

Technology Innovation to Meet EU and US CO₂ and Fuel Economy Regulations

技术革新: 应对欧盟和美国关于车辆 CO₂ 排 放和燃油经济性的法规

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福特汽车公司 亚太区 可持续发展, 环境和安全工程总监

**International Workshop on Technology and Policy Solutions for Energy
Efficient and Low Carbon Light-duty Vehicles**

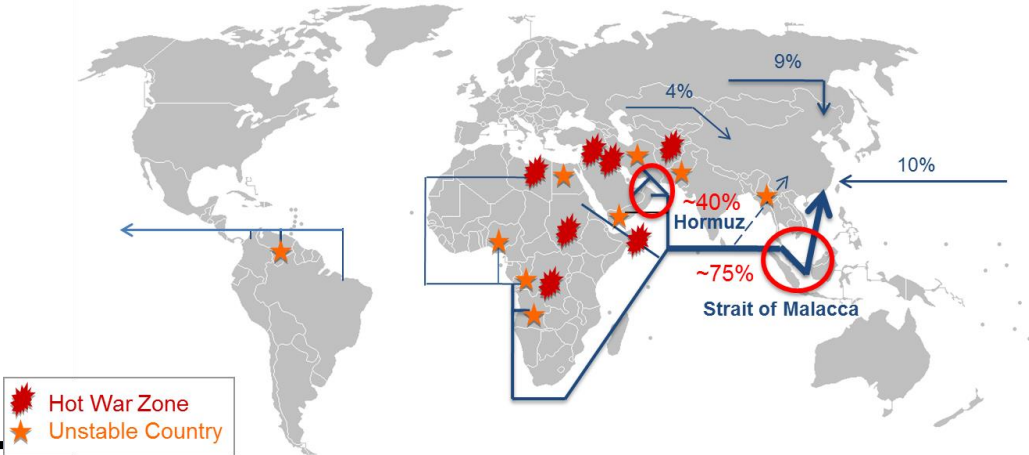
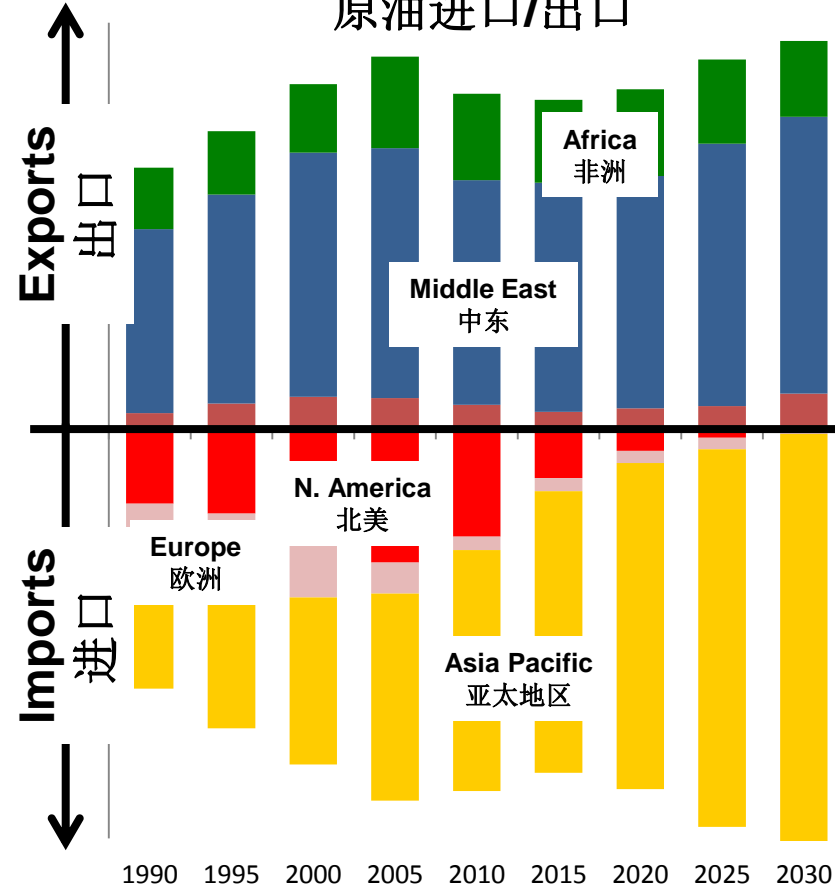
Beijing, China – June 4-5, 2014

Energy Security Challenge in Asia Pacific

亚太地区面临的能源安全挑战

Net Oil Imports / Exports

原油进口/出口



Asia-Pacific is a Large Net-Importer of Oil, Much of Which Comes from Unstable Regions of the World
 亚太地区对进口原油依赖程度高，大量进口原油来自于政治环境不稳定地区

