

CO2 reduction by ITS



MLIT

Ministry of Land, Infrastructure, Transport and Tourism

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1. Outline of ITS in Japan

- Environmental degradation :

- 20% of all CO2 emissions in transport sector

- Traffic congestion Time loss :

- 5 billion hours annually

- Traffic accidents :

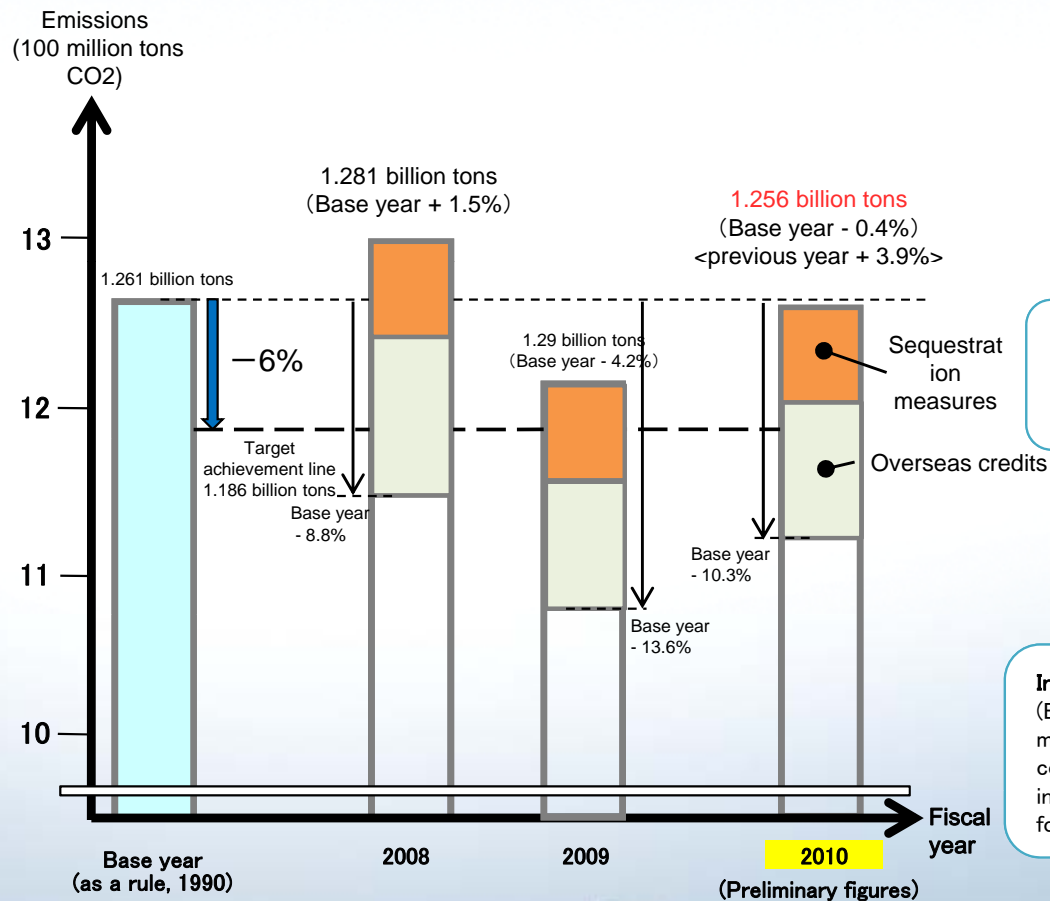
- 690,000 accidents resulting in 4,600 fatalities (FY2011)



