ **Cooperating with companies to promote a shift to energy saving-oriented business styles that eliminate wasteful energy usage**

Based on the experience of energy saving and power demand reduction during summer 2011, the TMG will consider revisions of energy usage mainly at retail stores regarding lighting and air conditioning and promote the continuation of energy saving-oriented business styles that eliminate wasteful energy usage.

■ **Supporting the installation of demand-monitoring equipment**

The TMG will promote the implementation of measures to reduce power demand and secure power supply necessary for continuation of business activity by providing small and medium-sized enterprises with subsidies for the installation of demand-monitoring equipment, independent power generation facilities and storage batteries.

Making power consumption visible via demand-monitoring equipment

The installation of demand-monitoring equipment makes it possible to keep track of power consumption (kW) by equipment and facility in real time. This will raise awareness about energy saving and enable the implementation of more effective energy saving and power demand reduction measures. Moreover, it will help to reduce peak power demand systematically, so it is expected to bring economic benefits, such as reduction of the contracted power usage.

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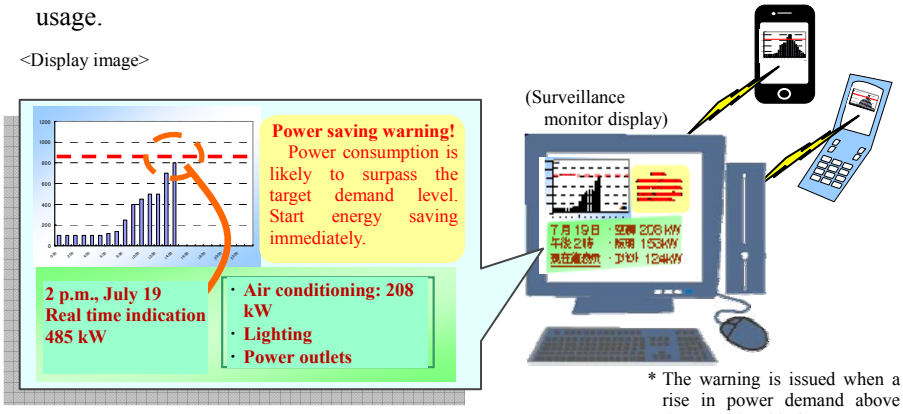


* The warning is issued when a rise in power demand above the target level is forecast.

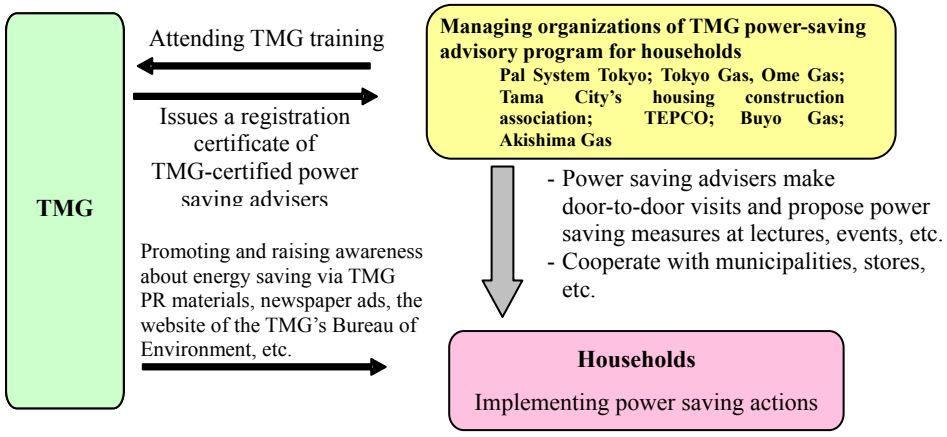
■Measures for households

■ Around 4,000 TMG-certified advisors provide advice on power-saving measures.

As in summer 2011, energy saving advisers will provide households with advice on energy saving and power demand reduction starting in June 2012. In addition to making door-to-door visits, they will provide free advice on effective energy saving and power demand reduction measures at various lectures and events organized by the managing organizations under the advisory program.

In summer 2012, the scope of energy saving advisors' activities will be expanded to include the provision of advice at energy saving seminars organized by municipalities and in-store lectures on energy saving held in commercial facilities.

Scheme for the power saving advisory program for households



■Cooperation with local and municipal governments in the Greater Tokyo Area

The TMG will strengthen cooperation with municipalities in Tokyo and will also work with other prefectures and municipalities in the Greater Tokyo Area to promote and raise awareness about energy saving and power demand reduction.

Energy saving measures implemented in the TMG headquarter buildings

1. Results of measures implemented during summer 2011

In summer 2011, we implemented various measures in order to reduce peak power demand in the TMG headquarters buildings by up to 25% (8,325 kW) compared with the summer 2010 level (11,100 kW). As a result, we achieved a 29% peak demand reduction.

2. Continuation of reasonable energy saving

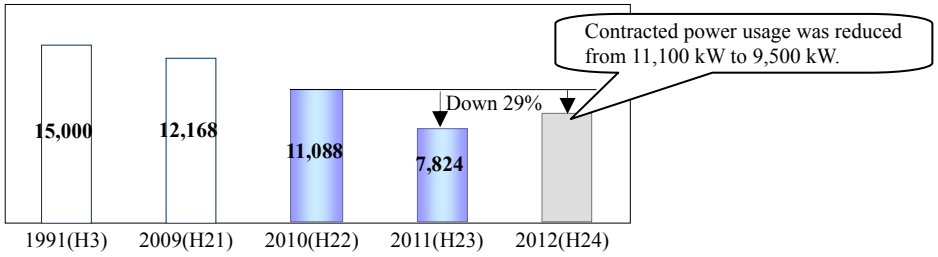
～Continuation of "reasonable energy saving measures" as permanent measures and implementation of measures to reduce peak demand according to the seriousness of the supply-demand squeeze ～

During autumn 2011 and thereafter, we have continued energy saving measures, such as reducing lighting in offices by half (lighting brightness at 500 lux or less). Until now, we have kept overall power consumption around 10% lower than the 2010 level. The contracted power usage has been reduced from 11,100 kW to 9,500 kW.

While maintaining the current level of energy saving results, we will implement additional measures in the event of a supply-demand squeeze (in normal times, we will avoid the implementation of measures that would impose an excessive burden, such as suspending the operation of elevators).

We will routinely implement effective energy saving measures, including further popularization of existing measures and at the same time, we are ready to implement measures to reduce peak demand on days and time zones when more aggressive energy saving is required.