Global Trends Driving Transportation System Changes

全球发展趋势导致世界交通体系的改变

Expanding Volumes, Urbanization and City Growth

人口数量增加, 城镇化发展和城市数量的增加

Increasing Mobility Diversification

出行方式的多样化选择

Customer Demands for Efficiency

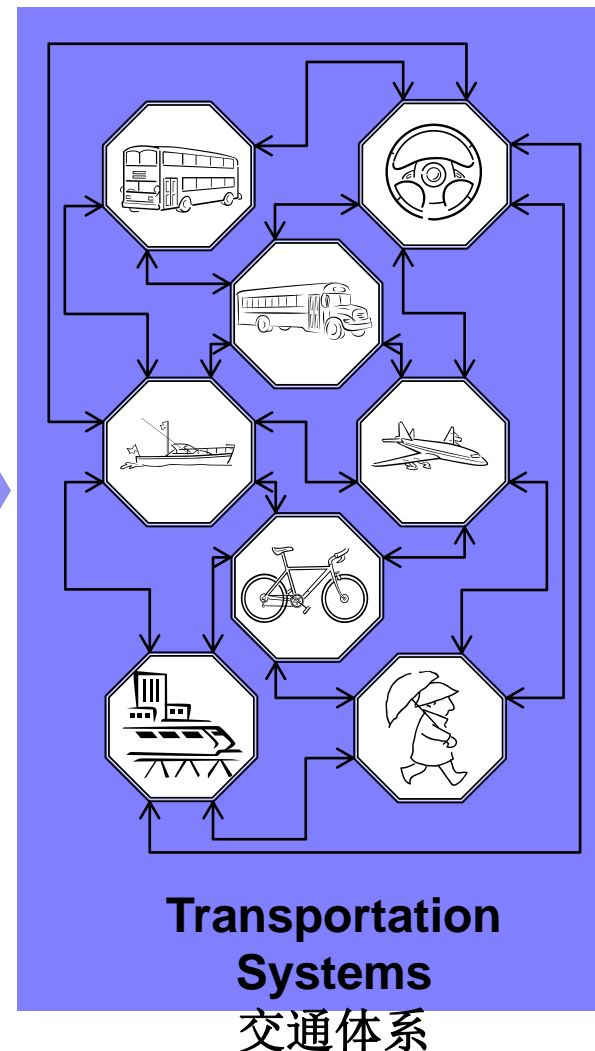
乘客需要更高效的交通方式

Volatile Energy Supplies

不稳定的能源供给

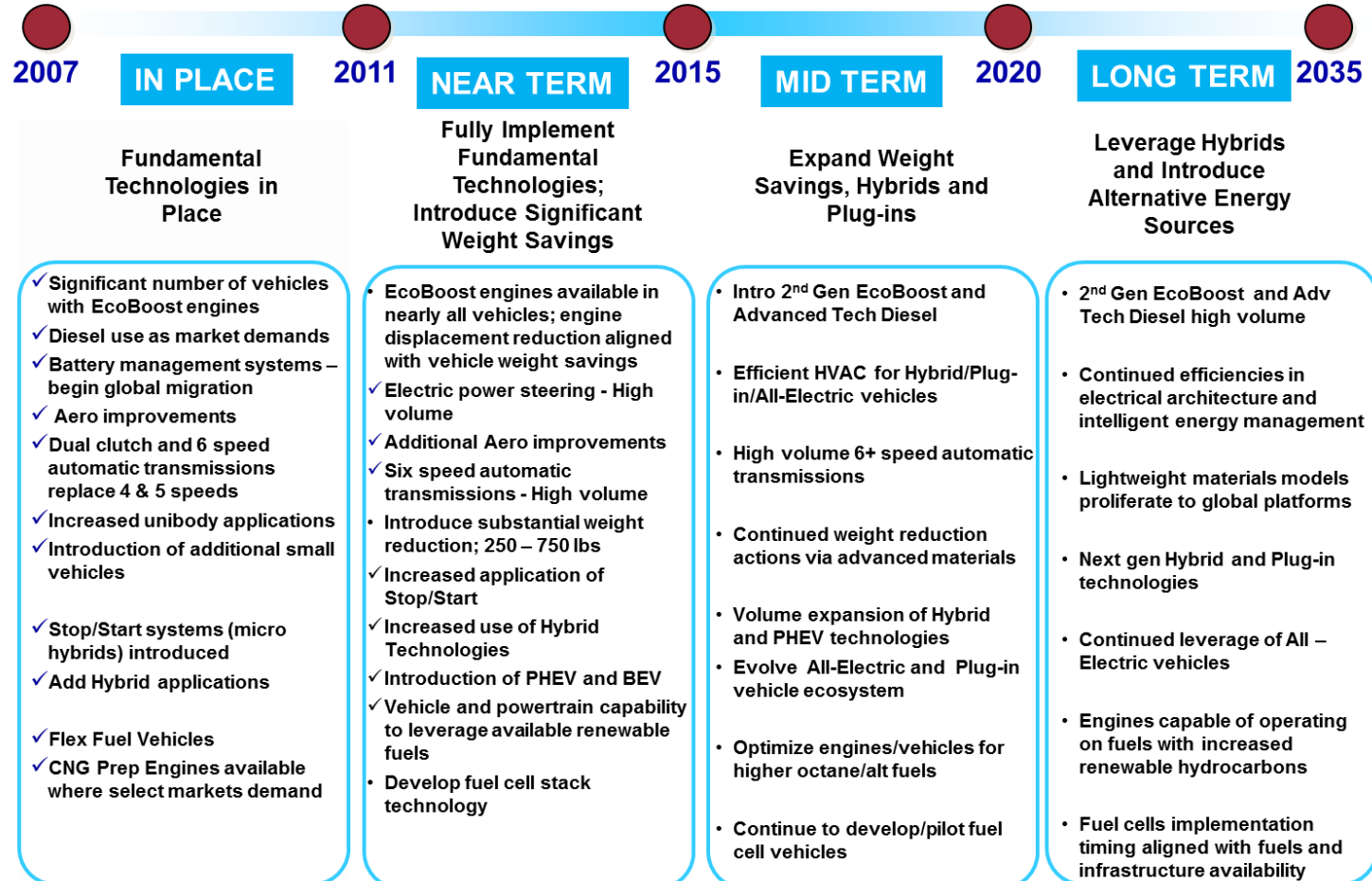


Drivers for Change
引发变革



Ford's Global Technology Migration Plan

福特汽车公司在全球推行的技术整合计划

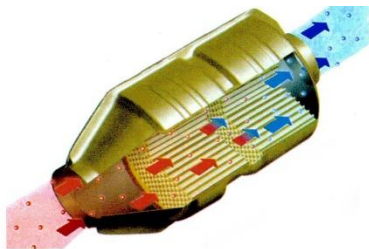
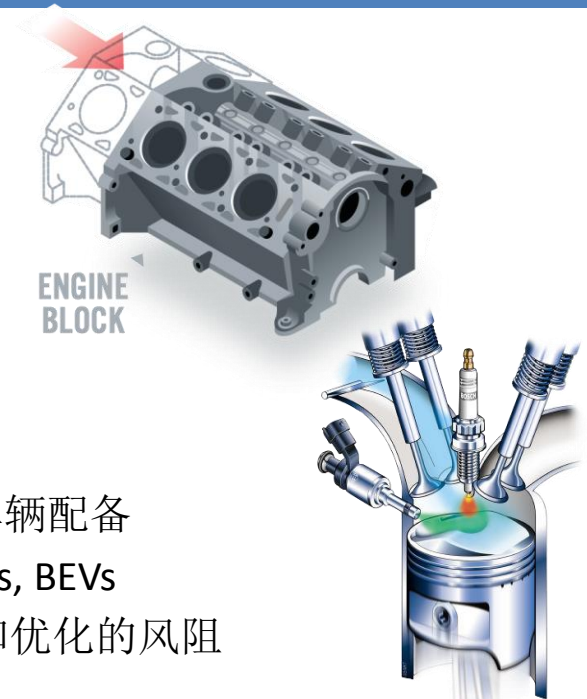


To Significantly Address Key Issues, Transportation Solutions Must Be Implemented at Large-Scale and Thus Must Be Affordable and Cost-Effective
必须大力推行低成本, 高效率的交通革新方案

Auto Industry

汽车行业

- Advanced Technology Engines: EcoBoost
采用先进技术的发动机: EcoBoost
 - Produced over 2 million EcoBoost engines globally
全球产量超过 2 百万台
 - Produced in Chongqing – available in 8 vehicles in China
在中国重庆建有生产基地, 目前国内销售的8款福特品牌车辆配备
- Electrification: HEVs, PHEVs, BEVs 电动车辆: 混合动力车辆, PHEVs, BEVs
- Weight Reductions and Improved Aerodynamics 车身轻量化设计和优化的风阻设计
- Improved Combustion and Aftertreatment Systems 高效的发动机燃烧和后处理系统