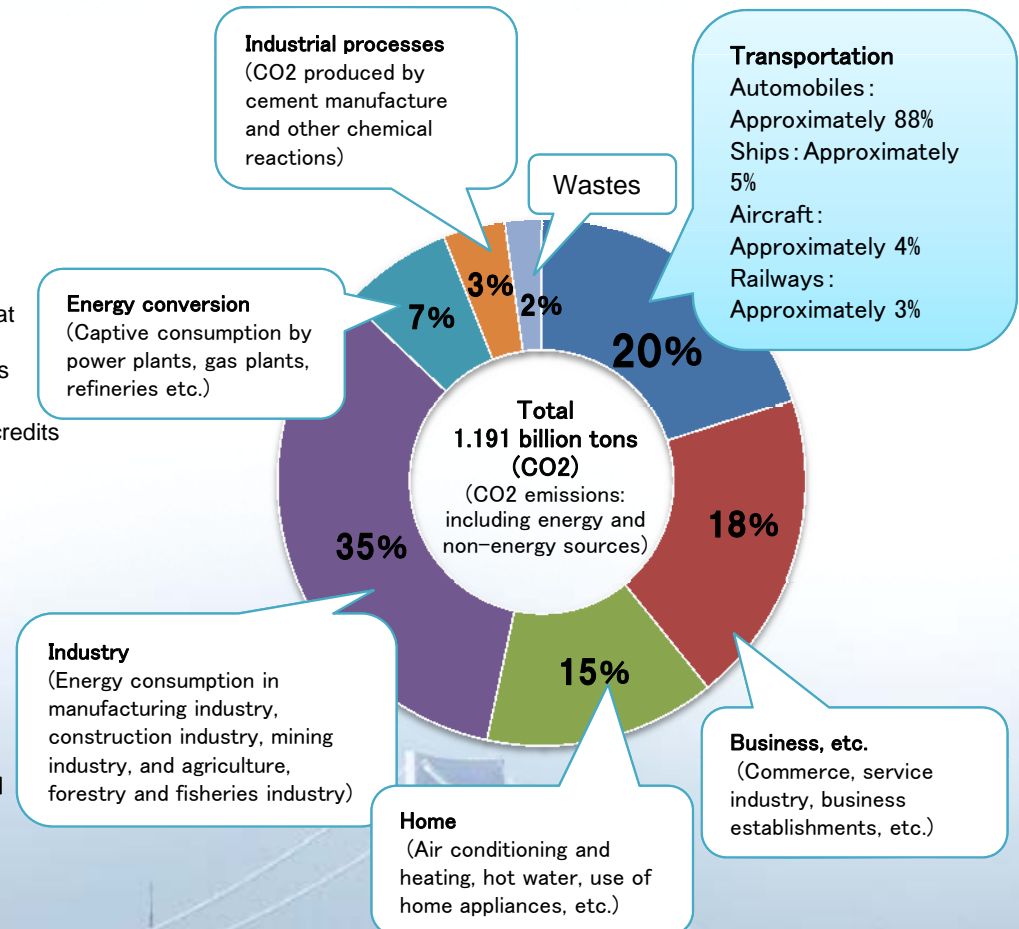
2. CO2 emissions by each sector in Japan

- 20% CO2 emissions in transport sector.

