



12th Diesel Engine-Efficiency and Emissions Research (DEER) Conference

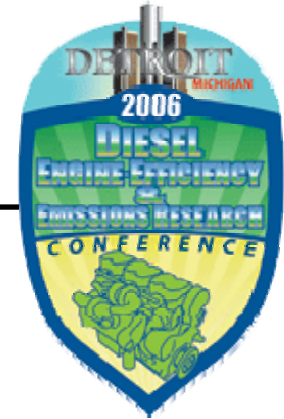
August 20-24, 2006, Detroit, Michigan

Accelerating Light-Duty Diesel Sales in the U.S. Market

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Volkswagen AG, Wolfsburg, Germany

Content

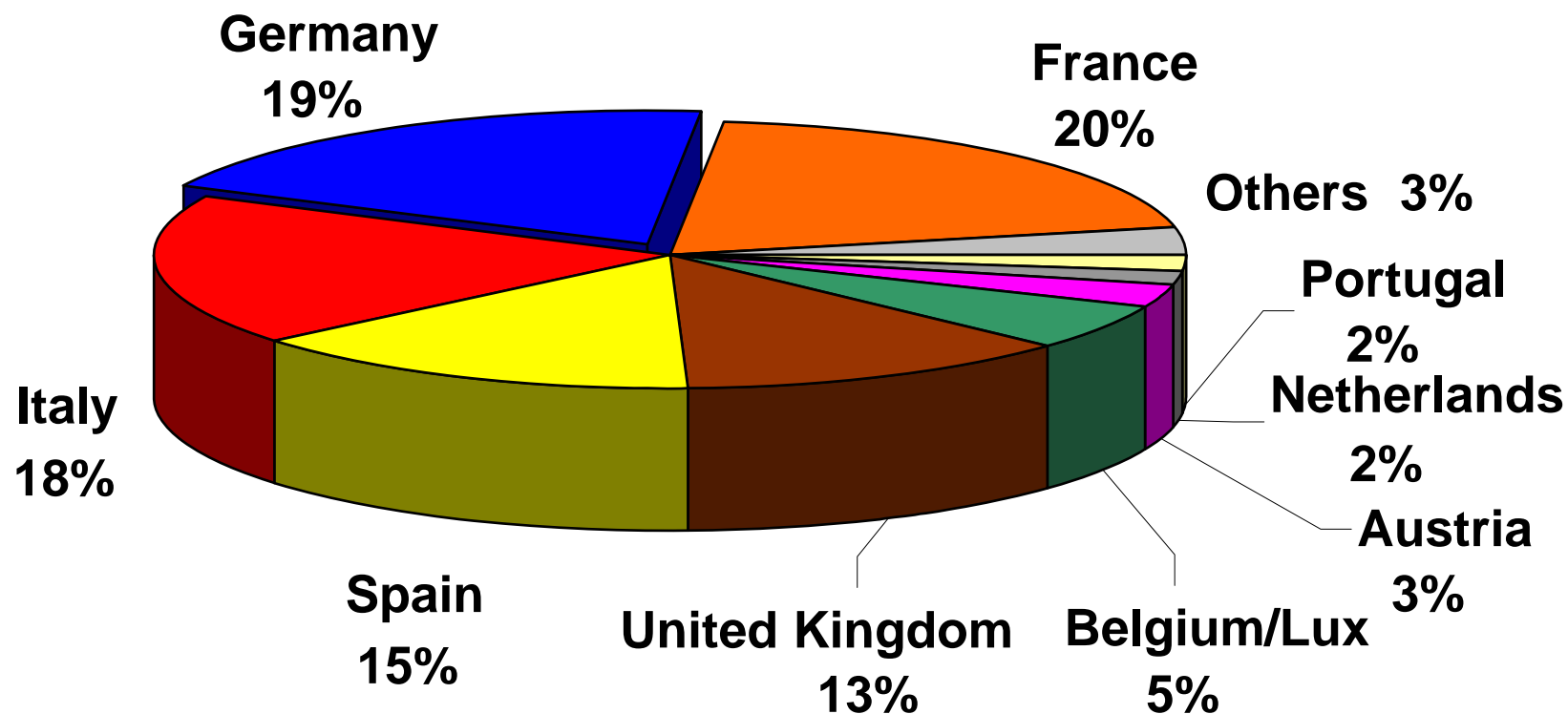


- ❖ **Situation in Europe**
- ❖ **Situation in U.S.**
- ❖ **Motivation for customers to purchase Diesel engine vehicles**
- ❖ **Accelerating Sales in U.S.**
- ❖ **Conclusions**

Accelerating LD Diesel Sales in U.S.