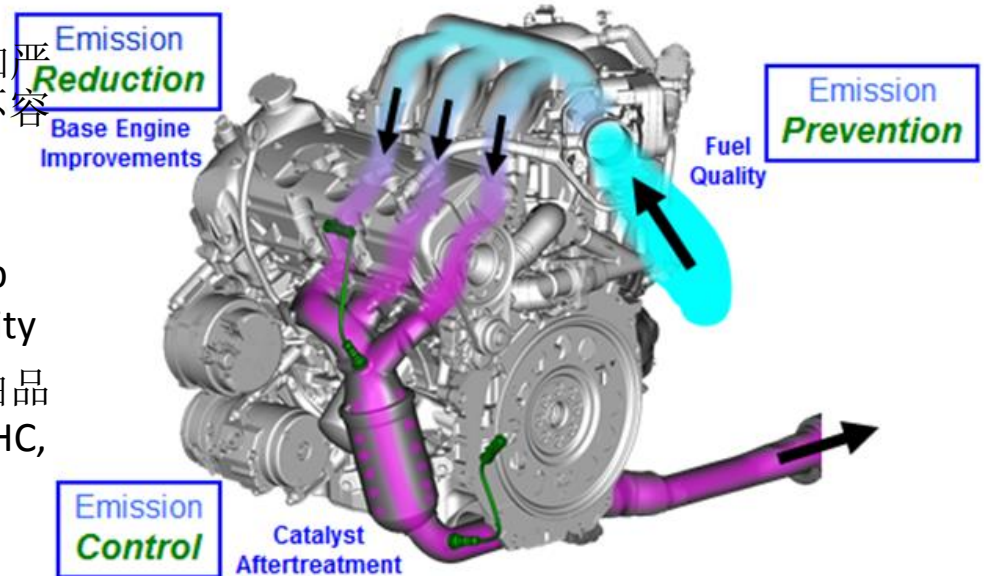


Automakers are Introducing a Range of Technologies to Improve Efficiency and Reduce Exhaust Emissions

全球汽车制造商们开发大量新技术以提高能源使用效率, 并降低车辆尾气排放

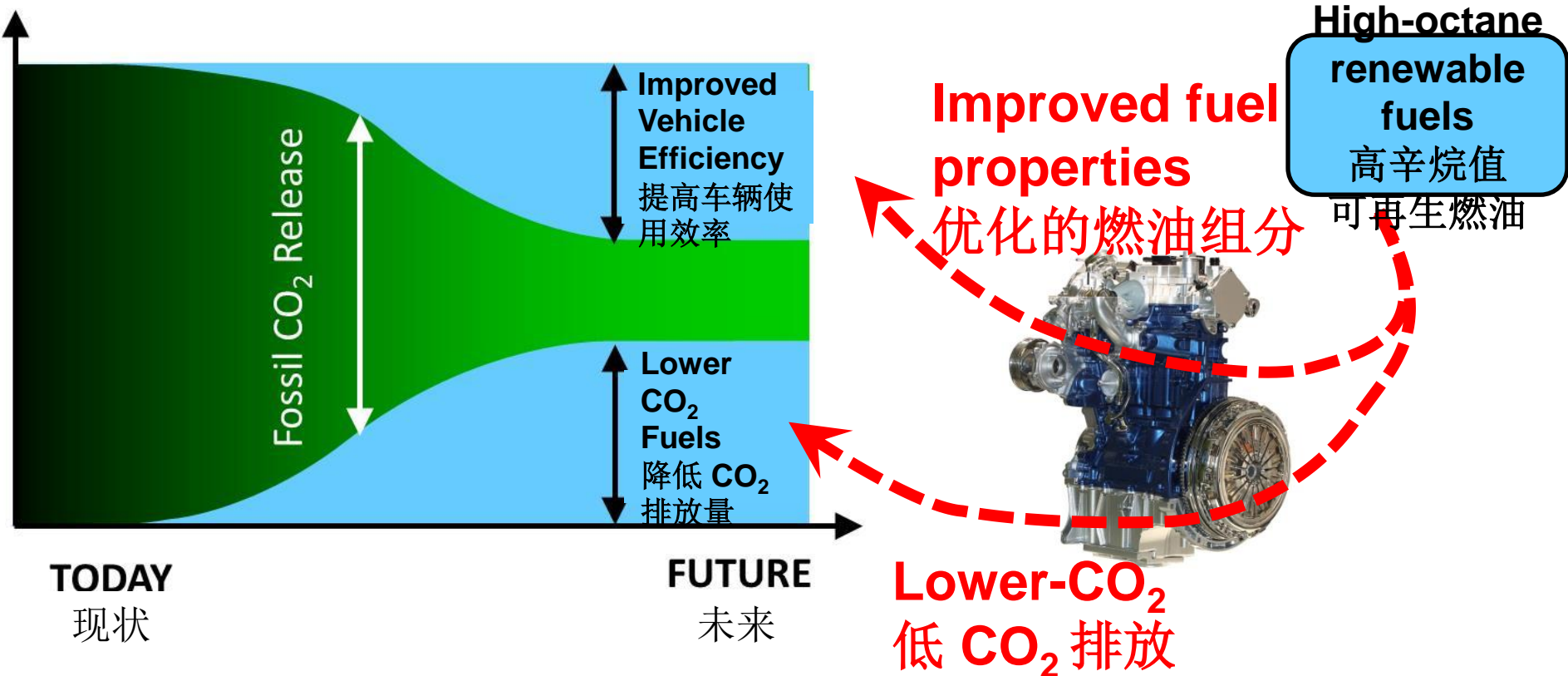
Fuel Industry 燃油行业

- Air quality is not improved solely on restricting emissions standards – fuel quality plays a key role in air quality improvements
- 空气质量的改善不能只寄希望于采用愈加严苛的排放技术法规 – 车用燃油的品质也不容忽视
- Reductions in NO_x, HC, CO, CO₂, etc. are achieved through a harmonious relationship between vehicle technologies and fuel quality
- 应该在改进车辆排放控制技术和提高燃油品质方面采取步调一致的行动以降低 NO_x, HC, CO, CO₂的排放.
- Vehicle emission equipment without the appropriate fuel quality can increase emissions
- 即使车辆本身采用了先进的排放控制技术, 但如果车辆使用的燃油品质不佳, 也会导致车辆排放水平的劣化.



