Proposed installation of public charging facilities for promoting electrified vehicles

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Introduction of Aichi Prefecture

Center of Japan, Aichi Prefecture

<table>
<thead>
<tr>
<th></th>
<th>Aichi</th>
<th>Tokyo</th>
<th>Osaka</th>
<th>Gross Japan</th>
<th>percentage of Aichi prefecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>7.48million</td>
<td>13.52million</td>
<td>8.84million</td>
<td>127.10million</td>
<td>5.9%</td>
</tr>
<tr>
<td>Area</td>
<td>5,172km²</td>
<td>2,191km²</td>
<td>1,905km²</td>
<td>377,981km²</td>
<td>1.4%</td>
</tr>
<tr>
<td>The total amount of manufactured goods shipment</td>
<td>US$395.0 billion</td>
<td>US$68.6 billion</td>
<td>US$138.9 billion</td>
<td>US$2653.9 billion</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

as of October, 2015

as of October, 2017

as of March, 2017
### Comparison with Other main Prefecture

<table>
<thead>
<tr>
<th>Prefecture name</th>
<th>Area</th>
<th>Population</th>
<th>The number of four-wheel vehicle possession</th>
<th>The number of car possession per person</th>
<th>Load extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aichi</td>
<td>5,172km²</td>
<td>7.48million</td>
<td>5.02million</td>
<td>4.15million</td>
<td>0.86million</td>
</tr>
<tr>
<td>Tokyo</td>
<td>2,191km²</td>
<td>13.52million</td>
<td>3.95million</td>
<td>3.18million</td>
<td>0.78million</td>
</tr>
<tr>
<td>Osaka</td>
<td>1,905km²</td>
<td>8.84million</td>
<td>3.52million</td>
<td>2.78million</td>
<td>0.74million</td>
</tr>
<tr>
<td>Domestic total</td>
<td>377,981km²</td>
<td>127.10million</td>
<td>77.67million</td>
<td>61.49million</td>
<td>16.17million</td>
</tr>
</tbody>
</table>

| Time of date    | October 2017 | October 2015 | March 2017 | April 2015 |

#### The percentage of travelers’ transportation means 2009

- **Aichi**
  - Privately owned car: 75.8%
  - Railway: 18.6%
  - Bus, taxi and others: 5.7%

- **Tokyo**
  - Privately owned car: 17.0%
  - Railway: 71.2%
  - Bus, taxi and others: 11.8%

- **Osaka**
  - Privately owned car: 39.4%
  - Railway: 51.6%
  - Bus, taxi and others: 8.9%

Aichi Prefecture is the area where people have a strong dependency on car transportation.
Solution for Environmental issues caused by Automobile is needed.

Decision of “Aichi Traffic Pollution Control Strategy in the New Century” (October, 2002)

Decision of “Aichi Traffic Pollution Control Strategy 2020” (March, 2013)

【Future Vision】
“Support peaceful and comfort lives / build the society which make harmony with both car uses and environment;”

【Environmental Target】
○ Keep environmental standard of NO2, suspended particle matter and noises.
○ Regarding Global greenhouse gases, reduce 12% from transportation section. (compared with 1990)
## Aichi works on followings with national government and municipality

<table>
<thead>
<tr>
<th>Efforts</th>
<th>public works</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Reinforcement of measures for Automobile</td>
<td>Promotion of measures for diesel vehicle</td>
</tr>
<tr>
<td>② Conducting car type restriction / promote turn Cars from outside to</td>
<td>Promote control of using car type restriction unmatched car</td>
</tr>
<tr>
<td>emission standard cleared cars</td>
<td></td>
</tr>
<tr>
<td>③ Promotion of low-emission vehicle</td>
<td>• Promotion of introducing electrified vehicle, low-emission car and car with</td>
</tr>
<tr>
<td></td>
<td>good gas mileage</td>
</tr>
<tr>
<td></td>
<td>• Promotion of building infrastructure of fuel supply facilities</td>
</tr>
<tr>
<td>④ Promotion of Eco-drive</td>
<td>Conducting Eco-drive</td>
</tr>
<tr>
<td>⑤ Adjustment and reduction of transportation needs</td>
<td>Maintenance, improvement and promotion of public transportation</td>
</tr>
<tr>
<td>⑥ Promotion of measures for transportation</td>
<td>Decentralization and avoidance of transit and inflow transportation</td>
</tr>
<tr>
<td>⑦ Promotion of measures for Automobile transportation concentrated area</td>
<td>Promotion of measures for Automobile environment in South Nagoya area</td>
</tr>
<tr>
<td>⑧ Promotion of enlightening activities</td>
<td>Promotion and enlightening activities of innovative Eco-car like next</td>
</tr>
<tr>
<td></td>
<td>generational automobiles</td>
</tr>
<tr>
<td>⑨ Measures for improving load environment</td>
<td>Promotion of measures for road structure and improving roadside environment</td>
</tr>
</tbody>
</table>
Japanese electrified vehicles’ environmental performance

Electrified vehicles’ CO₂ emission is less than conventional automobiles’.

