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Durham, NC 2008 Hydrogen Road Tour

Speaker Panel Event

Forum on Smart Grid and Hydrogen Economies: Technologies, Business and Systems Thinking

How will we deploy energy and climate security solutions as practical technology and public-private economic activities? How can we best deploy Smart Grid and hydrogen technologies—efficiently linked to renewable energy—with speed, maintain quality, and yet rapidly effect the broadest market space?

Forum on Smart Grid and Hydrogen Economies

Friday, August 15
Duke University

Time: 12:15 pm - 1:25 pm

Location: Biological Science Bldg., Rm 111

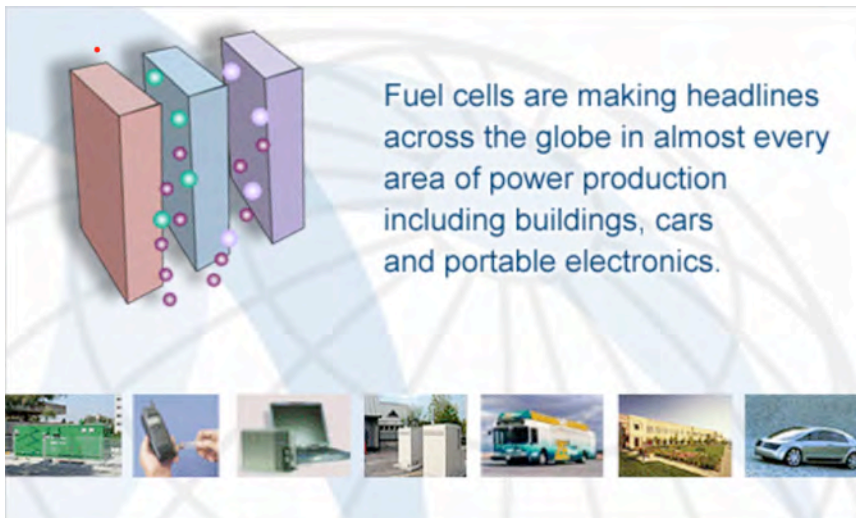
Followed by H2RT Stop #16: Durham, NC

Duke University Quad

Friday, August 15: 1:30 – 3:00 Pm

Objective

Hydrogen Road Tour (H2RT) is a two-week series of media, VIP and public events throughout the country that demonstrate progress and commitment toward commercially viable, emissions-free hydrogen vehicles and the associated infrastructure. Passenger vehicles, transit buses and stationary plants powered by hydrogen will help promote America's energy independence, reduce greenhouse gas emissions, and improve air quality while increasing our national security and creating new jobs.



Source: National Fuel Cell Research Center

Carolina CleanTech stakeholders, will be presenting information to the public, decision makers, and media concerning early examples of fuel cell and hydrogen infrastructure, their efficiencies and capabilities. Currently, the State of North Carolina has no significant fuel cell or hydrogen infrastructure initiatives. This speaker panel will discuss scenarios, projects in development, and technology commercialization examples where Smart Grid, fuel cell and hydrogen technologies may appear for North Carolina. The national and global community level possibilities and challenges for Triple Bottom Line applications of these key CleanTech systems will be discussed.

[For panelists, see Page 2]



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Moderator

Cynthia Moseley, Alternative Fuels Program Manager

North Carolina State Energy Office

The Panel

Lee Mazzocchi, VP Distribution

Progress Energy

Lee is the program manager for Progress Energy's Smart Grid initiatives. Lee Mazzocchi is Vice President of Distribution for Progress Energy Carolinas. In this position, he is responsible for Progress Energy's distribution system serving 1.4 million customers in the Carolinas. Mazzocchi has been with Progress Energy and CP&L since 1990, and has served in a variety of engineering and leadership positions in distribution and transmission throughout the Carolinas. He has a bachelor's degree in civil engineering from N.C. State University.

Smart Grid is a transformed electricity transmission and distribution network or "grid" that uses robust two-way communications, advanced sensors, and distributed computers to improve the efficiency, reliability and safety of power delivery and use. Smart Grid may best be defined as using communications and modern computing to upgrade the current electric power grid so that it can operate more efficiently, reliably and safely. Such an upgrade is equivalent to bringing the power of the Internet to the transmission, distribution and use of electricity - it will save consumers money and reduce CO2 emissions. Lee will discuss the future of Smart Grid and Smart Grid projects currently underway in North Carolina.

