Vehicle Fuel Economy
Renault perspectives

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Increasing energy consumption = High energy prices & CO₂ emissions
AUTOMOTIVE INDUSTRY: ENERGY AND ENVIRONMENTAL CHALLENGES

We are part of the problem
We want to be part of the solution

25% of oil demand for passenger cars & light commercial vehicles

12% of anthropogenic CO₂ emissions from cars & LCVs
EU 2020 CAFE objective seems achievable, Even though technology breakthrough is required

Two main challenges:
1. Develop affordable fuel efficient vehicle technologies
2. Spread-out the most efficient vehicle technologies…where car market grow…
TECHNICAL CHALLENGE

MANY LEVERS TO LOWER THE CO₂ EMISSION AND FUEL CONSUMPTION

CO₂ & Fuel Consumption levers

- Vehicle Energy Need
  - Weight
  - Aerodynamics
  - Rolling Resistance
  - Ancillaries Electricity Consumption
- Powertrain Efficiency
  - Mechanical Yields
  - Powertrain Energy Management
- Energy Production
  - Energy Conversion
  - Aftertreatment
  - Energy Production

Customer

NEDC: 1 CO₂ g/km ≈ 10 kg or 0,020 SCₓ or 8 Newton or 30 Watt (elec)

GFEI 2012

May 2, 2012

CONFIDENTIAL RENAULT PROPERTY
CONVENTIONAL CARS: THE FUTURE OF ENERGY EFFICIENCY

STILL A POTENTIAL TO IMPROVE THE ENERGY EFFICIENCY OF INTERNAL COMBUSTION ENGINES

![Graph showing CO2 emissions and energy needs for gasoline and diesel vehicles in different years. The graph compares emissions and energy needs for C Segment Sedans from 1995 to 2012, highlighting improvements in efficiency over time.]
SUSTAINABLE MOBILITY FOR ALL

THE BIG CHALLENGE IS « COST »
RENAULT-NISSAN TO DEVELOP RELEVANT TECHNOLOGIES AT AFFORDABLE COST

![Graph showing CAFE CO2 g/km from 2010 to 2020, with a focus on energy need, efficiency, and various technological advancements like Weight, Aerodynamics, Energy Saving, Gasoline Engine, Diesel Engine, Engine Trans, S&S, Eco Hybrid, and EV.](image-url)
NEW DIESEL ENGINE GENERATION

CONTINUOUS IMPROVEMENT OF DIESEL TECHNOLOGY

ENERGY dCi 110

Megane 90 CO₂ g/km
1,5l 4cyl. Turbo Diesel
Direct Common Rail injection

- Low RR tyre
- Downspeeding
- Combustion efficiency
- EGR Low pressure
- Thermal management
- Stop & Start
- Energy smart management

-16% CO₂ vs previous generation
NEW GASOLINE ENGINE GENERATION

BREAKTHROUGH IN GASOLINE ENGINE TECHNOLOGY

ENERGY TCe 115

Megane 119 CO2 g/km
1,2 4cyl. Turbo Gasoline
Direct Injection

-8%
Downsizing

-7%
Downspeeding

-2,5%
Stop & Start

-2,5%
Energy smart management

-2%
Combustion efficiency

-2%
Variable oil pump

-1%
Thermal management

-25% CO₂ vs previous generation
BREAKTHROUGH IN TRANSPORT : MASS MARKET EV

EV TO BE THE SOLUTION FOR A CLEAN & QUIET CITY AT DIESEL COST (TCO)
The Renault-Nissan Alliance industrial strategy & deployment

Target: 1.5 million EV on the road by 2016

- **Car production plants**
  - Smyrna (USA)
  - Zama (Japan)
  - Flins
  - Maubeuge
  - Sunderland
  - Valladolid
  - Cacia
  - Bursa

- **Battery plants**
  - Oppama (Japan)

**NISSAN LEAF**

**ZOÉ**

**KANGOO Z.E.**

**FRANCE**

**USA**

**JAPAN**
To make sustainable mobility happen:
Include all stakeholders in ambitious and voluntary commitments

RENAULT VOLUNTARY COMMITMENT:
Reducing the carbon footprint per car by 10% from 2010 to 2013 worldwide
Next steps?

- Promote improved fuel economy world-wide based on current experience where CAFE policy are implemented
- Every country unique in Energy & Transport policy, with benefit possible from diverse experiences (biofuels, LPG/CNG, Diesel/gasoline balance, EV…)

The **Global Fuel Economy Initiative** could be used as a platform to accelerate the introduction and harmonization of standards through targeted policies and programs, together with car & oil industries.