



**ALTERNATE FUEL REFUSE AND RECYCLING TRUCKS**  
**Leading the Way to Energy Independence and a Cleaner Environment**

**Rutgers University – Busch Campus Center  
Piscataway, NJ**

*Co-Sponsored by:*  
**Rutgers University NJ Agricultural Experiment Station**

**Rutgers EcoComplex**

**Energy Vision**

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**January 24, 2008**

**- AGENDA -**

**8:00 – 8:30am      Registration, Continental Breakfast**

**8:30 – 8:35am      Welcoming Remarks**

David Specca, *Acting Director*  
Rutgers Eco-Complex

Joanna D. Underwood, *President*  
Energy Vision

**8:40 – 9:00am      Refueling the US: The National Challenge and Local Opportunities**

Dennis A Smith, *Director*  
National Clean Cities Program, US Department of Energy

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**9:00 – 10:00am      Impetus for a Shift to Cleaner Renewable Transportation Fuels**

**Panel Discussion**

Moderator: Joanna D. Underwood, *Chair*, Energy Vision

**The Challenge of Greenhouse Gases and Climate Change for: The State's Energy Master Plan**

Representative  
Office of Economic Growth, Office of the Governor

**Impact of Vehicle Emissions on NJ's Air Quality and DEP's Emission Reduction Program**

Nancy Wittenberg, *Assistant Commissioner*  
Environmental Regulation, NJ Department of Environmental Protection

**Advancing Biofuel Production with Landfill Gas**

Swarupa Ganguli, *Regional Manager*  
US Environmental Protection Agency, Landfill Methane Outreach Program

**California Greenhouse Gas/Vehicle Pollution Challenge:  
How the State is Promoting Innovations**

Dean Saito, *Manager*  
South Coast Air Quality Management District, California

**10:00 – 10:15am      Break**

**10:15 – 12:00pm      Natural Gas Refuse Trucks: An Opportunity Here and Now**

**Panel Discussion – Industry Trends**

Moderator: Joanna D. Underwood, *Chair*, Energy Vision

**Bringing the First 100% Natural Gas Refuse Fleet to the East Coast:  
How and Why the Program was Set Up and the Ingredients for its Success**

Russell K. Barnett, *Director*  
Water and Environmental Programs, Smithtown

**The Engine/Energy Transition to Tomorrow**

Dave Lynch, *Regional Manager*  
Cummins Westport

**Putting Natural Gas Trucks to Work: What Customers Understand - and are Just Learning**

Greg R. Hallahan, *Vice President*  
Hallahan Truck Sales

**Ensuring the Success of Natural Gas Refuse Truck Programs:**

**Refueling, Funding, and Other Support that Industry Now Provides to Fleets and Municipalities**

Ray Burke, *Vice President*  
Business Development, Clean Energy

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**12:00 – 1:30pm**

**Lunch**

**China, India and the Swelling Global Markets for Alternative Fuels**

David R. Demers, *CEO*

Westport Innovations

**1:30 – 3:00pm**

**Fuels of the Future for Heavy Duty Vehicle Fleets**

**Panel Discussion –**

**Biomethane on the Horizon: A Clean, Renewable Natural Gas for Heavy Duty Vehicle Fleets**

Moderator: Robert W. Simkins, *Director*, Burlington County Resource Recovery Complex

**An Introduction to Biomethane: What it is and How it is Produced**

Dr. Peter Strom, *Professor*

Department of Environmental Sciences, Rutgers University

**Refining Bio-gas into Biomethane for Use as a Renewable Clean Fuel for Heavy Duty Vehicles**

William Brown, *President*

Acricion Technologies

**Mack Truck's Experience and Plans for Use of Biomethane in California and New Jersey Fleets**

Bruce M. Smackey, PhD., *Technology Commercialization*

Mack Truck and Volvo Group

**Expanding Use of Biomethane as a Vehicle Fuel in Europe and Beyond:  
The Policies Driving This Trend**

Peter Boisen, *Chairman*

European Natural Gas Vehicle Association (ENGVA)

Consultant to the Swedish NGV Industry (*biomethane focus*)

**3:00 – 3:30pm**

**Wrap-Up**

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## **- A BRIEF OVERVIEW -**

This discussion deals with the oil to hydrogen transition, with natural gas and biomethane as the transition fuels (although biomethane, unlike deplete-able natural gas, remains a renewable resource.)

There are more than 1,500 natural gas refuse and recycling trucks on US roadways today. (Note: EV research in 2007 suggests this number is now above 2,000) More than 1,200 of them are operating in California and a small number are in Texas, Massachusetts and New York State. The fact that the number of these trucks doubled in just the last two and a half years and the number of communities using them did as well (26 to 57) reflects the growing enthusiastic acceptance being seen of this new technology. It is time to bring the benefits of this new fuel/technology combination to New Jersey and to government and business leaders across the region.

Refuse trucks that are powered by natural gas not only rely on a fuel that is much cleaner and more domestically secure than diesel but these trucks are also quieter, improving the quality of life in the communities they serve. The trucks directly benefit sanitation workers as well. The workers driving or maintaining natural gas trucks are spared being subjected to the toxic fumes emitted by diesel trucks and to noise that has been known to reach levels that can damage their hearing.

Refuse trucks taking advantage of biomethane, also a clean gaseous fuel, are not only clean and quiet but they put to productive use the bio gases that would otherwise be generated by landfills and other organic waste sites and would contribute to the stream of greenhouse gases that are now causing climate change. Extracting and refining bio-gases into biomethane fuel turns expensive and odor-emitting landfill sites into generators of a clean, economic locally produced fuel that can be conveniently used in a closed loop to power the fleets of refuse trucks that come to the sites to deposit their waste loads. In urban areas where there are no active landfills, anaerobic digestion technology widely employed in Europe and Asia, can locally produce biogas for biomethane production. Biomethane can also be used alone or combined with natural gas to power many other vehicles: transit buses, school buses, light duty van and taxi or other fleets.

Being able to take economic advantage of New Jersey landfills, wastewater treatment plants and dedicated anaerobic digesters for fuel production might encourage counties to retain wastes that are currently hauled hundreds of miles out of state to disposal sites, at great economic and environmental cost, and instead to process those wastes locally into methane fuel and saleable CO<sub>2</sub>.

Powering heavy duty fleets with natural gas and biomethane means cleaner air and a more reliable, less expensive fuel today. In the longer term, the shift requires refinement of systems and materials that can store, deliver and make possible the operation of vehicles using a gas under pressure -- systems and materials that can be adapted to use of hydrogen tomorrow. Refueling stations for natural gas vehicles, with the addition of already commercial equipment, will be able to extract hydrogen from the natural gas (which is comprised of four hydrogen atoms and just one carbon atom) and power vehicles using an even cleaner fuel blend of about 80% natural gas and 20% hydrogen or hydrogen alone.

Hydrogen has been made from natural gas for the chemical industry and the US space program for more than 40 years. It is the likely to remain the major feedstock for producing hydrogen until economic ways exist to extract hydrogen from water using renewable energy.