Diesel Market in Western Europe New Registrations in 2005



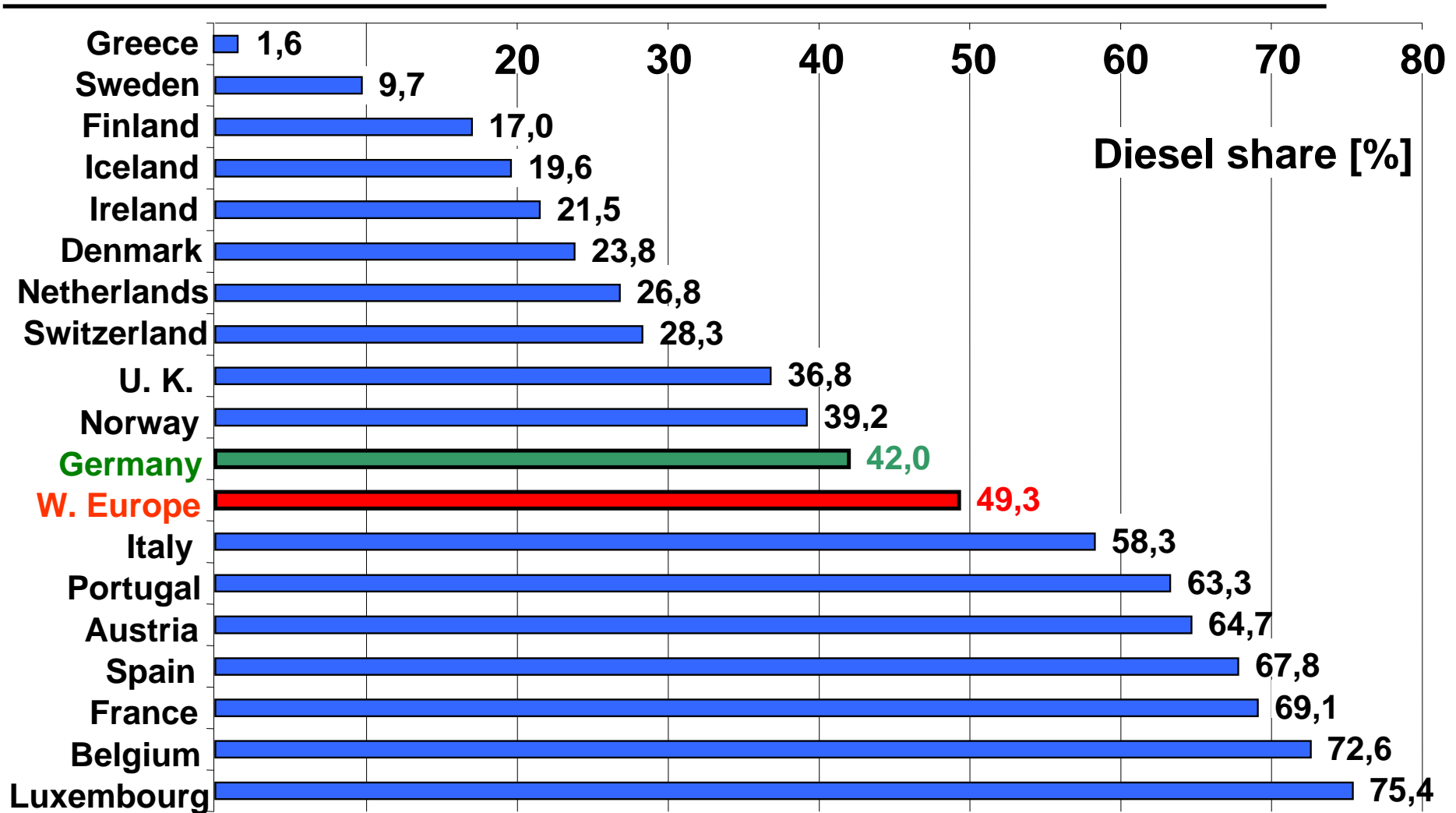
Total Diesel Market: 7 Mio. vehicles

Source: ACEA

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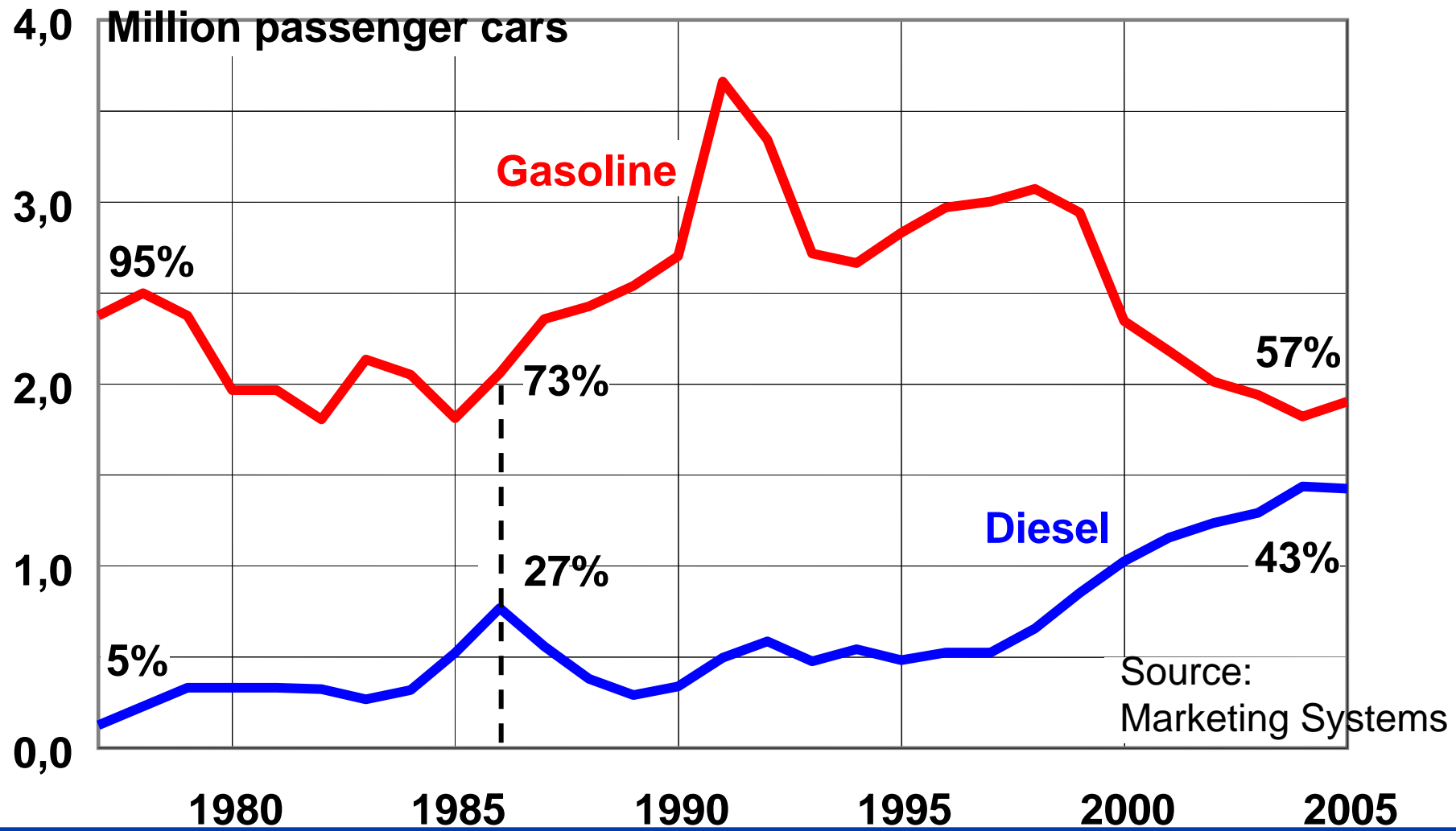
New Registrations of Diesel Passenger Cars Western Europe: 2005



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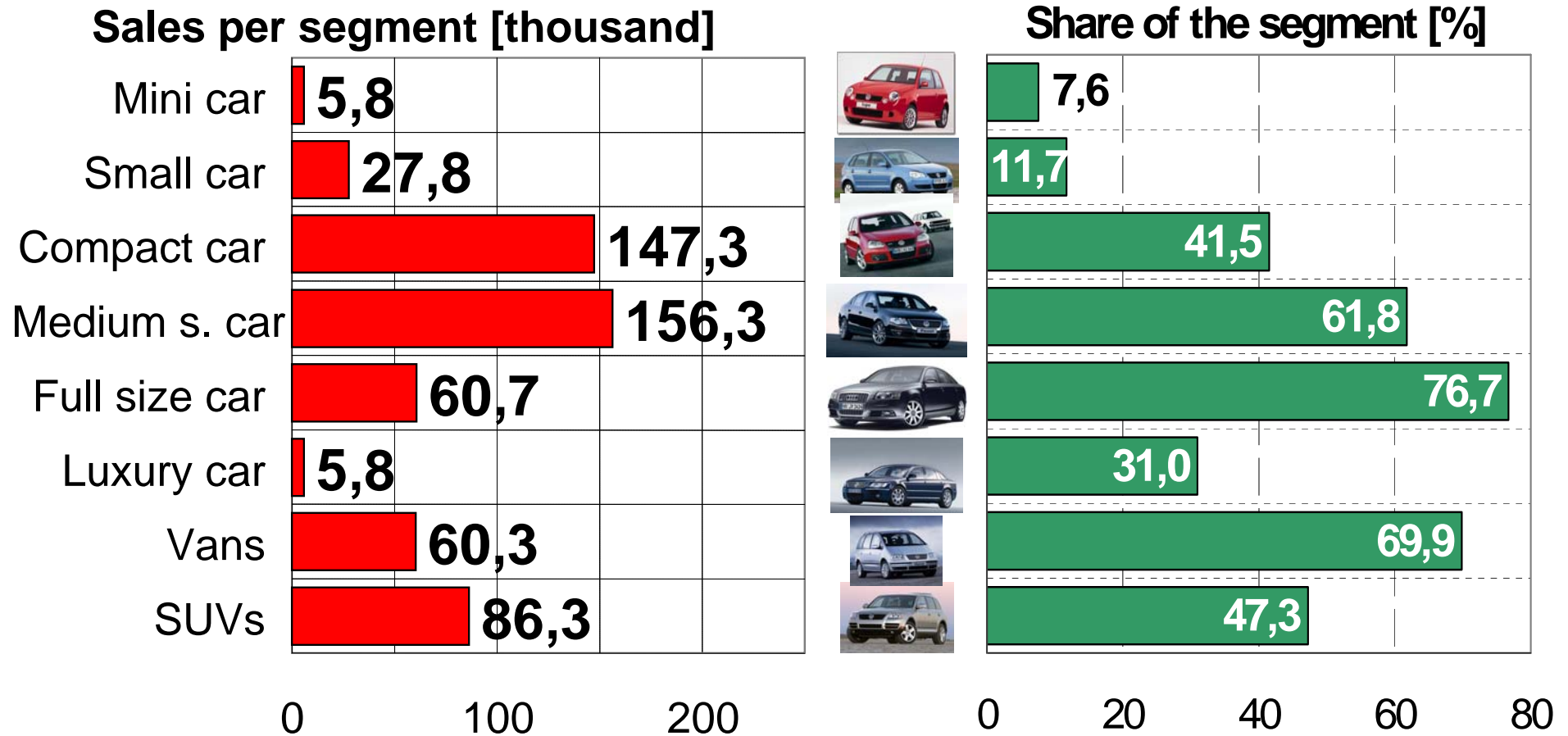
New Registrations of Passenger Cars (Germany)