●Changes in peak power demand in TMG headquarters buildings (kW)



●Measures taken in TMG headquaters buildings

Reasonable Energy saving measures taken routinely

Measures to be taken in the event of supply-demand squeeze

Lighting	• Reduced lighting in offices by one half (500 lux or less). • Switched off lighting near windows and at entrances/exits.
Air conditioning	• Kept the office room temperature below 28 degrees Celsius. • Optimized air conditioning through CO2 concentration management. • Switched off air conditioning in lobbies and some other areas.
Other	• Kept OA equipment in energy saving mode and made power usage visible. • Suspended the operation of some hot water supply systems and half of the tea supply appliances.
Additional	Prepared measures to be taken in the event of a power supply-demand squeeze according to the seriousness of the squeeze in light of the measures taken during summer 2011 (results in summer 2011: 29% reduction compared with summer 2010).

Energy saving at overall TMG-owned facilities

At other TMG-owned facilities, we will also continuously implement energy saving and power demand reduction measures. It should be noted that in normal times, we will avoid the implementation of measures that imposed an excessive burden at some facilities last summer (e.g., switching off road and sidewalk lighting during nighttime and suspending the operation of elevators and escalators in railway stations). Such measures may be implemented as additional measures in the event of a power supply-demand squeeze according to the seriousness of the squeeze.

By implementing those measures, we also aim to achieve the TMG's reduction target of greenhouse gas emissions generated by the activities of TMG-owned facilities in fiscal 2014 by 20% compared with the fiscal 2000 level.

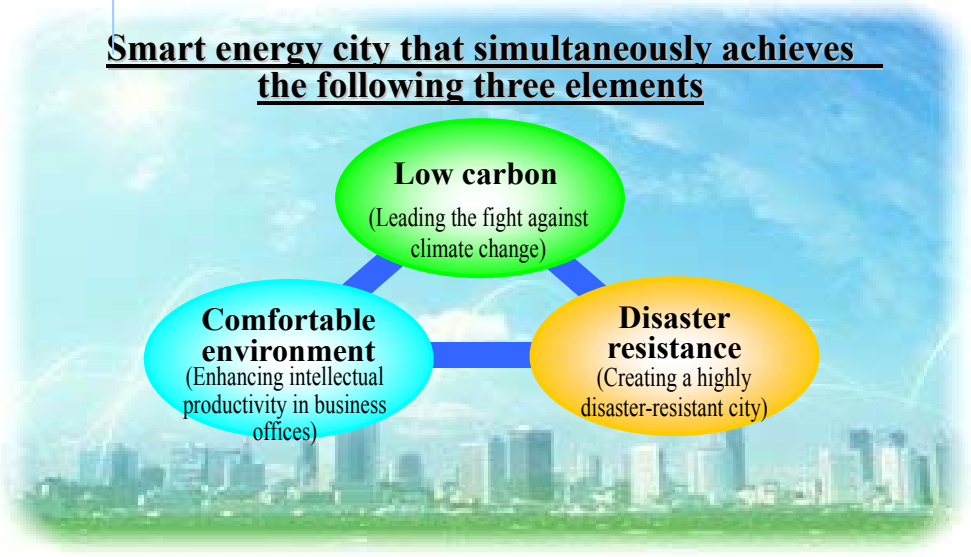
§3 Toward a Smart Energy City

～ Tokyo's Vision of a Cutting Edge City Based on Smart Energy Saving～

(1) Vision of a Desirable Smart Energy City

What is a Smart Energy City?

In addition to pioneering climate change policy, Tokyo must evolve into a "smart energy city" that simultaneously achieves low carbon, comfortable environments and disaster resistance in order to prepare for disasters and enhance the benefits of urban life and intellectual productivity based on "smart energy saving" as mentioned in §2.



Low carbon

Incorporating smart energy saving and "low-carbon" energy utilization into economic and social activities

Smart energy saving will take root and low-carbon social systems, technologies and lifestyles that enable CO2 emission reduction will spread as part of urban activities in Tokyo in terms of both energy supply and demand.

Comfortable environments

Optimal control of urban energy supply and demand to ensure "comfortable" office and living environments

We will accept widely energy saving and power demand reduction measures that make the environments of offices and houses more comfortable as spaces for the intellectual productivity that represents the source of Tokyo's economic vitality. At the same time, we will maintain productivity and identify the peak demand and save power as needed.

Disaster resistance

Diversifying energy sources to achieve a high level of "disaster resistance"

The use of distributed energy systems that make use of cogeneration, storage batteries and renewable energy will be expanded in order to ensure the continuity of business activity and everyday life even if an emergency such as a natural disaster halts energy supply from external sources.

Direction of the Energy Saving Initiative

In order to achieve a smart energy city, it is important to promote urban development that (1) makes maximum use of technologies and knowhow concerning energy saving and power demand reduction; (2) widely uses low-carbon, independent distributed energy systems; and (3) incorporates a social system of optimal energy management capable of improving energy utilization efficiency.

① Smart energy saving and power demand reduction that makes maximum use of energy-saving technologies and knowhow

