

Addressing Energy and CO₂ challenges : The Renault approach

Climate Change & Water Investment Conference – June 6, 2011

Dr Philippe Schulz
Expert Leader – Energy & Strategic Raw Materials

Agenda

- **Energy & Environmental challenges**
- **Radical changes in the energy mix for Transport**
 - ✓ The reign of CO₂ regulations
 - ✓ Sustainable fuels
- **The Renault answers**
 - ✓ *Drive the change 2016* and our commitments
 - ✓ Innovation & « sustainable mobility for all »

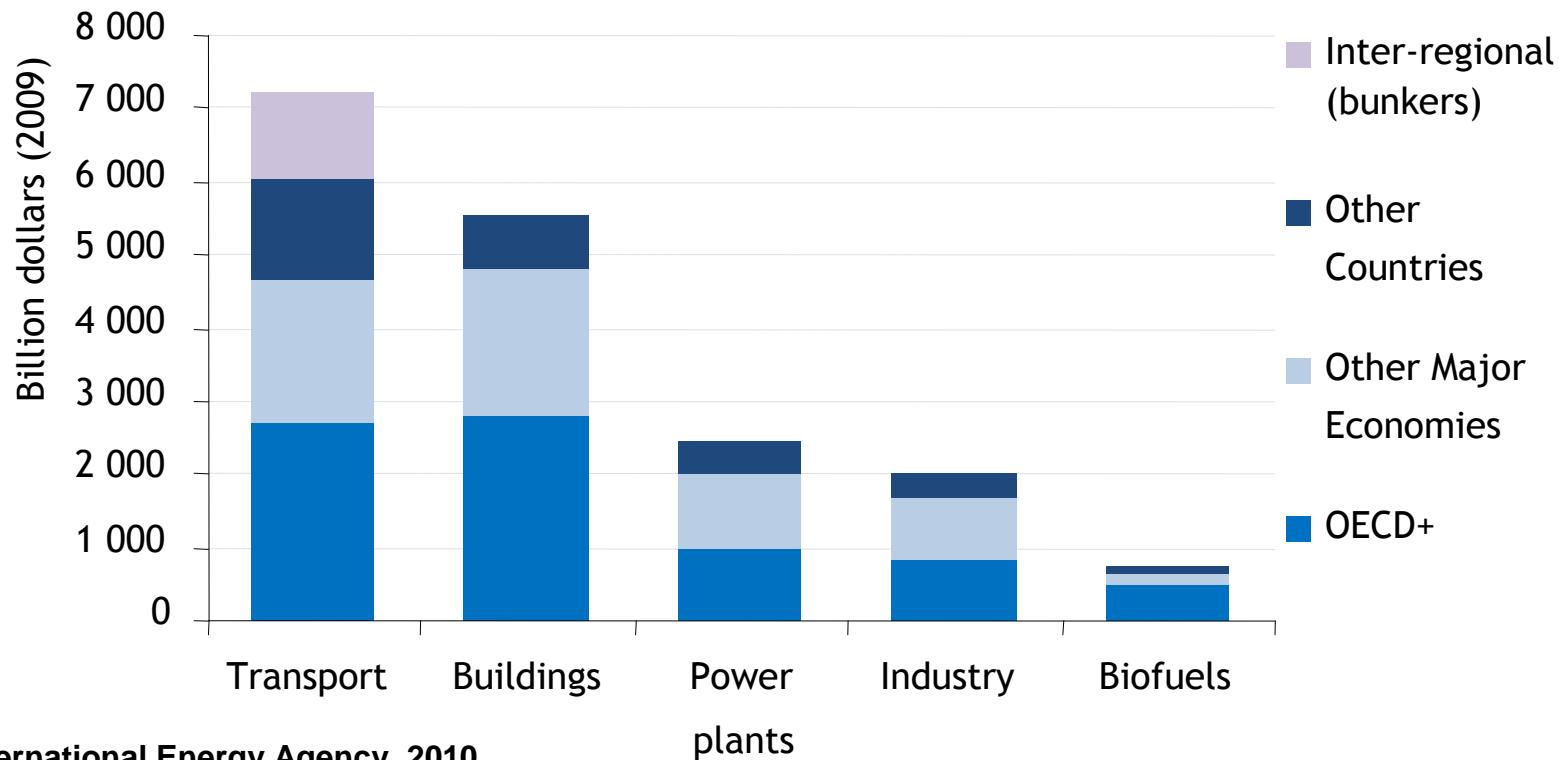
RENAULT
2016
DRIVE THE
CHANGE



Challenge Climate Change

Spending to achieve +2°C is becoming higher given lack of ambition by 2020 (Copenhagen 2009, Cancun 2010)