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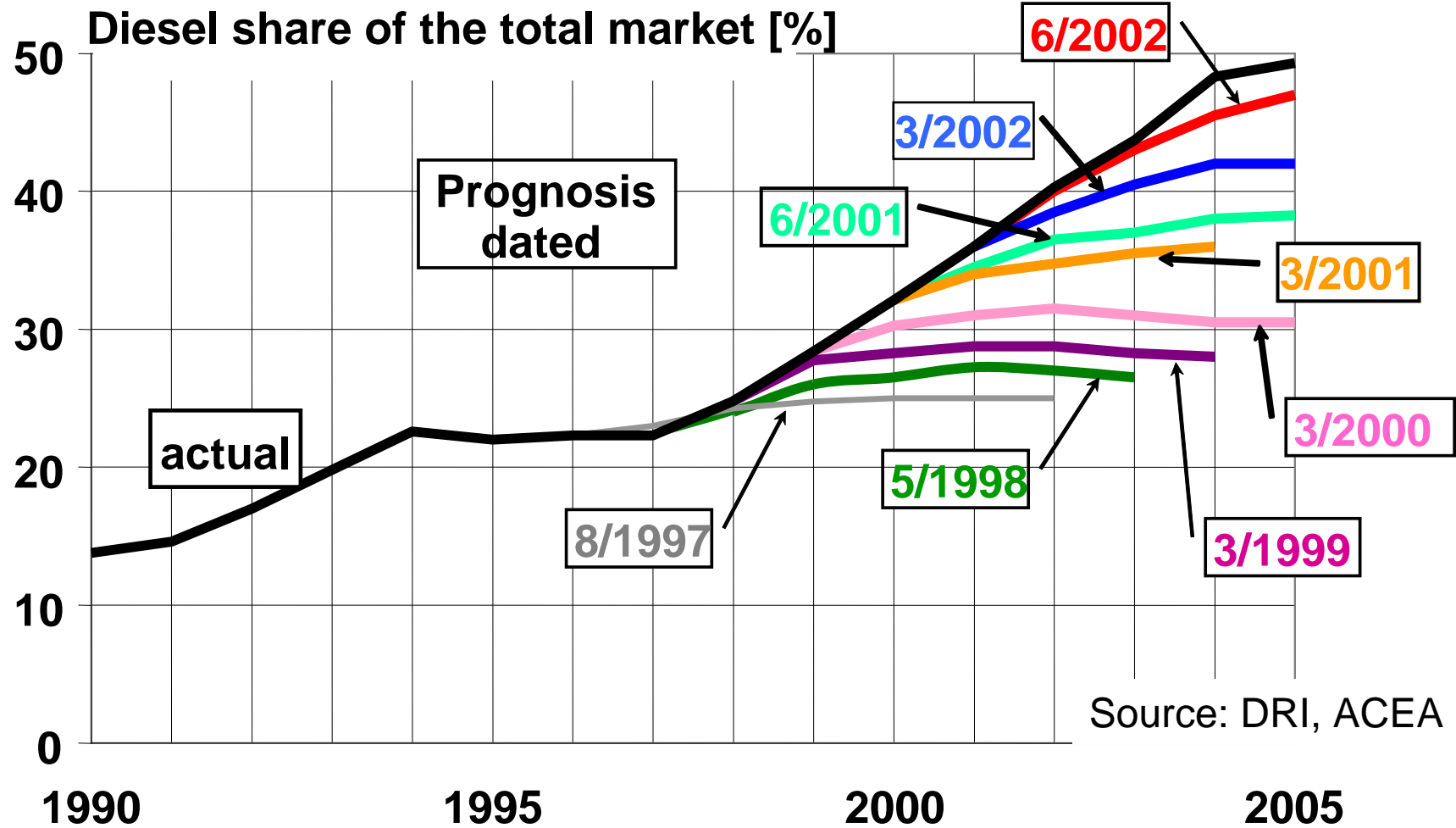
New Registrations of Diesel Passenger cars Germany: January – May 2006



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Diesel sales in Europe have always exceeded expectations



Accelerating LD Diesel Sales in U.S.



Content



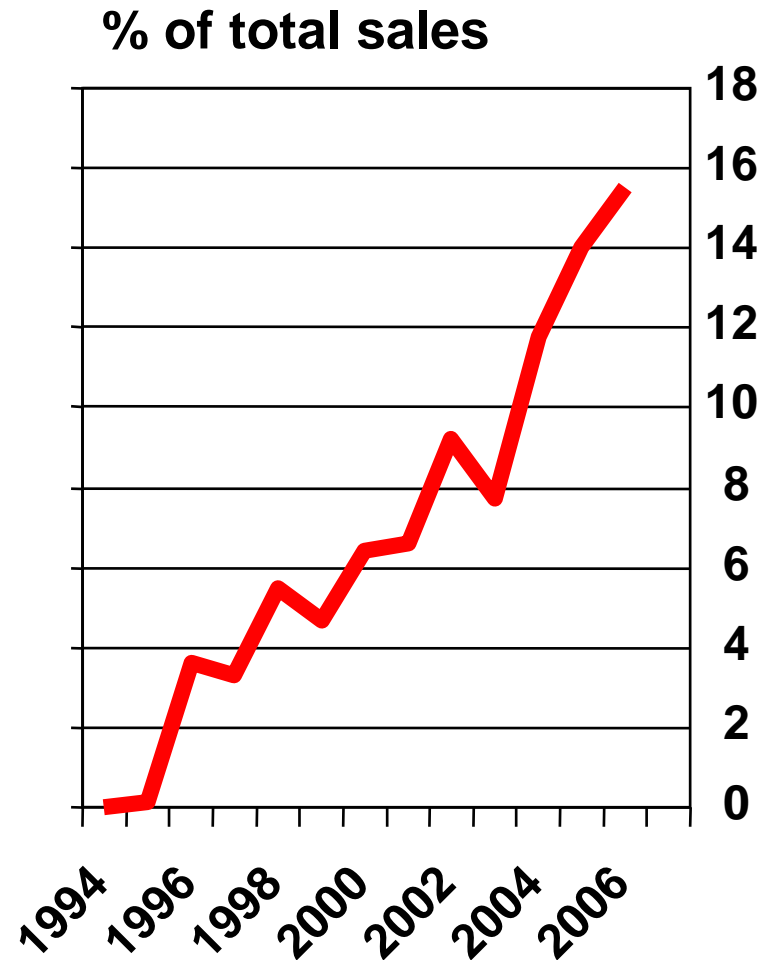
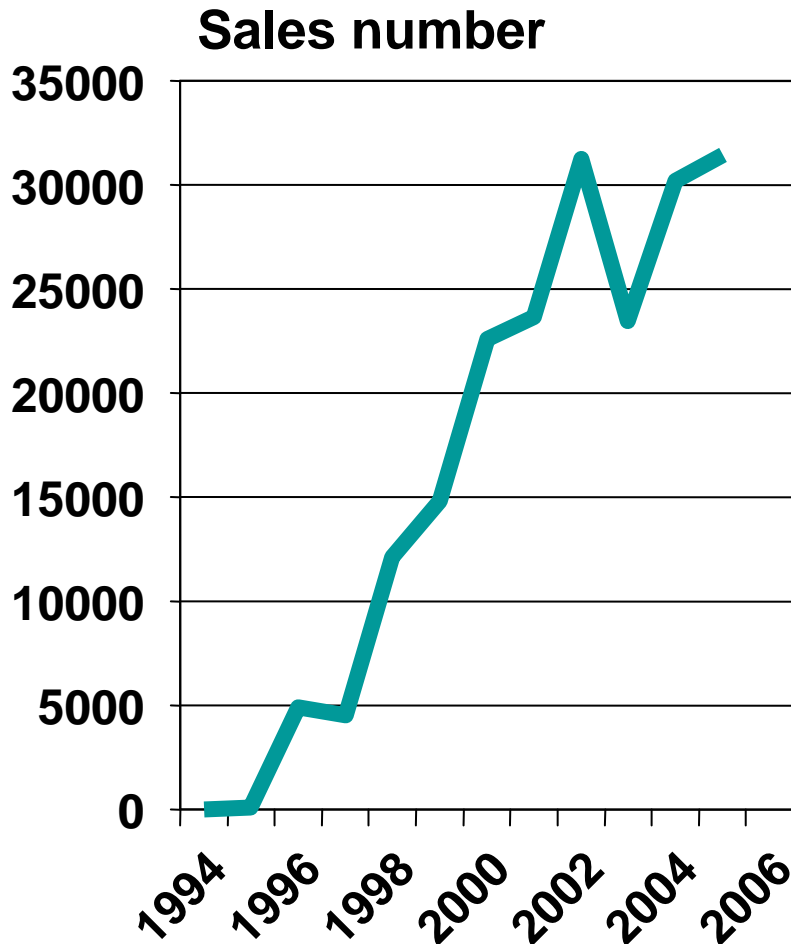
- ❖ Situation in Europe
- ❖ **Situation in U.S.**