＋

② Expansion of use of low-carbon, independent distributed energy systems

＋

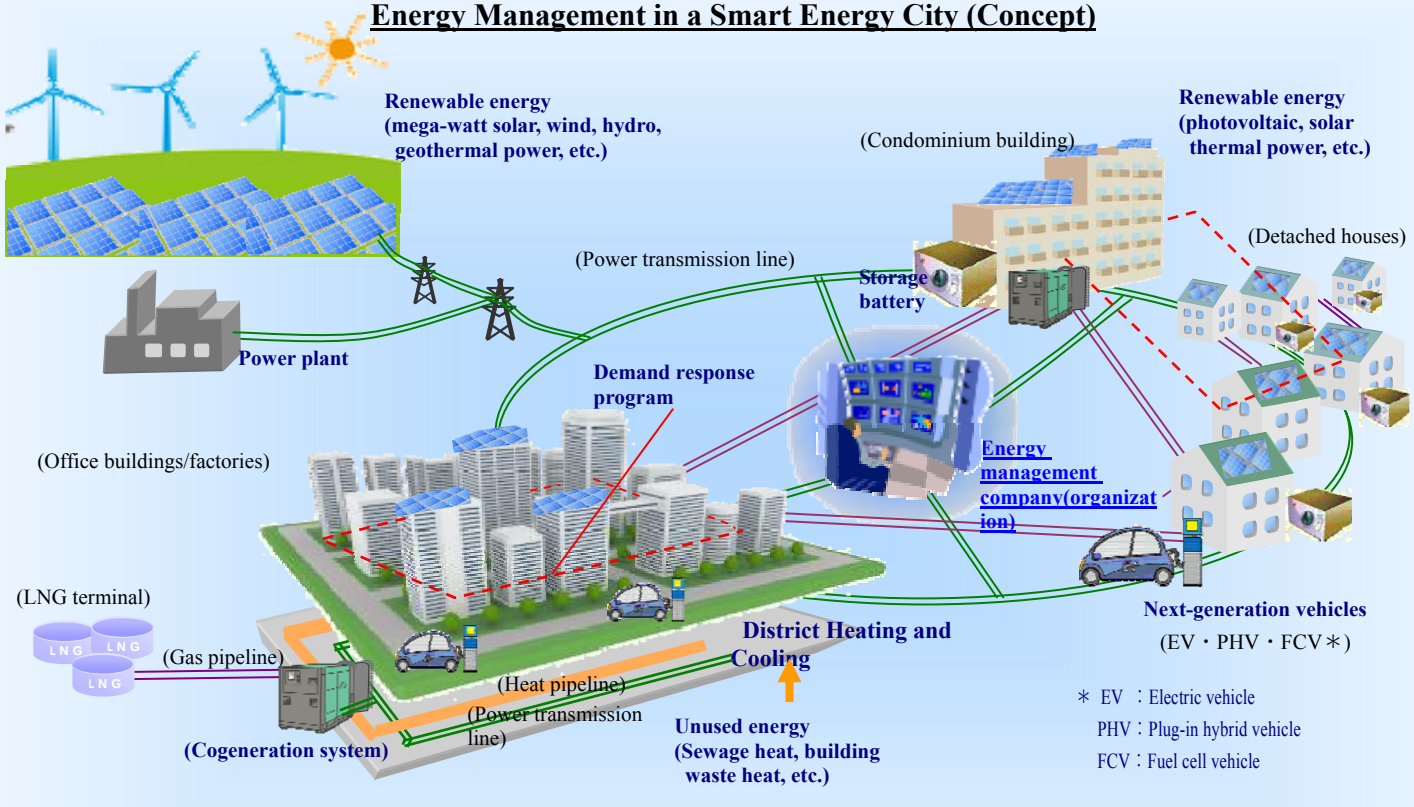
③ Optimization of supply and demand via Energy management

⇒ Toward a smart energy city

CO2 emission reduction	Popularization of renewable energy	Improvement comfortable environments and intellectual productivity	Widespread effort to create net zero energy buildings (houses)*
Peak power demand reduction	Diversify energy utilization	Enhancement of low carbon capability and disaster resistance	

* Buildings (houses) in which annual consumption of primary energy is zero or almost zero on a net basis due to the improvement of energy saving performance of building (housing) frames and facilities and the use of renewable energy

Energy Management in a Smart Energy City (Concept)



① Smart energy saving that makes maximum use of energy saving technologies and knowhow

■ Enhancement of environmentally-friendly buildings to promote low carbon

- Improve both the insulation performance and the "passive energy utilization capability" of buildings and facilities, that is the capability to make effective use of natural energy and environment such as solar heat and light, wind and greenery.
- Installation of energy efficient building facilities (air conditioners, lighting, venting and hot water supply systems)

*Passive capability:
Buildings' capability to take advantage of the natural environment as represented by sunlight, wind, temperature, etc.

■ Meticulous energy saving and power demand reduction in the operation of equipment and facilities

- Continuously improve the operation of equipment and facilities
- Use energy efficient OA equipment and home appliances, make power consumption visible and ensure meticulous individual control of equipment and facilities by linkage of BEMS, HEMS and storage batteries, etc.

*BEMS（Building Energy Management System）
*HEMS（Home Energy Management System）
Systems that achieve comprehensive energy saving by enabling comprehensive grasp of the status of energy supply and demand in the whole building and efficient operation of equipment and facilities.

② Expansion of use of low carbon, independent distributed energy systems

■ Expansion of use of renewable energy

- Promote and expand the use of renewable energy available in Tokyo, mainly solar energy (photovoltaic and solar thermal energy).
- Make aggressive use of mega-solar, wind and geothermal power systems; energy sources which have huge potential in regions outside Tokyo.
- Curb power usage according to changes in power output and make efficient use of power and heat storage equipment.

■ Enhancement of disaster resistance by using diverse energy sources

- Ensure the continuity of business activities and everyday life by using diverse energy sources and systems, including electricity, gas, oil, renewable energy and storage batteries.
- Expand the use of independent distributed energy systems that can be utilized in normal times as well as in emergencies, such as energy efficient cogeneration systems.

③ Optimal control of urban energy supply and demand via smart energy management

■ Creation of a low-carbon, highly disaster-resistant city that incorporates energy management.

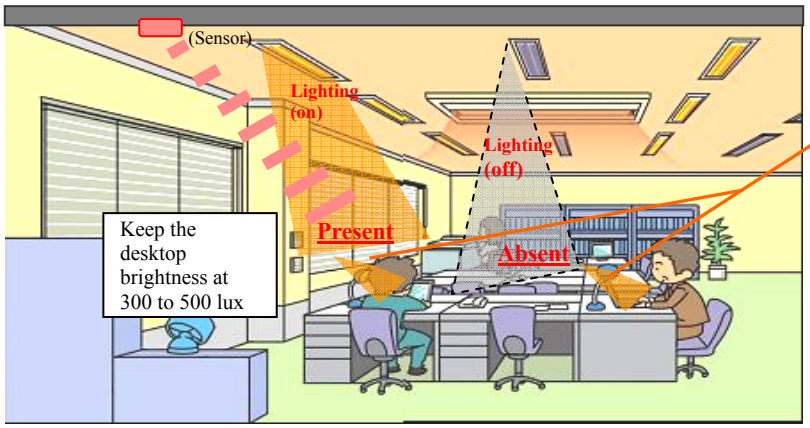
- Ensure optimal energy control of a large number of users by grouping them by zone and community. etc.
- Use incentive programs that encourage energy users to continuously cooperate in curbing power usage, such as the demand response program.
- Enhance low carbon capability and disaster resistance by taking advantage of economies of scale in office zones through the introduction of large-scale and energy efficient cogeneration systems. etc.

*Demand response program
A program to give users incentives to curb demand as a way to ensure optimum control of power supply and demand (pricing by season and time zone, provision of economic incentive to users who have curbed demand, etc.)

Example cases of energy saving technologies and measures intended to achieve a smart energy city

✓ Task -ambient system perceived comfort and work performance while using low power

The task and ambient lighting system reduces energy consumption in a whole building while maintaining intellectual productivity by combining the task lighting — the use of lighting equipment installed near workers to enable them to adjust lighting brightness according their needs — and the ambient lighting — the use of lighting equipment installed on ceilings and walls for the purpose of lighting broader areas.