Fuel Quality Improvements Are a Key Enabler for Future Emission Control Systems and Can Result in Air Quality Benefits Across the Existing Car Parc
改善燃油品质对提高车辆排放水平至关重要, 对于优化环境质量起着不可或缺的作用

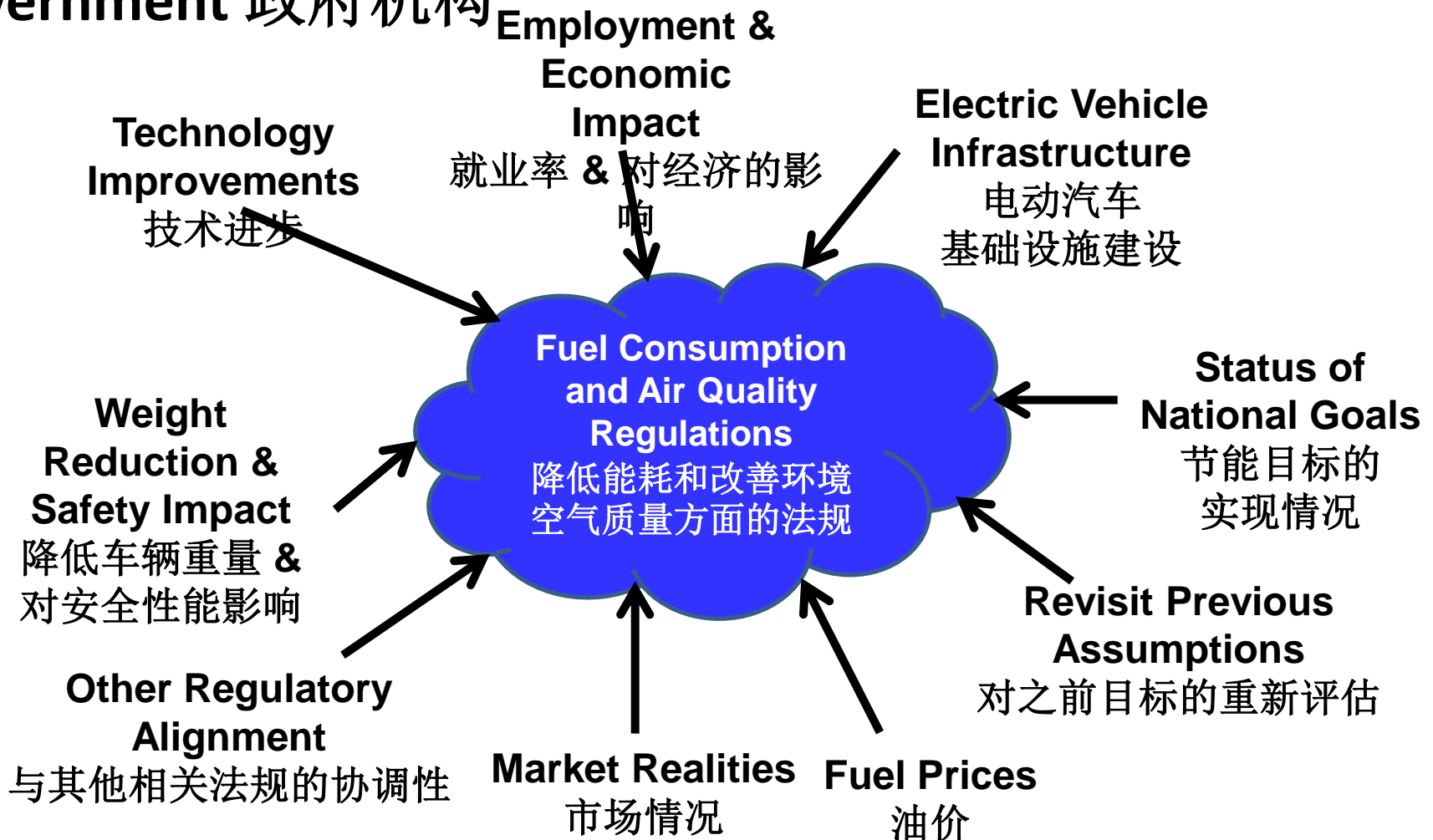
Fuel Industry 燃油行业



Fuel Properties (e.g., octane ratings) Can Also Contribute by Enabling More Efficient Engines