This evolving intelligent power distribution network includes the possibility to reduce power consumption at the client side during peak hours (Demand Side Management), facilitating grid connection of distributed generation power (with solar thermal and photovoltaic arrays, small wind turbines, micro hydro, or even combined heat power generators in buildings), grid energy storage for distributed generation load balancing, and improved reliability against many different component failure scenarios (in contrast to today's catastrophic widespread power grid cascading failures).

Dr. Ralph "Chip" Saunders, Principal

Strategic Research Group

Dr. Saunders participated in early climate change research and is a technology commercialization and system dynamics expert. He has been Senior Staff Scientist with Science Application International Corporation, an analyst RAND Corporation's Management Science Division, directed studies for the American Gas Association, acted as a Congressional energy legislation expert and has space vehicle expertise. Dr. Saunders' publications and presentations include: "Combustion of Alternative Fuels Study (CAFS)", "Conservation Technology Research and Development Commercialization



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Strategy/Methodology”, “Gas Utility Role in Urban Development”, “Energy and Commerce Contract Opportunities in Chicago”, and “Scenario Based New Car Planning”.

Dr. Saunders educational accomplishments are as follows: Undergraduate: Howard University – B.S. Mechanical Engineering/ Energy Conversion Systems inclusive of Nuclear Engineering. Graduate: University of Massachusetts at Amherst – Masters courses, Internal Combustion Engine Systems inclusive of Rocket and Jet Engines. UCLA – M.A., Urban Planning Transportation Systems. MIT – S.M., Management; Corporate Technology Strategy. Old Dominion University – Ph.D., Engineering Management. Additional doctoral studies (three years): University of Virginia – Systems Engineering and Darden Technology Innovation Management course work.

Bob Boyd, Manager, Project Development: Hydrogen Solutions

Linde North America

The Linde has a focus on localized hydrogen refueling unit (H2RU) infrastructure for bus fleets, utility vehicles or the passenger commercial demonstration fleets. Linde offers fueling solutions for either onboard storage of liquid or compressed storage system hydrogen fueling at 25, 35, 50 or 70 megapascals. Linde has stations that can support small fleets or large fleets, from 10 kilograms (kg)/week to 1000kg/day, or more. Linde is also, and perhaps foremost, a supplier of large hydrogen production systems that can transform almost any kind of energy (i.e. solar, wind, geothermal, tidal, biomass, coal) into the only truly zero emission fuel on a tank to wheels basis. There are numerous existing ways to make hydrogen and plenty of emerging hydrogen production systems still to be discovered. The near-zero greenhouse gas (GHG) impact of hydrogen use and distribution as a transportation fuel can not be matched by any other fuel production and combustion loop system.

Mr. Boyd has 31 years of experience on 3 continents with the company that has become the Linde of today. Mr. Boyd started in the AIRCO Central Research Lab in 1977 working closely with hydrogen for high temperature metallurgical processing systems. AIRCO merged with British Oxygen and later acquired by Linde in 2006. Over his career, Mr. Boyd has developed expertise in high temperature combustion systems related to NOX mitigation, cryogenic processing, high purity gases for semiconductor manufacturing, and high-pressure systems. Since 2001, Mr. Boyd has been developing H2RU stations and participated in the development of national and global standards for the fueling station infrastructure that will be necessary to support the emerging global hydrogen vehicle fleet.

Dick Dell, Executive Director

Advanced Vehicle Research Center

Dick will discuss the AVRC hydrogen fueling station program and efforts to deploy the first hydrogen stations in North Carolina. Dick Dell served in the US Air Force, 1963 to 1967. As an electronics specialist, he worked at Cape Canaveral on the Saturn Five program. In 1968 he joined IBM and held positions including Field Engineer in Baltimore, Instructor in New York, National Account Manager in Washington DC, Strategic Planning Manager and large project management for IBM Headquarters. Mr. Dell left IBM in 1989 to do international business development working in Egypt, Saudi Arabia and Kuwait, Europe and Eastern Europe, including Slovakia. He proposed the Advanced Vehicle Research Center (AVRC) to North Carolina in 2001 and has developed AVRC since that time.



