# Better methodologies to ensure comparability of international indicators

**(in the transport sector)**

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**Paris, 7 June 2012**

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# Why indcators'international comparibility

## For international organisations

- To be able to assess national policies effectiveness
- To statistically compare countries on similar criteria
- To allow for direct international comparisons

## For governments

- To benchmark the national performance
- To save resources on methodology development
- To adopt validated approaches

# One size does not always fit all !

# Applied to cars ….


# Local specificities to be taken into account

- Methodologies flexible enough to be representative of local circumstances
  - E.g. driving patterns reflected into the test cycle definition
- Local variable having an impact on the indicator to be factored out so it does not impact the indicator's cross-regional comparability
  - E.g. outside temperature for fuel economy measurement

# Some example for the transport sector The WLTP - Worldwide Harmonized Light-Duty Test Procedures

- Work started in June 2008 as part the UNECE GRPE Informal group
- To be finished by 2013
- Project slightly delayed

# 1. Purpose

- **Develop the world wide harmonized light duty test cycle, which will represent typical driving conditions around the world**
  - ✓ Define the methodology to develop the WLTC drive cycle
  - ✓ The WLTC drive cycle will be developed based on combination of collected in-use data and suitable weighting factors.
    - ✓China, EU, India, Japan, South Korea, USA

# 2.2. Basic concept

- Common test cycle is developed based on collected in-use data and weighting factor.

Weighting factor matrix and In-use driving data collection

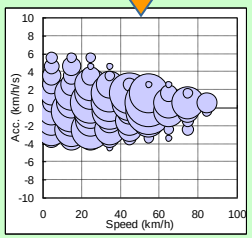
Weighting factor

| Road Category | Region A | Region B | Region C |
|---|---|---|---|
| I | $WF_{A1}$ | $WF_{B1}$ | $WF_{C1}$ |
| II | $WF_{A2}$ | $WF_{B2}$ | $WF_{C2}$ |
| III | $WF_{A3}$ | $WF_{B3}$ | $WF_{C3}$ |

In-use driving behaviors

| Road Category | Region A | Region B | Region C |
|---|---|---|---|
| I | | | |
| II | | | |
| III | | | |

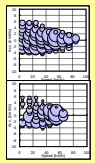
Develop unified speed-acceleration distribution

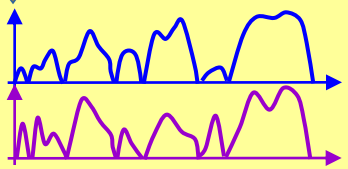



combine the short trips

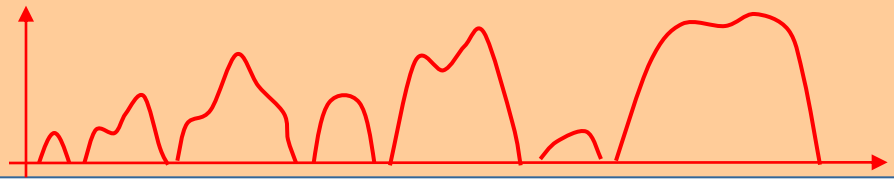
Compare the short trip combination and the unified distribution

- chi-squared based analysis
- Other parameter comparison





Common test cycle



# 3.1. Data processing

## ➢ In-use Driving Data Processing

**Raw Data**

Filtering & Thinning (if necessary)

Data conversion
Convert into L/M/H

Calculate the compensated WF
(refer to Appendix)

Divide into idling and short trip portions

Gear shift analysis

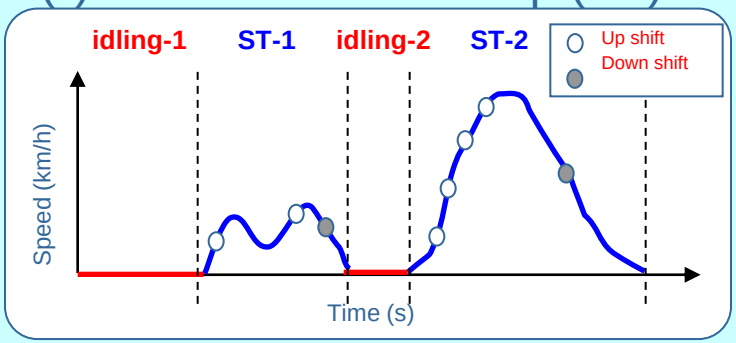
**idling database**

- Idling Duration Distribution
- Idling Average Duration

**short trip (ST) database**

- Speed-Acceleration (Positive & Negative) Distribution
- ST Duration Distribution
- ST Average Speed Distribution
- ST Average Duration
- Others (refer to 3.5.)