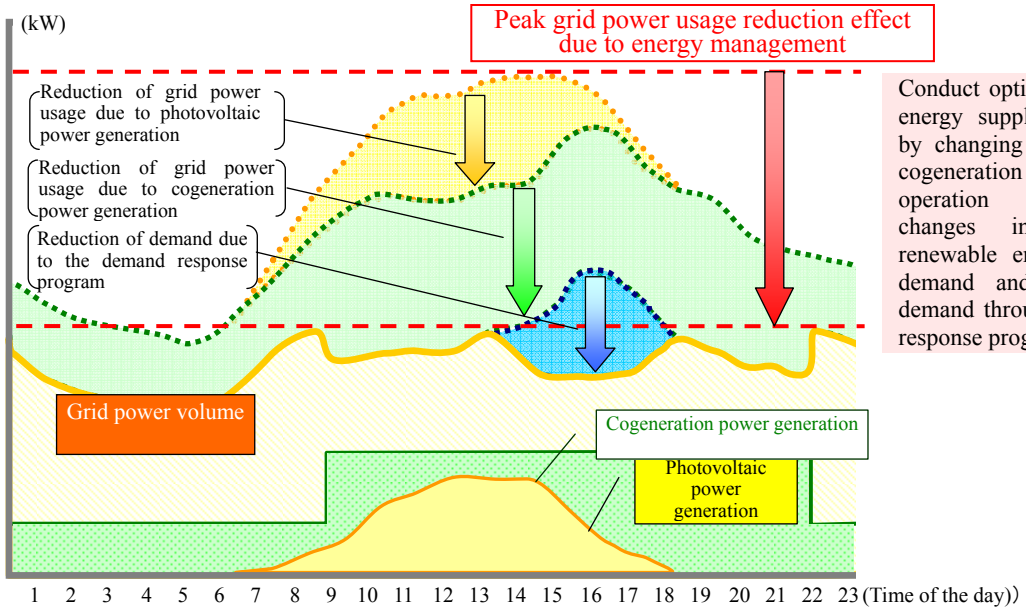


Lighting can be adjusted meticulously according to the working style and natural light changes by the time of day.

✓ Feasibility study on area energy management in Otemachi, Marunouchi and Yurakucho areas

The TMG is conducting a joint feasibility study with urban developers on an energy management system in business office areas. In the study, we are considering the specifics of the project, including the scope of the implementing organization's operations, based on the assumption of introducing distributed energy systems, including cogeneration and renewable energy systems. For example, the implementing organization would make optimum supply-demand adjustments with the participation of tenants while enhancing low carbon capability and disaster resistance through integrated management of electricity and heat.

<Peak grid power demand reduction effect due to energy management (concept)>



Conduct optimum control of energy supply and demand by changing the number of cogeneration systems in operation according to changes in output of renewable energy and heat demand and by reducing demand through the demand response program.

(2) Measures Intended to Achieve a Smart Energy City

Implementation of Measures at Business Facilities

■ **Implementing measures that appreciate users who choose low carbon power and heat with preferential treatment concerning compliance with the CO2 reduction obligation under the Tokyo Cap-and-Trade Program for Large Facilities**

We will consider implementing measures appreciating users' choice of low carbon power and heat under the Tokyo Cap-and-Trade Program for Large Facilities.

In addition, we will promote the installation and use of highly efficient cogeneration systems by enforcing the calculation rule under the program that gives preference to the use of cogeneration systems operated with high efficiency.

It should be noted that in order to avert the impact of an increase in CO2 emissions at the facilities covered by the program due to a rise in electric power companies' CO2 emissions factor, a fixed emissions factor is used to calculate CO2 emissions for the purpose of clearly identifying efforts made by energy consumers during the program period.

■ **Steady operation of the Tokyo Carbon Reduction Reporting Program for small and medium-sized facilities**

～Introducing a CO2 benchmarking that enables small and medium-sized enterprises to evaluate the level of their own CO2 emissions

We will develop a CO2 benchmark that enables small and medium-size enterprises to evaluate the relative level of CO2 emissions from their own facilities compared with the emission level of other facilities based on data for more than 30,000 small and medium-sized facilities that have been collected through reports submitted under the Tokyo Carbon Reduction Reporting Program for small and medium-sized facilities. The benchmark will be provided for use by small and medium-sized enterprises to encourage them to take more effective energy saving and global warming countermeasures.

■ **Implementing measures that promote the positive evaluation of small and medium-sized buildings with low CO2 emissions in the real estate market**

In order to develop a real estate market in which energy saving renovations by building owners are positively evaluated by investors and ensure that renovated buildings are preferred by tenants, we will promote the popularization of low CO2 emission buildings through effective provision and communication of information concerning the environmental performance, such as the CO2 benchmarks, of buildings that have been submitted and disclosed under the Tokyo Carbon Reduction Reporting Program for small and medium-sized facilities. In addition, we will consider a labeling system that demonstrates the benefits of the environmental performance of buildings owned by business operators.

Improvement of New Buildings' Energy Saving Performance

■ Enhancing buildings' energy saving performance

In order to improve large buildings' energy saving performance and enhance the energy saving performance level of future buildings, we will consider revising the energy saving standards. In addition, we will consider requiring the submission of green building plans in order to improve small and medium-size buildings energy saving performance.

As the adoption of "passive design" that makes effective use of natural light and wind leads to energy saving in buildings, we will continue to promote it.

Moreover, in order to promote smart energy utilization, we will consider establishing measures to promote the positive evaluation in the Tokyo Green Building Program for new buildings of measures to make energy consumption visible in large buildings.

■ Expanding the use of renewable energy

Regarding large buildings, we will consider requiring the installation of a certain ratio of renewable energy facilities in order to expand the installation of such facilities in new buildings in light of past installation achievement and the national government's adoption of the feed-in tariff program.

Regarding medium-sized buildings, we will also consider measures requiring consideration of the possibility of installing renewable energy facilities.

■ Enhancing labeling concerning buildings' environmental performance

Regarding new buildings, we will consider a system of requiring labeling of buildings' overall environmental performance.

Regarding existing buildings, it is necessary to promote energy saving at the operational level, so we will continue to promote information disclosure concerning CO2 emissions based on actual energy consumption. Regarding small and medium-sized buildings, we will consider a labeling system that demonstrates the benefits of the environmental performance of buildings owned by business operators.

