Promotion of “Smart City” in Yokohama with a focus on low carbon transportation efforts
City of Yokohama Overview

- Area: about 435 km²
- Population: about 3.7 million (second-highest nationwide, after the Tokyo Ward area)
- Number of business establishments: about 120,000 (fourth-highest nationwide)
- Number of employees: about 1.57 million (third-highest nationwide)

Yokohama, one of Japan's leading cities
Railway Development and Urbanization

2018

■ Rail transit network and urbanized districts

- There are 157 stations and 8 rail transport companies, including a municipal subway enterprise (excluding rail freight transport)
Motomachi-Chukagai Station

Bashamichi Station

Shintakashima Station

Nihon-odori Station

Station → Clean and High Quality, Sophisticated design
Promote of the public transport

Convenience improves by developing a railway station and commercial facilities integrally.
User ratios of major means of transportation in Yokohama by purpose (2008)

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Bus</th>
<th>Bicycle</th>
<th>Motorbike</th>
<th>Car</th>
<th>Railway</th>
<th>On foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>63.4</td>
<td></td>
<td></td>
<td>1.3</td>
<td>21.1</td>
<td>8.6</td>
</tr>
<tr>
<td>Private</td>
<td>29.6</td>
<td></td>
<td></td>
<td>11.4</td>
<td>14.7</td>
<td>33.7</td>
</tr>
<tr>
<td>Work Trip</td>
<td>61.4</td>
<td></td>
<td></td>
<td>4.6</td>
<td>15.7</td>
<td>7.9</td>
</tr>
<tr>
<td>Total</td>
<td>33.9</td>
<td></td>
<td></td>
<td>2.9</td>
<td>23.4</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Source: Tokyo Region Person-Trip Survey
Electric vehicles popularized in Japan

- 2011年: 22,262
- 2012年: 38,707
- 2013年: 54,757
- 2014年: 70,706
- 2015年: 80,511
- 2016年: 89,844

Percentage of total popularization:
- 2011年: 0.04%
- 2012年: 0.07%
- 2013年: 0.09%
- 2014年: 0.12%
- 2015年: 0.13%
- 2016年: 0.15%
Demonstration trial of round trip car sharing using ultra-compact vehicles

Early introduction of ultra-compact mobility vehicles, which are much smaller than regular vehicles and contribute to energy conservation and carbon emission reductions to popularize them as a new mode of local transport.

Operators: Nissan Motors, Nissan Car Rental Solutions, City of Yokohama

Trial period: Mar 2017 ~ Mar 2019 (2 years)

Scale: 40 vehicles (maximum), 23 pick-up/return stations (22 short-term parking)
We were selected by the Japanese government as a "Next-Generation Energy and social system demonstration area."

Renewable energy should use existing power networks.

Peak shifting and peak saving should also be part of the objective.
Overview of Yokohama Smart City Project
(Coordination between Yokohama City, 34 businesses, and 15 projects)

- **results (To FY2013) / goal (FY2010-2014)**
  - CO2 Reduction (39,000ton / 30,000ton)  HEMS (4,200/4,000)
  - PV (37MW/27MW)  EV (2,300/2,000)

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**Energy Storage SCADA**

- Energy Storage Batteries for Demand-Supply Control (Toshiba, Hitachi, Meidensha, NEC)
- Energy Storage Batteries for Consumers (Sony E, Sharp)
- Energy Storage SCADA (Toshiba)
- House HEMS (Panasonic)
- Apartment House HEMS (Tokyo Gas, NTT-F, NTT Docomo)
- Condominium HEMS (Toshiba, Mitsui Fudosan Residential, JX-E)
- Condominium HEMS (Daikyo-Astage)
- House HEMS (Toshiba, Mitsui Fudosan Residential)
- Collection and Delivery System (Hitachi, Toshiba)
- FEMS (Meidensha, Sumitomo Electric Industries)
- CEMS (Toshiba, Accenture)
- Comprehensive BEMS (Toshiba)
- Smart BEMS (Toshiba, Taisei Corp.)
- Office Building BEMS (Toshiba, Marubeni, Mitsubishi Estate, Mitsui Fudosan)
- FEMS (Toshiba, Accenture)
- Smart BEMS (Shimizu Corp.)
- Smart BEMS (Meidensha, NEC)
- Smart BEMS (JGC, JGC Information Systems)
- CEMS (Toshiba, Accenture)
- GDC (Nissan)
- Charging Stations (JX-E, NEC, Tokyo Institute of Technology)
- Chargeable and Dischargeable EVs (Nissan, Hitachi, ORIX, ORIX Auto Corp.)

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Actual Implementation Based on Public-Private Partnership

Yokohama Smart Business Association

<8 secretary members>

<10 general members>

Achievement of an “Energy - recycling City”

Promote local energy production for local consumption

Use BEMS to verify public facility demand response
Project for Constructing Virtual Power Plant

Contract the agreement to construct Virtual Power Plant among Toshiba, TEPCO and Yokohama City on July 6th 2016

Description of Project

Term: July 6th 2016  ~ March 31th 2018

Install the storage butteries at elementary school and junior high school in Yokohama City, which are 18 places and specified as local preventing disaster facilities.
Project for Constructing Virtual Power Plant

Installing Storage Battery

Storage Battery

Electric Room

Emergency Training

Emergency Training
Project for Constructing Virtual Power Plant

The target of Toshiba, TEPCO, and Yokohama City

Yokohama City

Preventing disaster higher
• Stabilize renewable energy
• Promote the environmental education

Tokyo Electric Power Company

Safety power supply
• Establish the effective method of DR
• Formulation of new charge plan using Storage Batteries

TOSHIBA

Developing control system
• Optimize charge and discharge of Storage Batteries
• Demonstration of new business by IoT
Yokohama's aim is to be an “energy-recycling city” that is environmentally robust, resistant to disasters, and economically strong.
Thank you for your attention.