高品质燃油 (如高辛烷值油品) 可用于高效能的发动机以降低车辆排放

Government 政府机构

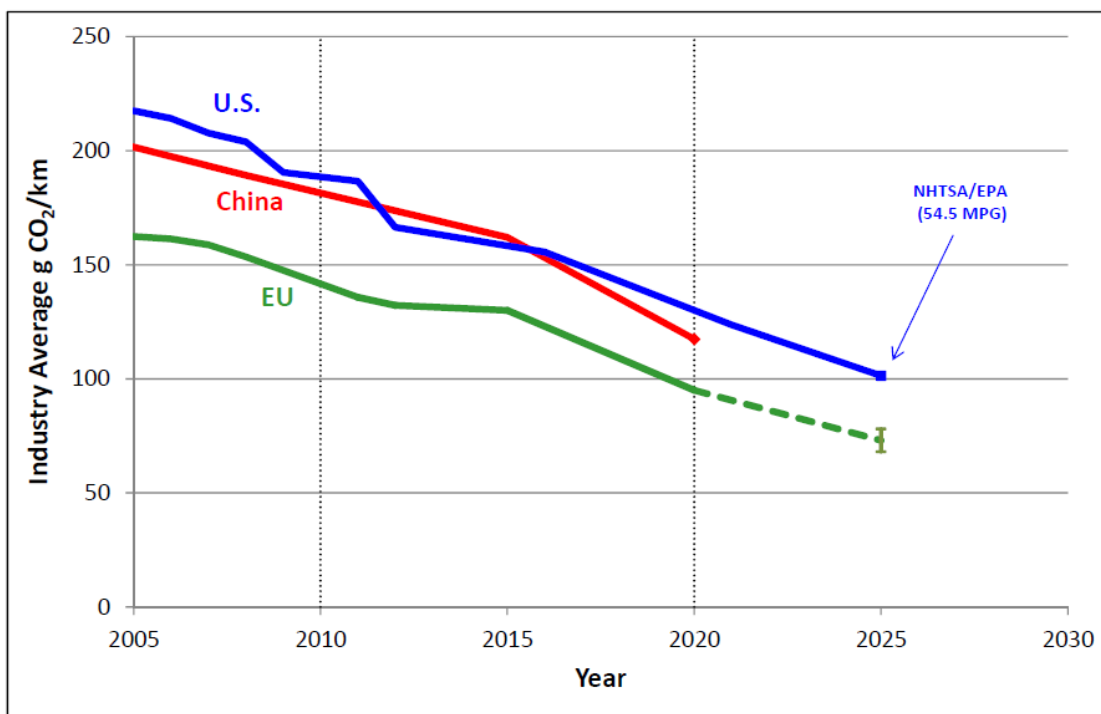


Broad Set of Considerations for Setting Fuel Consumption and Air Quality Regulations

全面考虑完善燃油经济性和环境空气质量相关法规体系

Global Fuel Economy / CO₂ Standards

全球燃油经济性 / CO₂ 减排相关标准法规



Direct comparison of standards is not possible given differences in:

考虑到以下方面的差异, 单纯对比法规技术内容没有意义:

- Test Cycles 测试循环
- Procedures 试验操作程序
- Fuels (Gasoline, Diesel) 试验基准燃料 (汽/柴油)
- Vehicles (Cars, Trucks) 试验车辆 (轿车, 卡车)