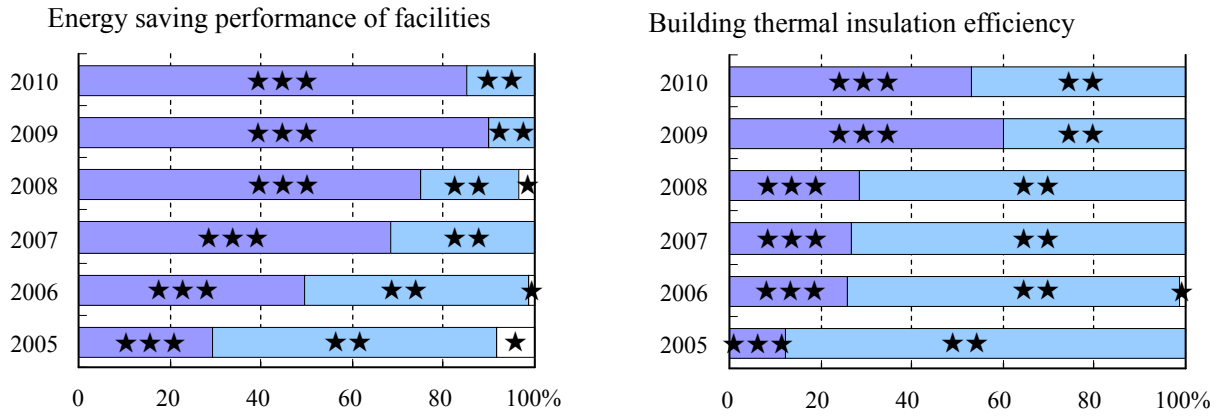
Promotion of Housing-Related Measures

■ Improving houses' energy saving performance

We will consider raising the evaluation standard of large condominium buildings' energy saving performance and requiring the submission of energy saving plans regarding medium-sized condominium buildings in accordance with the Tokyo Metropolitan Condominium Environment Performance Labeling System, which is based on the Tokyo Metropolitan Environmental Security Ordinance.

In addition, we will improve houses' energy saving performance by prompting the adoption of passive solar systems that take advantage of solar light and heat without using mechanical or electrical equipment.

Improvement of energy saving as indicated by the Labeling System
("★★★" represents the highest rating)



■ Expanding the use of solar heat in houses

The use of solar thermal power has not become as popular as the use of photovoltaic power. However, new types of solar thermal products have recently been introduced, including exquisitely designed roof-integrated solar panels and balcony-installable panels. In order to promote the construction of solar thermal houses using such excellent products, we will support the introduction of solar thermal power through a subsidy program targeted at housing developers (for the outline of the program, refer to the next page).

■ Promoting the introduction of renewable energy in houses by cooperating with the energy saving advisory program for households

Energy saving advisors will provide advice in order to raise awareness about the benefits of introducing photovoltaic power following the start of the feed-in-tariff program. In addition, we will also use a TMG-backed new program to popularize photovoltaic power and will encourage the use of hot water generated by solar thermal power and promote the use of highly efficient hot water supply systems that meet the Top Runner standard.

Expansion of Use of Renewable Energy and Other Low-Carbon Power Sources and Distributed Power Sources

■ Considering a new scheme to promote photovoltaic power generation in houses

In light of the national government's adoption of the feed-in tariff program, we will consider a new scheme that enables houses to install solar panels at reasonable cost and with adequate after-sale service in cooperation with private companies so that photovoltaic power generation can be further promoted.

■ Expanding the use of solar heat in houses (already mentioned above)

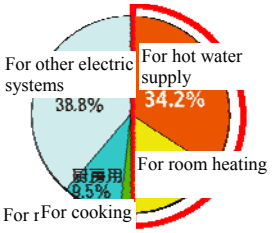
Subsidy program for housing developers to promote solar thermal power in condominiums, etc.

To expand the use of solar thermal power in Tokyo, we provide subsidies for housing developers that install solar thermal power systems based on new technology in new condominiums and detached houses.

Subsidy ratio: 50% (for projects in fiscal 2011 to 2015)

Website of Cool Net Tokyo
(URL) http://www.tokyo-co2down.jp/shugo/

This slogan is based on the idea that heat used for relatively low temperature systems, such as hot water supply and room heating systems should be generated through renewable energy such as solar and underground heat.



Breakdown of household energy consumption in Tokyo by usage (Fiscal 2008) From materials prepared by the TMG

Subsidy programs for household power generation equipment and renewable energy utilization equipment

We support the installation of power-generation equipment etc., to ensure power supply for households.

～ Deadline for application acceptance: the end of fiscal 2012 ～

Covered systems	Subsidy per unit
Photovoltaic power system	¥100,000/ kW
Solar thermal utilization system *conditional on a shift from an electric water heating system (Solar thermal water heating system)	¥70,000/square meter
Gas cogeneration system (Gas power generation-water heating system/fuel cell)	¥100,000/ kW
Storage battery system	¥100,000/kW

<Contact for subsidy application>
Tokyo Metropolitan Center for Climate Change Actions (Cool Net Tokyo) Phone: 03-5388-3472

■ **Introducing a program to promote consideration of the use of highly efficient cogeneration systems from the early planning stages of large-scale urban developments.**

Regarding large-scale development projects which are expected to generate massive and highly dense energy demands, it is effective to introduce highly efficient cogeneration systems using waste heat generated during the power generation process. To encourage consideration of the installation of such systems at an early planning stage, we will consider a program to promote the installation of highly efficient cogeneration systems under the District Energy Planning Program for Effective Utilization.

■ **Promoting the use of energy efficient cogeneration systems under the Tokyo Cap-and-Trade Program for Large Facilities**

We will promote the installation and use of energy efficient cogeneration systems by evaluating the power saving effects of cogeneration systems operated with high efficiency at facilities covered by the Tokyo Cap-and-Trade Program for Large Facilities.

■ **Promoting the installation of energy efficient cogeneration systems**

We will promote the installation of energy efficient cogeneration systems which enable effective use of waste heat generated during the power generation process and which can continue power supply in the event of disasters by cooperating with private urban developers and by providing subsidies for the installation of such systems.