(*) Definition of short trip (ST)

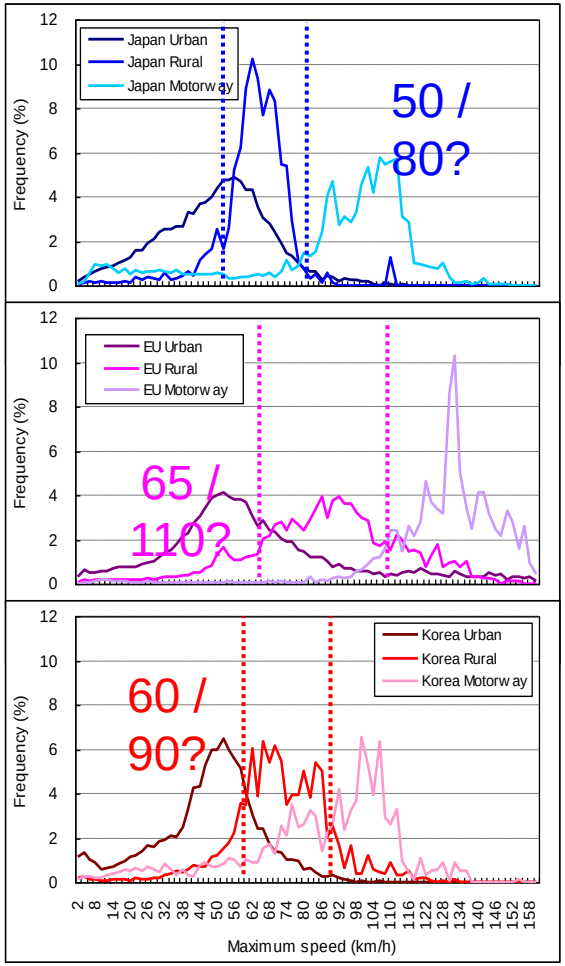


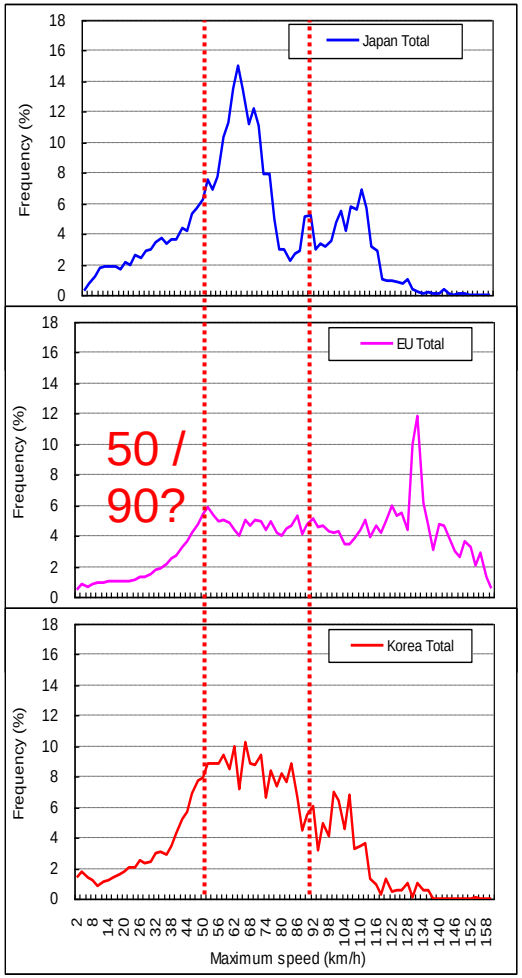

✓In-use data in each road type and in each region is processed separately.

✓Raw data shall be shared within the DHC group.