Comparison of CO₂ emission (‘well to wheel’)

<table>
<thead>
<tr>
<th>Type</th>
<th>CO₂ emissions (Well to Wheel JC08) g -CO₂/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline car</td>
<td>147</td>
</tr>
<tr>
<td>EV</td>
<td>77</td>
</tr>
<tr>
<td>(compositions of power sources※2 in 2012)</td>
<td></td>
</tr>
<tr>
<td>PHV</td>
<td>102</td>
</tr>
<tr>
<td>(Hybrid drive)</td>
<td></td>
</tr>
<tr>
<td>(battery charging drive)</td>
<td></td>
</tr>
<tr>
<td>(compositions of power sources※2 in 2012)</td>
<td></td>
</tr>
<tr>
<td>FCV</td>
<td>78</td>
</tr>
<tr>
<td>(off-site natural gas reforming)</td>
<td></td>
</tr>
</tbody>
</table>

※1 except for HV

Reference: Made by Aichi Prefectural Government, based on “Comprehensive efficiency and GHG emission analytics report” by incorporated foundation of Japan automobile research institute, March 2011,

※2 compositions of power sources in 2012

- Oil, others, 18.3
- L NG, 42.5
- Coal, 27.6
- Renewable, 10
- Nuclear, 1.7
Support measures to promote electrified vehicles

- **EV**
- **PHV**
- **FCV**

**Supports for introduction of EVs, PHVs and FCVs**
- Tax exemption from national and Aichi prefectural government
  - Ex: Exempt tax for buying and possessing cars
- Subsidies from national and Aichi prefectural government
  - Ex: support 30% of prices of newly-bought EV taxi
  - Ex: support 40% of prices of newly-bought FCV taxi

**Supports for installing charging facilities**
- Subsidies from national and Aichi prefectural government
  - Increase support rate for construction which along with our plan
  - Supports 75% of maintenance cost of hydrogen stations and 90% of operation cost
Our view of constructing battery charging facilities

**Private Area**
- Basic charging facilities
  - Home
  - Office
  - Normal battery charging

**Public Area**
- Path charging facilities
  - Quick battery charging
  - Dwell time around 30 minutes
  - Roadside service areas
  - SA/PA convenience stores...
  - Normal battery charger
  - Dwell time around an hour
  - Restaurants, roadside stations, around interchanges...
- Destination charging facilities
  - Quick battery charger
  - Dwell time Over an hour
  - Hotels, sightseeing places, mass commercial facilities, public facilities (museums)...

We made “Aichi arrangement and installation plan of charging facilities for EV, PHV”

For mass popularization of EV, promote installation of appropriate setting of public charging facilities.
**Appropriate arrangement and installation policy**

According to the following ideas by each municipality, we make the Arrangement Plan.

- **Path charging facilities**
  1. Arrangement depends on road extension
  2. In case of city area
  3. Setting around expressways’ interchanges

- **Destination charging facilities**
  □ Setting in commercial facilities etc
Path charging facilities (Arrangement depends on road extension)

【Types of battery charger】
quick battery charger and normal battery charger

【Installation places】
Around main highways

【Installation policy】
Even drivers look for charging facilities after they receive battery amount left warning, their car don’t run out battery

【The number of needed battery chargers】
One battery charger in every 10-20 km.
Path charging facilities （②In case of city area）

【Types of battery charger】
quick battery charger and normal battery charger

【Installation places】
city area and center of downtown
DID (Densely Inhabited District)

【Instalment policy】
there is no congestion of battery charging in
city area and center of downtown

【The number of needed battery chargers】
one battery charger in every 4 km².
Path charging facilities (Setting around expressways’ interchanges)

【Types of battery charger】
quick battery charger and normal battery charger

【Installation places】
around interchanges

【Instalment policy】
for additional battery charging before/after using expressway

【The number of needed battery chargers】
one battery charger in every up and down lane interchanges
Destination charging facilities (Setting in commercial facilities)

【Type of battery charger】
normal battery charger

【Installation places】
hotels, big malls, sightseeing places, City halls, Town halls, and museums.