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Sales of Volkswagen diesel vehicles in U.S.

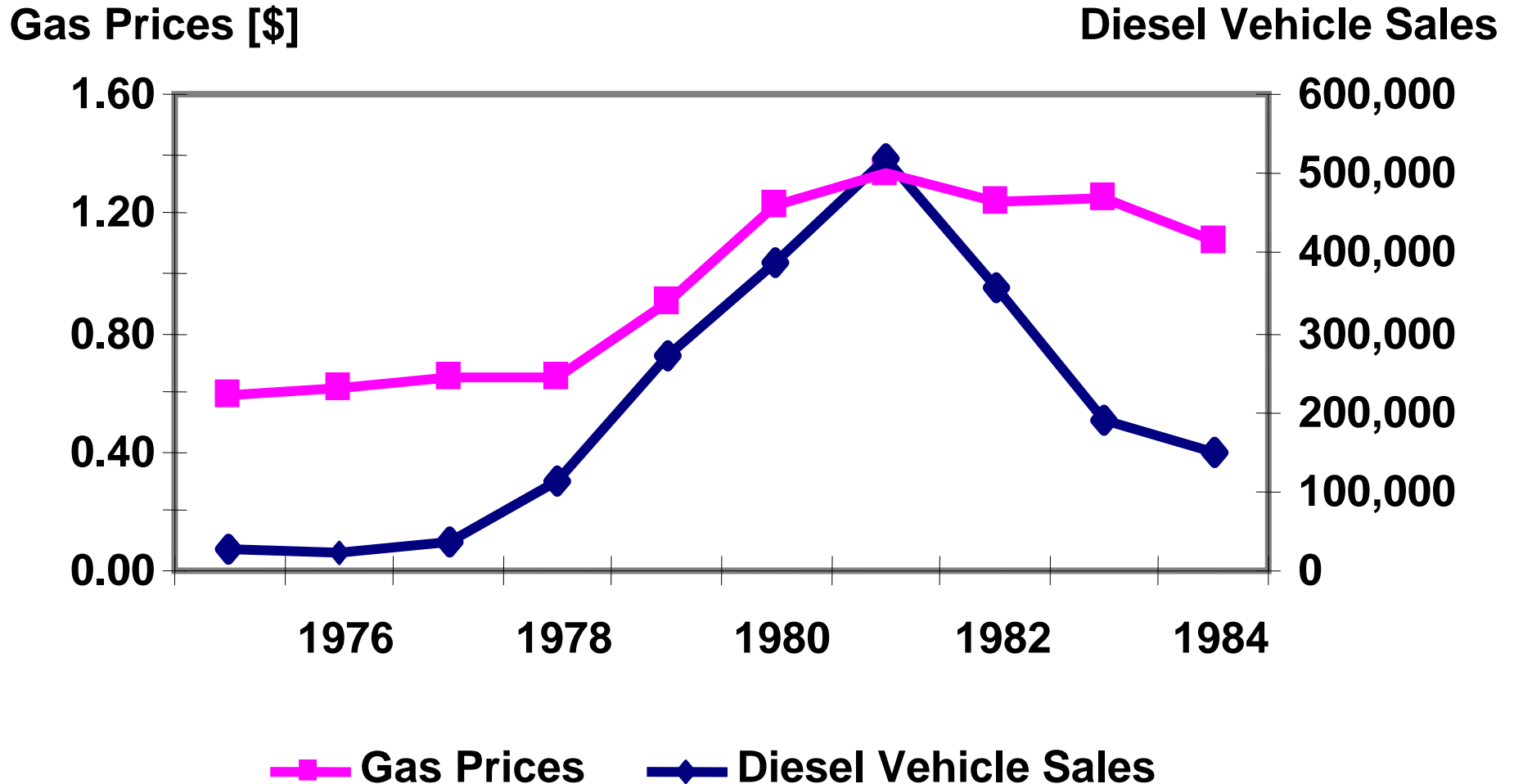
VW has continuously sold diesels in U.S. for over 25 years



Accelerating LD Diesel Sales in U.S.



