This is a plan that stipulates the measures for controlling greenhouse gas emissions for the entire city region based on Article 20-3 of the Act on Promotion of Global Warming Countermeasures. Although a previous plan was formulated in March 2011, taking into consideration the change in the state of global warming countermeasures and energy policy following the Great East Japan Earthquake, the plan was revised in March 2014 with the aim of creating a vibrant and sustainable community through the achievement of a low-carbon society.

Environmental problems brought about by global warming

The atmosphere of the Earth that we live on maintains a balance by letting off energy commensurate to the energy that is delivered by the sun. However, we have come to consume large volumes of fossil fuels, and the emission of greenhouse gasses into the atmosphere has been increasing. As a result the balance between heat insulation and heat release has been broken, and this impact is resulting in changes such as an increase in the global average temperature and an increase in rainfall. If these types of climate changes continue, the impact on the physical environment (the cycle of carbon, nitrogen, and water) supporting the ecosystem will increase.

Report from IPCC

In its Fifth Assessment Report the IPCC (Intergovernmental Panel on Climate Change) stated that warming of the climate system is unequivocal and limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

Significance of Yokohama City’s work

Yokohama City is one of Japan’s largest municipalities with 3.7 million inhabitants and 1.62 million households. It has been selected by the government as Eco-Model City and FutureCity for its implementation of various environmental measures, and accordingly it has aimed to serve the role of a forerunner in global warming countermeasures. In addition, in order to pass on the current environment to the future generation, it is necessary to prevent global warming and adapt to climate change.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2008</td>
<td>Selected as Eco-Model City</td>
</tr>
<tr>
<td>March 2011</td>
<td>Occurrence of the Great East Japan Earthquake</td>
</tr>
<tr>
<td>December 2011</td>
<td>Selected as FutureCity</td>
</tr>
<tr>
<td>March 2014</td>
<td>38th Session of the IPCC in Yokohama Revision of Yokohama City Action Plan for Global Warming Countermeasures</td>
</tr>
</tbody>
</table>
Current state of greenhouse gas emissions

The total amount of greenhouse gas emissions during FY 2010 was 19.3 million tons (CO₂), a 14% increase compared to FY 1990. By gas type, carbon dioxide emissions were 18.84 million tons (CO₂), accounting for approximately 98% of greenhouse gases in the city. In terms of sectors, while the ratio for the residential sector and transportation sector are high, the growth rate for the commercial sector has increased compared to FY 1990.

Greenhouse gas emission reduction target

With FY 2005 as the base year, three reduction targets have been set (a short-term target for FY 2020, a mid-term target for FY 2030, and a long-term target for FY 2050), as well as reduction guidelines aimed at achieving these targets.

- Short-term target (FY 2020): 16% reduction (compared to FY 2005)
- Mid-term target (FY 2030): 24% reduction (compared to FY 2005)
- Long-term target (FY 2050): 80% reduction (compared to FY 2005)

Guidelines for FY 2020 reductions

- Power consumption per household: 3,300 [kWh/household/year] (down 25% from FY 2010)
- Guideline for unit of output by application in the commercial sector

<table>
<thead>
<tr>
<th>New constructions</th>
<th>Existing constructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offices</td>
<td>80</td>
</tr>
<tr>
<td>Commercial facilities</td>
<td>145</td>
</tr>
</tbody>
</table>

kg-CO₂/㎡
Aiming for large reduction of greenhouse gases by 2050, global warming countermeasures in Yokohama are to be approached in an integrated manner by all of Yokohama City, including its citizens, communities, and businesses.

Basic policy

- Achieving pioneering activities and improving productivity as an integral part of the development of the future community
- Establishing a low-carbon and smart economic society that achieves the thoroughly efficient use of energy
- Promoting regional energy creation and local-production, local-consumption that is not overly reliant on nuclear power or fossil fuels
- Spreading a low-carbon business model and developing the related industries that will drive Yokohama’s growth
- Active deployment of reduction initiatives that will leverage the capabilities of citizens and the vitality of the public

Citizens and Communities

- Work to control greenhouse gas emissions in daily life.
- Select products and energy services with a low environmental load.
  - Propose and implement new ways of living.
- Shift to low-carbon lifestyles.

Businesses

- Work to control greenhouse gas emissions in business activities.
- Work to provide products and energy services with a low environmental load.