Cumulative additional spending needs by sector in the 2010 IEA Scenario



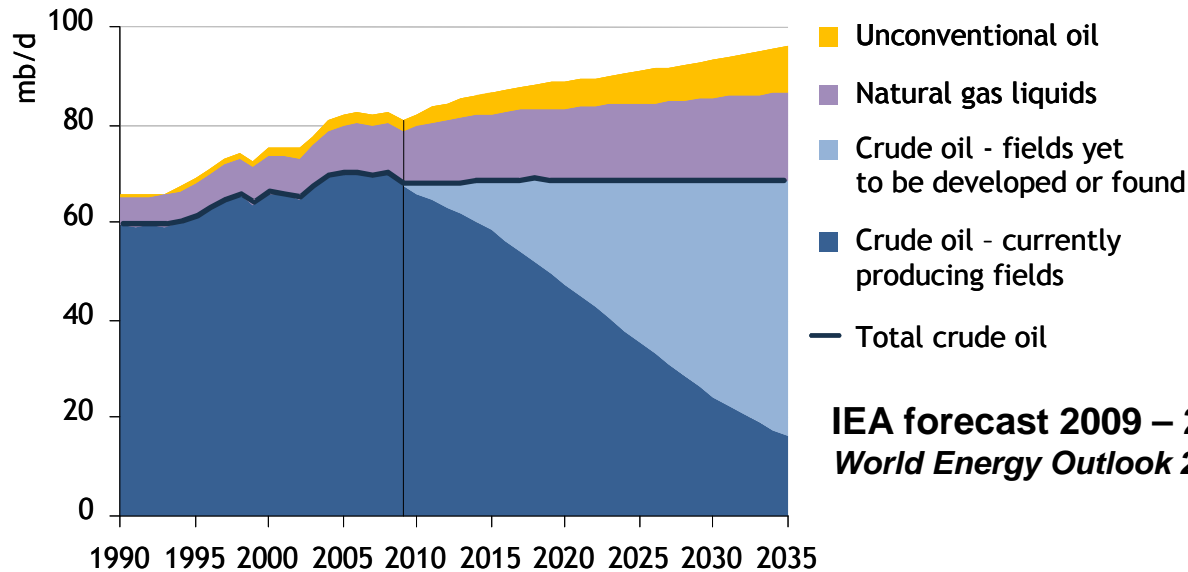
International Energy Agency, 2010

Huge public/private spending is required to decarbonize the transport sector

Challenge Energy

Oil : Towards a supply plateau and sustained high prices

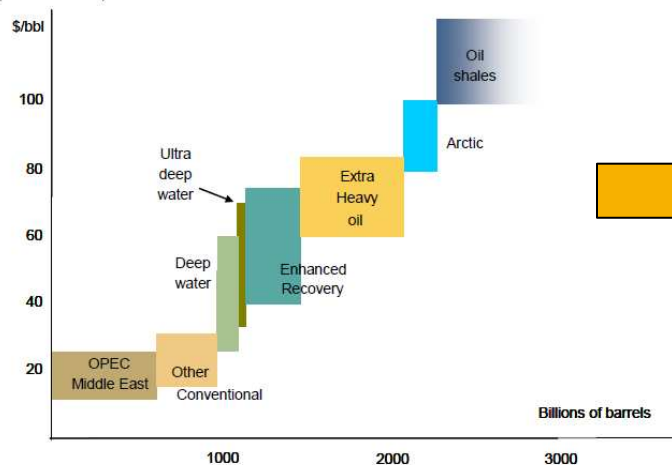
About the equivalent of five Saudi Arabia to discover and refine (2010 - 2035)



