

Governor's Energy Policy Task Force

Meeting Summary

16 July, 2008

Kingsport, Tennessee

Introduction

Governor Bredesen began the meeting by welcoming the participants and noting the webcast of proceedings. Several others, including the Mayor of Kingsport then also briefly welcomed the Task Force.

The Governor quickly outlined his goals for the Task Force, which are as follows:

- To launch a set of Lead by Example efforts for/by state government;
- To encourage efficiency/savings in both public and private sectors;
- To use the assets in TN to drive clean energy technology as an economic tool.
- To expand the use of and access to renewable/alternative fuels and energy sources.
- The end goal is to develop a state energy plan that can grow and evolve over time, and form the basis of legislation to be worked on next spring.

Ben Taube, Southeast Energy Efficiency Alliance (SEEA)

Mr. Taube, from SEEA, presented a big-picture look at industrial energy use in the Appalachian Region, and made comparisons to industrial energy use in the entire U.S. He also laid out 3 industrial energy efficiency programs that SEEA currently manages, and some of the benefits that might be expected from continuation and expansion of these programs.

- Introduction: SEEA covers 11 SE states, including 71 million residents. Regional nonprofit working on deploying energy efficiency across the industrial, governmental, residential, and transportation sectors.
- Total U.S. energy consumption = 100 quads/year (1 Quad = 1 Quadrillion BTU). Industry accounts for ~1/3 of annual consumption. There is significant opportunity for efficiency programs within industrial processes.
- The 3 programs:
 - a. Industrial Assessment Centers: targeted to medium/small plants. Focused on energy efficiency, waste minimization and pollution prevention, and productivity improvement. No cost to the industrial partner for participating. The program identifies opportunities to generate savings through energy efficiency, but the industrial partner is responsible for implementing the changes. 3 Industrial assessment savings centers in TN, all in universities (TN Tech, Memphis, ETSU).
 - 469 assessments to date (in all of the Southeast U.S.)
 - Example: An assessment at production plant found savings opportunities of 18% electricity, 11% natural gas.
 - Example: (from a cannery in TN) 5 efficiency opportunities with paybacks less than 4 years (some under a year).
 - b. Save Energy Now program: A program for large industrial facilities. Participating plants so far have average 8% total energy savings, at no cost to the industrial partner. ORNL major partner.

- 2 parts of program: 1.) Professional audit; 2.) Plant staff taught to repeat process.
 - Program goal (from DOE): drive a 25% reduction in industrial energy use in 10 years; “25 in 10” goal.
 - Program assessments in TN:
 - 9 sites audited so far, w/ \$16.9 million in energy savings identified.
- c. Combined Heat & Power (CHP):
 - Use exhaust heat from electricity generation for space or water heating, saving energy/cost on heating fuel.
 - In TN, there is currently about 500MW of installed CHP.
- The Appalachian Regional Commission study of energy is looking at economic and technical feasibility for energy efficiency improvements in the industrial sector. The study used a policy-scenario based assessment (including: building efficiency code improvements, carbon cap & trade, etc.) to estimate some of the benefits that might be expected from the continuation and expansion of the three programs, above (estimates are all for 2030):
 - In the Appalachian region, a greater share of energy consumption is driven by industry than in the rest of the country (36%TN to 34% US);
 - Expansion of Industrial assessment program can reduce overall industry energy consumption by 4.3%;
 - Energy savings assessment expansion can reduce industrial natural gas use by 48%. Overall industrial energy use reduced by further 5.6%.
 - CHP expansion (from 4% of total generation to 15% of total): 11.4% reduction in industrial electricity; overall industrial energy reduction of 19%.

Questions:

- Of the \$16.9 million in identified energy savings (from Save Energy Now program assessments in TN), how much of these savings are actually being realized, and are there real barriers to realizing these savings?
 - Don’t know how much has been realized. Sense that it is not significantly less than the total identified opportunity.
- Does the relatively higher proportion of energy use by industry in the SE have to do with cheap available power sources and mix of businesses in this region?
 - Yes, it is both of those factors.