Greenhouse Gas Emissions in Japan

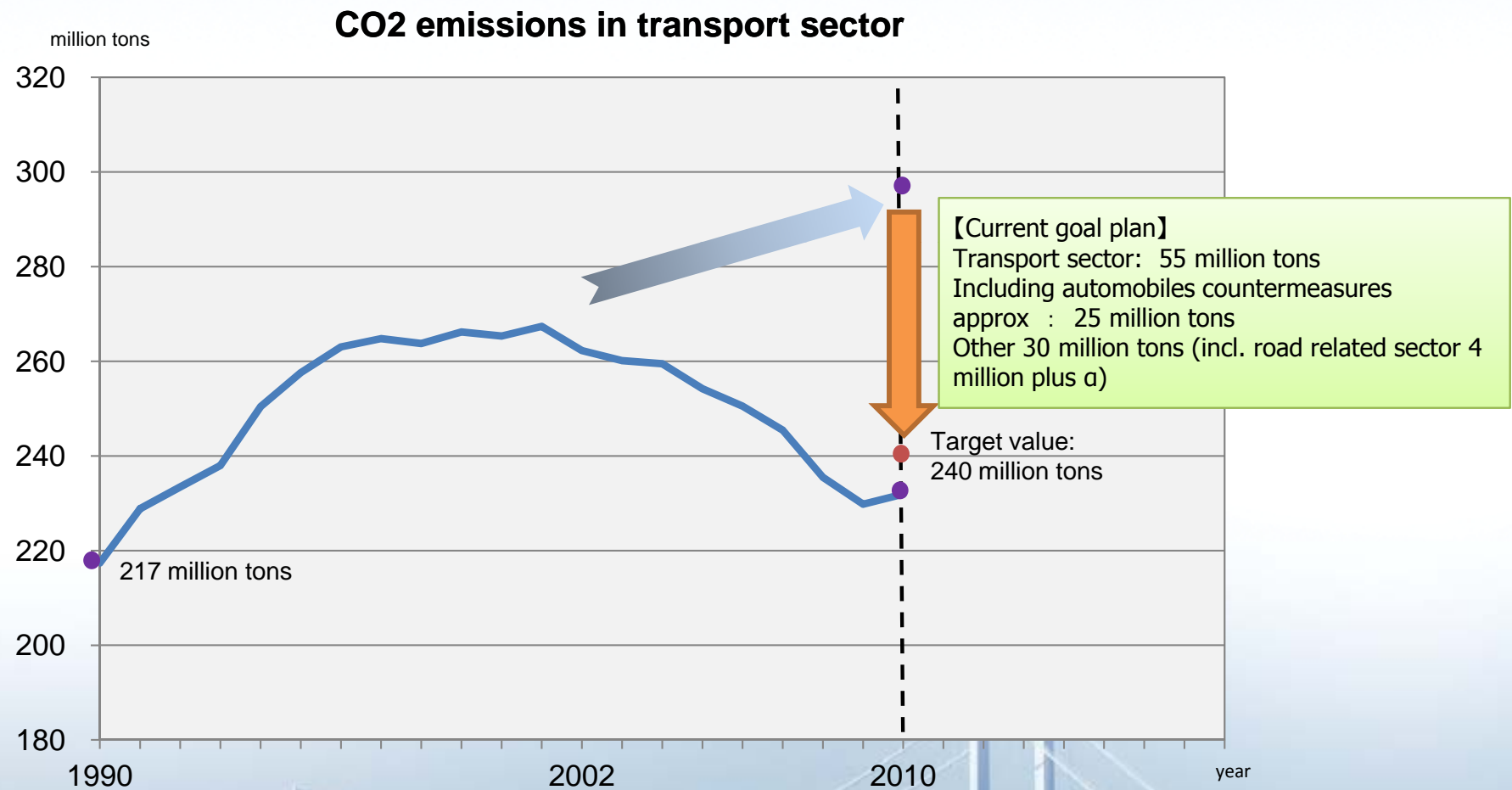


CO2 Emissions By Sector



2. CO2 emissions by each sector in Japan

- Current goal plan in transport sector : reduce CO2 emissions by 55 million tons



※BAU (Business as usual) : predicted value in case of without actual countermeasures for CO2 emission

3. Measures to reduce CO2 emissions by road sector

Perspective 1: Low carbon urban design tailored to the region

- Promote road greening
- Introduce LED road lighting
- Construct highway bridges that offer longer service life
- Promote public transport use (traffic node measures)

Perspective 2: Compliance with energy restrictions instituted in the wake of the Great East Japan Earthquake and creation of a desirable energy system

- **Promote ITS (VICS, ETC, and ITS Spot)**
- Construct a network of ring roads and other arterial roads, promote grade separated crossings, etc.
- Efficaciously administer expressway toll policies
- Reduce roadwork
- Measures for bottleneck railroad crossings, etc.
- Construct logistics network that will accommodate larger containers

Perspective 3: Global warming measures that promote changes in lifestyles and work styles

- Create and support a bicycle use environment






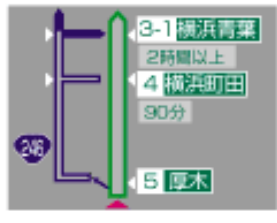
4. VICS (Vehicle Information and Communication System)

- provides road traffic information on car navigation screens.

- equipped on 35 million automobiles (June 2012).



- reduced annual CO2 emissions by **2.4** million tons in 2009.

	Information via FM multiplex broadcasting Displayed if manually selected	Beacon (radio wave, optical) information Automatically pops up
Ordinary road	 <p>Area for which information desired is selected from the menu.</p> <p>Example of FM simple map display</p>	 <p>Information on direction of travel provided based on vehicle location (▲ indicates vehicle location)</p>
Inner-city express-way	 <p>Area for which information desired is selected from the menu.</p>	 <p>Information on direction of travel provided based on vehicle location (▲ indicates vehicle location)</p>
Inter-city express-way	 <p>Area for which information desired is selected from the menu.</p> <p>Example of FM simple map display</p>	 <p>Information on direction of travel provided based on vehicle location (▲ indicates vehicle location)</p>