# Consideration of threshold speed - 3

## <Method3> Based on maximum speed distribution



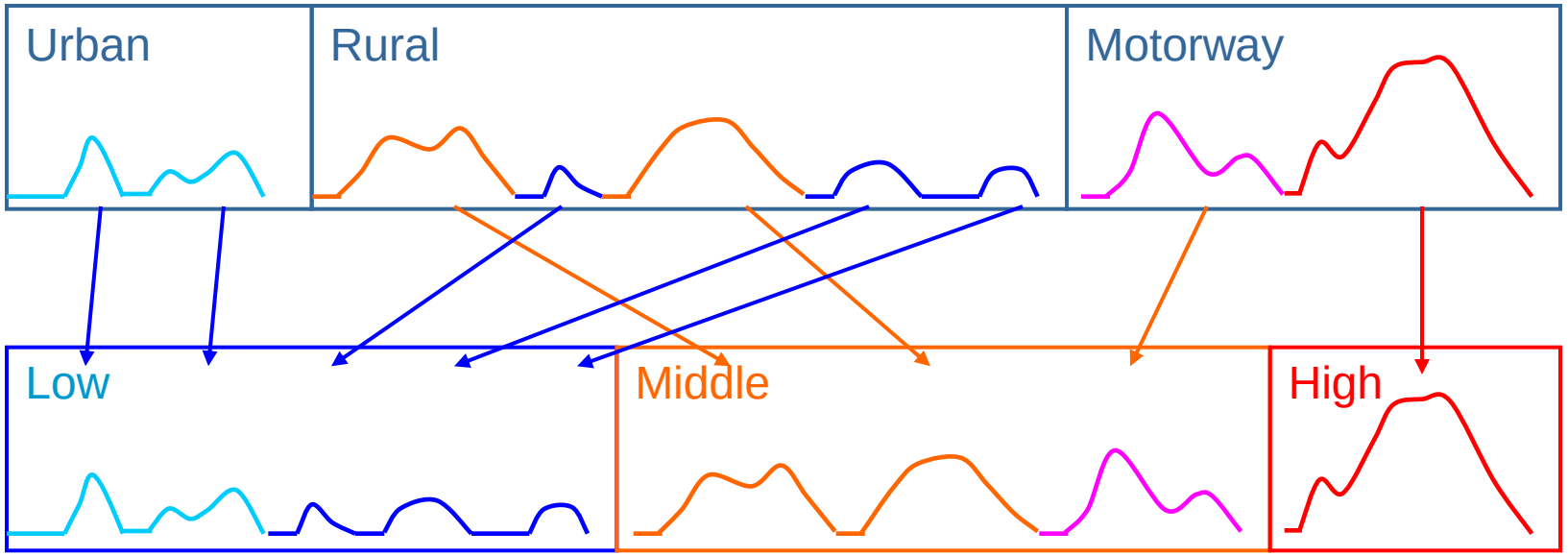

⇒After completion of all data acquisition, final threshold speed will be determined by taking into account of three methods.

# Data conversion

**Convert the each short trip data including the previous idling portion into new categories (Low/Middle/High) from original (Urban/Rural/Motorway) categories with the compensated WF (w')**