IEA forecast 2009 – 2035

World Energy Outlook 2010 – November 2010

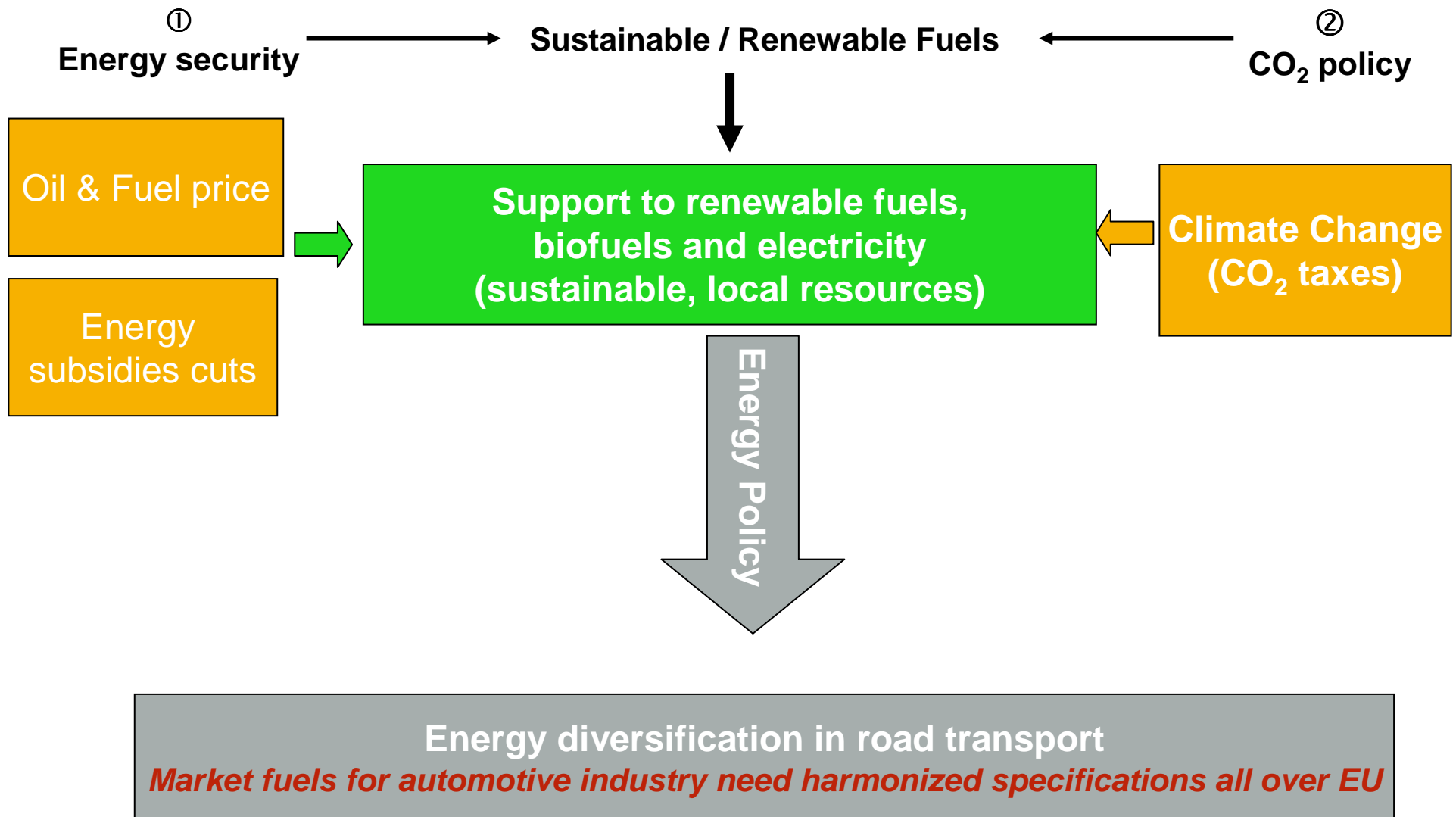
Break even oil price in 2010
(IRR >10%)