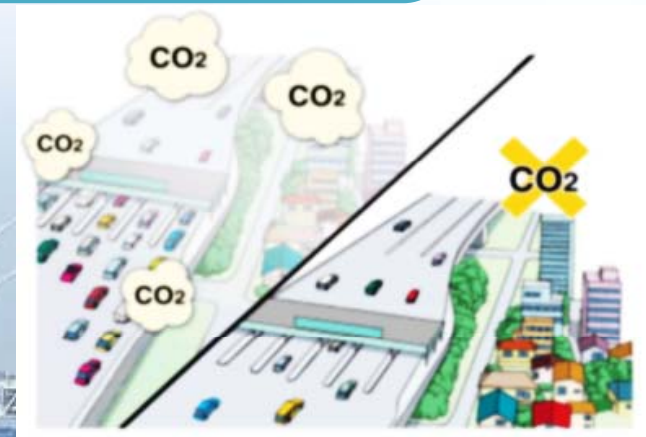
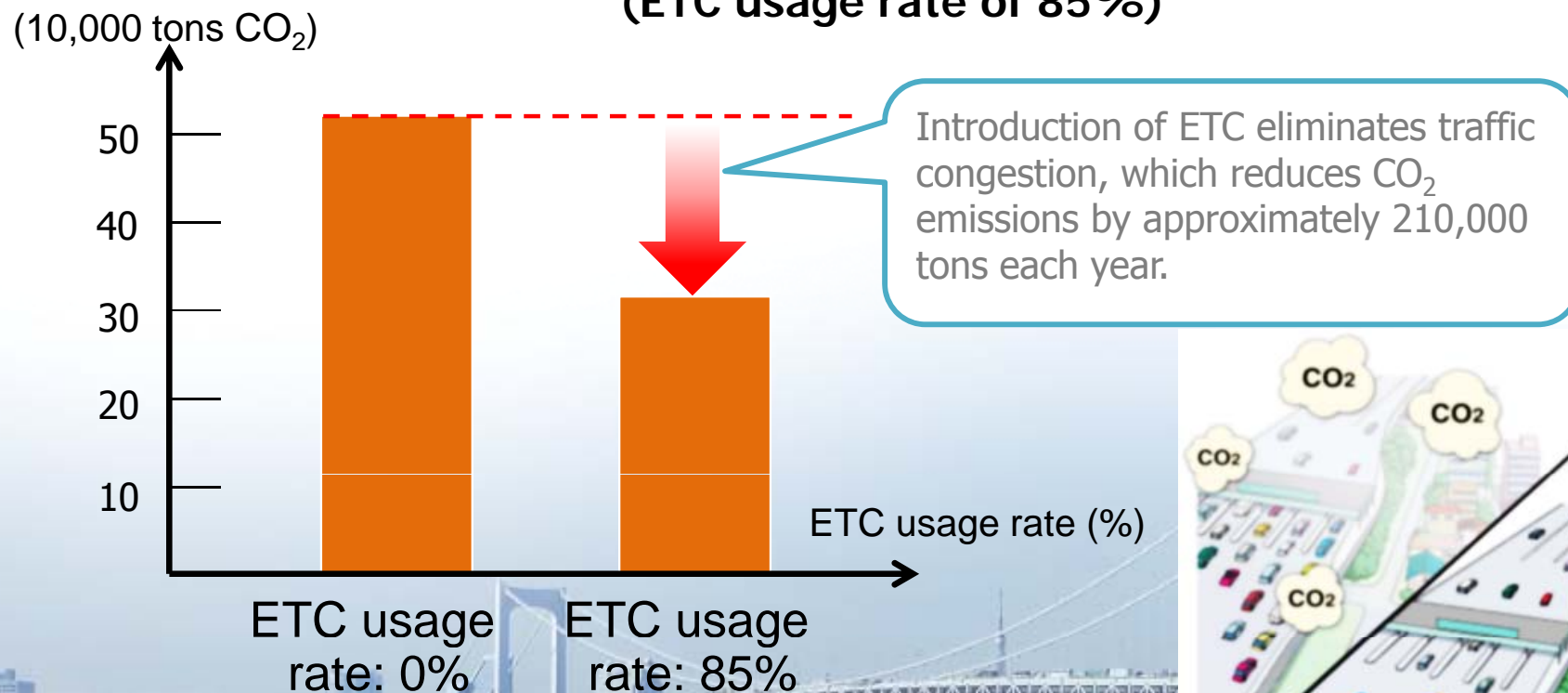
5. ETC (Electronic Toll Collection system)

- eliminates almost all toll-gate congestion on expressways (30% of all expressway congestion).
- usage rate on toll roads: 87% (39 million automobiles).



- cuts CO₂ emissions by about **0.21million** tons per year

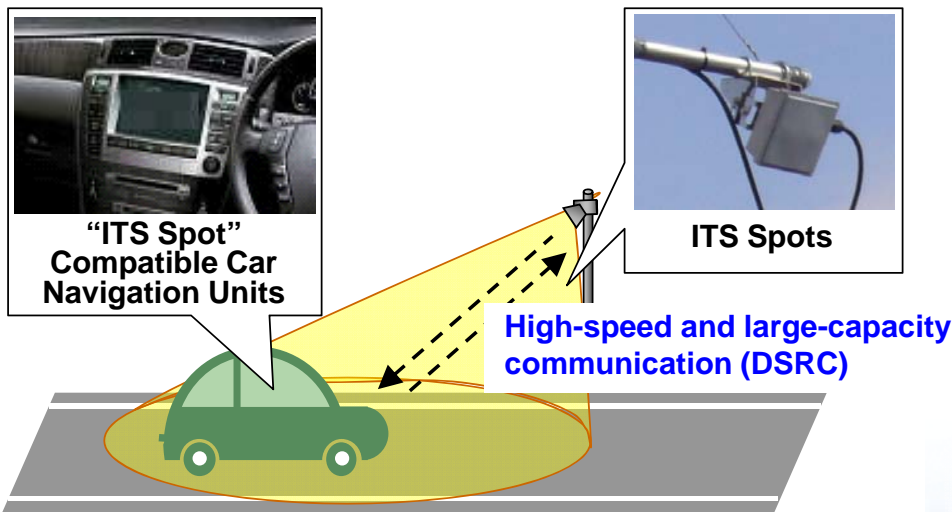
CO₂ reduction brought by introduction of ETC (ETC usage rate of 85%)