Urban Development that Incorporates Optimum Energy Control in Terms of Both Supply and Demand

■ Promoting energy management in housing development

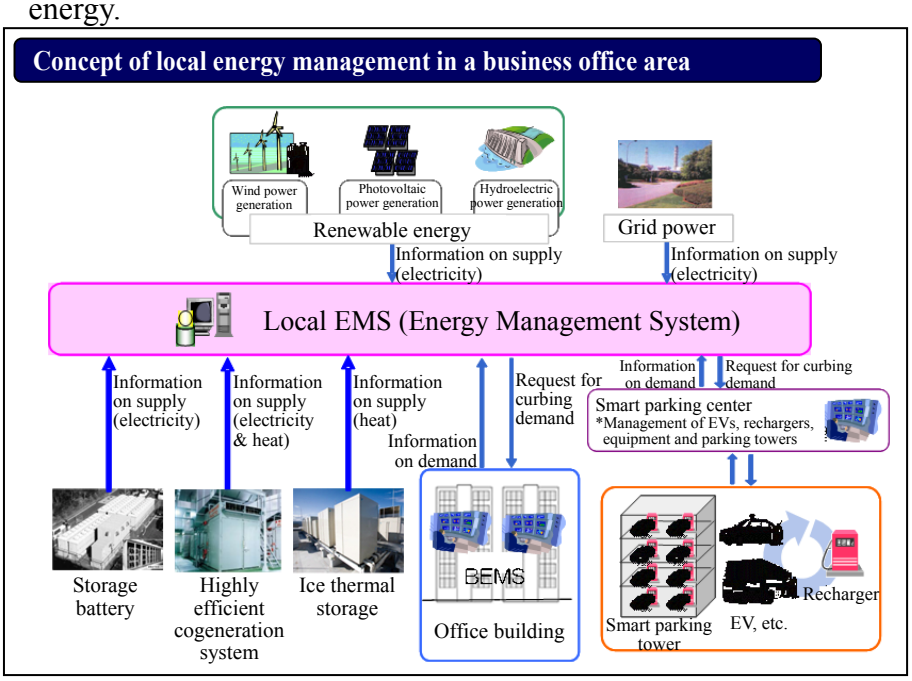
We will promote condominium development projects incorporating an energy management system on sites made available through the rebuilding of TMG-operated residential buildings by making use of private companies' innovative ideas and technologies. We will encourage housing energy management and enhance housing disaster resistance by enabling optimal management of energy supply-demand in normal times and ensuring a necessary level of power supply for the continuation of everyday life in the event of a disaster through the installation of such equipment as renewable energy, cogeneration and storage battery systems.

■ Promoting energy management in business office areas

We will promote the use of low-carbon, distributed energy systems, such as renewable energy and cogeneration systems, in business office areas in Tokyo. At the same time, we will promote partnership programs with urban developers to promote efficient use of energy while enhancing disaster resistance through integrated management of energy supply and demand.

In light of the results of a survey conducted regarding the Otemachi, Marunouchi and Yurakucho areas as model areas for energy management (refer to Page xx), we will communicate information concerning how local energy management should be conducted and promote the introduction of local energy management in future urban development projects.

In addition, we will promote efforts to create a low-carbon city with comfortable office and living environments and with a high level of disaster resistance by implementing leading projects in the Tokyo waterfront city area etc. in order to secure distributed energy.



(3) Cooperation with Private Companies, etc.

Cooperation with Private Companies

*ZEB (net zero energy building)
Buildings in which annual consumption of primary energy is zero or almost zero on a net basis due to the improvement of energy saving performance of building frames and facilities and the use of renewable energy

Maintaining a comfortable office environment and enhancing disaster resistance while implementing power saving is a huge challenge for private companies such as urban developers and general contractors as well.

The TMG will make efforts to increase public support for energy management and develop a new business model in cooperation with companies and municipalities in Tokyo that are proactively involved in the ZEB initiative and the introduction of energy management systems.

■Main organizers: TMG Bureau of Energy and Nikkei Inc.
■Special sponsors: Johnson Controls; Yamatake; Mitsubishi Electric Building Techno-Service; Mitsui Fudosan; Mitsubishi Estate; Mori Building; Mitsui Knowledge; Shimizu Corp.
http://www.kankyo.metro.tokyo.jp/climate/large_scale/cap_and_trade/meeting/cat7846.html

Strengthening of International Cooperation

*ZEH（net zero energy houses）
Houses in which annual consumption of primary energy is zero or almost zero on a net basis due to the improvement of energy saving performance of housing frames and facilities and the use of renewable energy

Currently, urban areas account for around 70% of the global energy consumption. Improving energy efficiency and enhancing low carbon capability of urban areas is a challenge for which cities around the world should cooperate and play the leading role.

The TMG has been implementing low carbon policy measures such as the Tokyo Cap-and-Trade Program for Large Facilities and promoting the development of low-carbon buildings in cooperation with private companies. These measures and post-earthquake energy saving efforts have drawn strong interest from around the world.

The TMG will use various occasions to communicate these measures and their results to the world and provide its experience and knowhow to cities around the world. In addition, in order to achieve a “smart energy city,” the TMG will strengthen cooperation with leading cities regarding how to promote ZEB/ZEH (net zero energy buildings (houses)).

As there are growing needs for energy saving and low carbon capability in Asian cities facing rapid urbanization and steep growth in energy consumption, the TMG will contribute to the development of low carbon capability in Asia by actively transferring policy knowhow to such Asian cities.

References

◆ Urban Energy policy in Tokyo

(Diversification and decentralization of energy sources through use of "made-in-Tokyo power")

1. Enhancing power plants performance and promoting low-carbon grid power supply near-by demand area

2. Tokyo Natural gas based Thermal Power Generation Project

3. Promotion of distributed energy sources and systems

4. Promotion of renewable energy

1. Enhancing power plants performance and promoting low-carbon grid power supply near-by demand area

＜Significance＞

Promoting measures to replace planning of decrepit thermal power plants with the latest natural gas based combined cycle generators which achieve energy efficient and low carbon.

＜Current situation about decrepit thermal power plants near-by Tokyo＞

There are about 1.1 million kilowatts over decrepit thermal power plants along the Tokyo Bay coast.

