

*2013 EV & PHV Town Symposium in Tokyo*

# Kyoto's Visions for Building Charging Infrastructures for Next Generation Vehicles

## Planning Process and Views

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# Overview of Kyoto

Details	Size/Qty
Area	4,613 km2 (1.2% vs whole of Japan) 31 <sup>st</sup> largest in Japan
Population	Approx. 2,640,000 (2.1% vs whole of Japan) 13 <sup>th</sup> largest in Japan
No. of owned cars	Approx. 1,260,000
No. of EVs/PHVs running	1,050 ※ (As of March 2013)
No. of quick chargers installed	39 units (As of March 2013)

※Based on figures reported by dealers and showrooms, etc.



# 1. Automobile Situation in Kyoto

## ◆ In recent years, transportation networks in Kyoto Prefecture are changing extensively.

- In 2014, the North-south transport axis will be completed in Kyoto Prefecture which long in the north-south direction (about 140 km). Completion of "backbone"  
(Kyoto-Jukan Expressway will be fully opened to traffic)
- Traversing roads such as Meishin and Shin-Meishin expressways are also being built.
  - Dramatically improve access to highway networks and regional road networks linking Kyoto Maizuru Port, industrial towns in the prefecture, major cities, and Keihanshin districts.

How to link macro and micro transportation networks?

## ◆ Approx. 1/4 of the greenhouse gas emitted in the prefecture is by transportation sector.

- EVs, which do not emit CO2 while driving, play an important role in the building of new districts for realizing a low carbon society along with the promotion of the use of public transport.

How to disseminate EVs and PHVs?

## ◆ Kyoto has abundant tourist resources such as tourist spots, nature, historical sites, etc.

- World Heritage sites, designated National Parks, Geoparks, Preservation Districts for Groups of Historic Buildings, etc.
  - Tie-up with tourist industry is expected. The tranquility of EVs and PHVs also matches the atmosphere of tourist spots, as well as the "eco" image of Kyoto.

Can EVs/PHVs withstand going around tourist spots and driving all the way back?

## 2. Current Challenges of Charging Infrastructures

- ◆ Lack of quick chargers at the SAs and PAs of expressways.
- ◆ Development of charging infrastructures near expressway IC is indispensable.
- ◆ Lack of quick chargers at connecting between north and south region and highways used for traveling between cities.
- ◆ The routes for traveling between cities lack diversity, and there is a need to ensure redundancy for driving EVs (multiple routes should be considered, not only one route)
- ◆ There are some areas without quick chargers such as Yamashiro region which has a relatively high population and Tango region which has rich tourist resources.
- ◆ There is a tendency for quick chargers to concentrate in cities, with only a few installed in suburbs.
- ◆ Taking into account the full-scale dissemination of EVs and PHVs in the future, there is a need for more quick chargers to be installed. etc



In order to promote the full-scale dissemination of EVs and PHVs, there is a need to overcome these challenges, and build an environment where users of EVs and PHVs can drive around Kyoto safely without worrying about running out of electricity.

### 3. Positioning and Objective of Visions

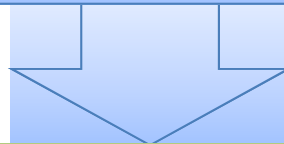
#### 【Positioning】

Indicates Kyoto Prefecture's views on building charging infrastructures required from transitioning from the initial stage of dissemination of EVs/PHVs to full-scale stage.

In particular, reflect the regional characteristics of Kyoto Prefecture and social elements such as Kyoto-like qualities.

#### 【Objective】

Promote active use of “projects promoting charging infrastructures for next generation automobiles” by private sector, while taking into consideration with Dissemination strategies for EVs and PHVs in Kyoto Prefecture.



**Accelerate the development of charging infrastructures in the aim to build a “Kyoto without running out of electricity”.**

※Review as required based on the situation of the development of charging infrastructures and dissemination of EVs and PHVs in the future.

## 4. Basic Ideas for Building Charging Infrastructures

Taking into account of the social elements and regional characteristics of Kyoto Prefecture such as Kyoto-like qualities, promote the establishment of charging infrastructures at the following regions, places, and facilities.