6. ITS Spot service

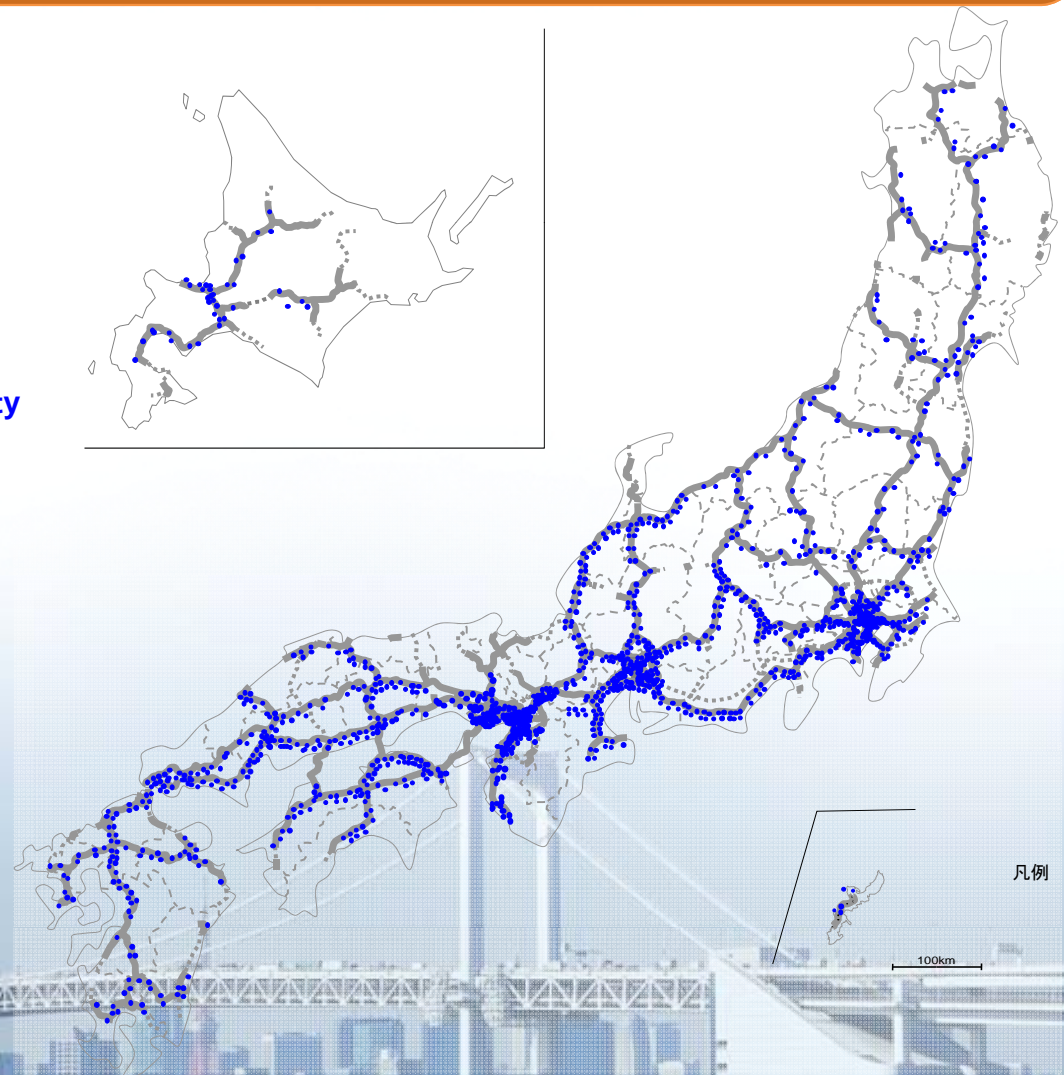
Deployment of "ITS Spots"

- Car navigation systems for ITS Spots released in 2009.
- 1,600 ITS Spots installed mainly on expressways.
- Encouraging smooth traffic flow with reduction of CO2.



