

Governor's Energy Policy Task Force

Meeting Summary

19 September, 2008

Franklin, Tennessee

Introduction

Governor Bredesen began the meeting and turned over the welcome to Scott Becker and Rob Trenum from Nissan, the facility in which the meeting took place. Scott and Rob discussed the energy efficient and environmentally beneficial features of the Nissan building. In particular, the lighting adjusts automatically based on natural light levels. The design also includes efficient HVAC, a water recycling system, and a green roof.

Governor asked about payback on lighting system: payback is relatively short, but specific numbers to be provided later. Point was made that utility bills are decreasing already as the operation of building is being fine-tuned.

Governor introduced the topic of transportation, which he indicated would be discussed head-on at this Task Force meeting. The agenda and presentations all address transportation energy issues. In addition to Nissan, Saturn and Volkswagen are building facilities in TN, which situates TN nicely to be a part of the expanding clean vehicle sector. The Governor discussed plug-in hybrids and the partnership between Nissan and TVA to explore the deployment of zero-emission vehicles, with the support of the state to assist with infrastructure.

See <http://www.tennesseeanytime.org/energy/> for webcast of this meeting and powerpoint presentations.

Joe Fergusson, Chattanooga Enterprise Center

- About 12 initiatives for economic development with a focus on job creation via hi-tech
- Electric transportation is a high priority and CEC believes electric transportation is on the cusp of significant expansion
- Introduced Tom Reddoch as authority on electric vehicles

Tom Reddoch, Electric Power Research Institute

- EPRI brings new technology to the forefront
 - Generally takes 30 years to bring new technology into the market place (e.g. wind and PV)
- Electric transportation can significantly reduce gasoline consumption and dramatically reduce the amount of money spent on gasoline
- Hybrids, plug-in hybrids, and all electric vehicles are three types of electric vehicles
 - Hybrids reduce gasoline consumption by 1/3
 - Very efficient gasoline engine
 - Brake system that captures energy
 - Smart features (car shuts off when not moving)

- Plug-in hybrids reduce gasoline consumption by 2/3
 - Opportunities for all three types of vehicles
- EPRI metrics
 - How much energy does a device use?
 - How much capacity required to power it?
 - What is its CO2 footprint?
- 20 mile battery will reduce gasoline consumption by 2/3
 - Reductions in CO2 in electricity production will reduce CO2 associated with transportation, assuming electric transportation
 - About a 38% reduction in CO2, based on current electricity generation options
 - Changing how electricity is generated can further reduce CO2 by 53% to 47% by 2030
- \$4 gasoline makes net present value for added cost for hybrid vehicle return two-fold (economics make good sense)
- Need auto industry and electric generation industry to communicate
 - Need auto industry to make vehicles
 - Need electric industry to develop infrastructure
- Practical, widespread electric transportation should be a reality in TN by 2010, in line with the average 30 year period required to bring new technologies to market for implementation
 - Nemesis is the battery; making good progress but it is still the weak link
 - Need to start developing the infrastructure so it is there when the cars are ready
 - In particular charging options for homes/residences
 - Charging stations are key
 - Who will host/maintain?
 - Where will they be?
 - Parking garages with Solar PV?
- The future is the smart grid; powerful enabling feature (will facilitate a lot of good things)
- EPRI has a program in conjunction with DOE, Ford, and Southern California Edison to launch 20 Escape hybrids; and a similar program with GM
- Conclusions for TN
 - Need to figure out how to convince auto industry to build these vehicles in TN
 - Create jobs around support for electric vehicles
 - Need to build infrastructure to support vehicles

Questions

- *Two policy components to move to electric vehicles: more efficient use of energy and change of source of energy, but how much more electricity will be required to support hybrid/electric vehicles? What will be the source? How have the costs/benefits been weighed? Annual electricity for 20 mile plug-in hybrid is between 1800kWh and 3000kWh; typical TN home uses 14,000kWh annually, HVAC uses about same as a plug-in hybrid annually. 70% penetration of electric vehicles would increase electricity usage by 6%.*