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Dr. Richard G. Newell, Associate Professor of Energy and Environmental Economics Nicholas School of the Environment, Duke University

Richard G. Newell is the Gendell Associate Professor of Energy and Environmental Economics at the Nicholas School of the Environment, Duke University. He is a Research Associate of the National Bureau of Economic Research and a University Fellow of Resources for the Future, where he was previously a Senior Fellow. He has served as the Senior Economist for energy and environment on the President's Council of Economic Advisers, where he advised on policy issues ranging from automobile fuel economy and renewable fuels to management of the Strategic Petroleum Reserve. He currently serves on the boards of the Journal of Environmental Economics and Management, the journal Energy Economics, the Association of Environmental and Resource Economists, and the Automotive X-Prize. He has also been a member of expert committees including the National Academy of Sciences (NAS) committee on Energy R&D, NAS committee on Innovation Inducement Prizes, and NAS committee on Energy Efficiency, the 2007 National Petroleum Council Global Oil and Gas Study, and the American Physical Society study of energy efficiency. He has served as an independent expert reviewer and advisor for many governmental, non-governmental, international, and private institutions including the OECD, Intergovernmental Panel on Climate Change, World Bank, National Commission on Energy Policy, the U.S. Environmental Protection Agency, the U.S. Department of Energy, the U.S. Energy Information Administration, the U.S. National Science Foundation, and others.

Professor Newell's research centers on the economics of markets and policies for the environment, energy, and related technologies, particularly the cost and effectiveness of alternatives for reducing greenhouse gas emissions and achieving other environmental and energy goals. Economic analysis of market-based policies, technology policies, and the influence of markets and policy on technology innovation and adoption are important themes in his work. He has published in major economics journals, including the Quarterly Journal of Economics, the Journal of Environmental Economics and Management, the Journal of Industrial Economics, and the American Journal of Agricultural Economics, and has contributed articles for widely disseminated publications such as "Technological Change and the Environment" for the Handbook of Environmental Economics and "Economics of Energy Efficiency" for the Encyclopedia of Energy. He holds a Ph.D. from Harvard University, Master in Public Affairs (M.P.A.) from Princeton's Woodrow Wilson School of Public and International Affairs, and a B.S. and B.A. from Rutgers University.



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Richard "Rich" E. Cregar, Instructor

Wake Tech Community College, Automotive Systems Technology

Rich does fuel cell workshops and will speak about hydrogen fuel cell vehicles and plug-in hybrids supporting Smart Grid. Prior to joining Wake Technical Community College, Rich Cregar was the Resident Instructor and Research Associate at the National Alternative Fuels Training Laboratory at West Virginia University. Wake Tech is the National Alternative Fuels Training Consortium (NAFTC) training center in NC. Rich has authored numerous articles on hybrid and renewable technologies for national on-line publications and helped to develop an award winning Biodiesel curriculum. He continues to deliver lectures on Hybrid Vehicle Technology and Biodiesel production throughout the United States.

In a career spanning more than 40 years, Mr. Cregar has served as a Training Manager and Instructor for Carquest Technical Institute, Team Leader and Site Manager for Universal Technical Institute in Houston, TX, and Allentown, PA. and as Operations Manager for the Bosch Technical Hotline in St. Paul. Mr. Cregar is a graduate of the Diesel Technology Academy (SAE) and holds the following certifications from the Institute for Automotive Service Excellence (ASE): Master Automotive Technician, (CMAT), Advanced Level Specialist in Automobile Advanced Engine Performance, (L1), and Alternative Fuels Technician (F1). Mr. Cregar attended Culver Academies (Culver, Indiana), Cornell College (Mt. Vernon, Iowa), and the University of Iowa. He is a member of the Society of Automotive Engineers (SAE), the North American Council of Automotive Teachers (NACAT), the Environmental Educators of North Carolina and the NC Community College Faculty Association. He also serves on the Vehicle Fire Safety Committee at SAE.

Mr. Cregar is a Technical Consultant to Miles Electric Vehicles, LLC. In this capacity he writes diagnostic and repair manuals for Electric Vehicle Technicians. Mr. Cregar also conducts workshops on Fuel Cell Powered vehicles and Teaching Fuel Cell Technology. Mr. Cregar serves on the Johnston County Board of Adjustment and represents the County on the NCDOT Upper Coastal Plain Regional Planning Commission. He sings Tenor as a member of The Johnston County Chorale. Married since 1974, the Cregars reside in Clayton, NC. They have 3 grown daughters.

Grant Millin, President

The PublicGen Companies and Public Fuel Cell

Grant is the president of The PublicGen Companies, a startup CleanTech pre-sales, development stage project management, and technical communications firm focused on Smart Grid and hydrogen infrastructure systems. He will discuss fuel cell buses, fuel cell distributed energy, opportunity fuels and other applications of fuel cell and hydrogen energy applications occurring today. Stationary fuel cells and efficient use of natural gas and waste-to-energy systems for hydrogen production serve as additional supports for grid modernization.

