Potential Global Warming Scenario

Theory (from IPCC report)

Average global temperature will increase up to +2°C on the basis of BAU

Atmospheric CO2 concentration must be stabilized under 550 ppm level

Source: IPCC 3rd Assessment Report

The Fully Networked Car
Geneva, 5-7 March 2008
To stabilize atmospheric CO2 concentration below 550ppm (according to IPCC report*), CO2 emissions from all new vehicles must be reduced by 70%.

* IPCC 3rd Assessment report
Nissan’s Global Concept
~ Triple-Layered Approach ~

Approach to ambitious goal “70% CO₂ reduction”

1. Improve fuel economy by Vehicle
2. Improve fuel economy by Driver
3. Improve fuel economy by Transportation system
Two modes in fuel consumption

Fuel consumption ratio

[\text{km/l}]

0 \quad 5 \quad 10 \quad 15 \quad 20 \quad 25

Average Trip Speed [\text{km/h}]

0 \quad 20 \quad 40 \quad 60 \quad 80 \quad 100 \quad 120

- depends on trip speed
- depends on drivers

- smooth flow
- congestion

(B) Eco-drive advice
(A) Eco-route

The Fully Networked Car

Geneva, 5-7 March 2008
Fuel consumption in the congestion

Fuel consumption depends on trip speed

![Graph showing fuel consumption ratio vs. trip speed in different congestion conditions.]

- No congestion
- Congestion

Average Trip Speed [km/h]

Fuel consumption ratio [km/l]

0 5 10 15 20 25

0 20 40 60 80 100 120
Increasing trip speed improves fuel consumption

Fuel consumption ratio [km/l]

Average Trip Speed [km/h]

(A)Eco-route

No congestion

congestion
(A) Eco Route Guidance with probe link travel time

Eco Route guidance with probe link travel time
Sufficient traffic information with probe cars

- Probe cars expand spatial coverage of traffic information.
- Necessary for Eco Route calculation
60% more Traffic information in Yokohama

Probe data for fastest route guidance

Road length with traffic information

60% increase

VICS

SKY probe

Before Sky

06 Nov

Dec

07 Jan

Feb

Mar

Apr

May

Jun

Jul

Road length (km)

1600

1500

1400

1300

1200

1100

1000

The Fully Networked Car
Geneva, 5-7 March 2008
Probe data for fastest route guidance

Travel time reduced by 20% by probe data

【Example: actual course】

【travel time reduction】

<table>
<thead>
<tr>
<th></th>
<th>Probe</th>
<th>VICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>55</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>60</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

GOAL

with VICS

probe & VICS

without information

Copyright(C)2006 ZENRIN CO., LTD. (Z07MA第014号)
average speed: approx. 26% up

<table>
<thead>
<tr>
<th>Probe</th>
<th>VICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>O</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Improvement of trip speed
Probe data for fastest route guidance

CO2 emission: 17% reduced


d| Probe | VICS |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Reduction of CO2 emission

4.0 4.5 5.0 5.5
ave. CO2 emission (kg)

8.7% 9.2% 17.1%

The Fully Networked Car
Geneva, 5-7 March 2008
2 modes in fuel consumption

Fuel consumption ratio [km/l]

Average Trip Speed [km/h]

depends on drivers

(B) Eco-drive advice

No congestion

congestion
Actual fuel consumption varies by driver.

Potential Possibility of Eco-driving

Actual fuel consumption

Frequency

Low efficiency

High efficiency

Average

Frequency

(km/L)

Low efficiency

High efficiency

(example of compact cars)

The Fully Networked Car
Geneva, 5-7 March 2008
(B) Eco-driving Advice System
(started in January, 2007)

To improve driving behavior

1) Drive with Eco-meter

2) Check the result at CARWINGS website

3) Compare the result with other drivers in the same model

4) Receive advice for improvement based on the result

Key point: maintain motivation for cycle turning
Effect of Eco-driving Advice System

Fuel consumption improved by 18%

- **2.5L Sedan**
  - Service members
  - Improvement by 18.9%

- **1.5L Compact**
  - Service members
  - Improvement by 17.8%

- **2L Height Wagon**
  - Service members
  - Improvement by 16.3%

- **2L Minivan**
  - Service members
  - Improvement by 18.1%