- *If battery is weak link, update on battery research? How does difference between lithium ion and nickel metal hydride impact options?* Lithium ion will make the batteries that are best for distance (good energy output relative to weight of battery), and will be the type of battery used for electric vehicles. It is a developing technology and improvements are still being made. Shorter, compressed charging times can be bad for lithium ion batteries. Need steady manufacturing stream to ensure consistent quality and performance (repeatability of cell formation within battery).
- *How does more battery distance (more than 20 miles) continue to impact gasoline use?* Beyond 20 miles the return on investment is not very good; it is a lot more expensive to create a battery beyond 20 and it will not reduce gasoline use by a relative percentage (assuming battery used in plug-in hybrid rather than all electric). 78% of car trips are less than 20 miles, so 20 mile battery captures a lot of car trips.
- *Role of local and state government in current auto industry programs EPRI is working on, in terms of infrastructure development? Is there a role for the state in policy development and investment in infrastructure?* EPRI is looking into infrastructure development, but has not really reached out to the states. Public Utility Commissions are looking for favorable electric rates to facilitate adoption, but this is not really an issue in the TVA service area.
- *Peak electricity is more expensive and there is generation congestion at peak times, so how critical is it for TN to introduce real-time meters and other programs for time differentiated pricing?* Bad signals lead to bad behavior; differentiated pricing is necessary to get people to change habits and share in the responsibility of using electricity efficiently. Smart grid will also help with rate visibility and options to mitigate peak demand.
- *What is prognosis for smart grid that includes electric cars that can feed electricity back into the grid?* Storage is good and necessary, and using the smart grid in the future will allow for a lot of beneficial activities and good management of resources.
- *Governor question: A role for government? Will there be standards for batteries and communications via smart grid?* There will be a common plug for electric vehicles. States lead on codes and standards, definite role.
- *Governor: how to use codes at a state level? Who is responsible for what? Who is developing the protocols?* Uniform practices for charging stations, how the transaction is effected (credit card or on the electric bill). EPRI is working on protocols, but looks for assistance from other parties, including the state.

Dominique Thormann, Nissan

- Nissan looks at CO2 emissions, other emissions, and recycling.
- May get 20-25% improvement in emissions from internal combustion engines, but need to get to 70% according to IPCC
- Can get around 40% emissions reduction using hybrids
- Need to go to all electric vehicles, using renewable electricity to recharge, to achieve the 70% reduction
- Lithium ion batteries provide solutions for weight and output (driving range and power for other electric features in the car)
- First launch in 2010 with one all electric vehicle, then a wider launch with more all electric vehicle options around 2012
- Created Automotive Electric Supply Company
 - Joint venture between Nissan and NEC
 - Supports hardware and battery manufacturing and development
- Looking at a driving range of 100 miles at first launch, because 90% of daily trips fall within that range
- Looking to eventually match current driving range of internal combustion vehicles, and match driving performance and features

Questions

- *Environmental benefits of all electric come from using renewable electricity; does Nissan have an official position on renewables mandates, and what is the role of a vehicle manufacturer in encouraging the deployment of renewables? As a manufacturer responsibility is to develop a product that has the potential to reduce emissions, provide the options and create the opportunities; but it is beyond the mandate of a car company to determine where the electricity comes from.*
- *What are the major advantages of all electric vs. plug-in? What about battery swapping vs. charging stations? All electric is a zero emissions vehicle (no internal combustion engine), hybrid still uses gas so Nissan is trying to skip intermediate step and get directly to final goal. Looking into swapping vs. charging options through various current partnerships around the globe, perhaps using different options in different locations.*
- *Governor: Nissan going to market with 100 mile car, how is this possible vs. the 20 mile options discussed by EPRI and 40 by GM? Nissan wants to get emissions to zero as quickly as possible, so that is the company's focus and primary goal. Nissan has developed a battery technology that makes this possible using lithium ion batteries.*

****10 minute break occurred at this point****

Governor Bredesen introduced Genera Energy and expressed the state's support for cellulosic ethanol as a beneficial renewable fuel and a financial boost for farmers in TN.