Sharon Nolen, Eastman Chemical Co.

Ms. Nolan presented an introduction to Corporate Energy Management practices at Eastman Chemical, and the resulting decreases in energy and emissions intensity in Eastman’s manufacturing processes.

- Introduction: Eastman is a global manufacturer of chemicals, plastics and fibers. Eastman is one of the largest employers in TN (10,500 globally), and its corporate headquarters is in Kingsport, TN.
- In 2007, Eastman spent \$199 million on environmental expenditures.
- Since 1990, toxic air emissions from Eastman plants have been reduced by 80%.

- Employee health and safety programs at manufacturing facilities are among the best in the nation.
- Eastman Corporate Energy Management program:
 - Eastman has an energy policy in its corporate documents;
 - Eastman employs a corporate energy management team, linked to management teams at all the company's sites and facilities;
 - The goal is to continuously improve energy efficiency and minimize energy costs.
 - Methods to drive improvement:: standardized measures, share best practices across sites and leadership teams, reinforce projects/results, and communicate to employees.
 - Eastman is a partner with DOE and EPA programs, working on ENERGY STAR chemical pilot program.
 - Original energy usage goals were set and achieved in 1990s.
 - New goals set in 2002: 2% reduction per year through 2012. Actual energy intensity improvement has been 36% in last 10 years (in million BTU/thousand Kg sold).
 - In 2006 had nearly met goal for 2012.
 - Also track greenhouse gas (GHG) intensity, with the goal of reducing GHG intensity by 2%/year until 2012.
 - GHG intensity tracking includes CO₂, methane and other gases, at all Eastman sites globally.
 - GHG intensity per unit of production is continuously decreasing. 2012 goal was already met in 2006 production year.
- Energy management at Kingsport site includes 2 major initiatives –
 - Site-based energy initiatives (insulation, lighting, etc.)
 - Manufacturing-specific energy projects
 - The key measure of efficiency that Eastman uses is site energy intensity (energy/unit of production)
 - So far Eastman has achieved \$14 million in total energy savings since 2005
 - Overall energy intensity (in MBTU/K-KG units sold) has declined at an average of 2%/year since 2001.
- Typical improvement projects:
 - Monitoring and feedback: A database of project ideas was created, and as they are implemented, projects are tracked to monitor savings and reductions generated. This information influences the selection and implementation of future energy projects.
 - Project example 1: Insulation repair and replacement
 - Uses infrared camera and DOE software to estimate energy losses.
 - Insulation is a strong investment: average payback is .3 years.
 - Project has eliminated \$5 million in energy waste.
 - Project example 2: Lighting (replace incandescent bulbs with compact fluorescent bulbs (CFLs))
 - Project involves total 17,000 bulbs (1/3 so far replaced): total savings estimate \$700,000
 - Lights out program: incorporate photocells to switch off outdoor lighting during daylight hours (automatically)

- Project example 3: Process optimizer to provide low-cost steam and electricity
 - Involves 400 buildings, over 1046 acres, w/ diverse manufacturing operations. 3 coal-fired powerhouses, and 3 gas-fired boilers.
 - Optimizer balances the system continually, suggests operating strategies for all plants.
 - Resulted in savings of 1 million MMBTU/year, CO2 emissions reduced by 1,000 tons/year.
- Questions:
 - \$700,000 savings for replacement of all 17,000 CFL bulbs or the 1/3 replaced already?
 - For all 17,000.
 - Have aggregate emissions and energy consumption been reduced? Or has production simply increased (causing energy intensity to decrease)?
 - Not sure whether aggregate energy consumption or emissions have actually decreased, or if energy/emissions intensities have decreased solely as a result of production increases.

Brian Hullette, CEO, Nu-Energie (Biofuels producer)

Mr. Hullette introduced his company, Nu-Energie, and described their history and operations, as well as some of the feedstocks used in biofuel production.