- **criteria : maximum vehicle speed, speed frequency etc.**

◆Image

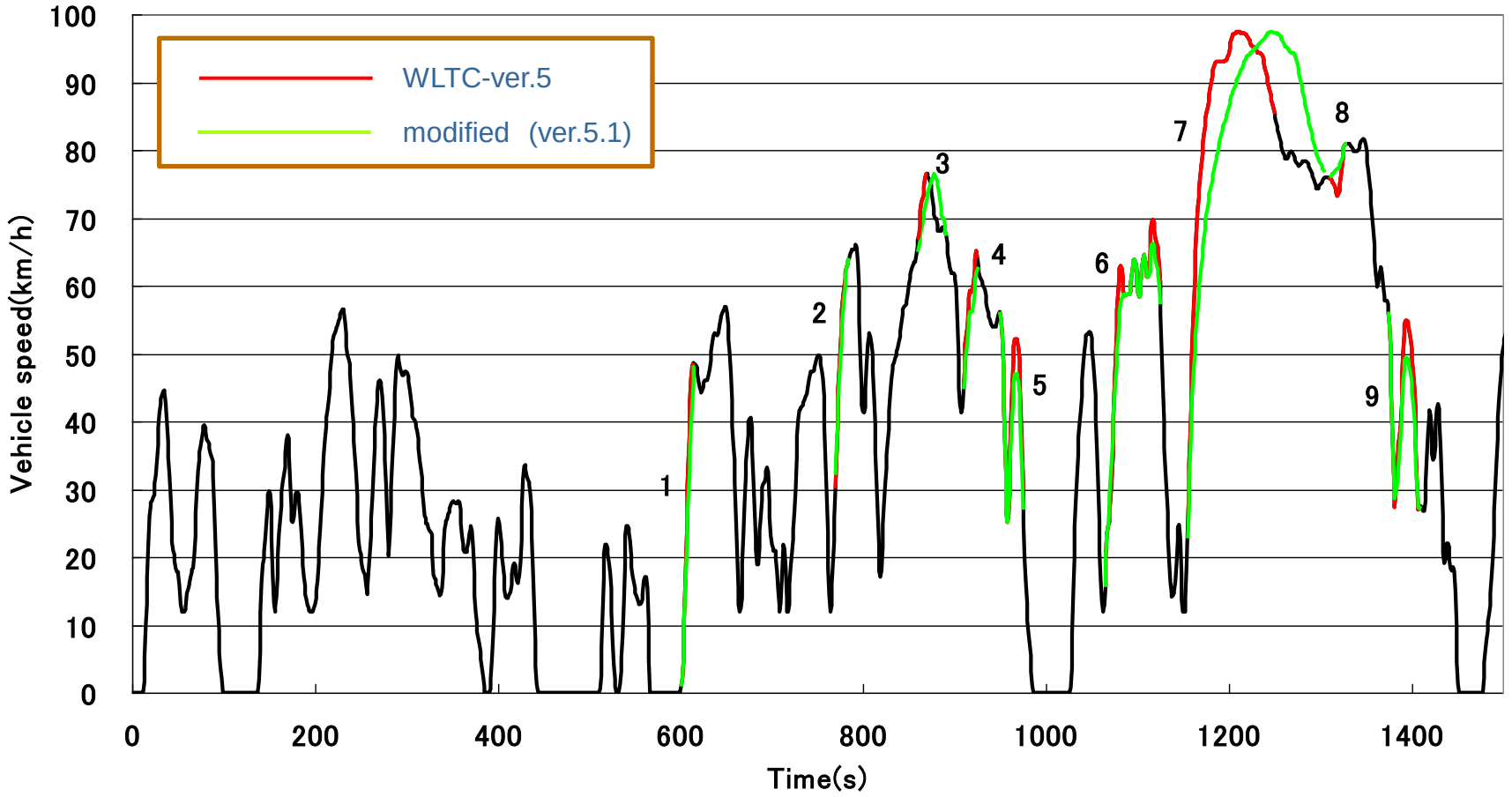



The segments that composed of ST and IDLE move into L/M/H categories with the compensated WF.

(*) Calculation formula of the compensated WF are shown in Appendix.