【Instalment policy】
charge battery while drivers stay their destination

【The number of needed battery chargers】
one battery charger in every place
### Target number by 2020 (Public Area)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Path charging facilities</th>
<th>Destination charging facilities</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of places</td>
<td>721</td>
<td>730</td>
<td>1,451</td>
</tr>
<tr>
<td>The number of battery chargers</td>
<td>954</td>
<td>1,046</td>
<td>2,000</td>
</tr>
</tbody>
</table>
Promotion system of the plan

「Aichi EV/PHV popularization network」
It is made up people who take the lead to conduct or support promotion of electric car popularization and construction of battery charging infrastructure.

- Establishment 23 April, 2009
- Participants 96 enterprises and organizations (February, 2018)

<table>
<thead>
<tr>
<th>Participants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Automobile maker (Toyota Motor Corporation, Mitsubishi Motors, Nissan Motor Co., Ltd., Toyota Auto Body Co., Ltd., Honda Motor Co., Ltd.,)</td>
<td>5 companies</td>
</tr>
<tr>
<td>Local government (Aichi Prefecture, Nagoya City, Toyohashi city, Okazaki City, Kariya City, Toyota city and others)</td>
<td>12 groups</td>
</tr>
<tr>
<td>Other enterprises (DENSO Corporation, Toyota Industries Corporation)</td>
<td>79 groups</td>
</tr>
<tr>
<td>Total</td>
<td>96 Operator</td>
</tr>
</tbody>
</table>

Activities decide action plans, evaluate and report conducted, willingly introduce electric cars, construct battery charging infrastructure, and do enlightening activities to popularize EV and PHV.
Improving convenience of charging facilities
~Send out location information of battery chargers~

Location information of battery chargers
(Web site)

Location information of battery chargers
(application)
Situation of installation of charging facilities in Aichi

- The number of battery chargers
- The number of charging places

New goal (the number of battery chargers): 1,723

New goal (the number of charging places): 1,655

Data from March 2010 to March 2021:
- March, 2010: 63
- March, 2011: 201
- March, 2012: 233
- March, 2013: 494
- March, 2014: 543
- March, 2015: 756
- March, 2016: 1,171
- March, 2017: 1,188
- March, 2018: 1,199
- March, 2019: 1,199
- March, 2020: 1,199
- March, 2021: 1,199
Situation of installation of charging facilities opened to the public in Aichi

< Installation places as of March, 2013 >

661 battery chargers in 494 places

< Installation places as of March, 2017 >

1723 battery chargers in 1199 places

Installation places (fast battery charger)
Installation places (usual battery charger)
“Aichi FCV promotion council”

For promoting FCV, we promote and guide preparations for hydrogen stations, in conjunction with national and local governments, and private companies.

- Establishment: 1 July, 2005
- Participants: 69 enterprises and organizations (March, 2018)

“Aichi hydrogen stations arrangement and installation plan” (February, 2014)

Subsidies for preparations × Subsidies for managements
Situation of installation of hydrogen stations in Aichi

17 hydrogen stations in 18 places

(March, 2018)

Sales by using 2 battery chargers

Mobile hydrogen station

- Station (open) ••• 12 hydrogen stations in 12 places
- Mobile (open) ••• 3 hydrogen stations in 4 places
- Station (unfinished) ••• 1 hydrogen stations in 1 places
- Station (demonstration) ••• 1 hydrogen stations in 1 places
Change in Electrified vehicles’ situation in Aichi (as of March, 2017)

(cars)

- PHV
- EV
- FCV
## Comparison of the situation of installation of public charging facilities

<table>
<thead>
<tr>
<th>Item</th>
<th>EV</th>
<th>PHV</th>
<th>FCV</th>
</tr>
</thead>
</table>
| **The situation of installation of public charging facilities**  
【In Aichi Prefecture】 | **about 1200 places**  
(battery charger)  
(6% of gross Japan) | about 1500 places  
(gas station) | **16 places**  
(hydrogen station)  
(16% of gross Japan) |
| **The situation of installation of public charging facilities**  
【In Japan】 | about 21000 places  
(battery charger) | about 31000 places  
(gas station) | about 100 places  
(hydrogen station) |
| **The number of popularization of the Automobile**  
【In Aichi Prefecture】 | about 7 thousand | about 8 thousand | about 6 hundred |
Future plans

<Charging facilities>
① Setting in unconstructed areas including mountainous areas

② Setting in new facilities attracting many customers like large shopping malls

③ Having more than one battery charger per place to reduce congestion

<Hydrogen-supply facilities>
Setting in both city areas and unconstructed areas
Thank you for listening

The tower of Nagoya Castle