- ① To enable EVs to run stress-free in Kyoto Prefecture which is long in the north-south direction, and with the Kyoto-Jukan Expressway opening along the whole length soon, enhance “route charging” which enables charging on routes for traveling to destinations such as roadside stations, expressway SAs/PAs, around expressway ICs, convenience stores and gas stations on arterial roads, etc.
- ② Promote “destination charging” which is charging during stay at destinations such as tourist facilities, dining and experience facilities, mass commercial facilities such as shopping centers, etc. , based on Kyoto’s characteristics of having abundant tourist resources and many tourists.
- ③ Taking into account that “destination charging” and “route charging” alone cannot provide the required electricity due to massive power consumption as a result of sudden traffic jams, etc., build “emergency charging” facilities in car dealers and public facilities.

① Led to installation of total of 459 units centering around quick chargers

②+③ Led to installation of total of 170 units of quick chargers of normal chargers

## 5. Facilities Installed with Charging Infrastructures

### ***Quick chargers***      Installation for route charging and emergency charging

- ① Roadside stations
- ② Expressway SAs and PAs
- ③ Areas surrounding connections (interchanges, etc.) between expressways and ordinary roads.
- ④ Along highways and near traffic nodes
- ⑤ Areas with decreasing number of gas stations
- ⑥ Facilities with ability to draw customers and facilities expected to be visited by the general public  
(Large commercial facilities, tourist facilities, convenience stores, etc.)
- ⑦ Automobile infrastructure facilities (car showrooms, dealers, car-rental agents, gas stations, etc. in Kyoto Prefecture)
- ⑧ Emergency charging facilities (Public facilities of municipals in Kyoto Prefecture)

### ***Normal chargers***      Installation for destination charging

- Large commercial facilities, amusement facilities
- Lodging facilities such as hotels and Japanese-style inns, etc.
- Public facilities of municipals in Kyoto Prefecture      etc.

## 6. Example of Kyoto Prefecture's Ideas on No. of Units Installed

### (National roads)

National roads in 19 zones: (No. of units) Install 4 units of rapid or normal chargers in all zones.

(Proportion) Install 1 quick charger in zones of each approximately 20 km.

### (Major regional roads)

Prefectural roads in 9 zones...(Proportion) Install 1 quick charger in zones of approximately 10 km.

※ Applies to roads whose traffic volume of small cars for 12 hours exceeds 10,000 cars, and zone length exceeds 7 km.

※As the zone length of all applicable prefectural roads was under 20 km, the number of units was not set.

### (Promotion of entire region)

Solution of route chargers or destination chargers shortage area.

Referring to the government's target value (4,000) to promote the establishment of quick chargers, Kyoto Prefecture's geographical attributes value was calculated.

Cumulative number according to government budget : Quick chargers 4,000 units

Population-based : Approx. 2.64 million people  
in Kyoto Prefecture (2.1% of whole of Japan)

$4,000 \text{ units} \times 2.1\% = \text{Approx. } 84 \text{ units}$

Area-based : Kyoto Prefecture : 4,613km<sup>2</sup>  
(1.2% of whole of Japan)

$4,000 \text{ units} \times 1.2\% = \text{Approx. } 48 \text{ units}$

Then Population-based or Area-based were distributed to municipals.  
And take larger one between as the approximate number of units to be regionally distributed.