Interrelationships between parties implementing the project

Yokohama City

- Conducts policy implementation such as initiatives support and information provision to support and ensure the success of the initiatives of other bodies.
- Conducts plan progress management.
- Conducts pioneering activities as a business.

In communities, various bodies are active, such as residents’ associations, regional associations, NGOs, and other citizens’ organizations.

In this plan, the bodies included in these types of organizations are to fulfill their respective roles while working together in coordination with each other.
Yokohama’s future vision for 2050:

- **Conversion to a city with an intensified urban structure** to support the super-aging, falling-population society in the future.

- **A city with a small environmental footprint** that uses energy very efficiently.

- **A city** that achieves environmentally-friendly transportation that makes it easy for everyone to get around.

- **A city** with a marine and green environment befitting of Yokohama that takes advantage of the appeal of the city.

---

**Development to other cities and overseas and in Japan**
- Blue carbon
- Blue resource

**Development of new technologies**
- Preventing heatstroke
- Inland waters hazard map

**Adaptation**
- Garbage incineration plant power generation and waste heat utilization
- Effective use of plant waste heat

**Utilizing the knowledge of industry, government, and academia**
- Storage battery

**Waste**
- Promotion of the 3Rs
- Solar power generation

**Creating a low-carbon city**
- Intensified urban structure
- A city that is highly energy efficient
- Achievement of regional energy management

**Transport**
- Securing regional transportation services
- A city without traffic congestion
- Spread of electronic vehicles

**Preservation of green areas**
- Accessible greenery and water circulation

**Residential**
- Highly energy efficient housing
- Introduction of PV and HEMS
- Promotion of energy-saving activities

**Commercial**
- Highly energy-efficient constructions
- Introduction of cogeneration and BEMS

**Industries and Energy Industries**
- Energy flexibility through cooperate partnerships
- Introduction of cogeneration

---

**Highly airtight, super-insulated houses**
**Houses equipped with solar power generation systems**
**Electronic vehicles**
**High-efficiency air conditioning equipment**
Framework of countermeasures and policies

Global warming countermeasures can be roughly classified into mitigation that aim to reduce or absorb greenhouse gas and adaptation that address the impact of climate change, which presently is unlikely to be avoidable. Mitigation will consist of separate countermeasures and policies for each sector that emits and absorbs greenhouse gases, as well as cross-sector countermeasures and policies.

Separate countermeasures and policies for each sector

1. Residential
2. Commercial
3. Industries
   Energy Industries
4. Transport
5. Waste
6. City Hall
7. Absorption through forests and tree planting

Cross-sector countermeasures and policies

Renewable energy
Regional countermeasures
Development of regional environment

Coordination

9. Spreading renewable energy
8. Creating a low-carbon city
10. Low-carbon coordination
11. Adaptation to climate change
1. Residential
- Spread of energy-saving and low-carbon houses
  - 1. New homes that are energy saving and low carbon
  - 2. Existing homes that are energy saving and low carbon
- Reduction of energy consumption for home appliances and equipment
  - 3. Energy-saving home equipment
  - 4. Energy-saving home appliances
- Spread of lifestyles with lower energy consumption
  - 5. Promoting home energy management
  - 6. Promoting energy-saving activities in homes and communities
  - 7. Spread of solar power generation and solar-heated facilities

2. Commercial
- Promoting efficient use of energy in business activities
  - 1. Planned reductions of emissions
  - 2. Energy efficiency at offices
- Expansion of forms of businesses that contribute to the environment
  - 3. Development and sales promotion of environmentally-friendly products
  - 4. Promotion of Yokohama Green Valley
  - 5. Spread of solar power generation and solar-heated facilities
  - 6. Spread of other forms of renewable energy

3. Industries, Energy Industries
- Promoting efficient use of energy in business activities
  - 1. Planned reductions of emissions
  - 2. Energy efficiency at plants
- Increase of energy supplies with a small environmental footprint
  - 3. Compliance with the emission reduction system
  - 4. Development and sales promotion of environmentally-friendly products
- Expansion of forms of businesses that contribute to the environment
  - 5. Promotion of Yokohama Green Valley
  - 6. Spread of solar power generation and solar-heated facilities
  - 7. Spread of other forms of renewable energy
  - 8. Energy flexibility through cooperative partnerships in Keihin coastal areas