Power plant	Location	Fuel	Output(10 thousand kilowatts)		
			Duration of operation		Total
			35−39years	over 40years	
Anegasaki	Chiba prefecture	LNG, Heavy oil etc.	60.0	180.0	240.0
Goi		LNG		176.0	176.0
Sodegaura		LNG	260.0		260.0
Oi	Tokyo	Crude oil	35.0	70.0	105.0
Yokosuka	Kanagawa prefecture	Crude oil, Heavy oil etc.		213.0	213.0
Yokohama		LNG, Heavy oil etc.		52.5	52.5
Minami−Yokohama		LNG	45.0	70.0	115.0
Total			400.0	761.5	1,161.5

2. Tokyo Natural gas based Thermal Power Generation Project (Developing Large-scale power plants (1 million kilowatts in scale))

<Significance>

- Securing energy sources through use of "made-in-Tokyo power"
- Contribution to ensure highly efficient and low carbon energy sources
- TMG can take the initiative and propose deregulations to the national government to remove existing barriers

  ⇒ While making proposals to the national government, we will also take actions on our own

● Establish a cross-sectional project team. (August, 2011)

● Three places identified among TMG-owned land through a screening done under certain conditions, such as construction period and cost, or operation cost. (May, 2012)

～ Detailed surveys are currently underway

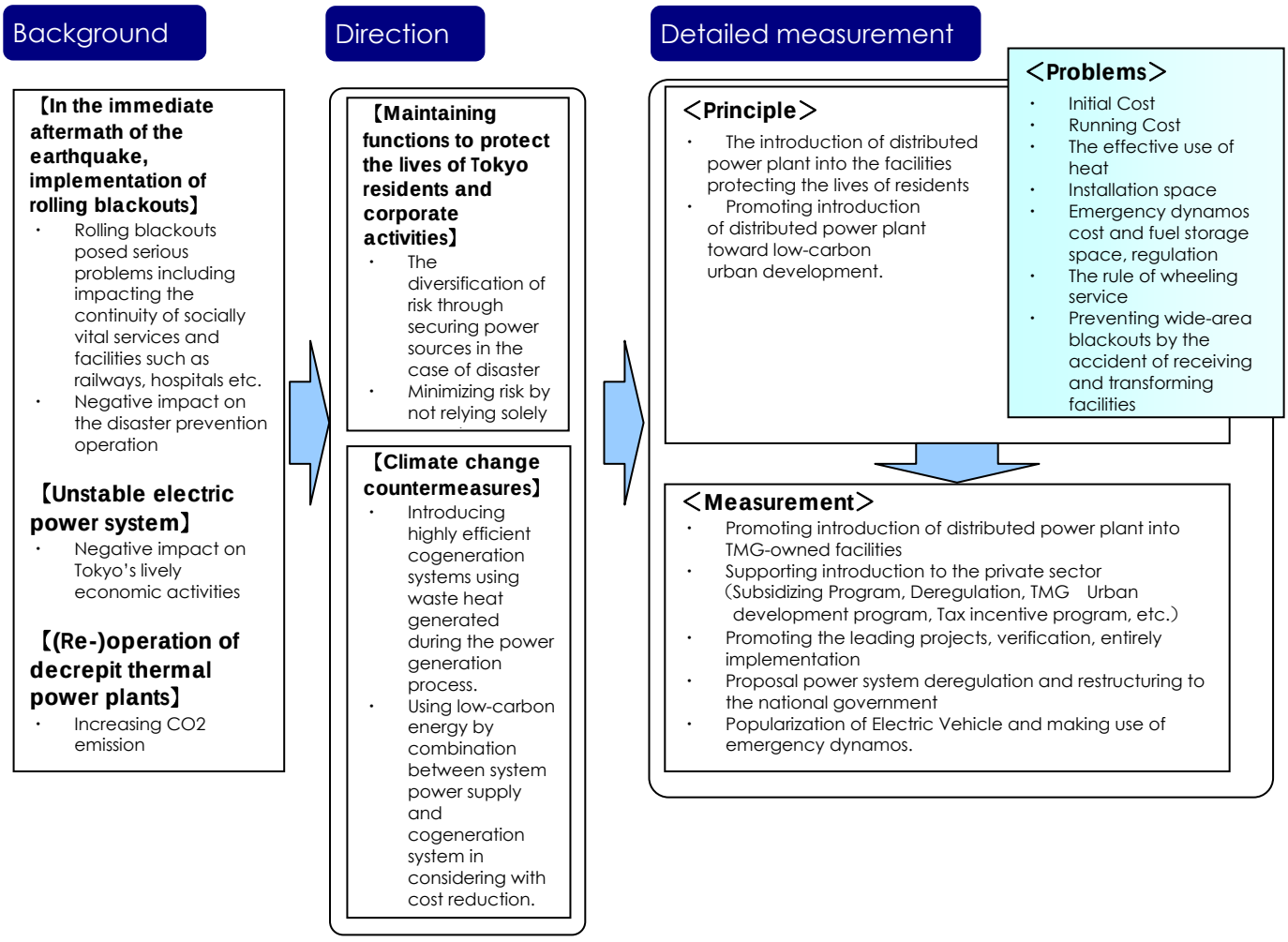
3. Securing Distributed Energy Sources

Measures for promoting distributed energy resources

＜Significance＞

・Expansion of use of distributed power sources such as natural gas based cogeneration system etc.

・Protecting the lives of Tokyo residents and corporate activities in the case of earthquake that directly hits Tokyo area, and achieving low-carbon urban development.

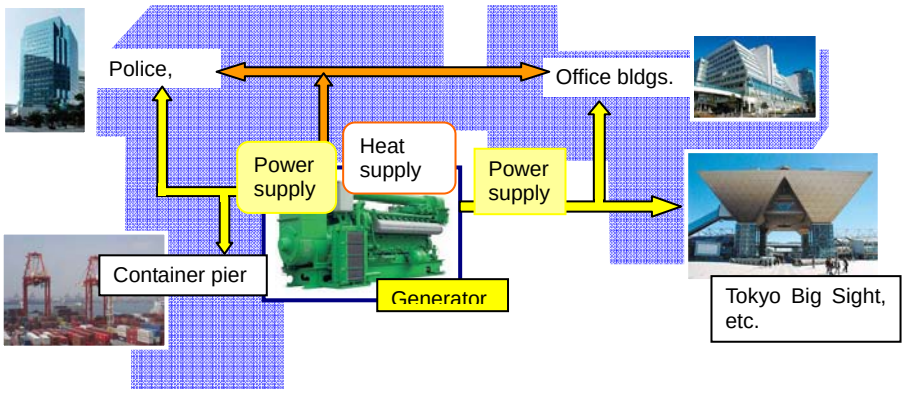


Leading Project

I. Introducing a decentralized energy network in the Tokyo Waterfront Area

Leading project 1

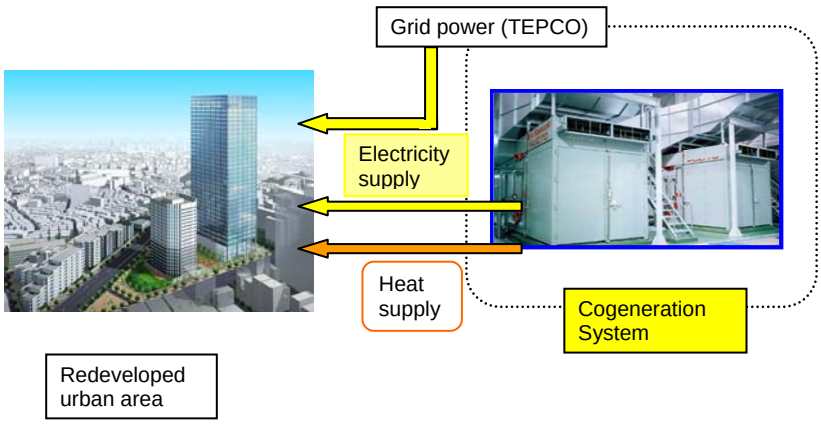
・Establish power generators in addition to district heating and cooling (DHC)
・Develop power transmission and distribution network in a common utility duct



