Outline

- Objective of the study
- Scope of the study
- Overview of approach and work packages
- Modalities and conceptual framework
- Overview of the stakeholder Consultation
Objectives of the study

- Overall objective:
  To evaluate the possible design options for the regulation of cars and light commercial vehicles (LCV) CO₂ beyond 2020, including:
  - Impacts from different design options
  - Pros and cons of different design options

- Building on all work already performed on this topic
- Complemented by additional assessment where necessary

- Consortium: CE Delft (lead), TNO, Cambridge Econometrics & TML
Scope of the study

- **Focus** of the study:
  - Regulation of car and LCV
  - GHG emissions
  - 2025 and 2030 in particular, where possible also 2050

- **Greenfield approach** adopted
  - **NOT:** existing Regulation as starting point with modifications
  - **BUT:** starting point are the objectives of the Regulation: broad overview and assessment of design options
Overview of approach and work packages

- Phase 1: Collection & assessment of available information
- Phase 2: Assessment of relevant elements for post 2020 Regulations
- Phase 3: Impact assessment of short list & Recommendations
- Stakeholder consultation throughout entire project
Timeframe of the project

- Project runs from September 2014 till August 2015
- Interdependencies with other on-going studies
- Phase 1: Collection & assessment of available information:
  - September 2014 - February 2015
- Phase 2: Assessment of relevant elements for post 2020 Regulations
- Phase 3: Assessment of short list & Recommendations
Phase 1 - WP1: Collection of available information

- Synthesis of previous literature on modalities:
  - Previous studies commissioned by DG CLIMA, e.g.:
    - Evaluation of existing Regulation
    - Competitiveness impact of LDV CO₂ Regulations
    - Studies for the 2020 Regulations on cars and LCVs (SR1 and SR3)
    - Studies on different regulatory approaches and regulatory metrics (SR4 and SR8)
  - Other relevant literature, e.g. studies from the US
  - Main findings summarised in one factsheet per modality
Phase 1 - WP2: Development of technology scenarios

• Brief story line:
  • With/without breakthrough of certain technologies
  • Decarbonisation of energy carriers

• Quantification:
  • Powertrain technology parameters (energy efficiency and penetration rates)
  • Well-to-tank energy parameters

• Will be used in the assessment to test the robustness of design options
Preliminary examples of technology scenarios

Breakthrough of highly efficient ICE powertrain technologies (petrol, diesel, biofuel, gas)

- Ultra-efficient gas-powered ICEVs with fossil natural gas
- Ultra-efficient ICEVs with low/no shares of biofuel
- Natural gas with high share of biogas
- Biofuel breakthrough
- Mixed electric (PHEVs, EREVs) with low share of renewables
- FEV/FCEV breakthrough with low share of renewables

Breakthrough of electric powertrain technologies (FEV, PHEV, EREV, FCEV) for LDVs

- FEV/FCEV breakthrough with high share of renewables
- Low WTT emission factors

High WTT emission factors

- Natural gas with high share of biogas
- FEV/FCEV breakthrough with high share of renewables
Phase 2: Assessment of relevant elements for post 2020 Regulations

- Level of ambition:
  - Bottom-up analysis
  - Top-down analysis
  - Feasibility of target levels

- Assessment of (combinations of) modalities:
  - Long list

- Assessment of most promising combinations:
  - Long list -> Short list
Conceptual framework

 Modalities

What is the scope of the Regulation?

How to measure the parameters needed for determining the overall performance?

How to determine the overall performance

Approach for target setting

How to fairly distribute the burden across regulated entities?

How to provide flexibility to facilitate compliance and to correct for undesired side-effects?

Objectives & design steps

Policy Objectives & choice of instrument

Overall Objective

Specific objective

Methodology for determining performance

Target level(s) + date(s)

Specific target levels

Specific target (including arrangements)

Level of ambition

Overall level of ambition of the Policy

Overall level of ambition based on top-down analysis

Specific level of ambition of the Regulation

Specific level of ambition in terms of target values based on bottom-up analysis

Huib van Essen, December 9th 2014
Modalities: What is the scope of the Regulation?