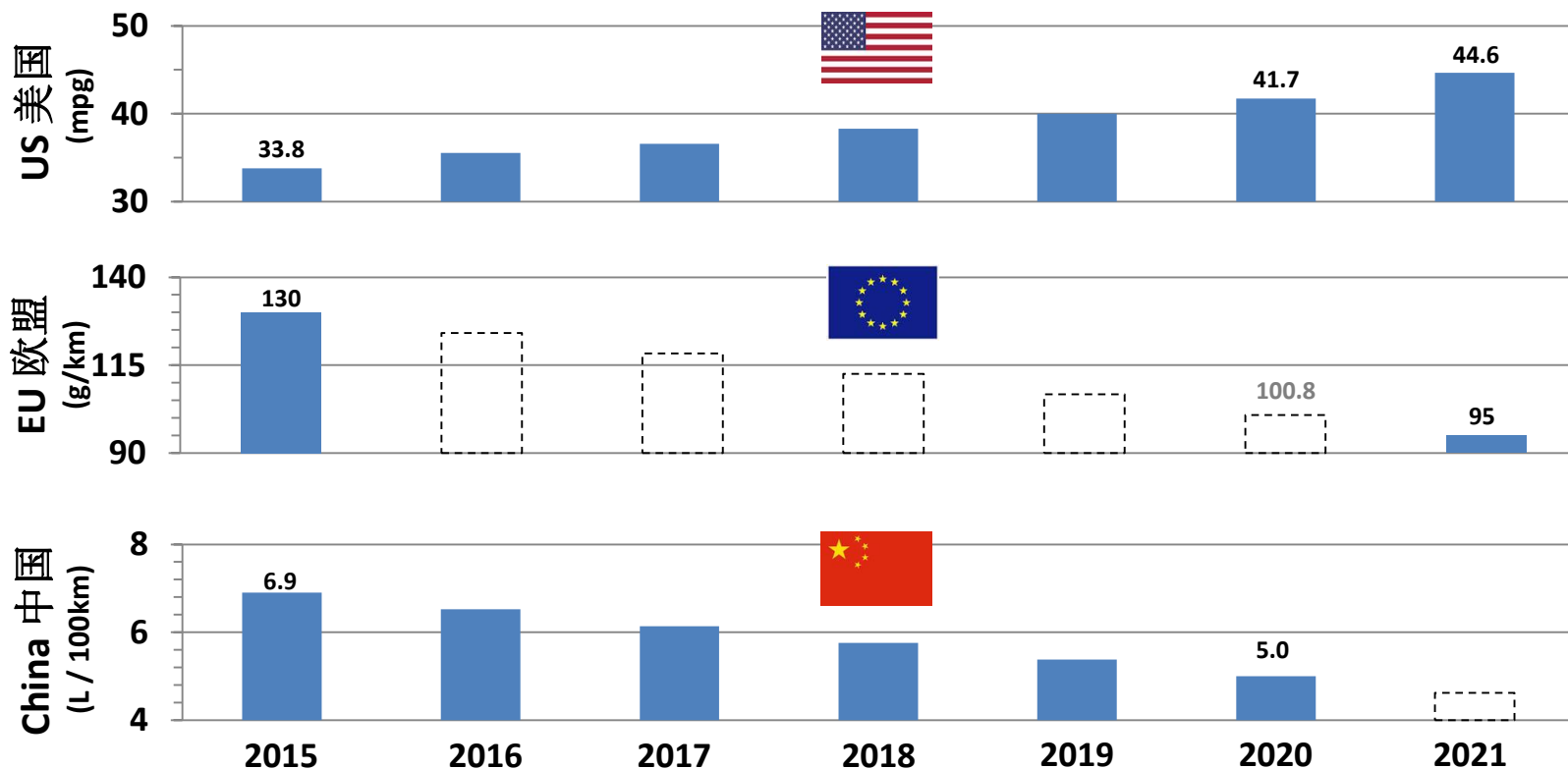
Standards are Being Introduced Globally That Are Significantly Increasing Fuel Efficiency, Reducing CO₂ Emissions and Converging by Mid-2025

世界各国都致力于2025年中期之前, 引入并实施严格的标准法规以期显著提高燃油经济性并降低CO₂ 排放量.

Comparison of FE / CO₂ Standards

燃油经济性和 CO₂ 减排相关标准法规比较

Average Annual Improvement
年度改进情况
(2015 – 2020)