- Nu-Energie operates one of 3 biofuels plants in TN. They are located in the Phipps Bend Industrial Park, on the site of former nuclear facility.
- Nu-Energie plant currently produces ~5 million gallons/year of biodiesel, with a production capacity of 15 million gal/year.
- Nu-Energie has received support through TN ECD (equipment savings, training), TN Fastrack Grant (\$750,000), and a USDA Business Industry Loan (\$1.5 million).
- Plant is capable of converting many different kinds of oils into clean-burning fuels (multi-feedstock plant).
 - A partnership with Siemens has led to greater plant efficiency.
 - 2nd-generation plant is 50% more efficient than 1st-generation biofuel facilities.
 - Plant has virtually no emissions, and their operation is a zero waste production process.
- Nu-Energie is in collaboration with ORNL to combine reaction/separation processes to reduce building footprint by 60% (smaller facility to heat, light, etc.).
 - Nu-Energie currently sources used cooking oils from 20,000 restaurants, to be used as a production feedstock (5 million gallons/year).
 - They can produce and sell cooking-oil derived biodiesel at a lower cost than regular diesel fuel.
- Nu-Energie is exploring generating biofuels from algae (5 years off) with very high yields (30,000 gal/acre). They are looking into feedstocks that do not compete with food industry, do not contribute to increases in food commodity prices.
- Eastman Chemical uses Nu-Energie produced B-20 in all diesel trucks.
- Biodiesel emissions reductions are significant for many airborne pollutants (15% for CO2 for B20, 85% for B100).

Questions

- What obstacles are there to your expansion right now, and to getting your fuel really out there on the market?
 - Feedstock costs are 85-90% of overall costs. Jathropha (a new feedstock crop) might help lower those costs, and allow for us to expand.
- What about distribution challenges?
 - The plant was designed so that, if we expand, we will do so with another facility at Nashville or Memphis. Our current plant can't handle much more than 15,000 gal for distribution.
- Is biodiesel chemically similar to standard diesel fuel? And how does an engine need to be modified to use your biofuel?
 - Chemically they are dissimilar, but a standard diesel engine needs no modification to burn this fuel.
 - There are issues with cold weather, which can cause biofuels to revert to a gel state, causing problems for engines. But this is not a significant problem in TN.
- Does biodiesel provide a similar amount of power/engine compression as standard diesel fuel?
 - Biodiesel has a higher flash point than standard diesel, yielding slightly higher engine compression. VP notes that in his car he finds himself getting an additional 2-3 mpg with biodiesel as opposed to standard diesel fuel.
- What are the economics of this? What are the feedstock costs and other costs that you have to deal with?
 - Soybean stocks have gone up 3x in the last year, which has posed challenges for us. Right now, biodiesel from soybean stocks costs us about \$1 more to produce than the price of standard diesel fuel. Used cooking oil feedstocks, on the other hand, allow us to produce biodiesel for about ½ the cost of standard diesel fuel.
- From a given amount of cooking oil, how much biodiesel can you produce?
 - The multiplier currently is about 1.03: Given 100 gallons of cooking oil, and adding 10 gallons of methanol, we could produce about 103 gallons of biodiesel.
- Where does the methanol come from?
 - Currently we are buying it mostly from chemical companies, including Methodex, in Savannah, GA.
- The emissions reduction numbers that you showed earlier, were they based on biofuels produced from cooking oil feedstocks?
 - Those numbers came from soybean-sourced biofuels.
- How would that number differ for cooking oils?
 - It would be similar, but that you would be getting a second use from what was formerly a waste product. In that sense you are seeing a 100% emissions reduction from cooking oil-based biofuels.
- How does the cost of your product compare to the price of standard diesel fuel today?
 - Right now we would be paying more for 1 gallon of soybean oil, pre-production, than for 1 gallon of diesel fuel. But cooking oil is

- half that price, and allows us to produce biodiesel \$.10-\$.15/gallon cheaper than standard diesel.
- What would be the logic in setting up a satellite operation in Nashville, near your feedstock sources?
 - That makes a lot of sense, and would help us distinguish ourselves from the rest of the industry. We want to be located near our sources. And with our collaboration with ORNL on the small footprint operation, that should allow us to produce very small processing units for distributed production.
- Is there any other feedstock that is economic without any incentives? Are algae economic without incentives?
 - There are other feedstocks, but what you need to do is close the loop and grow your own stock to control the pricing better. Other than Jathropha, I don't know of many others. Jathropha is comparable in cost to the used cooking oil, as long as we are growing the crops ourselves.

