
“Focus on the Future”
UM Automotive Research Conferences

WELCOME!

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Funding

– Affiliate Program
– Research
– Conferences
Automotive Analysis Division
University of Michigan
Transportation Research Institute

**Affiliates**

**IT Organizations**
- Oracle Corporation
- IBM
- HP
- Siemens-PLM
- QAD

**OEMs**
- General Motors
- Toyota
- Nissan Tech Center

**Government**
- NREL / EPA
- NSF
- Motor Carrier

**Consultants**
- Deloitte
- About Consulting

**Suppliers**
- Chevron
- Visteon
- Denso
- Dana
- Delphi
- Peterson Spring
- Continental
- TRW
- Valeo

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**UMTRI**

**Automotive Analysis**
For 2010, we have re-designed our Affiliate program by focusing the funding received from our Affiliates on 3 main annual research projects that look at the current and future direction of the global automotive industry:

1. **Automotive powertrains and emissions focused on technology and regulatory/policy forecasting through our Powertrain Strategies for the 21st Century study**

2. **The role of information technology in the automotive industry through our Automotive CIO study**

3. **The globalization of the automotive industry based on a focused, country level analysis of a developing or developed market.**
UMTRI-AAD Affiliate Program

- Affiliates will have access to all three reports, but they will be asked to choose which project their funding will support.

- Supporting companies will form the advisory board for each study and meet with UMTRI researchers to determine topics to examine within each study.

- Results will be presented at our annual conferences on powertrains, information technology, and globalization.

- We are also open to focusing on other areas of research based on client requests.
Upcoming UMTRI-AAD Conferences

• **September 15, 2010 (Wednesday):** *The Business of IT: Transforming the Organization and the Vehicle.* This 3rd annual conference will continue to follow the evolution of IT within the organization and the vehicle.

• **November 10, 2010 (Wednesday):** *Inside China: Understanding China’s Current and Future Automotive Industry.* This 3rd annual conference will provide in depth analysis of China’s automotive industry and its future direction.

• **February 16, 2011 (Wednesday):** *Automotive Safety: How Far Have We Come and Where Are We Going?*

• **April 20, 2011 (Wednesday):** Topic to be Determined

• **July 13, 2011 (Wednesday):** *Powertrain Strategies for the 21st Century.* This 3rd annual conference will focus on current powertrain topics and their effects on the future of the industry.
Panelists

• Gary Smyth, Executive Director, North American Science Labs, GM Global Research and Development

• Mike Omotoso, Senior Manager of Global Powertrain Forecasting, J.D. Power and Associates

• Gary Hunter, Chief Technologist – Diesel Engines, AVL Powertrain Engineering, Inc.

• Les Alexander, General Manager Government Solutions Group, A123 Systems
Panelists

- **John Woodrooffe**, Research Scientist, Director of the Commercial Vehicle Research and Policy Program and Head of Vehicle Safety Analytics, University of Michigan Transportation Research Institute

- **Bryan Krulikowski**, Vice-President, Morpace Market Research
Morning Schedule

• 9am
  – Bruce Belzowskii
  – Gary Smyth
  – Mike Omotoso

• 10:40am Break

• 10:55am
  – Gary Hunter

• 11:30am Q&A

• Noon-1:30pm Lunch
Afternoon Schedule

• 1:30pm
  – Les Alexander
  – John Woodrooffe

• 2:35pm  Break

• 2:45pm
  – Bryan Krulikowski

• 3:15pm  Q&A

• 4:00pm  Adjourn
Conference Questions

• Which powertrain technologies will play the biggest roles prior to and post 2016?

• How do manufacturer powertrain strategies differ across countries or regions?

• How will the focus on CO2 emissions affect manufacturer powertrain strategies?
Conference Questions

• Is the U.S. government providing enough consistent direction for the industry, related to advanced powertrains?

• What challenges face battery makers in the short and long term?

• What changes in fuel economy should we expect for medium and heavy trucks?
Conference Questions

• How do consumers view alternative powertrains?

• What can be done to encourage the transition to more fuel efficient vehicles?
Powertrain Strategies for the 21st Century: A Global Perspective

July 14, 2010

Bruce M. Belzowski
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Global Fleet Statistics

• Major Countries: U.S., Western Europe, Japan, South Korea, China, Brazil, Russia, India

• Central Question: If the goal is to reduce dependence on oil, then a country would need to eliminate gasoline and diesel fueled engines. How long will it take to turnover a country’s fleet of vehicles to alternative powertrains/fuels?

• What paths will individual countries take to a more fuel efficient fleet?