The PublicGen Companies consist of PublicGen LLC and EarthSync LLC. PublicGen is dedicated to climate change technology projects. The EarthSync Energy Modernization and Climate Change Technology Hub is a news and networking site. Both operations are designed to foster the deployment of energy modernization and climate change technology. Grant has a B.A. interdisciplinary studies (independent) degree from UNC Asheville in *Sustainability and Security Studies*. He also holds a Master



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of Entrepreneurship from Western Carolina University; and is completing his Master of Project Management studies, also at WCU. Grant acted as the North Carolina project manager for the U.S. DOT *Hydrogen Road Tour*.

Anne Tazewell, Alternative Fuels Program Manager

NC Solar Center

Anne Tazewell currently works as the Alternative Fuels Program Manager at the Solar Center, where she helps coordinate statewide efforts to increase the use of advanced transportation technologies and alternative fuels, such as biodiesel, ethanol, natural gas, propane and electricity. Anne provides outreach to fleet managers, elected officials and other decision makers about transportation fuel alternatives. She is also the Policy Chair of Triangle Clean Cities - a coalition of public and private partners sponsored by the U.S. Department of Energy that encourages the use of alternative fuels as a means to reduce our dependency on imported petroleum and improve air quality. In 2006, Anne is launching a three-year \$2 million Clean Fuel Advanced Technology (CFAT) project that will provide emission reducing grants in eligible North Carolina counties.

Prior to joining the Solar Center in July 2004, Anne worked at Triangle J Council of Governments as a Clean Cities Coordinator for four years. There she was responsible for securing over \$500,000 in grant programs to provide incentives to expand the use of alternative fuels in the Triangle area. She also managed public education efforts that included conferences and workshops, radio and television advertising, website and newsletter development, as well as an educational video.

Anne graduated from New College of the University of South Florida with a B.A. in Environmental Studies. She has also worked professionally as a restaurant owner, textile designer and resource conservation consultant.

The Tour

Several hydrogen fuel cell passenger vehicles will stop in Durham, NC Friday 1:30 – 3:00 Pm at Duke University: Duke Chapel and Quad and will then travel to Charlotte. Members of the public, decision makers and media are welcome to attend these events. On Saturday at 8:00 Am a NC H2RT media event will display these vehicles at UNC Charlotte's Grigg Hall: UNCC Motorsports and Automotive Engineering campus. Events are in productions that will describe the technology; provide options for fuel cell hydrogen infrastructure including waste-to-energy opportunity fuels and Smart Grid; and discuss the impacts of hydrogen technologies in addressing climate change and security. Stationary fuel cells and hydrogen production can work well with renewable energy systems like solar and wind.

The Hydrogen Road Tour includes vehicles from automakers that are traveling across the country. The Tour will make 33 stops in 18 states and the District of Columbia in 13 days. Stops will be short; just an hour or two. At each stop, the Tour will provide media, invited VIPs and the public with a hands-on experience with the vehicles. The Tour will highlight hydrogen-related state programs and commerce.

Durham, NC H2RT Event

Friday, August 15

1:30 pm-3:00 pm

Location: Duke University, Quad and Chapel

Durham NC H2RT panelist event summary, FINAL August 3, 2008

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There will be an afternoon static display for the public and invited guests to look under the hoods and speak to the vehicle engineers at Duke's Chapel and Quad. Media and VIPs are invited to drive the vehicles to the next stop in Charlotte.

Although a few areas have hydrogen fueling stations, most do not. Therefore, H2RT is bringing mobile hydrogen stations with it. Guests will have the opportunity to see how safe, easy and clean it is to fill a vehicle with hydrogen and learn about its properties as an energy carrier.

Additional Information

For additional information about the North Carolina events and fuel cell/hydrogen technologies, please visit: EarthSyncHub.com/NCH2RT .

...or visit the Hydrogen Education Foundation's site:

<http://www.h2andyou.org/>

DOE Hydrogen, Fuel Cells & Infrastructure Technologies Program:

<http://www1.eere.energy.gov/hydrogenandfuelcells/about.html>

California Fuel Cell Partnership:

http://cafcp.org/fuel-vehl_cars.html and http://cafcp.org/fuel-vehl_buses.html

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