Powertrain Strategies for the 21st Century: Advanced Powertrain and Infrastructure Challenges and Opportunities

“Focus on the Future”
UM Automotive Research Conferences

WELCOME!

Presentations available at: www.umtri.umich.edu/aad

Bruce M. Belzowski
Assistant Research Scientist
bbl@umich.edu
Automotive Analysis
University of Michigan
Transportation Research Institute

- Affiliate Program
  - Supporting Members
  - Research Partners

- Funding

- Research
  - Globalization
  - Powertrains
  - IT

- Conferences
  - 5 Annual Conferences

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Suppliers
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Upcoming UMTRI-AA Conferences

• September 11, 2013 (Wednesday): *The Business of IT: Transforming the Organization and the Vehicle.* Our 6th annual conference on how IT innovation is changing the auto industry. The first half of the conference will focus on how IT is changing automotive organizations, and the second half will focus on IT’s effect on the vehicle. This year we will focus on how external GPS devices are changing how manufacturers view their own GPS units.

• November 13, 2013 (Wednesday): *Inside China: Understanding the Current and Future Chinese Automotive Industry.* Our 6th annual conference that brings to the audience the knowledge of people who truly know the Chinese auto industry.
Upcoming UMTRI-AA Conferences

• **February 12, 2014 (Wednesday): Automotive Safety: How Will Connected and Autonomous Vehicles Affect Automotive Safety?** This conference is a follow-up to our 2011 Automotive Safety conference. Since that time, there has been major technological progress in the areas of connected and autonomous vehicles. This conference will review what has happened to date, and what experts see for the next 5-10 years.

• **April 16, 2014 (Wednesday): Inside Russia: Understanding the Current and Future Russian Automotive Industry.** Russia is the final BRIC market in our study of the globalization of the auto industry that is expected to be a growth market for automakers in the future. This conference will provide insight into how government, industry, and consumers view the current and future Russian automotive market.
Upcoming UMTRI-AA Conferences

- **July 23, 2014 (Wednesday): Powertrain Strategies for the 21st Century.** Our 6th annual conference that provides insight into how manufacturers and suppliers are managing their resources to meet the needs of consumer while meeting government requirements.

The UM Alumni Discount for 2013-2014

Alumni who sign up for all five conferences in the series, receive a $250 discount
Panelists (AM Session)

- **Brendan Jones**, Director, Electric Vehicle Infrastructure Strategy at Nissan North America

- **Justin Ward**, Advanced Powertrain Program Manager, Toyota Motor Engineering & Manufacturing North America

- **Mihai Dorobantu**, Director – Technology Planning & Government Affairs, Eaton Corporation
Panelists (PM Session)

- **Matt Sandstrom**, Clean Energy Coalition’s Mobility Division Manager and the U.S. Department of Energy’s Detroit Area Clean Cities Coordinator
- **Jon Coleman**, Fleet and Sustainability Manager, Ford Motor Company
- **Michael Delaney**, Manager, Strategic Initiatives, DTE Energy
Morning Schedule

- 9am
  - Bruce Belzowski
  - Brendan Jones
  - Justin Ward

- 10:40am-10:55am  Break

- 10:55am
  - Mihai Dorobantu

- 11:25am-Noon  AM Session Q&A

- Noon-1:30pm  Lunch
Afternoon Schedule

- 1:30pm
  - Matt Sandstrom
  - Jon Coleman
- 2:35pm-2:50pm Break
- 2:50pm
  - Michael Delaney
- 3:25pm-4:00pm PM Session Q&A
- 4:00pm Adjourn
Conference Questions

- What do powertrain experts think the distribution of different powertrains and fuel will be for the new vehicle fleet in 2016 and 2025?
- At what price per gallon will consumers make fuel economy a primary concern in a new vehicle purchase?
- For an electric vehicle to be a consumer’s only vehicle, what range and recharge time would be necessary.
Conference Questions

• What type of infrastructure will be needed for electric vehicles and plug-in hybrids in the near term and the long term?

• What growth should we expect in pure electric vehicles, plug-in hybrids, and fuel cell vehicles by 2025?

• What infrastructure improvements will be needed to support fuel cell vehicles?
Conference Questions

• How are suppliers and manufacturers working together to overcome the powertrain and infrastructure challenges?

• Compared to manufacturers, how much are suppliers contributing to the development of new powertrain and infrastructure technologies?

• What infrastructure projects are occurring locally and across the country to support new powertrain technologies?
Conference Questions

• What challenges does CNG face in becoming a mainstream vehicle fuel?
• How much can fleets contribute to the introduction and continuing growth of new powertrain technologies?
• What are the differences in charging stations?
• What will increase the growth of charging stations?
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Bruce M. Belzowski
Assistant Research Scientist
bbl@umich.edu
Powertrain Strategies for the 21st Century: 2013 Results

July 25, 2013

Bruce M. Belzowski
Assistant Research Scientist

Sponsored by:
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The Powertrain Strategies for the 21st Century Survey

- An survey of powertrain experts from automotive manufacturers, suppliers, government, NGOs, academia, and consulting
- Asks for their predictions for 2016, 2020, and 2025.
- Follows our similar surveys from 2006 and 2007
- Results are preliminary because we are still collecting data. For these analyses we have about 100 responses.
The Powertrain Strategies for the 21st Century Survey

• These results represent the thinking of powertrain experts at this point in time.

• These responses also represent the effects of relatively new, stiffer regulatory regimes imposed on the auto industry.
Survey Demographics

• Organizations:
  – Vehicle Manufacturer: 13%
  – Parts/Service Supplier: 52%
  – Other: 36%
    • Includes: Academic Research, Government, NGOs, and Consultants

• Titles:
  – CEO, VP, and President: 30%
  – Chief Engineer, CTO, and Director: 27%
  – Managers: 24%
  – Engineers or Technicians: 10%
  – Researchers or Scientists: 9%
US Regulatory Regimes

• **Fuel Economy:**
  – Regulated by the National Highway Safety Administration and the Environmental Protection Agency through the Corporate Average Fuel Economy (CAFE) regulation.
    • Regulatory goals include:
      • 2016: 34.1 miles per gallon
      • 2020: 38.9 miles per gallon
      • 2025: 54.5 miles per gallon

• **Emissions:**
  – Regulated by the Environmental Protection Agency
    • 2016: 263 CO2 grams per mile
    • 2020: 250 CO2 grams per mile
    • 2025: 163 CO2 grams per mile
Powertrain Strategies for the 21st Century

• Topics covered in the survey for 2016 and 2025:
  • Successful ways of reducing dependence on foreign oil
  • Likelihood of foreign and domestic manufacturers meeting CAFE and emissions regulations
    • Future fuel prices
    • Consumer fuel price sensitivity
  • Future market share of different fuels
  • Future market share of different powerplants
  • Consumer willingness to spend for advanced powertrains
  • Distribution of battery technologies
  • Preferred consumer electric vehicle range and recharge time
Powertrain Strategies for the 21st Century

- Other topics covered in the survey:
  - Ways of improving fuel economy
  - How much weight can be reduced in vehicles?
  - Engine design: # of cylinders, % of superchargers and turbochargers, diesel component penetration
  - Type of transmissions and drivetrains
  - Challenges to increasing penetration of diesel, CNG, fuel cell, and electric vehicles
  - Infrastructure challenges for electric vehicles
  - Cost issues for powertrain electronics
  - Engineering integration and human resources issues
  - Company level powertrain development challenges