July 23, 2013

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Senior Corporate Counsel

First Energy
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Dear Mr. Jack:

At the June 19th stakeholder meeting to discuss Mon Power’s future energy efficiency programs it was indicated that First Energy would welcome suggestions and comments on proposed and possible energy efficiency programs and measures that could be deployed in West Virginia. The Sierra Club worked with Optimal Energy to conduct analysis of First Energy’s energy efficiency programs in Ohio, Pennsylvania, and Maryland, and to develop initial recommendations on programs that should be offered in West Virginia. This analysis is not meant to be comprehensive, but we hope that it will help spur additional discussion during the follow-up stakeholder meeting tomorrow and will be useful in developing Mon Power’s forthcoming submission to the West Virginia Public Service Commission on September 1st of this year.

The table below shows the efficiency programs offered by FirstEnergy in West Virginia, Ohio, Pennsylvania, and Maryland.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Program** | **West Virginia**  | **Ohio** | **Pennsylvania** | **Maryland** |
| Home Performance with Energy Star | No | Yes | Yes | Yes |
| Appliance Turn-in | No | Yes | Yes | Yes |
| Efficient Products | No | Yes | Yes | Yes |
| Residential New Construction | No | Yes | Yes | No |
| Manufactured Homes | No | No | No | No |
| Low Income | Initial Audit Only | Full measure set | Full measure set | Full measure set |
| C&I prescriptive | None | Lighting, motors and drives, refrigeration, kitchen, HVAC, specialty equipment | Lighting, HVAC, motors and drives, specialty equipment | Lighting, kitchen, HVAC, water heating |
| C&I Custom | Lighting Only | Yes | Yes | Yes |
| Small Business Direct Install | No | No | No | Yes |
| C&I New Construction | No | Same as for residential | Same as for residential | Separate LEED Program |

As we understood from the June 19th meeting, FirstEnergy is currently proposing to offer only two efficiency programs: a low-income program and a non-residential lighting program. For context, according to EIA Form 861, 61% of Mon Power’s 2011 electric sales came from the Commercial and Industrial sectors. Since lighting makes up about 35% of the C&I load, this means that a full two-thirds of Mon Power’s electric sales in the state are ineligible for efficiency programs[[1]](#footnote-1). Not only does this, at the outset, severely limit the savings that efficiency can hope to achieve in West Virginia, it creates concerns regarding ratepayer equity, as large swathes of FirstEnergy customers are unable to participate in its efficiency programs despite having to contribute to the cost of running them.

In contrast, FirstEnergy offers a much more comprehensive suite of efficiency programs in Ohio, Pennsylvania, and Maryland. What follows are initial recommendations on how best to fill the gaps in FirstEnergy’s current West Virginia efficiency portfolio and allow FirstEnergy’s West Virginia customers to receive the same level of efficiency services as they do in FirstEnergy’s other service territories. This expanded efficiency effort would create significant benefits for FirstEnergy’s customers and the state of West Virginia.

## Low-Income Program

The low-income program includes a check-up audit with free-installation of CFLs in primary use lighting, up to three faucet aerators, one low-flow showerhead, and a potential replacement of their existing refrigerator. While this is a good start, an expanded program would provide significant extra benefits to West Virginia’s low-income program.

First, it is very unlikely that most low-income participants will be able to move forwards on the recommendations found in the audits given their economic situation. It has therefore become standard national practice for low-income efficiency programs to provide 100% funding for efficiency improvements that were recommended as part of an initial audit. In fact, FirstEnergy’s low-income programs in Ohio, Pennsylvania, and Maryland all offer incentives for a much wider range of measures, including:

* Attic, floor and/or wall insulation
* Caulking and weather stripping
* Hot water system improvements
* Reflective window tint
* Furnace cleaning, tuning, and safety repairs

Programs in other jurisdictions have also achieved good success with measures such as duct sealing and AC tune-up and refrigerant charge correction. Adding these HVAC and weatherization benefits in West Virginia will enable FirstEnergy to capture the benefits of efficiency improvements identified in the audits it is already paying for, and significantly increase the value of the program to FirstEnergy’s low-income customers.

## Residential Programs

FirstEnergy currently has no plans to offer efficiency services to non-low income residential customers. Not only does this significantly restrict the energy savings and benefits available to FirstEnergy, it raises potential equity concerns. FirstEnergy’s residential customers are responsible for a portion of the costs of efficiency programs but have no ability to access the resulting benefits.