After a break, Governor Bredesen introduced the Leading By Example sub-committee, and some of the issues and background: The issue of efficiency within state government is something that is still not done well today, but that makes it a very target-rich environment. The working group, led by John Noel, has been asked to dig deeper into these issues and come up with some recommendations. John will present these recommendations, and afterwards we may want to consider adopting some of these.

John Noel, Chair, Leading By Example (LBE) Sub-Committee –

Mr. Noel introduced the sub-committee and some of the issues surrounding increasing energy efficiency within state government. He then presented a set of recommendations from the sub-committee for actions that the state of Tennessee should take regarding energy.

LBE in State Buildings –

- Mr. Noel noted that many of the things presented by Eastman, earlier in the meeting, are similar to the Lead By Example issues that will be presented, and that if TN state government were able to run itself more like Eastman had, that it would be doing much better with regard to energy issues.
- The process so far: We have had several meetings with government agency heads, folks from the universities, as well as private sector and ESCO groups. We have also received assistance from ORNL, EPA and TVA.
- In 1960 the efficiency of the fossil fuel power sector was 33% in the U.S. and 33% in Denmark. Today in the U.S. it is still 33% efficient, and in Denmark it is 60% efficient. The U.S. economy wastes about 50% of the energy that it uses. Today natural gas is 95% more expensive than it was a year ago, coal is not far behind, and electricity rates may soon rise like gasoline.
- In 2007, TN spent between \$151-\$178 million on energy, and that is likely to increase above \$200 million in 2008. \$129M of that cost was in buildings, and \$22-\$49 million is in vehicle fleets.
- Building energy expenditures in the state government are broken down through 27 different agencies, departments and institutions.
- Organizational change is needed. Responsibility for energy issues is divided between 27 different agencies. The state should consider consolidating

leadership in a single strong leadership position. We need also to elevate and incentivize energy issues within state government.

- Targets: Targets are an important aspect in understanding energy use moving forward. These targets should be aggressive but realistic. We propose a target of a 15% reduction in overall energy use in state buildings by 2011, and 25% by 2015, relative to 2007 values.
- Tracking and reporting: The state does not, for the most part, track its energy use. This is an essential first step in energy management. Energy use in all state buildings should be tracked and benchmarked.
- Retrofitting: The state should develop a strategy to retrofit state-owned buildings for energy efficiency. Focus on a comprehensive whole-building approach.
 - Retrofits of 2 state-owned buildings in Nashville, completed in 2004, cost \$4 million, and have produced energy savings of \$800,000/year.
- We need to immediately go after the lowest-hanging fruit: changing incandescent bulbs for compact fluorescent bulbs, LED exit signs, etc.
 - The state should see energy efficiency retrofits as an investment, rather than as an expenditure.
- The state should develop a standardized and comprehensive plan to implement building retrofits, perhaps utilizing energy services companies. This must involve replacing building infrastructure, as well as quicker fixes.
- Current practice of requiring a 5-8 year payback for all efficiency measures is a barrier to realizing all cost-effective efficiency upgrades. Life-cycle costing or longer payback periods allow for capture greater efficiency measures.
- There are opportunities also in new construction. The State Sustainability Guidelines for new state buildings is currently under development, and currently is based on ASHRAE 2004 building codes. We believe that it should go beyond this baseline code.
 - North Carolina requires state buildings be built to 30% beyond ASHRAE 2004 energy codes.
 - Rhode Island requires state buildings conform to LEED, as well as incorporate all cost effective energy efficiency measures, beyond code compliance.
- Equipment and appliances: The state should immediately require state agencies to purchase Energy Star rated equipment and appliances, where available.
 - Should also consider requiring purchase of Water Sense rated products. As water is another resource that needs to be conserved and protected, and has significant energy impacts.
- Renewable Energy & Cogeneration: The state should assess the opportunity to incorporate cogeneration and renewable energy technologies at all state facilities, and move forward with the best of these opportunities.
 - Solar water heating offers cost-effective renewable energy. This and cogeneration could immediately begin saving energy and cost for state government.
 - The state should partner with TVA's Generation Partners program.
- Leased space: Leased space can be a barrier to energy efficiency since state has less control. The state should pursue a comprehensive strategy to reduce energy use in leased office space
- The state should come out with energy guidelines (lighting levels, thermostat set points, etc.) for building managers.