- **Regulated vehicle categories**
  - Only cars (M1) + LCVs (N1) or also (part of) N2 vehicles

- **Regulated entities**
  - Manufacturers or manufacturer groups

- **Metrics**
  - TTW or WTW
  - CO₂ or energy use

- **Embedded emissions**
  - Included or not
Modalities: How to measure the parameters needed for determining the overall performance?

• Measuring TTW vehicle parameter(s)
  • Type approval test procedure or on-road ECU data?
  • Specific additional test procedures?

• Determining WTT parameters (if included)
  • EU or Member State level?
  • Single year or projections?

• Determining parameter(s) for embedded emissions (if included)
  • Default values or harmonised LCA-reporting by OEMs?
Modalities: How to determine the overall performance?

- Rewarding off-cycle reductions
  - Eco-innovations or off-cycle credits?

- Rewarding or penalising technologies
  - Super credits or minimum shares of ZEVs
  - Debits / corrections for technologies that are over-incentivised w.r.t. real word reductions

- Aggregation & weighting
  - Technology specific targets or one target for all
  - Sales-weighted average limits or sales and mileage-weighted limits

=> Definition of sales: EU or MS averages?
Modalities: Approach for target setting

• Approach for target setting
  • Targets for fixed dates/periods (no intermediate targets)
  • Annually declining targets
  • With phase-in
  • No phase-in
  ➞ Definition of target year(s)/period(s)
Modalities: How to fairly distribute the burden across regulated entities?

- Utility parameter
  - No differentiation or utility parameter
  - Utility based on mass (with or without correction) or footprint

- Shape and slope of the target function
  - Linear vs. non-linear target functions
  - Based on equal percentage retail price increase or percentage CO$_2$ decrease?
Modalities: How to provide flexibility to facilitate compliance and to correct for undesired side-effects? (1)

- **Pooling**
  - No pooling vs. sales (and mileage) weighted pooling
  - Pooling between cars and vans targets or not

- **Trading of CO₂ credits**
  - No trading of credits or trading
  - Trading between cars and vans or not
  => Definition of what is traded + temporal aspects

- **Excess emission premiums**
  - Included or excluded

Huib van Essen, December 9th 2014
Modalities: How to provide flexibility to facilitate compliance and to correct for undesired side-effects? (2)

- Banking / borrowing
  - Allowed or not
  - Only banking or both

- Derogations
  - Small and/or niche derogations
  - Based on EU sales or global sales
  - For certain vehicle types or for OEMs

- Corrections for undermining the achievement of the target
  - Adjustment of $m_0$ in the target function or not
Phase 3: Impact assessment & Recommendations

- Assessment of modalities
- Long list of combinations of modalities
- Selection of short list: design options
- Impact assessment of short list of design options (incl. model runs)
- Policy Recommendations
  - Most desirable design options
  - Identification of open issues that require further assessment
- Key criteria in assessments:
  - Effectiveness / Robustness
  - Cost effectiveness
  - Social equity
  - Competitiveness
  - Technology neutrality

Huib van Essen, December 9th 2014
Modeling approach

Design options → Cost Assessment model → Technology & cost impacts → MOVEET → EDIP → Social equity impacts

MOVEET → Transport impacts → E3ME → Macro-economic impacts
Stakeholder consultation: on-line questionnaire

• To assess stakeholder preferences with respect to different (options for) modalities
• Responses from individual companies are welcome, no need for single responses per stakeholder group (saves time for coordination)
• Various statements on design options: (fully) (dis)agree
• Two open questions:
  • Modalities to be adjusted/eliminated
  • New design options to be added
  • Argumentation
• Available from: www.cedelft.eu/ce/questionnaire/906
• Questionnaire open until 31 January 2015
Stakeholder consultation: meetings

• First meeting
  • Probably in May 2015
  • To present and discuss draft results of:
    • Levels of ambition
    • Assessment of modalities (long list)
    • Definition of short list of design options

• Second meeting
  • Probably in July 2015
  • To present the draft results of the assessment of design options
Questions?