3 Basic Services

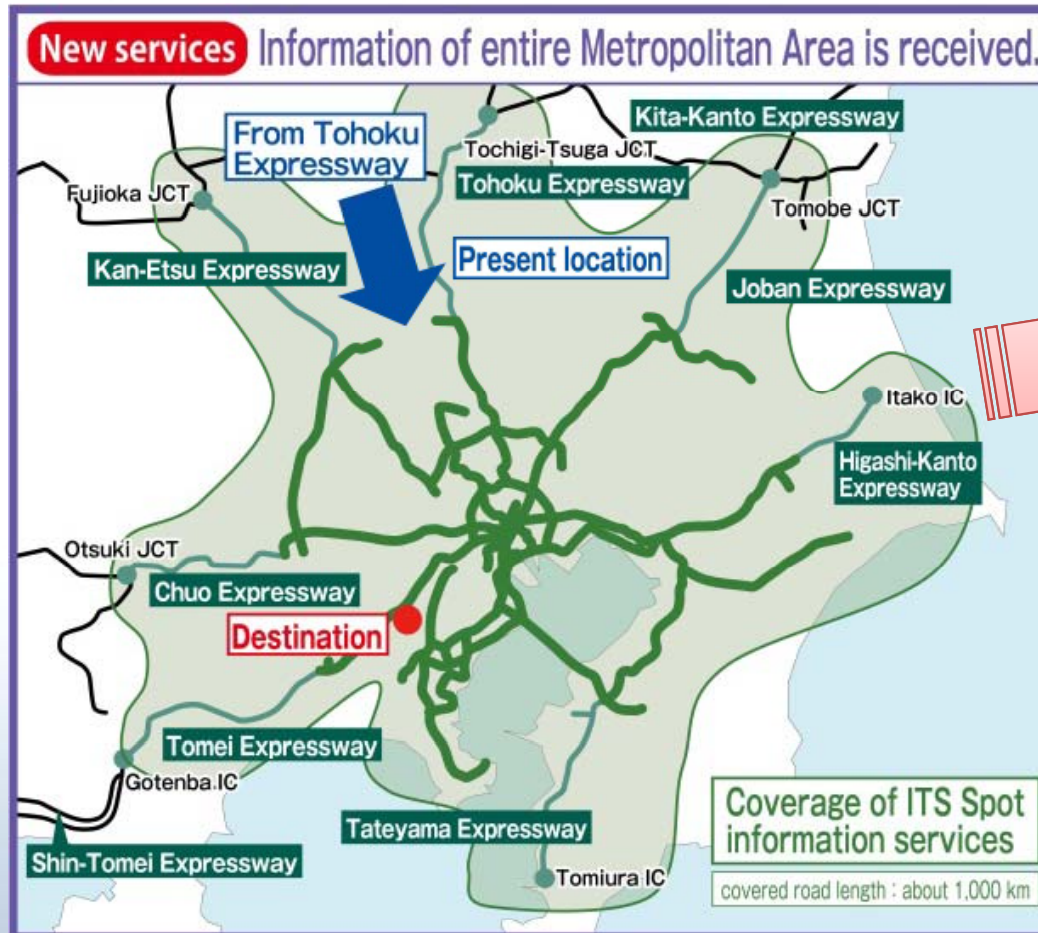
- Dynamic Route Guidance
- Safety Driving Support
- ETC



6. ITS Spot service

Service1 : Dynamic Route Guidance

- Travel time information for appox. 1000km be received from ITS Spot.



Travel time data for all road segments in the metropolitan area are received from ITS Spot.

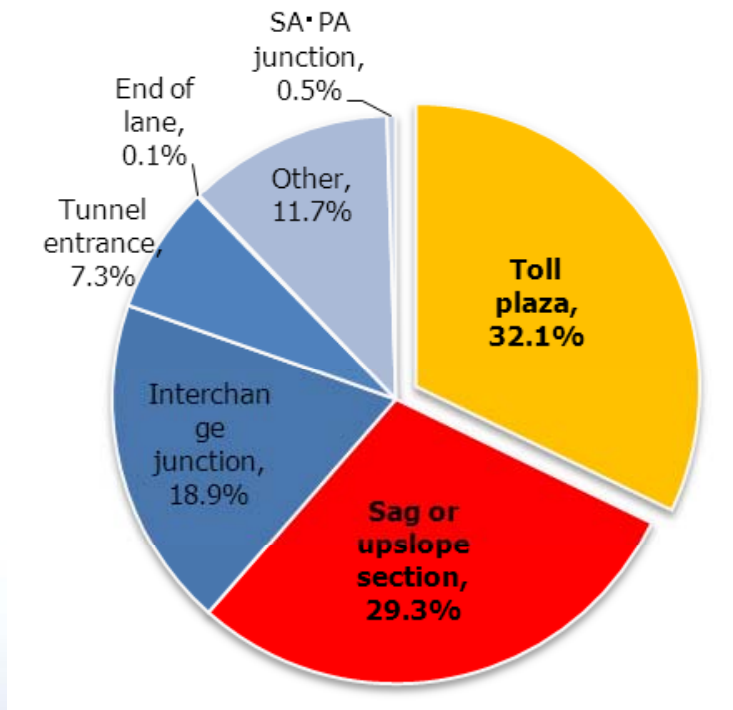
The car navigation system smartly selects an optimum route.

The whole road network can be used effectively.