- We need to fund and staff an extensive initiative in order to implement these recommendations and goals.

Questions to John Noel and Dr. Jonathan Raab:

- What is a standard rate of return for solar energy?
 - It depends on the volume that you place on the building. It involves less infrastructure and cost than photovoltaic cells.
- For residential users, how long would a standard payback be? And how long would that unit last?
 - Payback on some units (solar hot water) is as short as 3-5 years. Payback for photovoltaic units is more like 15-20 years. The state of TN has a grant program for PV, and with federal grants and TVA programs, can reduce the cost by as much as 70% for the commercial sector.
- You were referring to increasing metering in existing buildings, correct?
 - Yes. There are many locations in the state where buildings are not separately metered, so that we cannot track energy use in those buildings.
- There is a lot of interest in reducing energy use, but we need to increase the sense of priority and urgency, both for the citizens and state employees, and that is something that the Governor can do.
- Leased space will require greater education and information for state employees on what incentives are available, and what can be done around efficiency issues. Lack of information is a major obstacle for us, in a leased building.
 - Leases are much more complicated, because we are not in control of much of these things. New leases offer a great opportunity to negotiate new opportunities.
- Even for new leases, how do we include energy efficiency?
 - If the building has a history, you can look at energy bills to check its energy use per square foot, and use that data to compare between buildings. Other states are requiring things like LEED certified buildings, etc.
 - If you can't get the bills, you need to move on to a professional auditor. You would need a standardized auditing method for all rental buildings.

LBE in State Vehicle Fleets –

- The state owns about 10,000 vehicles, 85% of which are tracked by General Services and TDOT. Fuel expenditures in 2007 totaled about \$22 million.
- Public Chapter 489 requires state agencies to reduce their use of petroleum by 20% by 2010.
 - The state should set target of an additional 25% reduction in petroleum use by 2015 (40% total reduction by 2015).
- The state owns virtually no compact sedans in its vehicle fleets. We own a large number of SUV's, and about 40% of our fleet is pickup trucks.
- The state should always seek to purchase the most efficient vehicles in every vehicle class.
 - Agencies/departments should be required to justify their request for any non-compact sedan vehicle.

- Fuel efficiency should be incorporated in new vehicle purchasing, using a life cycle cost analysis.
- Design a system to ensure that more efficient vehicles are dispatched first from state motor pools.
- The state should require agencies/campuses to develop a plan to reduce vehicle-miles traveled (VMT) for work-related trips and employee commuting (through videoconferencing, carpools, park-and-ride, mass transit expansion, etc.).
- The state spent \$27 million in 2007 on employee personal vehicle reimbursement. The state should change its policies to encourage employees to use state vehicles rather than personal vehicles.
- Vehicle maintenance is important to driving efficiency. Especially, tire pressure and replacement, tune-ups, and other items.
- Vehicle fuel efficiency can be significantly improved if employers comply with speed limits. One can improve gas mileage by 10-20% by requiring employees to comply with speed limits.
- 5-8% of gas in state fleets is lost to vehicle idling, and accounts for more than ½ million gallons of gas/year. Many states and cities have anti-idling policies.
- State employees rarely utilize E-85 flex fuel capacity of state vehicles.
 - State should expand E-85 refilling availability.
 - Align incentives to encourage employees to refill flex fuel vehicles with E-85.