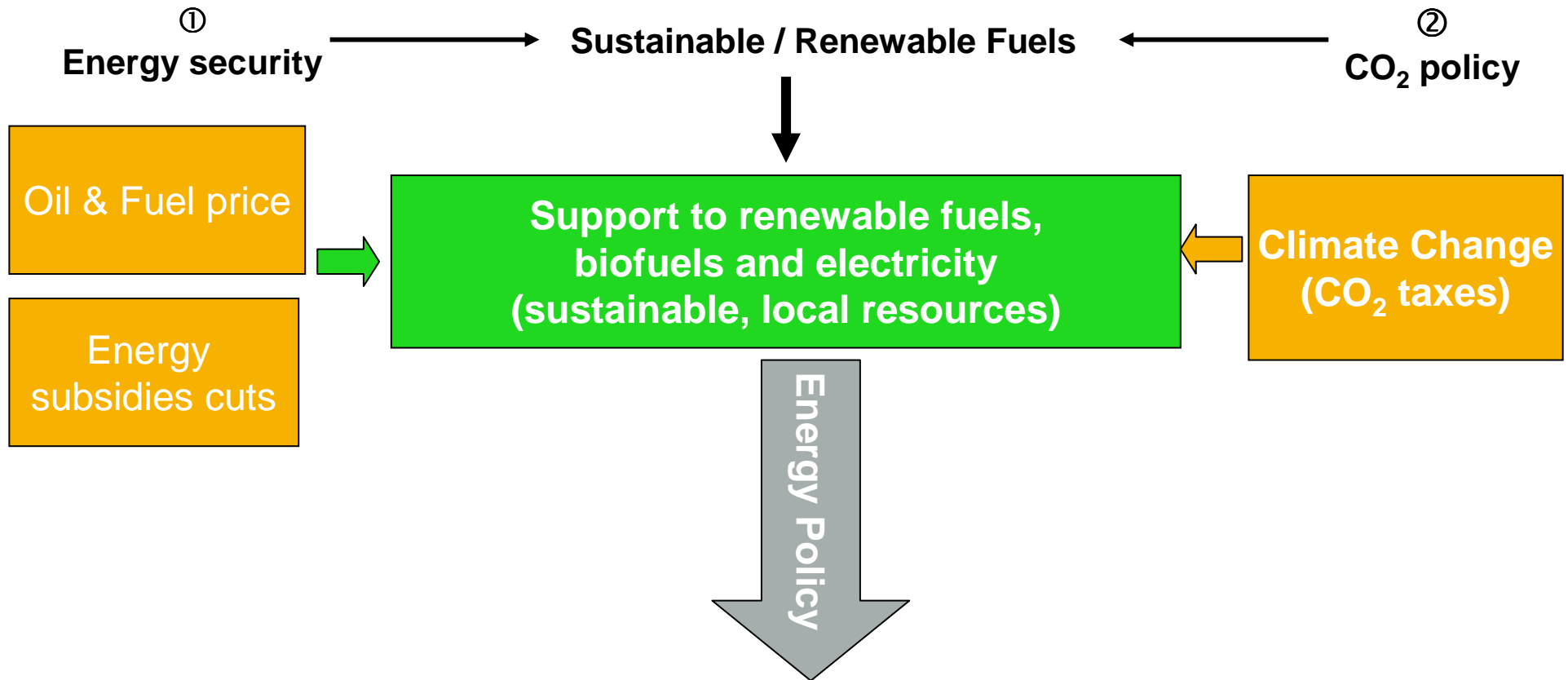
Upwards trend on long term oil price

Fuel subsidies in many countries will become a huge burden to economic growth

Radical changes in 2020 Energy Mix in road transport



Radical changes in 2020 Energy Mix in road transport



Energy diversification in road transport
COM (2010) 2020 and “Energy Efficient Europe 2020” (Jan.2011):
« The shift towards a resource efficient and low-carbon economy that is efficient in the way it uses all resources »



Example : New Energy European regulatory framework will influence fuel market-shares by 2020