II. Introducing Large Cogeneration system in redeveloped urban areas

Leading project 2

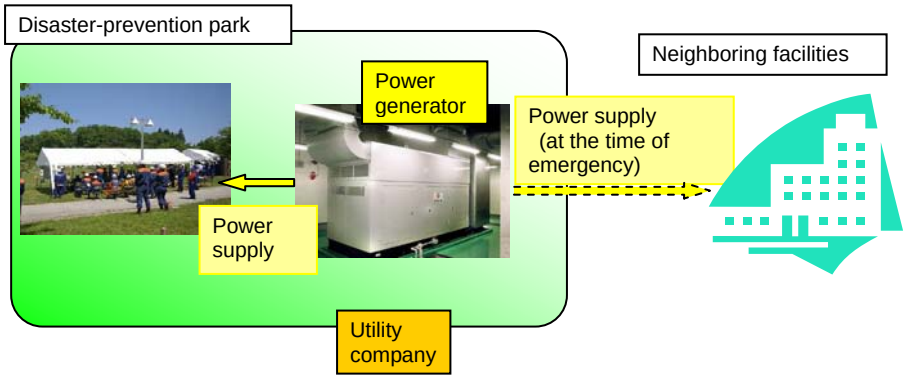
・Introduction of power generation system by private developers (Preparations for public offering underway in the Takeshiba District)



III. Securing emergency power sources in post-disaster parks and supplying power to neighboring facilities

Leading project 3

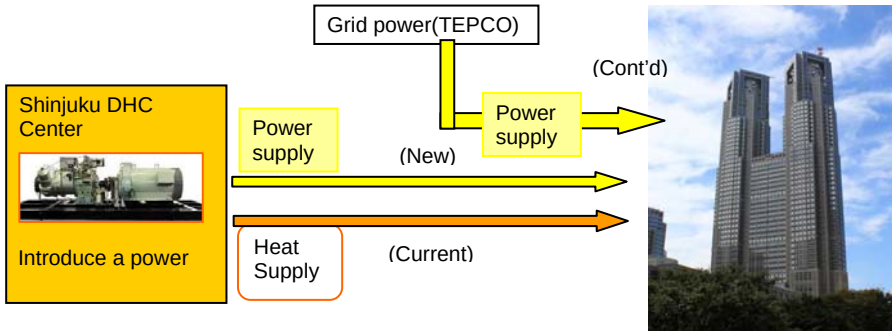
・Consideration to establish underground power generating facilities in parks
⇒ Preparations underway for model projects in Tokyo's post-disaster parks



IV. Diversifying power supply to the TMG Buildings

Leading project 4

・Will accept 3,000kW supply in FY2012
・Will expand this to 6,000kW by FY2015 (securing power supply needed for work)
⇒Significant improvement of the buildings' functions as an emergency shelter

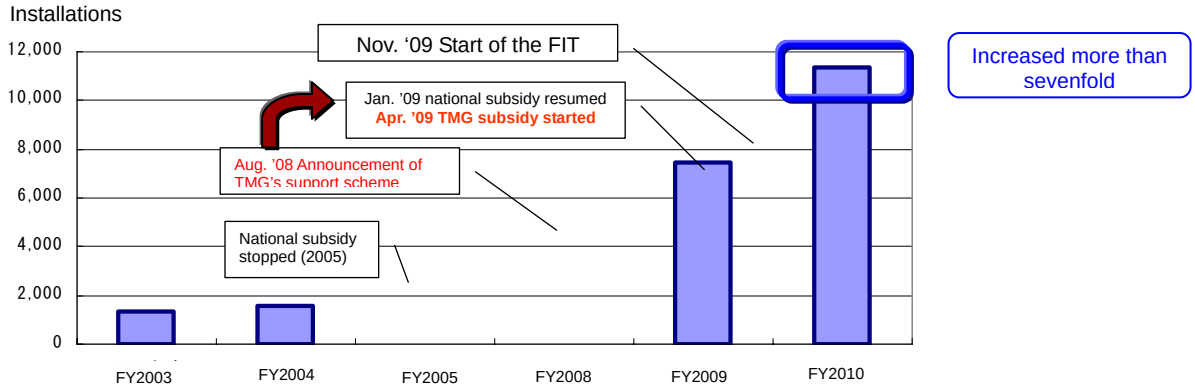


4. Expanding the Use of Renewable Energy

● **PV System Installation in Tokyo**

～Number of applications increased more than sevenfold after introducing the subsidy scheme.

～ Number of the total capacity of PV system installation increased more than tenfold during the subsidy program.



● **The total capacity of PV system installation for the household sector in Tokyo**

Fiscal year 2008 Approx.420kW/month(Average)

↓

Fiscal year 2011 Approx.4,200kW/month(Average)

Increased more than tenfold

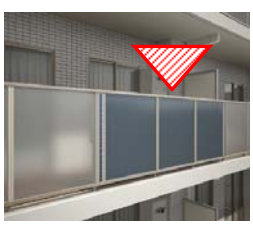
【Reference】

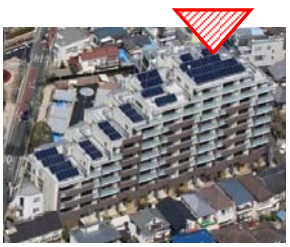
Subsidy scheme for solar heat installation to new houses also started

■Budget: 2 billion yen
■Period: FY2011-2015
(Application received from Nov. 16, 2011)
■Subsidy rate: 1/2 the eligible expenses
■Eligible expenses: equipment and installation costs
■Beneficiary: Housing companies

<Support for solar heat system in new houses using the following new technologies>


(Photo: SANYO Homes)


(Photo: Tokyo Gas)


(Photo: Daiwa House Industry)


(Photo: Conserval Engineering Inc.)