4. Transport
- Use and spread of environmentally-friendly vehicle
  - 1. Promotion of environmentally-friendly driving
  - 2. Vehicle improvements
- Transportation system improvements
  - 3. Restraining of excessive use of privately-owned cars and promotion of use of multi transportation
  - 4. Development of railway and road networks
- Creating a city with low-carbon transportation
  - 5. Reducing the environmental impact of Yokohama Port
  - 6. Creating a city with good forms of transportation in both urban and rural areas

5. Waste
- Reduction of total amount of waste
  - 1. Reduction and proper disposal of general waste
  - 2. Reduction and proper disposal of industrial waste
- Promoting initiatives aimed at achieving low-carbon businesses
  - 3. Use of waste heat
  - 4. Promoting reductions through coordination between citizens, businesses, and administration
  - 5. Promoting reductions through coordination between citizens, businesses, and administration
  - 6. Effective use of sewage sludge

6. City Hall
- Reducing energy consumption at City Hall
  - 1. Appropriate management of energy
  - 2. Promoting environmental values and use of environmental products
- Forerunning use of renewable energy
  - 3. Thorough energy conservation efforts
  - 4. Forerunning introduction of renewable energy and stabilized energy use
- Spread of business styles with lower energy consumption
  - 5. Promoting regional use
  - 6. Promoting environmentally-friendly behavior among city employees
  - 7. Implementing use of efficient vehicles

7. Absorption through forests and tree planting
- Maintaining the total amount of greenery
  - 1. Fostering forests for the next generation
- Enhancing the quality of greenery
  - 2. Creating places close to farming
- Achieving abundant lives together with greenery
  - 3. Creating greenery that feels nearby
  - 4. Deployment of effective public relations

8. Creating a low-carbon city
- Promoting an intensified urban structure
  - 1. Promotion of low-carbon measures by area, improving the city’s thermal environment
- Achieving high energy efficiency and the reduction of the environmental load
  - 2. Energy flexibility through cooperative partnerships in Keihin coastal areas
- Development of environment-friendly transportation
  - 3. Reducing the environmental impact of Yokohama Port
  - 4. Promotion of Yokohama Green Valley

9. Spreading renewable energy
- Instilling a common understanding concerning renewable energy
  - 1. Spread of solar power generation and solar-heated facilities
- Creating a framework for the spread and expansion of renewable energy
  - 2. Spread of other forms of renewable energy
  - 3. Phased expansion of system for introduction of renewable energy facilities

10. Low-carbon coordination
- Policy coordination with advanced cities
  - 1. Coordination with cities in Japan and overseas
- Environmental cooperation with cities overseas
  - 2. Promoting coordination with cities overseas
11. Adaptation to climate change

1. Prevention and mitigation of heatstroke
2. Prevention and mitigation of heavy rain damage
3. Promotion of monitoring in coordination with citizens

Target emissions amounts in FY2020

<table>
<thead>
<tr>
<th></th>
<th>Base year (FY 2005)</th>
<th>FY 2010</th>
<th>FY2020 Current trend</th>
<th>FY2020 Countermeasures case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>4.39</td>
<td>4.35</td>
<td>4.60</td>
<td>3.47 (▲1.12)</td>
</tr>
<tr>
<td>Commercial</td>
<td>3.35</td>
<td>3.57</td>
<td>4.56</td>
<td>3.57 (▲0.99)</td>
</tr>
<tr>
<td>Industries</td>
<td>2.95</td>
<td>2.79</td>
<td>3.40</td>
<td>2.72 (▲0.68)</td>
</tr>
<tr>
<td>Energy Industries</td>
<td>3.68</td>
<td>3.54</td>
<td>3.83</td>
<td>3.52 (▲0.31)</td>
</tr>
<tr>
<td>Transport</td>
<td>4.34</td>
<td>4.06</td>
<td>3.44</td>
<td>2.16 (▲1.28)</td>
</tr>
<tr>
<td>Waste</td>
<td>0.43</td>
<td>0.52</td>
<td>0.53</td>
<td>0.44 (▲0.09)</td>
</tr>
<tr>
<td>Absorption through forests and tree planting</td>
<td>—0.01 (▲0.01)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5 Gases other than CO₂</td>
<td>0.41</td>
<td>0.46</td>
<td>0.50</td>
<td>0.50 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>19.54</td>
<td>19.30</td>
<td>20.84</td>
<td>16.37 (▲4.47)</td>
</tr>
</tbody>
</table>

Compared to base year ▲16%