Paula Flowers, Genera Energy, LLC

- Ethanol is a good alternative transportation fuel, but there is debate around what feedstock to use to create ethanol
- Cellulosic ethanol provides a better ratio of energy-out vs. energy-in than corn and grain ethanol
- Cellulosic ethanol is possible, but the current issue is making cellulosic ethanol commercially (economically) viable
 - Goal to make it commercially viable by 2012
- Federal mandate via Renewable Fuels Standards is driving commercialization of cellulosic ethanol technology
- Need to substantially ramp up cellulosic production to meet RFS requirement
- TN is leading the way in this effort
 - Both in the field and in conversion technology, and continuing to pumping stations
 - A lot of state support to develop cellulosic ethanol in TN
 - Partnerships between the state, state universities resources, and private enterprises
 - Developing crops to be dedicated inputs for energy, including pre-commercial production of fuel derived from switchgrass
 - Goal is commercial production of crops and conversion to fuel by 2012
- Challenge in the conversion process is the step to derive sugar from the feedstock
- A key issue is proximity of conversion facility to field where crop is grown
 - Provides competitive advantage to TN
- Switchgrass is native to TN
 - Perennial plant that uses fraction of water and fertilizer compared to other crops
 - Can already get 10 tons/acre in TN
 - UT working to refine/optimize in-field production of switchgrass
- Chicken and egg situation: need to plant and cultivate sufficient amount of switchgrass now so that it is ready to harvest when conversion facilities are ready to accept it, but there is not sufficient switchgrass currently to supply commercial production
- TN has enormous potential for switchgrass production
 - Grows well in existing soil conditions
 - Looking at land that is not currently being used for a better purpose (not interfering with food production)
- Collaboration with Dupont Dinasco to build a pilot conversion facility in TN;
 - Experts on industrial enzymes, which are needed to breakdown feedstocks into sugar
 - Also looking into other possibilities, such as switchgrass pelletization to co-fire for energy production
 - Launch facility using corncobs, but it will be compatible with switchgrass and will transition quickly to all switchgrass.
 - Get pilot facility up in 2009 and launch commercial facility in 2012

Questions

- *Why cellulosic produces less carbon?* Energy inputs into producing cellulosic ethanol are less, so the ratio of energy in vs. energy out is much better and closer to ratio associated with fossil fuels (7 or 8 for cellulosic ethanol vs. 16 for fossil fuel)
- *What is the process for determining the type of biomass used as energy feedstock; why not use wood type biomass?* There will not be one national feedstock; feedstocks may vary by region based on availability and ease of production. It's hard to convert the switchgrass to sugar, and wood is even harder to convert.
- *Have you looked at the environmental issues associated with using different feedstocks?* Yes, UT has looked into environmental issues and settled on switchgrass as the best option in TN based on several metrics, including environmental impact.
- *Governor comment:* switchgrass will make small farms much more resilient

Governor introduced the public transportation topic. Maintaining investment is necessary, although expensive. Addressing public transportation will be an important part of the energy plan and the Governor is interested in knowing what TN can realistically do to incorporate public transit in the Task Force plans.

Greg Adkins, TPTA

- Broad-based public transportation coverage throughout TN; exists in every county in the state
- Standard cost increases (fuel and other operating costs) have impacted public transit
- Increases in demand have forced some operators to increase prices and/or cut services
- Strong demand in TN for public transit, but displeasure with current services
 - Want more types of services
 - Want services along highways
 - Want more park and ride
- Use of public transit reduces general demand for oil and reduces road congestion
- Additional benefits of public transit:
 - Promotes density around transit hubs (transit oriented development) and facilitates smart growth
 - Reduces air pollution, relative to individual cars
 - Creates construction and operation/maintenance jobs (green jobs)
- Recommendations for state action:
 - Reduce VMT via incentives to encourage use of existing public transit among state employees

- Legal priority for public transit operators to have access to fuel in times of shortages
- Need to increase financial support for public transit from the state via a dedicated revenue source
 - Dedicated support from the state can be used to leverage federal support
- Support efforts for local governments to opt into regional public transit plans and support local government efforts to gain access to federal funds
- Provide state funding for green technology vehicle options, such as hybrid buses that will use less fossil fuels

Questions

- *Can the state card be changed so it can be swiped in the public transit system; convenience is important.* Card is being updated to be able to be used in this way.

Quick WG updates

LBE Update:

- Meeting and coordinating with F&A, and yesterday met with approximately 50 building facilities managers to discuss the LBE recommendations accepted by the Task Force/Governor and gather additional input.
- Meeting later the same day with the executive committee of the building council.
- Also still meeting with stakeholders and public to gather feedback.