2020

**Automotive CO₂ emissions regulation
443/2009**

CAFE = 95 g/km

**European Directive on Renewable Energy
2009/28/CE**

**20 % Renewables in energy
mix**

**10 % Renewables in
transport**

+

**Sustainability criteria for
biofuels; next step all fuels ?**

**European Directive on Fuel Quality
2009/30/CE**

**Renewable fuel
market-share
Revised in 2014**

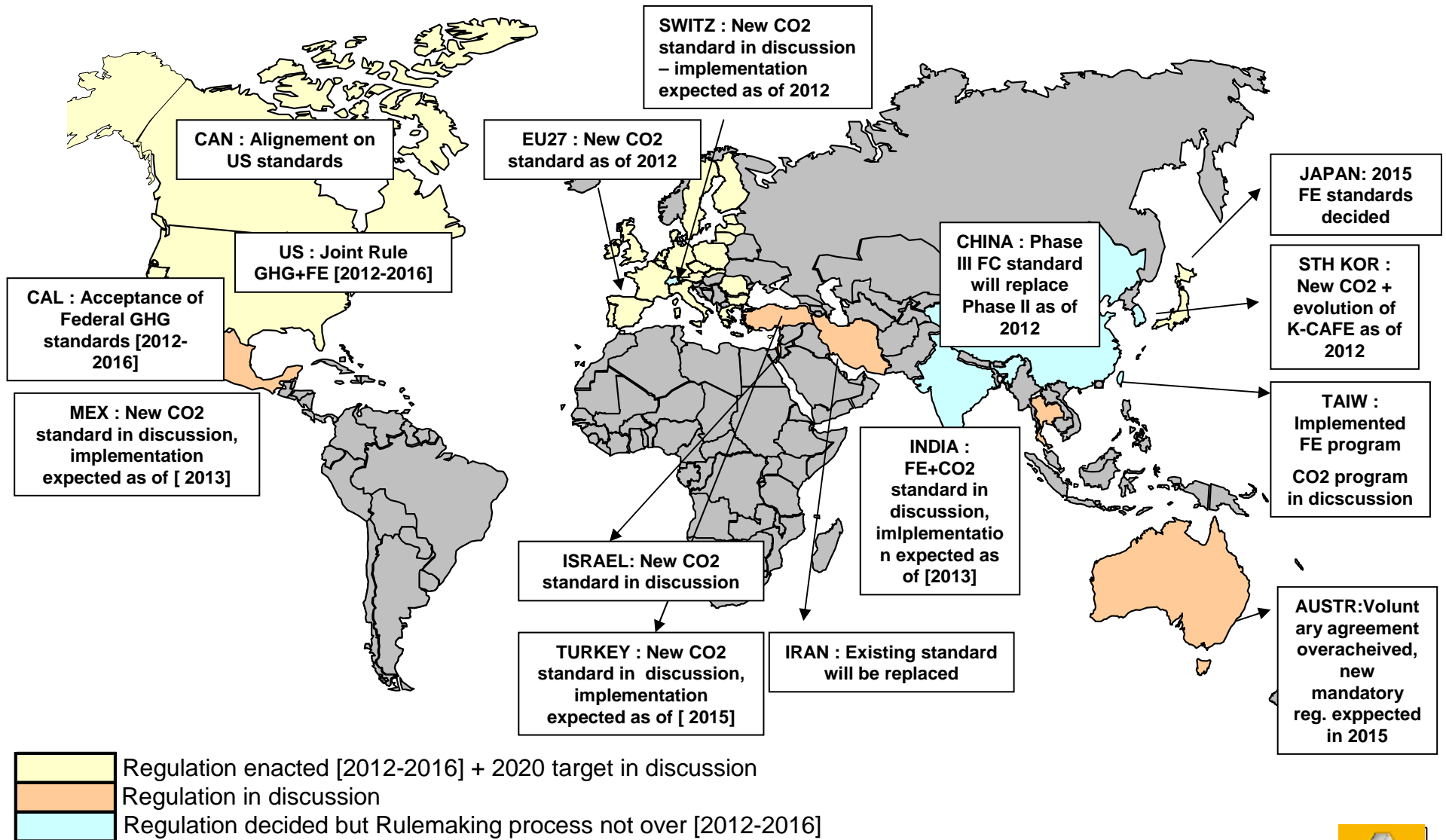
$$\tau_{ren} = \frac{(Biofuels_{1^{st}gen} + 2 \cdot Biofuels_{2^{nd}gen} + 2,5 \cdot Electricity_{\tau_{ren_{elec.}}} + \alpha \cdot H_2_{ren.})_{all\ modes}}{(Fuels + Electricity)_{road+rail}}$$

**Revision of 2003 Energy Taxation Directive
(CO₂ & Energy based)**

Diesel / Gasoline balance ?