6. ITS Spot service

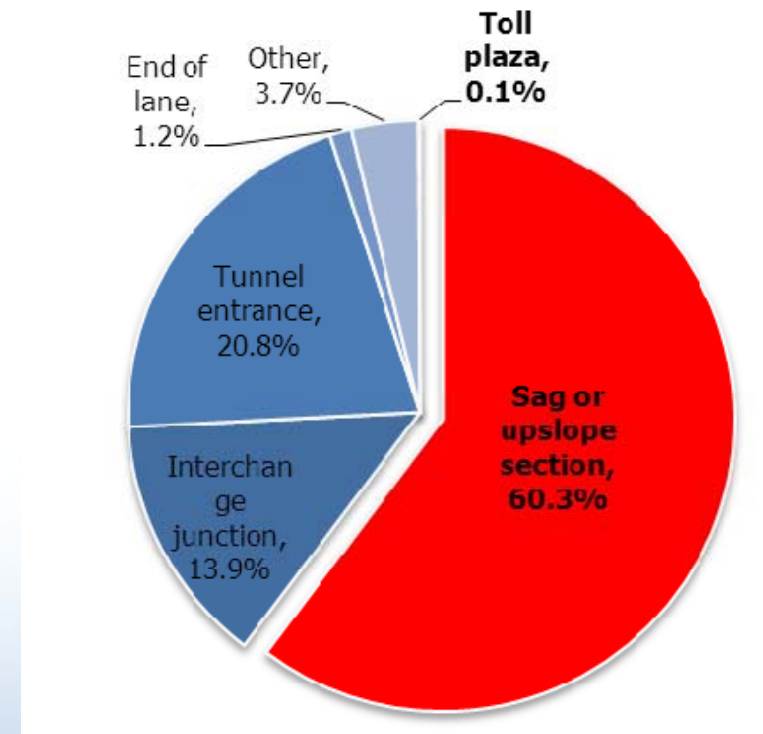
- 60% of congestion occurs at sags and on upslope section.
- Urgent measures urgently required.

Congestion on inter-city expressways



2000 without ETC

Total congestion frequency =
12,378 per year



2009 with ETC

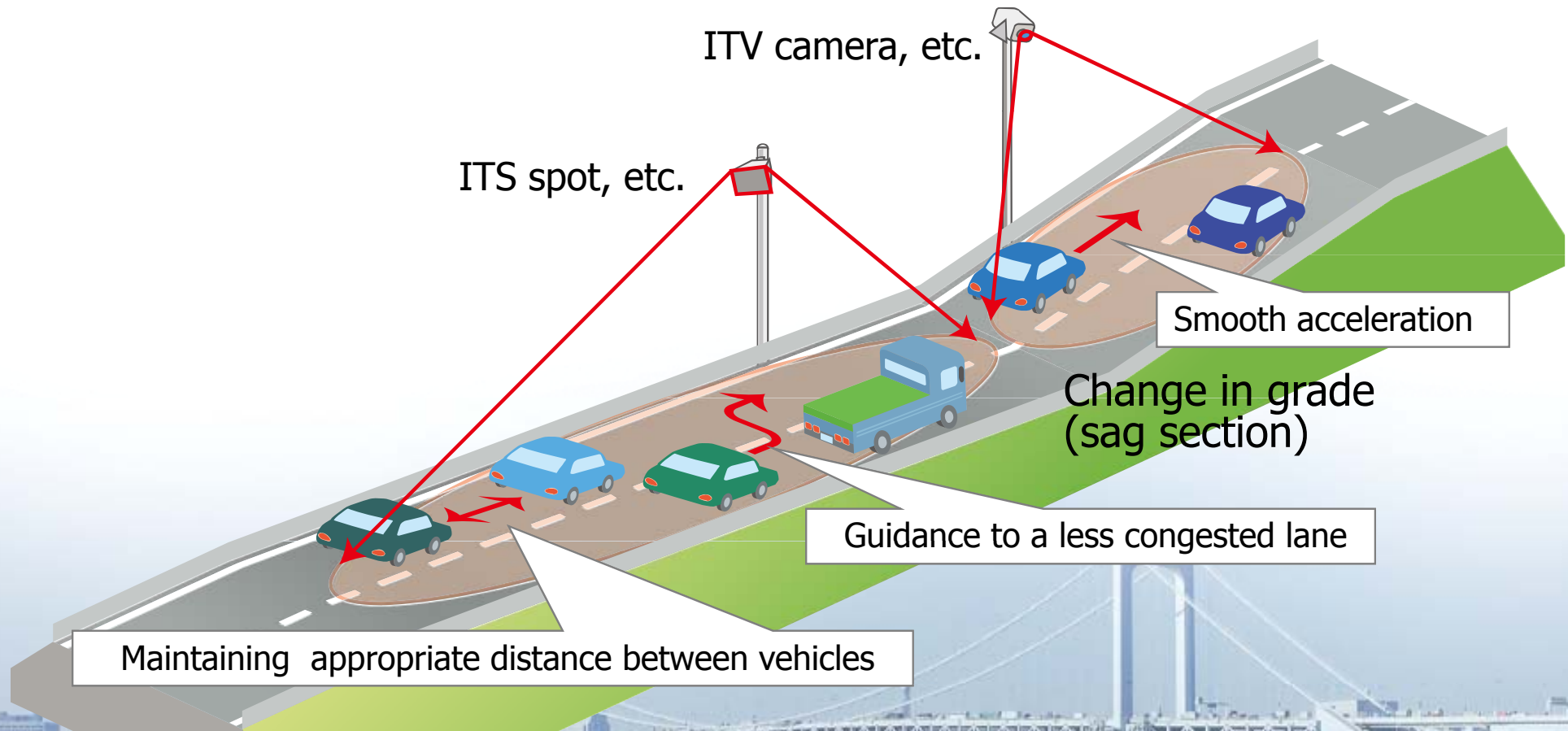
Total congestion amount =
107,516 km·h per year

6. ITS Spot service

Sag congestion countermeasure based on cooperation between the road infrastructure and automobiles

- ITS Spots transmit optimum speed, headway distance.
- ACC* equipped automobiles automatically drive based on the information.
- Experiment to be carried out from 2012.