In order to better capture the full benefits from efficiency, FirstEnergy WV could offer at least five different programs in the residential market: Home Performance with Energy Star, refrigerator/freezer turn-in, residential prescriptive program, residential new construction, and manufactured homes.

One potential supporting strategy that could be used with pretty much any residential (or small C&I) program is on-bill financing. On-bill financing supplements the cash incentive with a low-interest loan that can be used to pay for the rest of the measure. Payments towards the loan are automatically added to the customer’s monthly electric bill. Experience in other jurisdictions has shown that on-bill financing comes with very low default rates, and that programs offering this strategy achieve much higher penetration for a given cash incentive.

### Home Performance with Energy Star

Home Performance with Energy Star, or a similar program, is part of the standard residential efficiency portfolio across the country. It has a long and proven track record. It works similarly to the low-income program, but with lower incentive amounts due to this sector’s better ability to afford capital improvements. First, a home audit is performed that evaluates HVAC systems, insulation, windows, and the relatively integrity of the thermal envelope as measured by a a blower door test. Low-cost and easy to install measures, including some combination of CFLs, showerheads and faucet aerators, LED nightlights, surge protectors, and pipe insulation will also be installed during the initial audit. The audit will also result in a list of more detailed energy saving improvements related to the HVAC system, insulation, and weatherization. The participant can than choose which of these measures to install, and is eligible for additional incentive payments for each measure implemented.

As mentioned, this type of program is offered nationwide as a standard efficiency program, and has a long track record of providing significant cost-effective savings. FirstEnergy itself offers similar programs in its service territories in Ohio, Pennsylvania, and Maryland. Its Pennsylvania program, for example, offers $150 towards the initial audit, up to $900 for more comprehensive weatherization and HVAC measures recommended in the audit, and then another $150 for a follow up audit to ensure that the measures were installed correctly. Met-Ed, a FirstEnergy subsidiary serving territories in Pennsylvania, achieved 12% of its total 2012 savings through this program, with a highly cost-effective TRC test ratio of 3.62.[[2]](#footnote-2)

### Residential Appliance Turn-In

Appliance turn-in recycling programs provide free pick-up and small rebates (on the order of $50) to residential customers who turn in their old secondary refrigerator or freezer. Sometimes an additional rebate is offered to turn in old room ACs if a contractor is already scheduled to pick up a refrigerator or freezer. Since there is a large market for used refrigerators, the baseline case is that either the participant would continue using the secondary refrigerator or that it would be resold in the used market. In either case, the program saves energy by taking old units out of the market.

Although the savings achieved per recycled appliance vary based on the age of the unit, size, and hours of use, they can be substantial. New York claims 1,655 kWh in annual savings per recycled refrigerator, while a recent Illinois evaluation calculated 1,337 kWh and Vermont uses 1,238 kWh. Assuming a typical pick-up cost of $120 per unit, this gives savings at a cost of $0.09 per annual kWh, or $0.011 per lifetime kWh over an 8 year measure life – well below the avoided cost of energy, even allowing for administrative costs.

While recycling room ACs provides significantly lower savings than refrigerators or freezers, they can be picked up at very little incremental cost if a contractor is already at someone’s house for a refrigerator or freezer pickup. For this reason, many appliance turn-in programs also offer to pick up room ACs at the same time as a refrigerator or freezer. Room AC participation tends to be fairly small, but including the measure rounds out the program and creates a more comprehensive offering.

This program structure has proven to be very successful for other FirstEnergy subsidiaries in Ohio, Pennsylvania, and Maryland. In Pennsylvania’s latest program year, for example, savings from its appliance turn-in program achieved 9% of Met-Ed’s total savings, at a very high TRC of 4.98.[[3]](#footnote-3) A few aspects of this program make it particularly easy to get up and running in a newly expanded portfolio of efficiency programs. First, this program is typically completely outsourced to a third-party administrator – most commonly JACO Environmental or Appliance Recycling Centers of America (ARCA). These contractors have significant experience running successful and cost-effective appliance turn-in programs across the nation, and should be able to cost-efficiently deliver services. Second, because this will be a new program, it is reasonable to assume the average recycled refrigerator will be significantly older than in programs that have already been running for several years. This is consistent with experience in other jurisdictions that have seen the age of recycled refrigerators decrease with program age, and suggests that average savings per unit will be higher for FirstEnergy’s new program than elsewhere in the nation. Energy Star provides a good overview of the logic and mechanics of appliance turn-in programs.[[4]](#footnote-4)