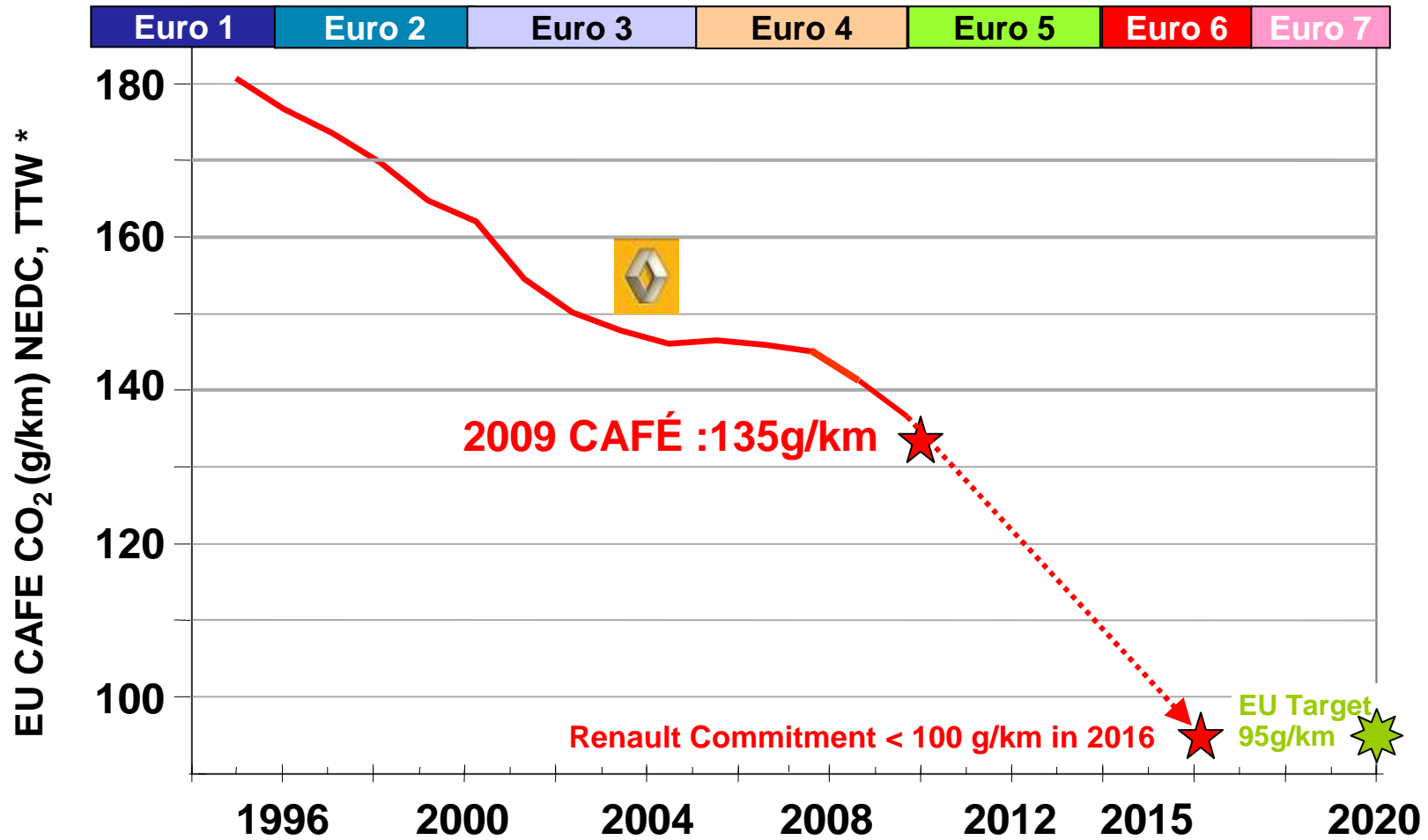


The global reign of CO2 regulations in road transport



Renault : An ambitious CO2 roadmap

Exhaust Emissions : NOx, HC, CO, PM

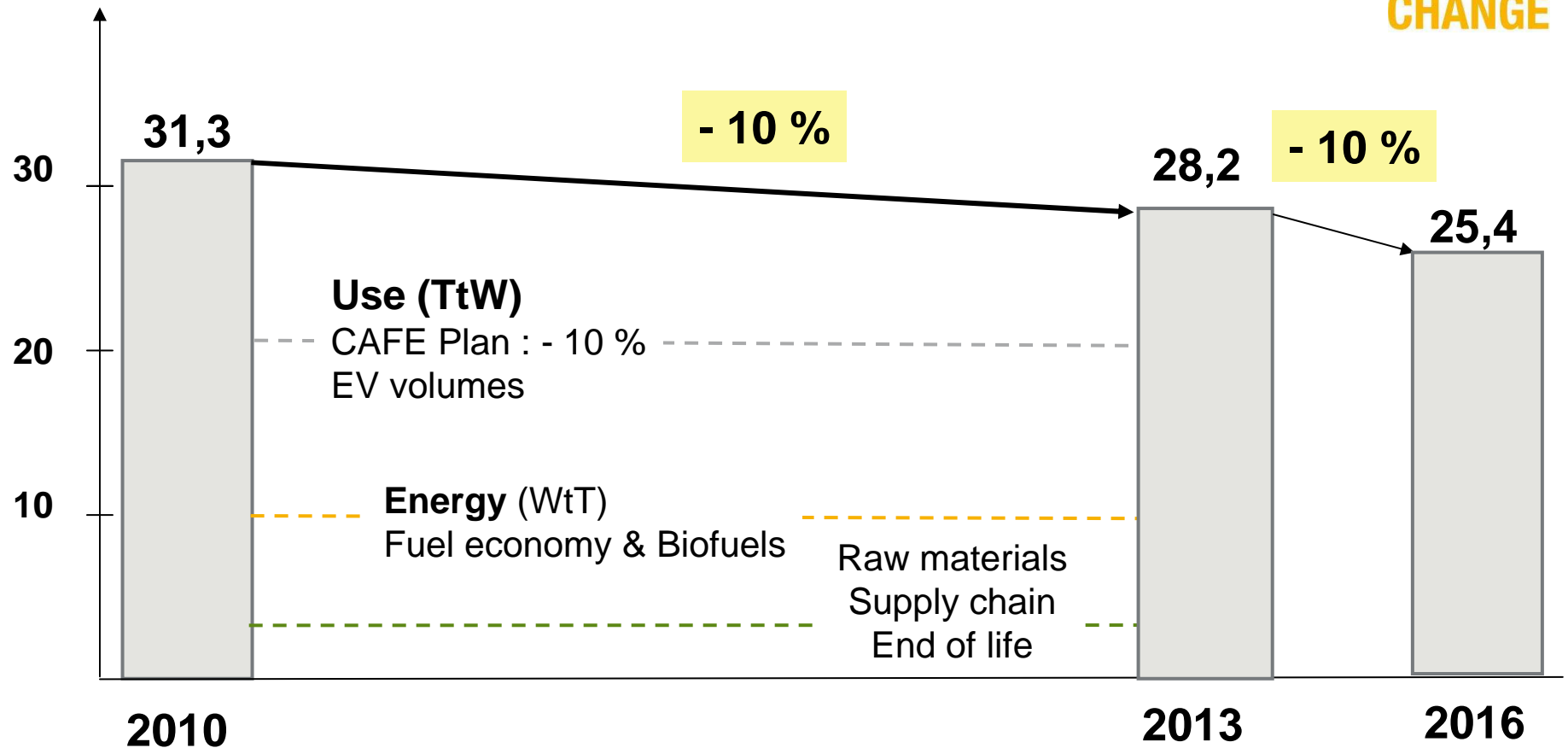


Answer Energy & Climate Change

2010 -16 : 20 % REDUCTION OF AVERAGE VEHICLE CARBON FOOTPRINT

RENAULT
2016
DRIVE THE
CHANGE

Year Average Product Carbon Footprint
tons CO₂ / car lifetime



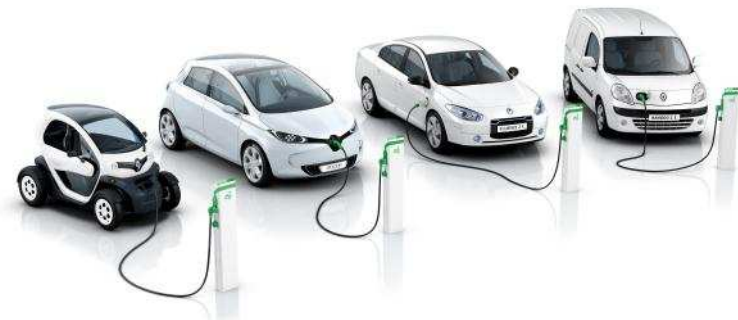
INNOVATION

To answer to global Environmental and Energy challenges

RENAULT
2016
DRIVE THE
CHANGE

Optimization of ICE vehicles

Affordable Electric Vehicles



ENERGY dCi 130
(with stop/start)