* ACC (Adaptive Cruise Control): Function which controls speed and headway of a moving automobile.



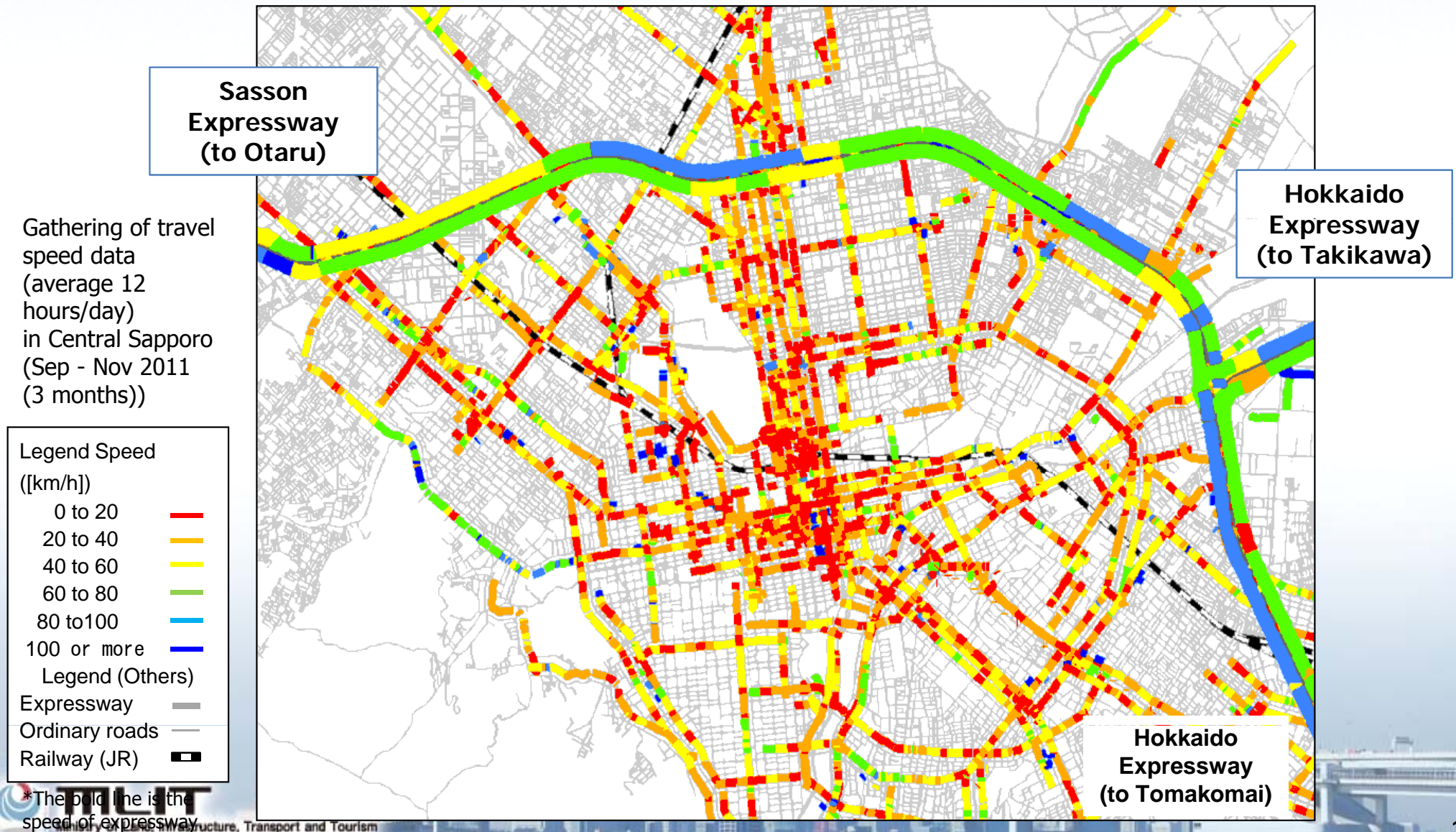
※ According to the results of the simulations for congestion on Saturday, August 21, 2010, The spread of 30%, it is possible to reduce the amount of about 50% congestion.

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6. ITS Spot service

Congestion measure based on probe data

- Collected probe data via ITS spot use for travel speed survey.
- Understanding of travel speed is effective to congestion measures.



7. Conclusion

- Japan has implemented many policies in the ITS field, including ETS, VICS and ITS Spot service.
- ITS makes a major contribution to reducing CO2 emissions.
- Further promotion and research of ITS is underway.