  • Light duty vehicles only, no commercial vehicles.
Global Fleet Statistics

• Powertrain technologies included in the analysis:
  • Compressed Natural Gas (CNG)
  • CNG / Diesel Hybrid
  • Diesel / Electric Hybrid
  • Gasoline / Electric Hybrid
  • Gasoline / CNG Hybrid
  • Gasoline / Liquefied Petroleum Gas (LPG) Hybrid
  • Pure Electric
  • Ethanol (E85)
  • Ethanol (E85) / Electric Hybrid
  • Hydrogen
  • Fuel Cell
Analysis Strategy

• Analysis based on:
  
  • Vehicles in Use predictions from average of 1977 to 2009 fleets
  
  • Vehicle Sales predictions from Growth and Scrappage estimates
  
  • IHS Global Insight production estimates for fuels and powertrains
  
  • Vehicles in Use, Vehicle Sales, Growth, and Scrappage for New and Old Powertrains/Fuels
Turning Over a Large Fleet
U.S. Fleet Statistics

• Number of Vehicles
  • Light Duty Vehicles: 237 million

• Drivers:
  • Regulation: Historically ambivalent, currently aggressive
  • Innovation: Currently very aggressive

• Trends
  • Significant increase in hybrids using different fuels, especially ethanol
U.S. Fleet Assumptions

• Assumptions:
  • Alternative powertrains/fuels include: CNG, CNG/Electric, Diesel/Electric, Pure Electric, Flexfuel (E85), Flexfuel/Electric, Gas/Electric
Turnover of the U.S. Fleet

% of Fleet Turnover

- Less Aggressive NPT Intro
- Moderately Aggressive NPT Intro
- Very Aggressive NPT Intro
- Total Fleet

# of Vehicles (000)

Sources: IHS GlobalInsight and Euromonitor

100% Alt PT

Automotive Analysis
Moving Away from Diesel
Western Europe Fleet Statistics

• Number of Vehicles (2009)
  • Light duty vehicles: 240 million

• Drivers:
  • Regulation: Historically aggressive, currently very aggressive (CO2 emissions)
  • Innovation: Currently very aggressive (Pure electrics and fuel cells)

• Trends
  • Current market share for pure diesel predicted to decrease with advent of multiple fuels and hybrids
Western Europe Fleet Assumptions

- Assumptions:
  - Alternative powertrains/fuels include: Diesel/CNG, Diesel/Electric, Pure Electric, Flexfuel (E85), Flexfuel/Electric, Fuel Cell, Gas/CNG, Gas/CNG/Electric, Gas/LPG, Gas/LPG/Electric, Gas/Electric
Turnover of the Western European Fleet

% of Fleet Turnover

- Less Aggressive NPT Intro
- Moderately Aggressive NPT Intro
- Very Aggressive NPT Intro
- Total Fleet

Sources: IHS GlobalInsight and Euromonitor

Automotive Analysis
The World of E85
Brazil Fleet Statistics

• Number of Vehicles
  • Light Duty Vehicles: 5 million

• Drivers:
  • Regulation: Focus on E85
  • Innovation: FlexFuel technology

• Trends
  • Focus on E85 as the only fuel
Brazil Fleet Assumptions

• Assumptions:
  • Alternative powertrains/fuels include: FlexFuel, FlexFuel/CNG
Turnover of the Brazilian Fleet

% of Fleet Turnover

- Moderately Aggressive NPT Into
- Total Fleet

100% Alt PT

Sources: IHS GlobalInsight and Euromonitor

Automotive Analysis
What If We Do Something?
China Fleet Statistics

• Number of Vehicles
  • Light Duty Vehicles: 27 million

• Drivers:
  • Regulation: Emissions, Euro-1, Incentive plans to stimulate sales of more fuel efficient vehicles.
  • Innovation: Very aggressive in developing pure electrics and hybrids.

• Trends
  • Combining a small gas powered strategy with a pure electric development strategy.
China Fleet Assumptions

• Assumptions:
  • Alternative powertrains/fuels include: CNG, Pure Electric, FlexFuel/Electric, Gas/CNG, Gas/CNG/Electric, Gas/LPG, Gas/Electric
Turnover of the Chinese Fleet

% of Fleet Turnover

# of Vehicles (000)

Sources: IHS GlobalInsight and Euromonitor

Automotive Analysis
Conclusions

• All countries can and will set their own path for oil independence

• Nearly all countries will be challenged to turnover their fleets by 2050

• Countries that take a more aggressive path, even if they have very large fleets, can have an effect

• Can countries keep up the momentum to complete the process of turning over their fleets?

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