Questions to John Noel and Dr. Jonathan Raab:

- Is the state fleet being fully utilized? Can some of the vehicles be declared under-used and retired?
 - Vehicle energy use is very well tracked, so that we could go through and assess vehicle utilization, to make that kind of determination.
- It seems a little difficult to police individual behavior, regarding the personal vehicle reimbursement.
- It looks as though, if you did nothing but change the purchase mix of vehicles, that would swamp the rest of the recommendations put together. Do you agree?
 - That, and the VMT reduction measures are the most important, yes.
- Did you get into how the vehicles are used? My sense is that the majority of these are not pool vehicles. Is that correct?
 - Yes, the pool is relatively small relative to what is constantly under individual agency control.
- Have you seen any state that you think is really doing this right?
 - I think we have seen pieces being done right. Hybrid purchase requirements, least-cost purchasing, etc.
- With a couple of strokes of the pen (i.e. changing vehicle purchasing practices), it looks as though we could get as much done, as with 10 other measures.
 - I think we would be missing a great opportunity if we did not pursue the zero cost measures, to get information to state employees as to how they could reduce fuel consumption by 10-20%.

- From Eastman: We think that you should consider an overall education program for state employees on energy issues. We have found that central to our efforts at Eastman.
- Gov. Bredesen: The buildings recommendations really had a couple of key points, directions for where to go, and that's what I was looking for here in the vehicle fleets materials. If I am going to go back and put together an executive order in the next couple of days, what is that going to look like? What are the 2-3 key components of that order?
 - The Energy Star appliances purchasing requirement, and the creation of a leadership position for energy issues in state government (e.g. an Energy Czar).
 - You would need more than a Czar. You need a staff under that Czar, and a way for them to have access to and influence over other agencies and departments and campuses.
- Gov.: My preference is not to create a new department, but to find a way to work with and coordinate the existing agencies/commissions, etc. Energy costs are important, but they make up only about ½ of 1% of the state budget. I think more will get done, with greater accountability, through a cabinet position, than through creating an additional state agency. F&A already has a lot of power in regards to energy expenditure, and might make a good locus for leadership on these issues.
- The ft² numbers from an earlier meeting, was that state owned buildings only? Or owned and leased?
 - The 90 million ft² number was for state-owned buildings only.
- Long-term continuity is also a major concern. The mission of a Czar, or something like that is to carry out the governor's policy, so when the governorship changes over, who knows what will happen to all of these things. So for long-term continuity, it is important to embed these things through the legislature.

Gov. Bredesen moved that the Task Force formally accept the recommendations provided by the LBE sub-committee. The movement was seconded, and all Task Force members were in favor.

Gov. Bredesen put forward 2 other areas (in addition to LBE) that could use sub-committee attention, to come up with policy recommendations.

- *Residential Energy Use* subcommittee appointed, Mike Vandenberg (chair), Phil Chamberlain, Elizabeth Eason, Lynn Evans
 - Gov. notes that this area may likely more to do with legislative action and public education than Executive Orders.
- *Encouraging Development of Energy Technologies in TN* subcommittee appointed: Miles Burdine (Chair), Matt Kisber, Dana Christensen, Jack Holder, John Noel.

Governor Bredesen asked for comments from the public and received comments from three individuals on the following topics.

- Francine Davids, The League of Women Voters – The importance of energy efficiency and renewable energy. Ms. Davids shared 2 examples of successful energy efficiency retrofits in TN, and asked what could be done regarding mercury in CFLs.

- John Nastley, Hodge Associates/Energy Services Coalition – Mr. Nastley spoke to the slow pace of energy efficiency retrofit projects in Tennessee currently. 15% energy consumption goal will be unmet, unless a new, stronger leadership is put in place, to drive the process forward. Mr. Nastley also raised the need for programs/incentives to cause industrial users to implement more of the retrofit options put forward through the auditing process.
- Randy Reid, MetroLight – Mr. Reid described dimmable exterior lighting, that might allow energy reductions during off-peak nighttime hours.

Following the public comments, meeting was adjourned.