1975-1984 U.S. Gas Prices vs. Diesel Vehicle Sales



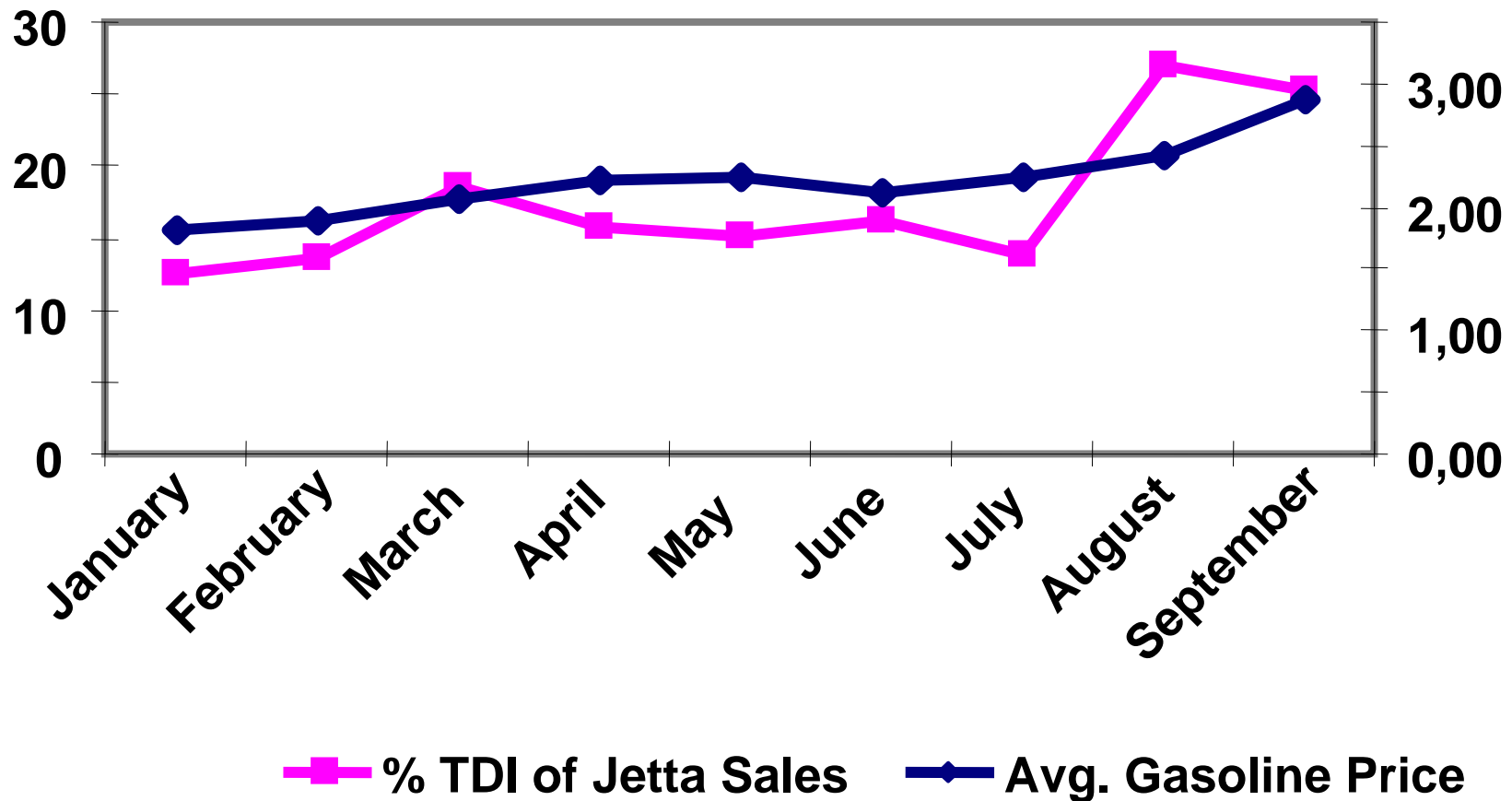
Accelerating LD Diesel Sales in U.S.



Percentage of TDI of 2005 Jetta Sales vs. Average Gasoline Prices in U.S.

Jetta Diesel Vehicle Sales [%]

Gas Prices [\$]



Accelerating LD Diesel Sales in U.S.



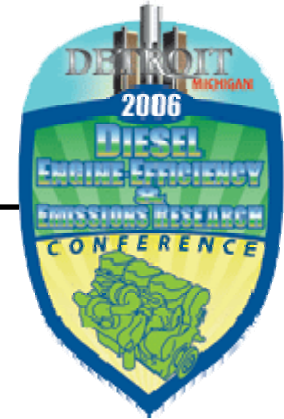
Diesel Market Potential in U.S.

- **Current U.S. diesel sales at about 15 % at Volkswagen**
- **Diesel sales depends on fuel price**
- **Fuel price related surge in diesel demand (25% of Jetta orders)**
- **Fuel Price projections?**

Accelerating LD Diesel Sales in U.S.



Content



- ❖ Situation in Europe
- ❖ Situation in U.S.
- ❖ **Motivation for customers to purchase Diesel engine vehicles**

Accelerating LD Diesel Sales in U.S.



Why do customers in Europe purchase Diesel engine vehicles?

The modern TDI engine is

- powerful
- economical
- ecological
- future-oriented



Accelerating LD Diesel Sales in U.S.



The modern TDI engine is ...

powerful

because it is a mature high-tech product with

- high traction power
- high elasticity

and impressing with its

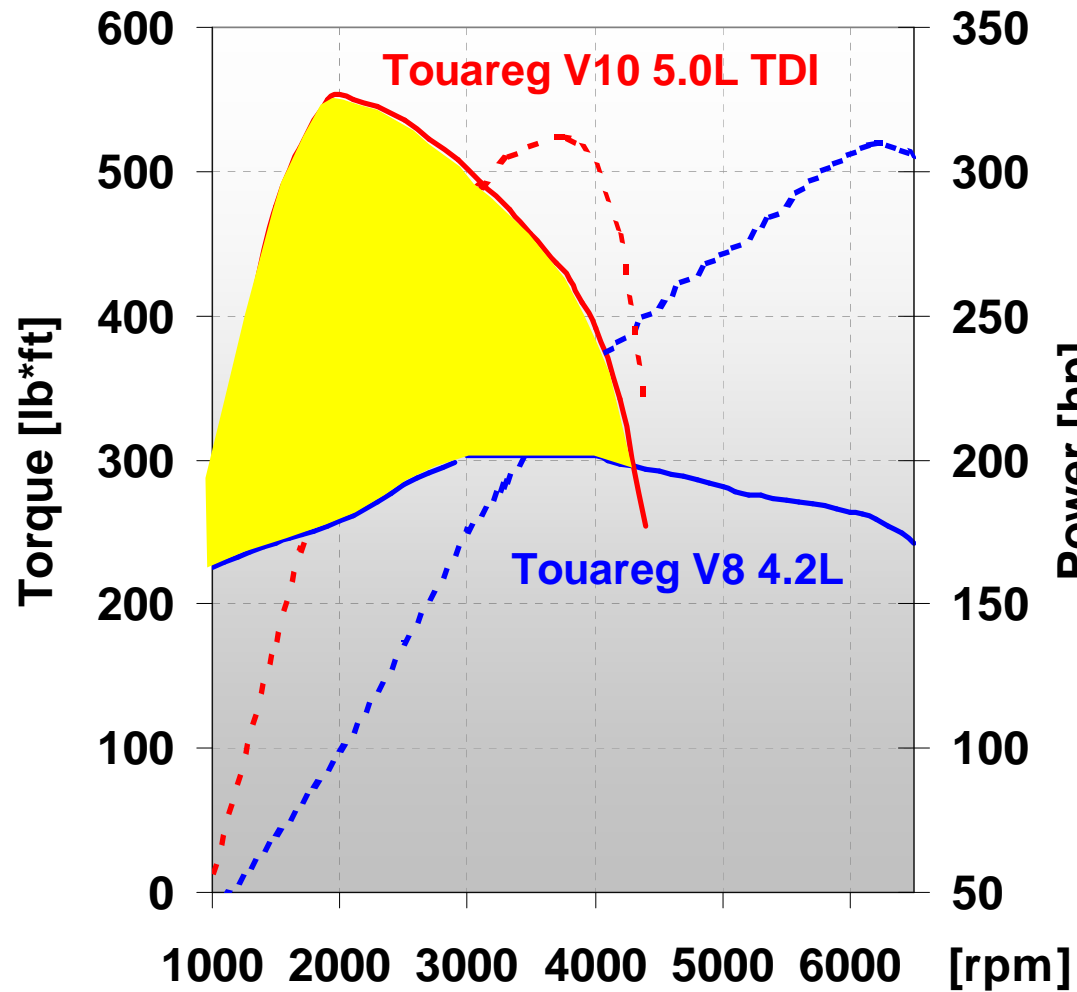
- speed
- acceleration
- handling
- comfort

Accelerating LD Diesel Sales in U.S.



The TDI is powerful ...

Touareg



Accelerating LD Diesel Sales in U.S.