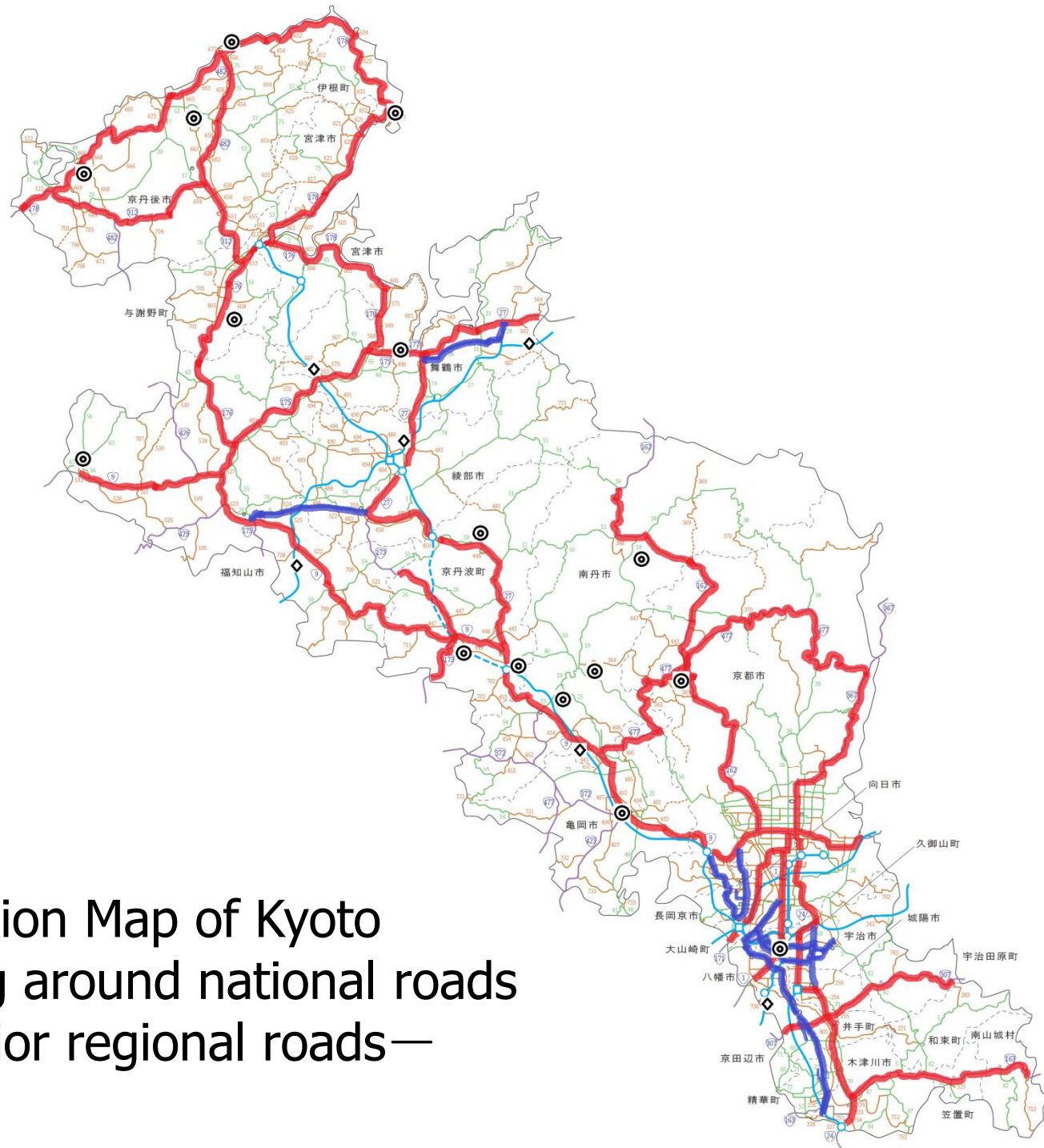
If estimate is above 3 units, one unit must be a quick charger, and the remaining can be quick or normal chargers.

If estimate is below 2 units, can be quick or normal charger.



## 7. Views on Installation in Visions and No. of Units Installed

Place of installation	Installed by (Tentative)	Scale of installation	Quick cha rgers	Normal ch argers	Quick or normal ch argers※
① Route Charging (Additional Charging)			① 459 units		
(1)Roadside stations/street stations	Companies running roa dside stations	Total 16 places	32 units	80 units	—
(2)Expressway SAs/PAs	Companies running exp ressways	Total 6 places	12 units	—	—
(3)Expressway IC vicinity (within 3 km range)	Commercial facilities, restaurants, convenience stores, gasoline stands, etc.	Total 48 locations	96 units	—	96 units 76 units — —
(4)Along main national roads (19 zones)		Every 20km	35 units	—	
(5)Major regional roads (9 zones)		Every 10km	9 units	—	
(6)Other vacant areas (Over-all installation)		36 districts in pref ecture (By city/ward /town/village)	23 units	—	
② Emergency Charging (Last-minute Charging)			②+③ 170 units		
(7)EV/PHV car dealer	Dealer, showroom, municipal	Total 30 facilities	—	—	60 units
(8)Government public facility, etc.		Total 2 facilities	—	—	6 units
③ Destination Charging (Incidental Charging)					
(9)Other vacant areas Charging during stay at destination	Large commercial facilities, hotels, Japan ese inns, restaurants, temporary deposit car parks, etc.	36 districts in prefec ture (By city/ward/town/ village)	—	—	104 units
①+②+③			629 units		
			207 units	80 units	342 units