ENERGY TCe 115
(with stop/start)

Sustainable mobility for all



INNOVATION

Continuous reduction of fuel consumption

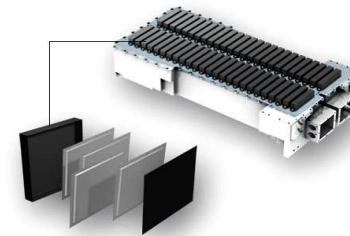
	MAY 2007	→	MAY 2011
	1.2 TCe 5,9 l	↘ - 1,3 l/100 km	1.2 TCe 4,6 l
	1.5 dCi 4,4 l	↘ - 0,7 l/100 km	1.5 dCi 3,7 l
	1.2 TCe 5,9 l	↘ - 0,6 l/100 km	1.2 TCe 5,3 l
	1.9 dCi 5,8 l	↘ - 1,4 l/100 km	Energy 130 4,4 l

Again and always, on the road of innovations...

ELECTRIC & ICE PWT / VEHICLES



EV Li-ion BATTERIES



NEW MOBILITY SERVICES



INNOVATIVE PARTNERSHIPS



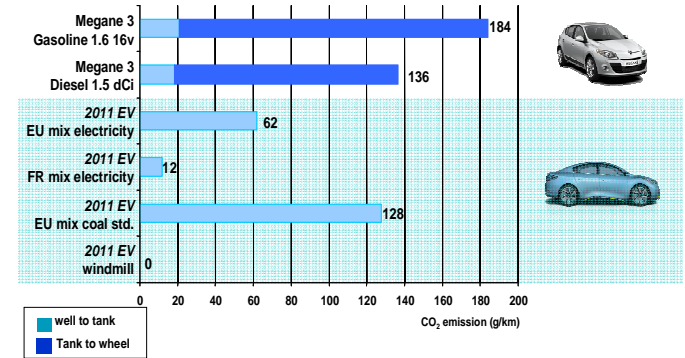
better place



WHY EV ?

① It's ecological

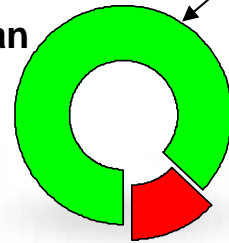
Zero emission in use
(CO₂ & exhaust emissions)



② It's compatible with many car uses

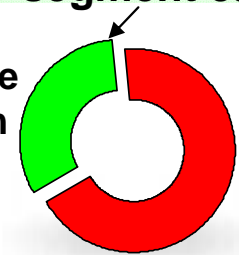
87% of daily trips

Are LESS than 60km/day



32% of B-segment cars

NEVER make more than 150 km



③ It's already economical



[http:// www.renault-ze.com](http://www.renault-ze.com)




THE ALLIANCE INDUSTRIAL STRATEGY

Target : 1,5 million EV on the road by 2016

USA

Smyrna




NISSAN LEAF

Zama

Japan

Oppama



NISSAN LEAF



NISSAN LEAF

Sunderland

Flins



ZOE

Maubeuge



KANGOO Z.E.

Valladolid

Cacia



TWIZY Z.E. CONCEPT

Bursa



FLUENCE Z.E.

 Car production plants

 Battery plants

Renault EV performance is already a reality

- **Bibendum Challenge in Berlin - May 18, 2011**
- **Fluence ZE**
 - Winner of 300 km inter-city challenge (over 34 EV, PHEV and Fuel Cell Vehicles)
 - Best energy efficiency (300 km with 37.44 kWh, ie driving range of 215 km under real conditions without recharging)
 - 1st place in driveability tests on ADAC circuit
 - 1st place in WtW CO₂ emissions (57 g/km calculated by Michelin experts)
 - Design award for EV with best integrated recharging solution



CONCLUSIONS

- Energy, Environmental Challenges and Mobility will drive the future of automotive industry, not CO₂ alone
- The energy mix in Transport will require liquid fuels, sustainable biofuels, gas and electricity depending on local conditions, legal frameworks and supports
- Fuel and automotive industries need adequate industrial lead-time and not too much fuel and product diversity
- Renault commitment on ICE optimization, EV deployment and carbon footprint reduction.

RENAULT
2016
DRIVE THE
CHANGE