The modern TDI engine is ...

economical

because of

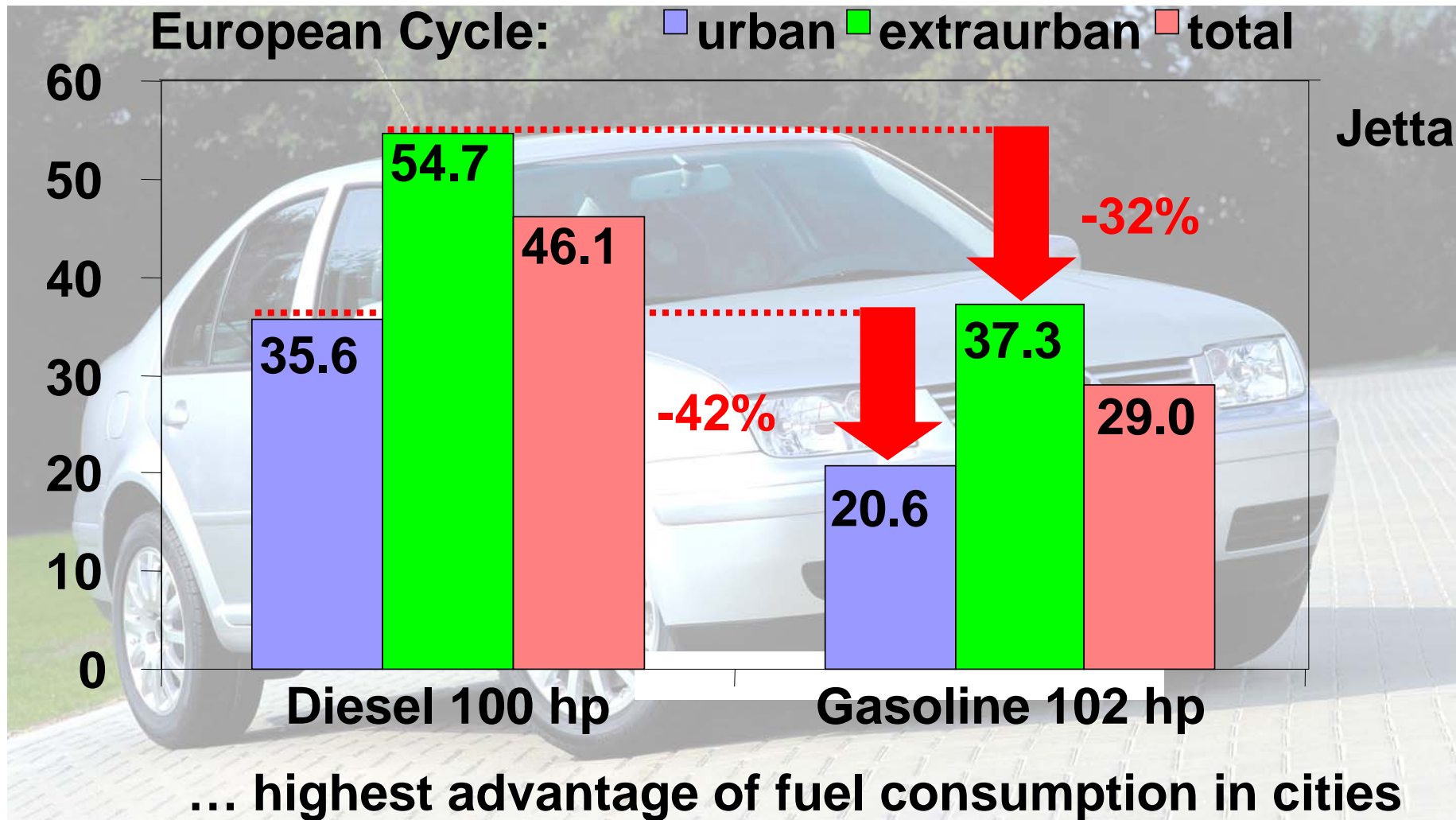
- **low fuel consumption**
- **extreme durability**



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The TDI is economical ...



Accelerating LD Diesel Sales in U.S.



The modern TDI engine is ...

ecological

because

- it saves the resources worldwide due to its outstanding fuel economy
- it enables low environmental pollution
- it contributes very little to greenhouse relevant gases
- the particulate emissions have been reduced by over 90% since 1988

Accelerating LD Diesel Sales in U.S.



The modern TDI engine is ...

future oriented

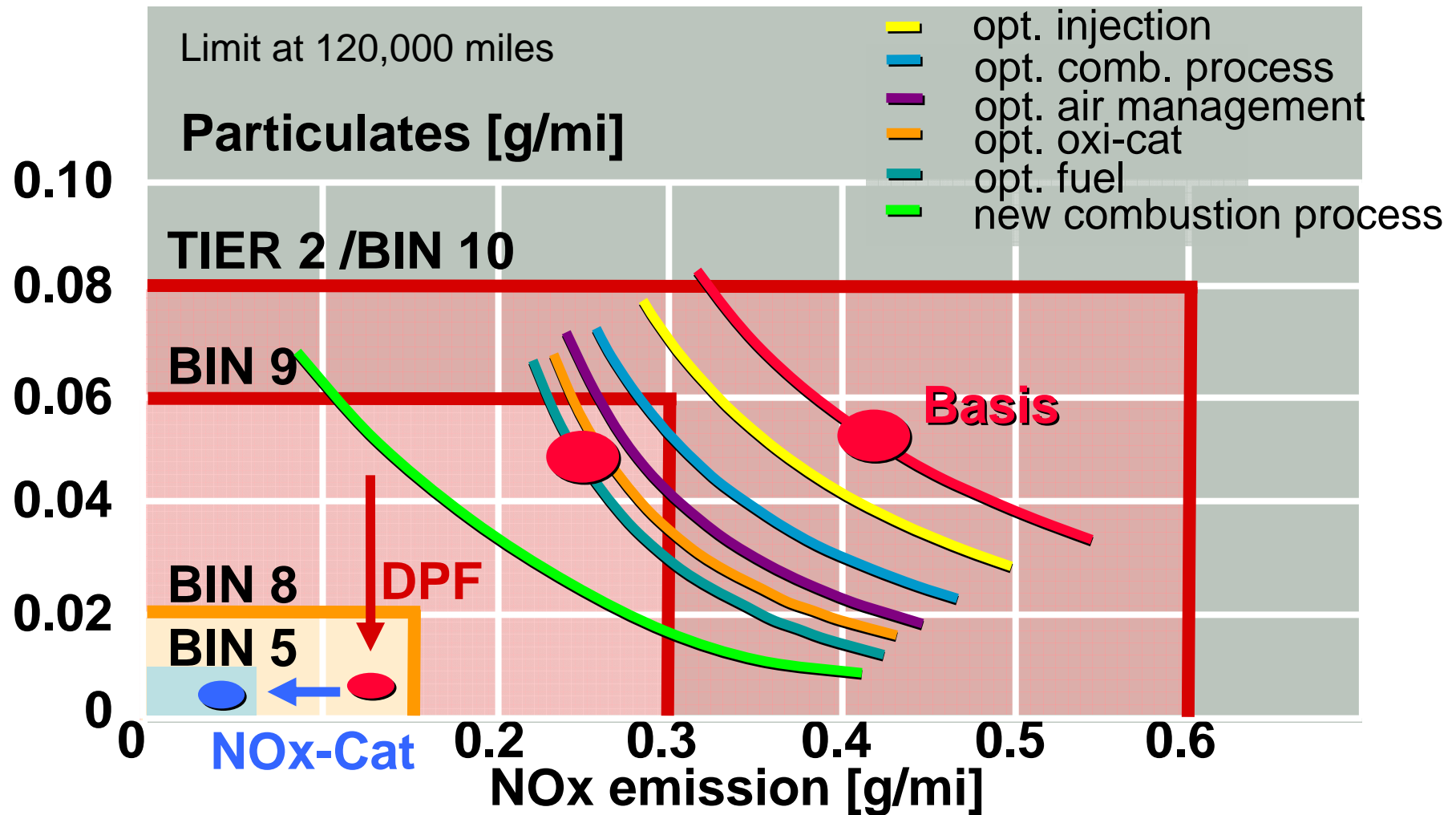
because

- **it will comply with future emission legislations**
 - **the problems of the diesel (PM, NOx)**
 - **are (DPF) or**
 - **will be (deNOx)**
- solved**

Accelerating LD Diesel Sales in U.S.