## 8. Vision Map of Kyoto

—Centering around national roads and major regional roads—

# <Tango/Chutan Area>

**[National Roads]** **[Prefectural Roads]**

**Route 9**

**Route 27**

**Route 173**

**Route 175**

**Route 176**

**Route 178**

**Route 312 Route**

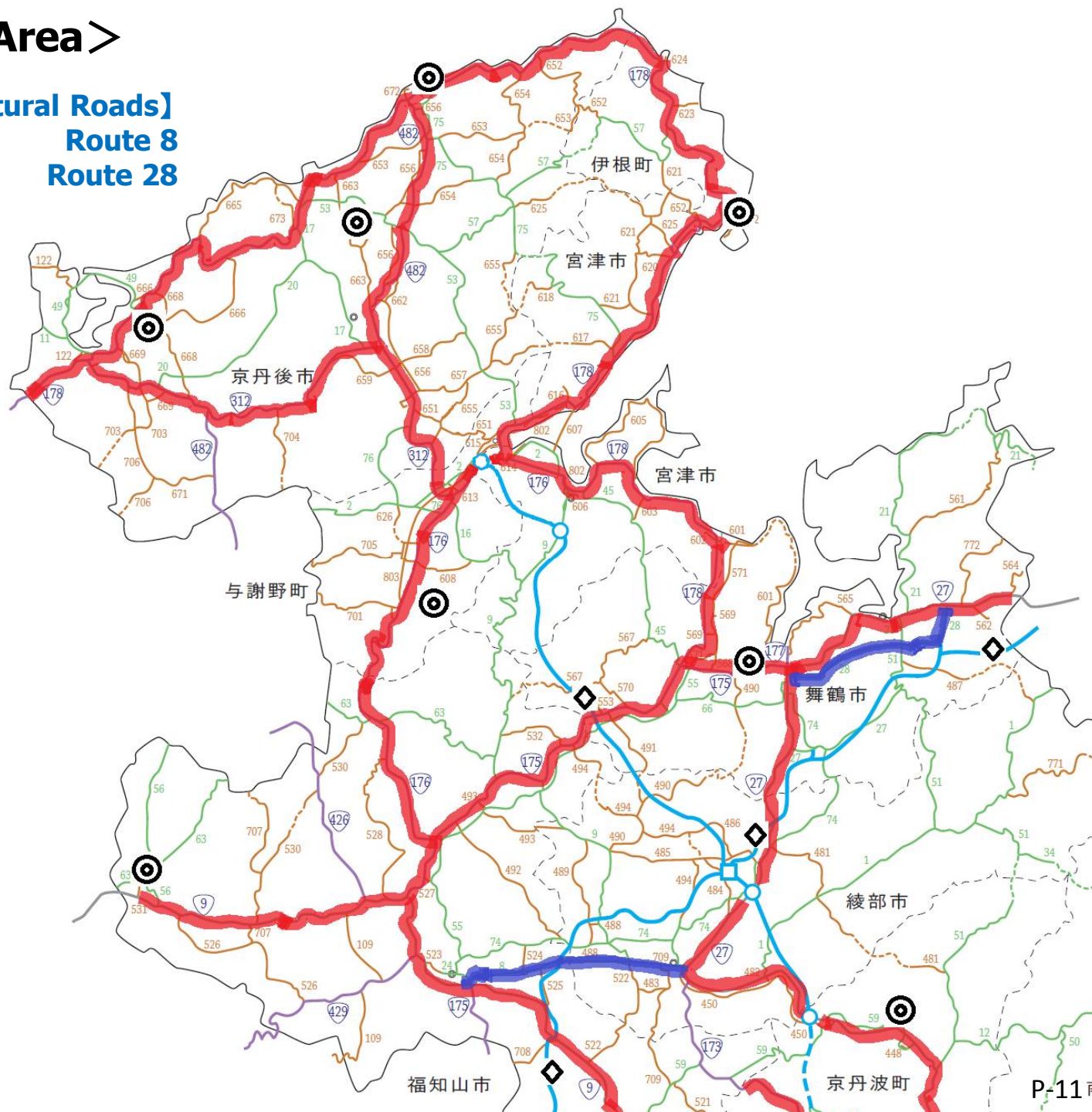
**482**

**Route 8**

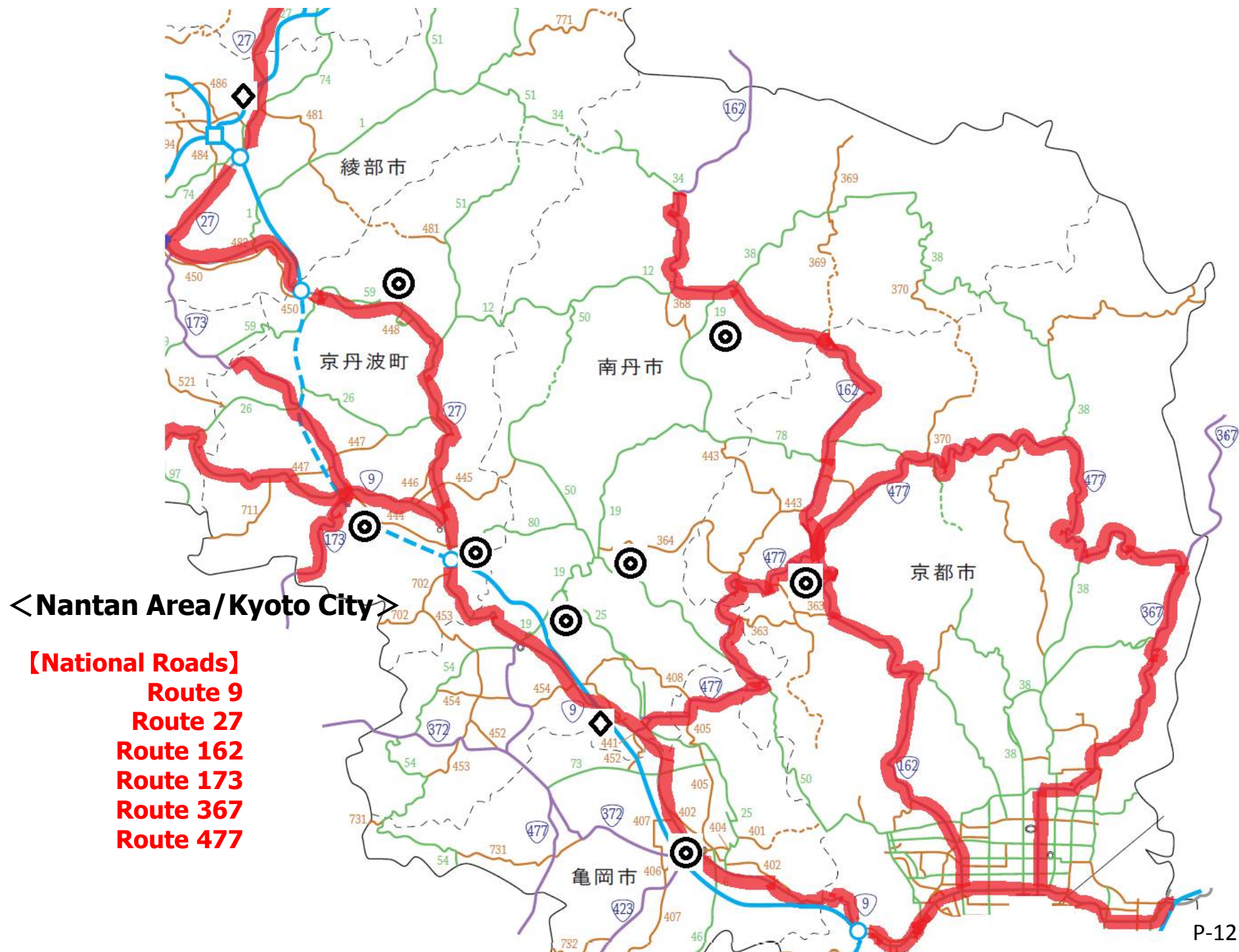
**Route 28**

**[Roadside Stations]** ◎

**[SA/PA]** ◇







**【Prefectural**

## Roads)

## Route 10

## Route 13

## Route 15

## Route 22

## Route 67

## Route 69

## Route 81

# *Future Prospects for Spreading EVs/PHVs in Kyoto Prefecture*

## Promotion of further dissemination of EVs/PHVs

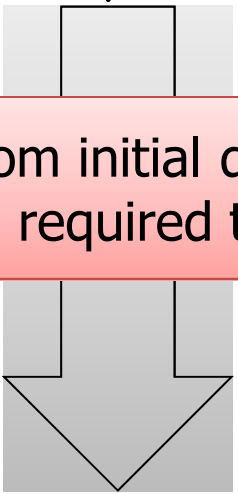
- ◆ In order to promote/continue dissemination of EV/PHV, provide continuous support using national systems, etc.

〔 **Economical support** 〕

## Building of charging infrastructures

- ◆ Aim to install quick chargers while making use of dynamism of private sector

〔 **Establishment of driving environment** 〕



Presently in transition period from initial dissemination stage to full-scale.  
Continuous support is still required to full-scale dissemination.

Kyoto Prefecture is planning to integrate and reassess current plans for promoting dissemination of EVs/PHVs, and review the ideal means of providing support for full-scale dissemination.