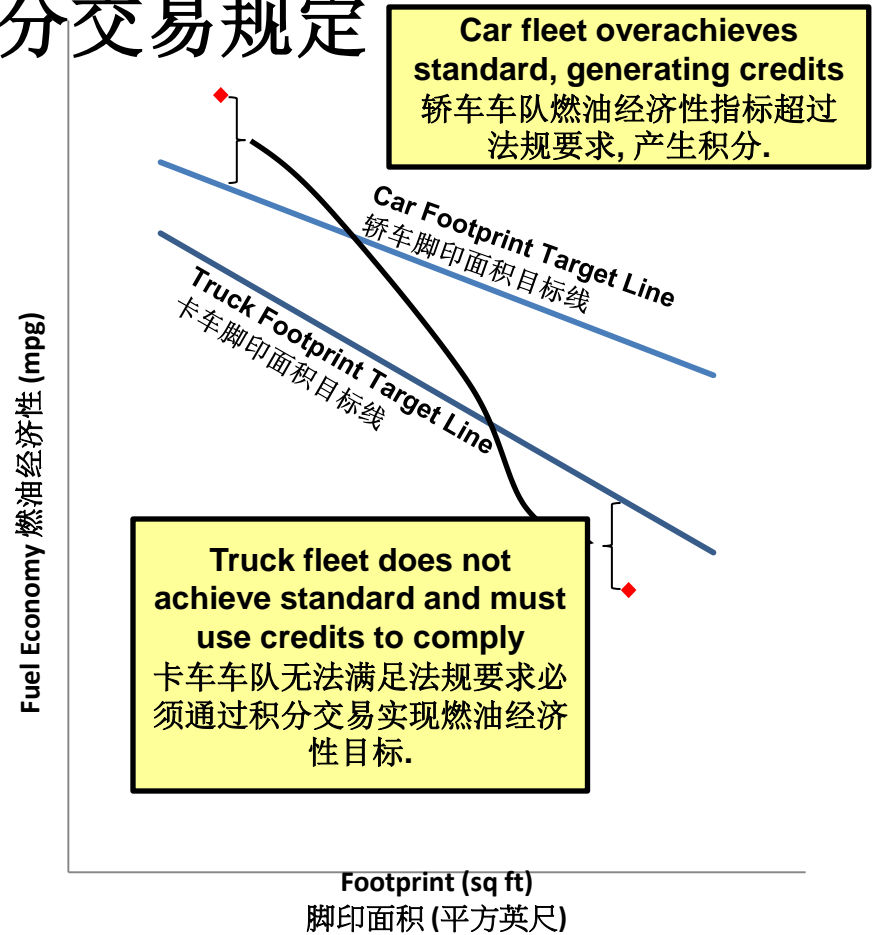
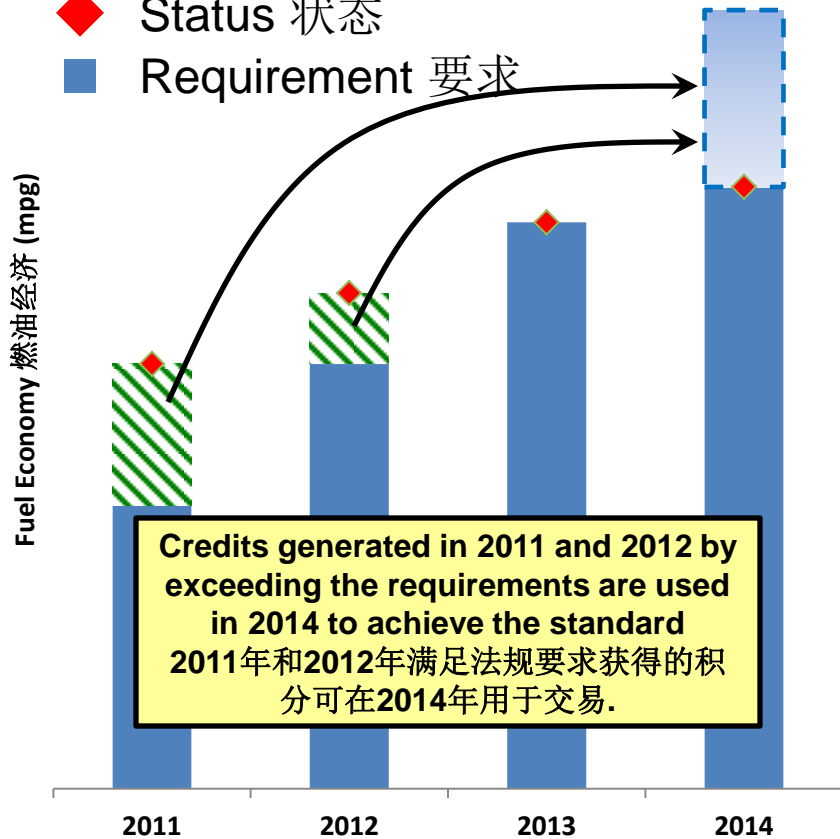
The Rate of Improvement for China Standards is Much More Aggressive than for Comparable Standards in the US or EU

中国相关标准法规的改进程度远高于美国和欧盟的同类标准法规。

US CAFE Credit Banking / Credit Transfer Provisions




美国 CAFE 积分存储体系 / 积分交易规定

- ◆ Status 状态
- Requirement 要求



Credit Banking / Transfer Provisions Incorporated To Allow Flexibility For Manufacturers To Manage Fleet Compliance
积分存储 / 积分交易制度使得车辆制造商可以采用灵活的方式, 确保其车队平均燃油经济性指标满足法规要求。

Eco-Innovations 计划

			
Definition	-Plan to add new definitions of off cycle technology to the current 4 technologies - TPMS, high-efficiency A/C, start-stop system, Gear-shifting indicator.	<ul style="list-style-type: none"> • For new and innovative motor-vehicle and engine-technologies • Effect can not (significant) be measured with 2-cycle-test • Max. credits via Opt1: 6.2g/km (fleet) 	<ul style="list-style-type: none"> • Not (fully) measurable in the NEDC • Intrinsic to the transport function • Min. saving potential >1g/km • Market penetration in all new passenger cars in 2009 <3% • Max. credits: 7g/km (fleet)
Verification	TBD	Opt1: Predefined list of technologies and assigned CO ₂ savings Opt2: 2-cycle-test <-> 5-cycle-test Opt3: Alternative method (approved by EPA)	Opt1: Comprehensive approach (measurement) Opt2: Simplified approach (calculation)
Application	TBD	Off-cycle credits according to predefined list are included in manufacturer's annual GHG compliance report	Application for eco-innovation technology by manufacturer or supplier ↳ Approval by JRC/EU Commission ↳ Publication of the accepted technology ↓ Homologation and CO ₂ reduction entry in COC paper

Eco-Innovations Are Important To Encourage Advanced Technologies That Improve Fuel Consumption

“Eco-Innovations” 计划鼓励开发使用有助于改善车辆燃油经济性的各种先进技术

Great Products, Strong Business, Better World