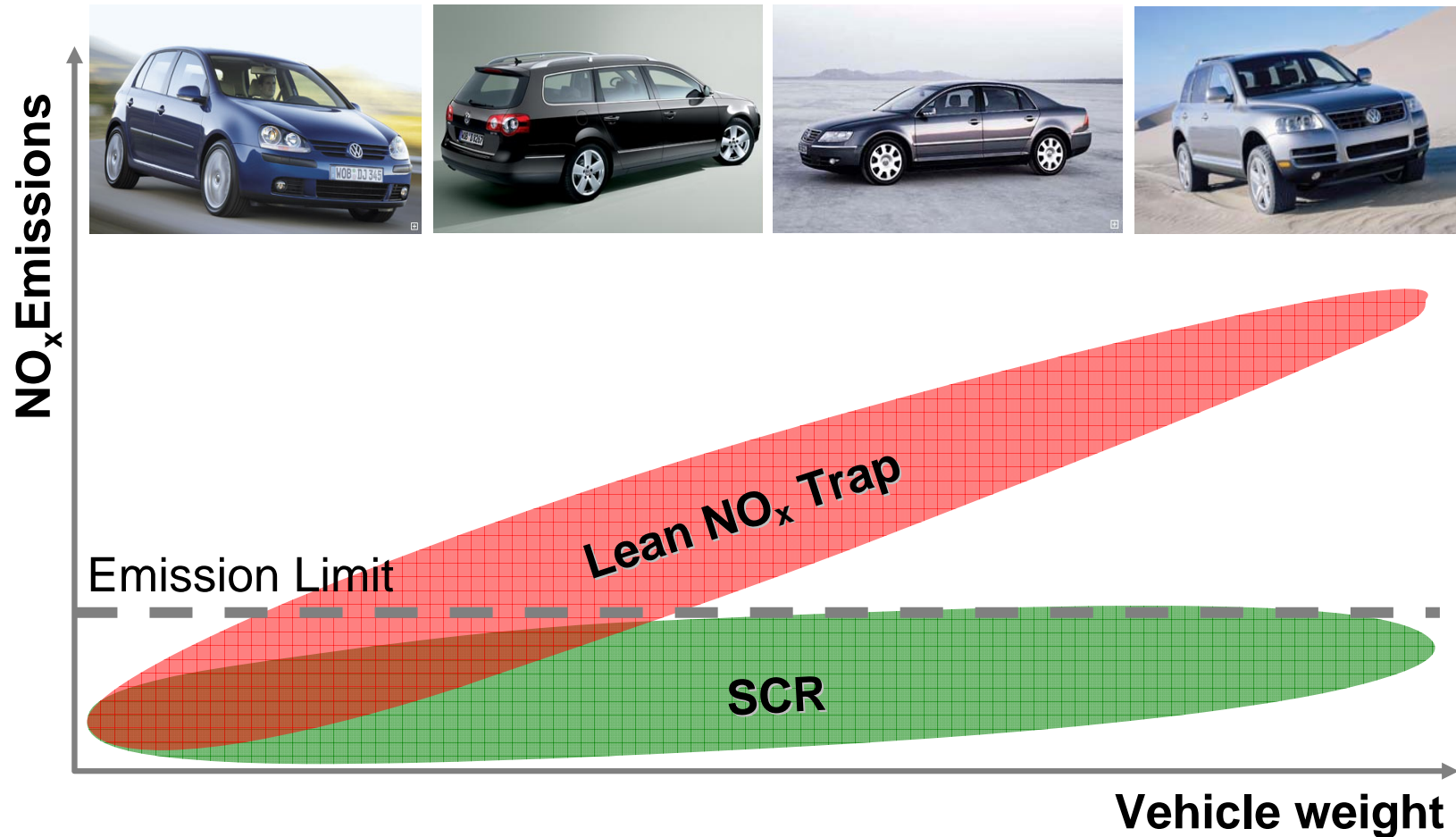
Future development potential for passenger cars



Accelerating LD Diesel Sales in U.S.



System Applicability

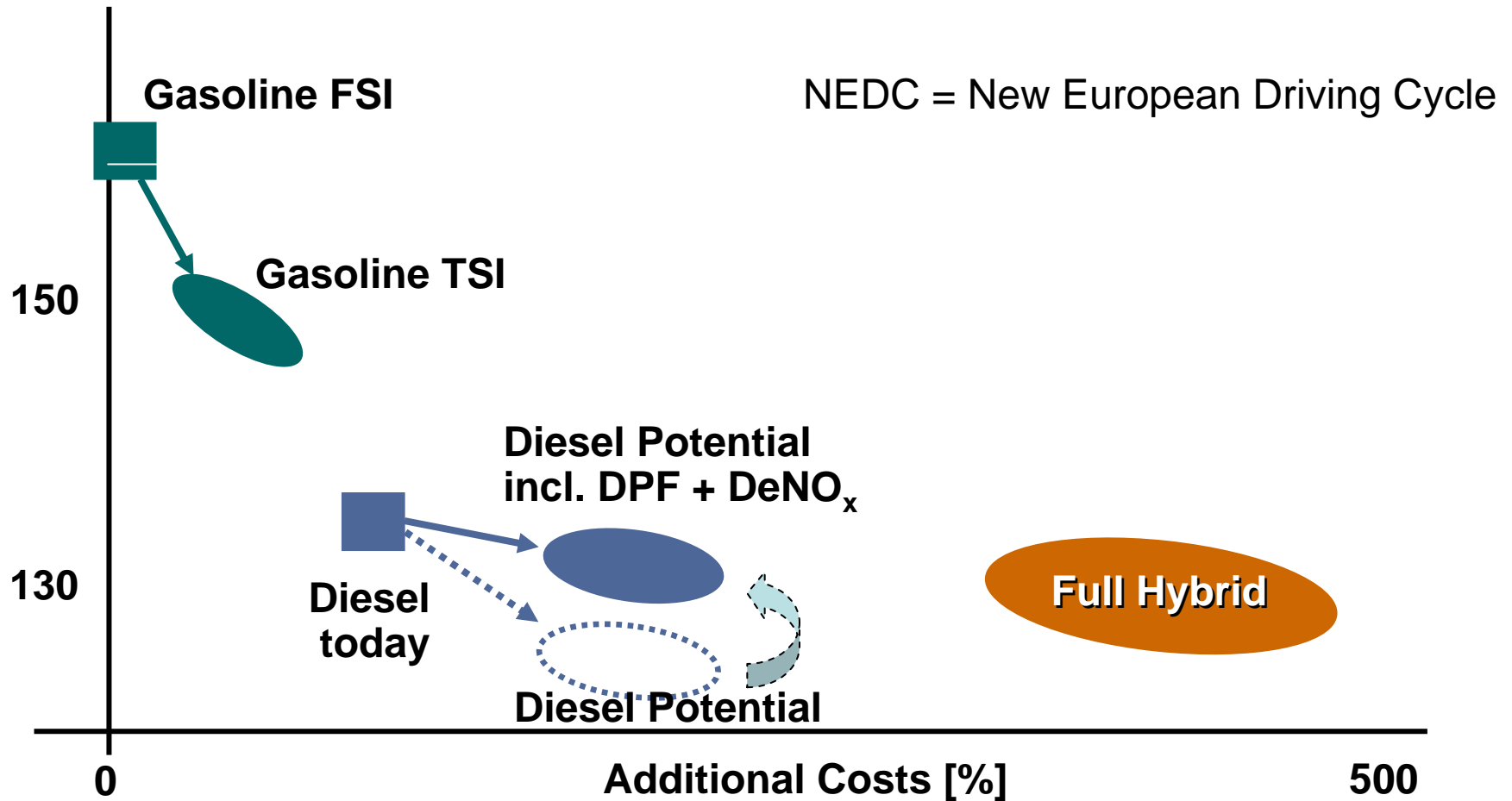


Accelerating LD Diesel Sales in U.S.