# Japanese Proposal

9 points for modification

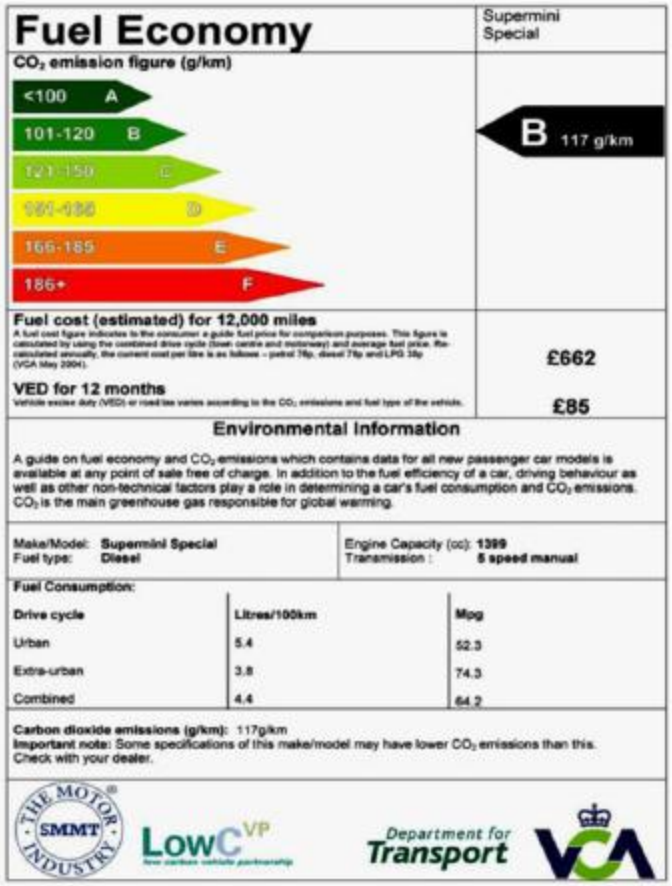


# The EU Fuel economy label directive

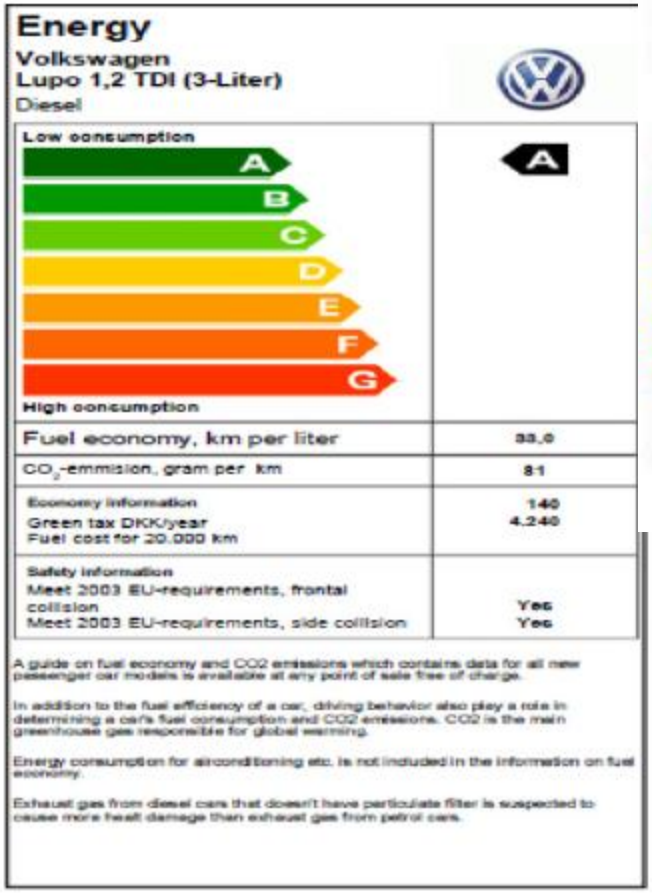
- Directive 1999/94 imposes showing fuel consumption / $CO_2$ emissions at dealership on new cars
- Also imposes a label, but each member state free to choose the form and scale

- Also imposes a guide to be published showing the top 10 per fule type
- And a poster with all the make models and their CO2 performance at the dealership

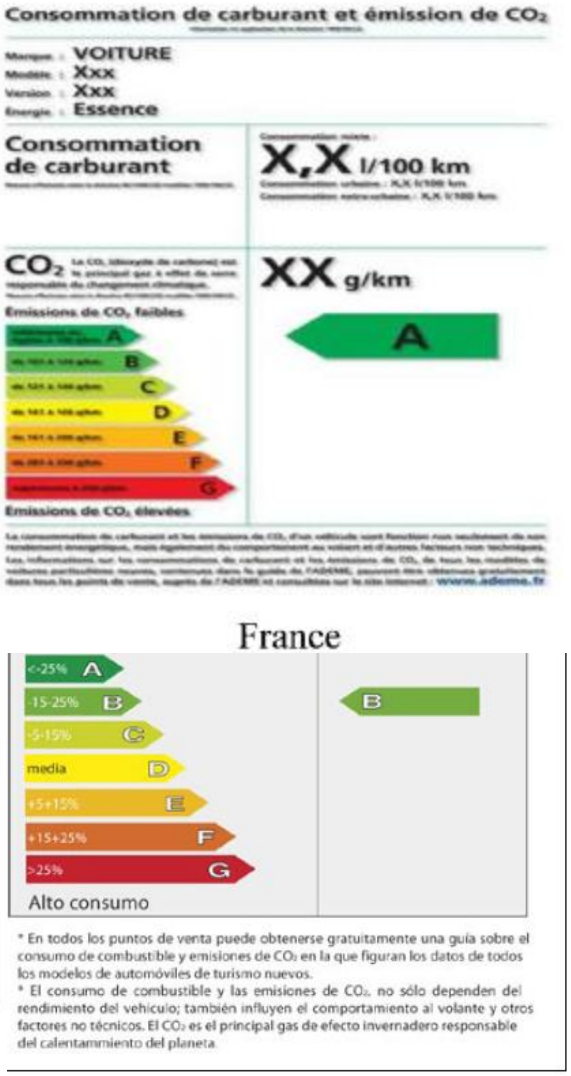
# Labels for different EU member states




United Kingdom




Denmark




France

# About specific car performances

| | tested fuel economy (gCO2/km) | France | Spain | UK | Belgium | Switzerland | Germany |
|---|---|---|---|---|---|---|---|
| Number of bins | | 7 | 7 | 13 | 7 | 7 | 7 |
| Smart fortwo mhd | 98 | A | C | A | A | A | C |
| Ford Focus 1.6 TI-VCT | 139 | C | A | E | C | B | D |
| Lexus RX450h | 148 | D | A | F | C | A | A |

# Conclusions (as indicator user)

- EE Indicators should be harmonized internationally
  - Key to good quality policy evaluation, analytical work
- Local conditions should be taken into account
  - Indicator meaningful if adapted locally

# Conclusions (as indicator producer)

- Common indicators methodologies a long, hard, bumpy road
  - Considerable resources needed
- All loopholes to be considered
  - Hard to predict ingenuity to go make the most of a methodology
- Forward looking needed
  - Avoiding indicators methodologies modification

# Thanks for your attention!