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# **Technology Opportunities Using E100 for CO2 Benefit** F.Turkovics 17 de julho 2015

#### **Overview**

#### Introduction

- Brazilian Legislation
- Fuels in Brazil: Particularities

Technology road map

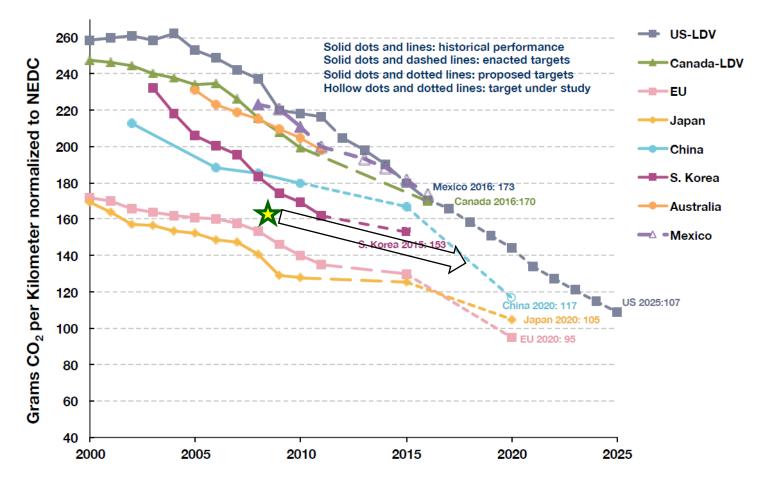
Time to market



# **Introduction – Brazilian Legislations**

Brazilian future emission legislation will enforce a decay on CAFE

InovarAuto: decree-law that imposes new limits

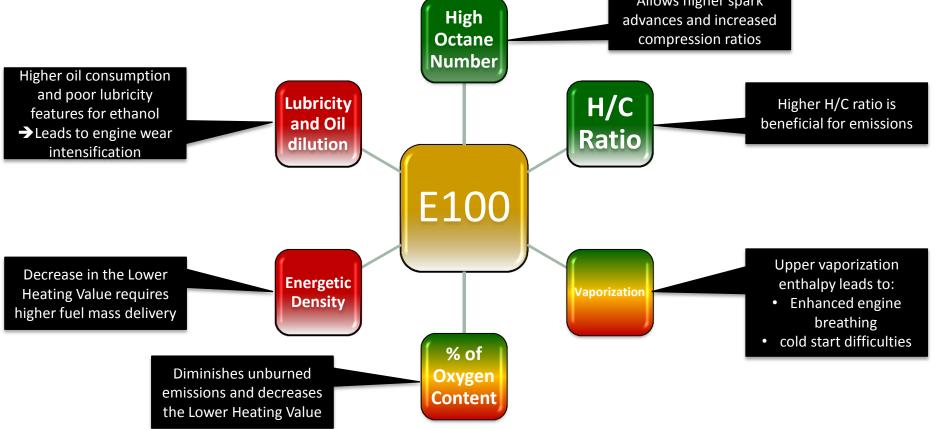


SOURCE: "Global Comparison of Light-Duty Vehicle Fuel Economy/GHG Emissions Standards" ICCT – The International Council on Clean Transportation – agosto/2011

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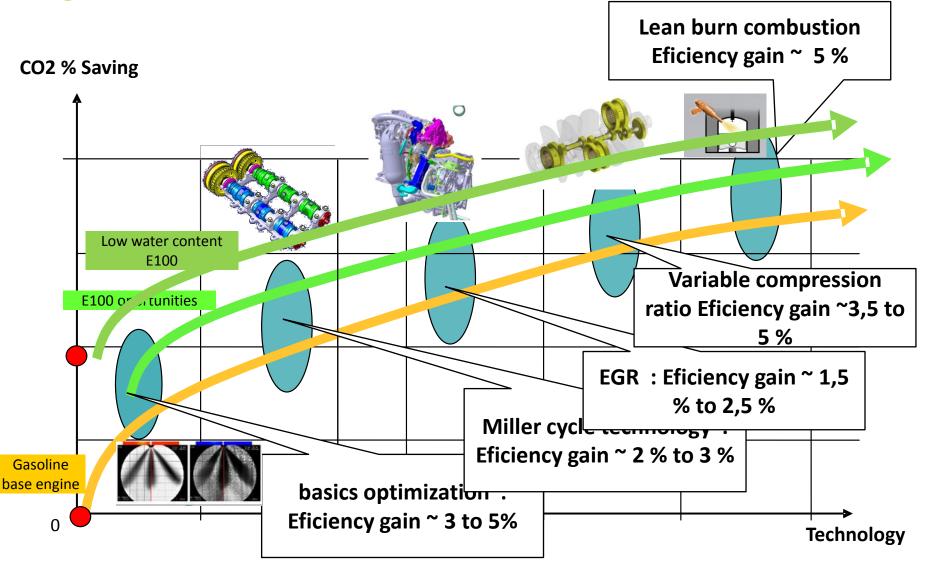
# **Introduction – Fuel Particularities**

- <sup>B</sup> Brazilian market requires Flex Fuel engine operation
  - The engine should work properly with mixtures between E22 and E100
  - Ethanol has several different properties in comparison with regular pure gasoline
    Allows higher spark



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#### Technology Optimization roadmap for internal combustion engines and additional CO2 benefit by using E100 Fuel



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Impacts on combustion system and 'time to market '

Short time : **Basics combustion** optimization **New engine** Mid time until 5 years technology Ex : IGR , new cycle ( Miller / Atkinison ) road map EGR .... Long term until 10 years Ex : variable compression rate , lean burn combustion , water injection .....

# **Main Conclusions**



Has to to get o good state of the art with E100 fuel

- Understand physical and chimical phenomena concerned
- To enfase remarkable properties for combustion

E100 specific features can brings significant addicional CO2 benefit to gasoline engine technology as :

- Miller cycle
- EGR
- Variable compression ratio

**....** 

Low water content ethanol introduction can be an addicional oportunity for fuel consumption reduction.