Cost efficiency – example Golf

CO₂-Emissions NEDC [g/km]



Accelerating LD Diesel Sales in U.S.



Why do customers purchase Diesel vehicles?

- the TDI technology closed the gap to the gasoline engine on
 - performance
 - noise
 - emissions
- the TDI has increased fuel economy / reduced CO₂ emissions dramatically
- the TDI provides lower operating costs

Accelerating LD Diesel Sales in U.S.



Content



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- ❖ Motivation for customers to purchase Diesel engine vehicles
- ❖ **Accelerating Sales in U.S.**

Accelerating LD Diesel Sales in U.S.



Volkswagen ...

- ... is ranked 4th in total vehicle production worldwide (12% of global market share)
- ... is a worldwide leader in diesel technology and diesel passenger car production with a current Diesel sales in
 - Western Europe: ~ 50 %
 - Canada: ~ 50 %
 - US: ~ 15 %

Accelerating LD Diesel Sales in U.S.



Volkswagen ...

- ... is strongly committed to the marketing of diesel powered cars in the future, including in the United States
- ... believes Diesel will succeed by delivering
 - Increased energy efficiency;
 - Reduced CO2 emissions;
 - High levels of performance, convenience;
 - The best platform for renewable fuels including Biodiesel, Sunfuel, SunDiesel

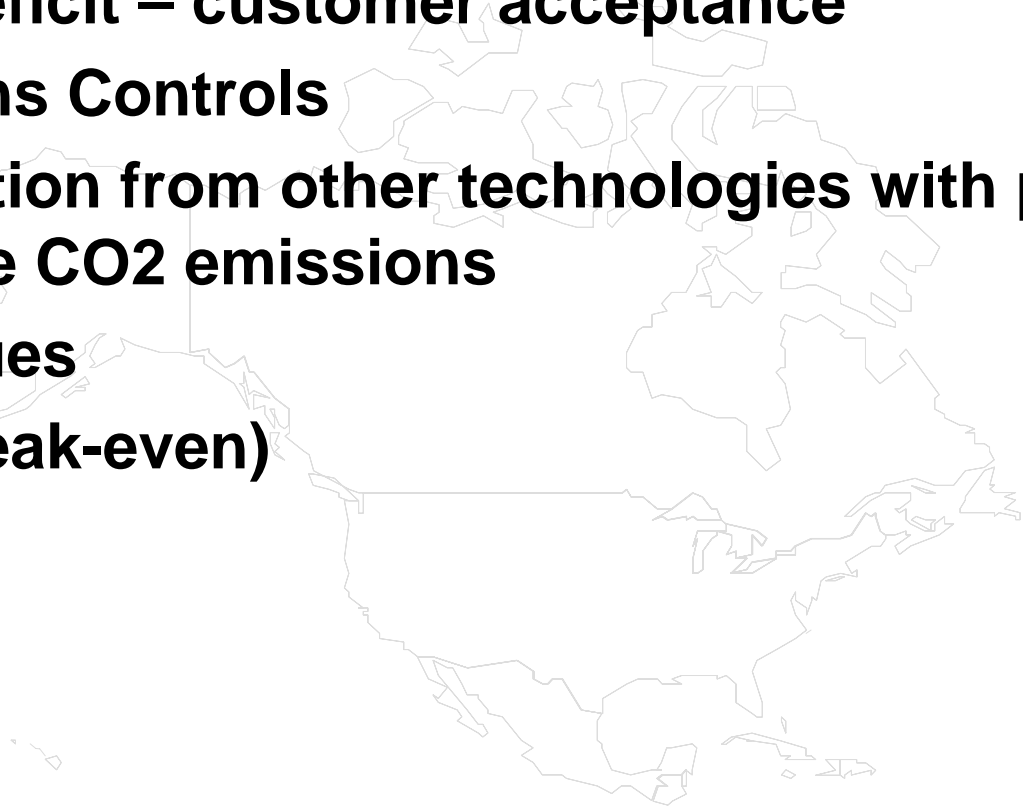
But there are some challenges which must be addressed

Accelerating LD Diesel Sales in U.S.



Obstacles Facing LD Diesel Development

- **Image deficit – customer acceptance**
- **Emissions Controls**
- **Competition from other technologies with potential to reduce CO2 emissions**
- **Fuel Issues**
- **Cost (break-even)**



Accelerating LD Diesel Sales in U.S.



Addressing Diesel's Image Deficit

- **Ongoing campaign to educate opinion makers and policymakers about the advances in diesel technology and the benefits that advanced diesels can provide for the economy, the environment, and for consumers.**
- **High visibility events that demonstrate technical advances to the public incl. motorsports campaigns (e.g. Audi R10 first diesel vehicle wins Le Mans and Sebring).**
- **Marketing: Promoting diesel sales through advertising and through promotion of alternative fuel strategies that relate to diesels (biodiesel, BTL/GTL projects to address customer interest in renewable fuel capability).**
- **Customer experience: The biggest gains in diesel acceptance will come through successful customer experience as more diesel vehicles appear in the US.**

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Addressing Diesel's Image Deficit



If customers drive the vehicles they will want them!

Accelerating LD Diesel Sales in U.S.



Addressing the Diesel Emissions Challenge

- **The threshold for success is to meet EPA's Tier 2 Bin 5 emissions levels in MY 2007 – 50 state strategy**
- **Volkswagen and other manufacturers have confidence this can and will be achieved**
- **Multiple technological solutions under current development, evaluation and comparison**
- **Diesel Particulate Filter in serial production**
- **NO_x is the toughest challenge: Solutions include Selective Catalytic Reduction (Urea Injection) and NO_x storage with regeneration**

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Addressing the Competition

- **Advanced Diesels will compete against and coexist with other technologies including**
 - Advances in Gasoline Technology
 - “Success” of Hybrids
 - Public Focus on Long Term Solutions (Hydrogen)
- **Government should promote innovation and assure fair competition by establishing technology neutral regulations and incentive programs**
- **Industry must invest in development and production of clean diesel technology**
 - Volkswagen is committed to play a leading role

Accelerating LD Diesel Sales in U.S.



Addressing Fuel Issues

- **Fuel quality**
 - ultra low sulfur content important for new aftertreatment devices
 - strict standards must be applied to alternative fuels/blends (biodiesel, synthetic diesel)
- **Fuel Availability**
 - 35 – 40 % of U.S. filling stations sell diesel fuel
 - fuel distributors plan to increase availability in line with market demand
- **Fuel Prices**
 - new level of consumer interest in fuel economy, \$3.00/gallon as “tipping point”
 - Fuel prices are not expected to decline

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Accelerating LD Diesel Sales in U.S.



Conclusion

- **Modern TDI Diesel technology has come a long way since the old diesel engines of the past**
 - **The modern TDI Diesel engine is not only powerful but also very economical**
 - **A major progress in lowering the exhaust gas emissions has taken place**
- ➔ We are convinced that**
- ✓ **the TDI is a solution for future powertrains for light duty vehicles**
 - ✓ **there is a further potential in the U.S. which will be realized**

Accelerating LD Diesel Sales in U.S.





Thank for your attention!

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