Residential Energy Update:

Mike Vandenberg, Governor's Task Force on Energy Policy; Jonathan Raab, Raab Associates & MIT

- Mike and Jonathan presented update on the recommendations still under consideration by the Residential Work Group
- Looking to get feedback on whether to develop targets, what those targets are, and what they will be based upon
 - Separate targets for buildings and transportation
 - Also need to determine who will be responsible for tracking and how the data will be tracked
- Buildings
 - Information & Education
 - State-lead public information campaign and residential energy efficiency options
 - Promote TVA and distributor efficiency and renewable programs
 - Education to assist with implementing building codes in force beginning 2009
 - Develop a labeling system for houses, starting with new construction and moving to retrofits and resale
 - Incentives such as:
 - Tax breaks

- State grant or loan program to support residential energy audits and the purchase of energy efficient products
 - Energy Efficiency mortgages
 - Gas utility efficiency programs (similar to those recommended for TVA)
 - Targeted efficiency programs for low-income customers and renters
 - Regulatory:
 - Have building codes (residential and commercial) that update as automatically as possible on a regular schedule, and ensure enforcement
 - Develop appliance standards
 - Need further evaluation to develop standards that are not preempted by federal legislation
- Should also think about water conservation and household recycling
- Transportation issues:
 - Education & Information
 - Strongly recommend joining the EcoDrivingUSA campaign
 - Actions for personal driving habits, maintenance tips, and actions for state and local governments
 - Incentives
 - Actions to reduce VMT such as telecommuting
 - Support deployment of alternative fuel infrastructure (fueling stations)
 - State-level tax incentives to purchase efficient vehicles
 - Regulation
 - Form a Smart Growth Study Commission
 - Enforce speed limits
- Recommendations parked for later:
 - CA Pavely GHG emission standards
 - Feebates for cars
 - State-level appliance standards

Questions

- Questions were actually two responses to questions posed by Mike Vandenberg in the Residential Energy WG update:
 - Response to question of whether to require residential energy targets in TN: look into what other states are doing to provide a barometer for TN.
 - Response to including water: definitely include water, it takes energy

Clean Energy Tech Update: Jonathan Raab

- Had first Clean Energy Tech Work Group meeting following last Task Force meeting
 - Meeting had four presentations

- **Renewable Energy Potential for TN and Region** (Bob Hawsey, incoming Associate Laboratory Director at NREL)
 - Renewable installed capacity is expanding quickly, and prices are all on downward trajectories
 - Worldwide investment in renewables is growing (esp. w/private capital)
 - TN wind resources aren't great, but solar and biomass are good
 - Develop policies to support and expand renewables in TN
 - RPS
 - net metering
 - utility and state funded programs
 - Energy efficiency, switch grass and solar PV should be TN Clean Tech priorities
- **ORNL Clean Tech Research, and ORNL ESCo project and Conversion to Biomass** (Dana Christiensen, Associate Director, ORNL)
 - ORNL doing substantial work on Clean Tech, including:
 - Zero energy buildings
 - Renewable and advanced grid integration
 - Turning "grass into gas"
 - Sustainable ORNL campus initiative
 - Increased square footage by 33% with 5% energy increase
 - ESCo agreement w/Johnson Controls investing \$89 million on campus for energy efficiency and converting steam plant to biomass
- **Renewables and TVA, and Integrating Buildings, Cars, and Metering/Pricing** (Joe Hoagland, VP Energy Efficiency and Demand Response, TVA)
 - TVA Renewables
 - Currently 459 MW
 - Federal RPS could be challenging, and or expensive
 - Smart metering
- **Clean Technology Policy and Program Options including National Experience** (Jonathan Raab, Raab Associates/MIT)
 - Clean Tech includes renewable energy, distributed generation, energy efficiency and demand response
 - Clean Tech Job includes direct (manufacturing, installing, servicing), indirect/supporting, and induced
 - Clean Tech Program or Policy
 - Result in clean tech jobs from manufacturing etc. regardless of whether technology installed in TN
 - Result in clean tech jobs from installing clean tech in TN regardless of where manufactured
- Next steps include a meeting directly following the Governor's Clean Energy Summit on Oct. 15th.

Questions

- No questions or comments

Administrative

Governor's Summit on Clean Energy Technology (Oct. 14-15, Knoxville, TN)

- Encourage the Task Force to attend both days of the summit, but at least attend one day
- Clean Tech Work Group meeting at end of second day, for those who can attend—all Task Force members invited

Public Comments

- Steven Smith, from Southern Alliance for Clean Energy: shared memo addressing cost of new generation (an issue brought up at the previous Task Force meeting). Cost to build all new baseload generation is going up, and option for energy efficiency is the cheapest option. Nuclear is projected to be 10-14 cents/ kwh compared to actual energy efficiency at 2-4 cents/kwh; wanted to emphasize the importance of implementing energy efficiency measures.

Meeting adjourned after public comments. The Governor expressed his satisfaction with the process to date.