### Residential Efficient Products program

Most residential efficiency portfolios include a prescriptive mail-in or on-line rebate program, often called “Efficient Products.” The main purpose of Efficient Products programs is to capture lost opportunities by encouraging consumers to upgrade to efficient equipment at the time of replacement of existing failed equipment. Since the rebate only aims to reduce the incremental cost between the standard equipment and the efficient equipment, it can typically be lower than for retrofit programs. Administrative costs are also typically lower for these programs than for others, as there is no need to pay contractors to audit homes and install measures. Further, Efficient Products programs offer an easy way for every FirstEnergy customer to enjoy the benefits of efficiency programs even if they cannot or choose not to have a home energy audit.

Measures included in a typical Efficient Products program include lighting (both lamps and fixtures), air conditioning, programmable thermostats, refrigerators and freezers, dehumidifiers, room air cleaners, and heat pumps. FirstEnergy subsidiaries run programs offering prescriptive rebates on HVAC, lighting, and other products in Maryland, Ohio, and Pennsylvania. In these states, this is run as two programs – one for HVAC and one for lighting and other products. For simplicity, these could be combined into one prescriptive program, but this is not necessary. In Pennsylvania, these two programs made up 38% of Met-Ed’s total portfolio savings in the latest program year. The HVAC program achieved a TRC of 1.26, and the lighting/other equipment program achieved a TRC of 4.03. For more detailed information on a typical Efficient Products program, please see the EE Best Practices website’s profile on Vermont’s program.[[5]](#footnote-5)

### **Residential New Construction**

New construction programs are an important part of an efficiency portfolio. Because an inefficient home can lock in decades of wasted energy it can be the least expensive opportunity to implement efficiency. Best practice new construction programs focus on contractor and developer training to encourage integrated design. These programs often have a focus on market transformation, and many well-established new construction programs have found that once they demonstrate the increased market value of homes built to program standards they are able to decrease or even eliminate direct financial incentives. Further, there are often benefits, such as workforce development, that are not fully captured in the TRC.

One option for a fairly low cost program model provides two paths for incentives – a performance path and a prescriptive path. The performance path offers varying rebates based entirely on the HERS score of the home – a well-accepted home energy rating system. In order to capture savings from contractors who do not or cannot take a whole building approach, a prescriptive path can also be offered. The prescriptive path would offer separate rebates for discreet efficiency actions in various energy systems in the house – for example ensuring that at 60% of lighting fixtures are ENERGY STAR qualified, or installing higher than code HVAC systems, water heating systems, or building insulation. New Orleans provides a good example of one such program.[[6]](#footnote-6)

### Manufactured Homes

Although not offered by FirstEnergy in other states, we believe that a manufactured homes program would be a valuable addition to West Virginia’s efficiency portfolio. Though manufactured homes represent 6.1% of the national housing stock, they tend to be less efficient than site-built homes, both because there is a separate and outdated building code governing their construction and because the focus on first-cost is even greater than for site-built homes. Because of these factors, there are a few specific actions that can be taken that result in very large savings for manufactured homes.

The most important action involves going from the electric furnace that typically comes with a manufactured homes to an electric heat pump. Nationwide, 53% of manufactured homes use electricity for their main heat source, and 73% heat water with electricity. Almost all of these electrically heated homes use an electric furnace – one of the most inefficient ways to heat a home available. In fact, significant low-cost savings can be captured by convincing manufactures to instead install heat pumps in new homes; depending on climate, savings my approach 50% or more on annual heating energy.

As an example, the Tennessee Valley Authority (TVA) has recently implemented a program working with manufacturers of manufactured homes to install heat pumps on new homes. So far, a large portion of developers in the region now participate in the program.[[7]](#footnote-7) For a more comprehensive approach to efficiency in manufactured homes, Energy Star offers a separate rating for this type of new construction. An Energy Star certified home will be more efficient than the baseline HUD code in a variety of building systems, including better windows and insulation and tighter ducts. A manufactured homes program could potentially provide incentives to consumers and manufactures to build and buy Energy Star manufactured homes. While this will not provide quite the same “bang for the buck” as focusing exclusively on installing heat pumps, it will likely provide significant cost effective savings.[[8]](#footnote-8)

## Commercial and Industrial Programs

In West Virginia, FirstEnergy currently runs one efficiency program for the commercial and industrial (C&I) sector – a performance-based, $0.05 per annual kwh saved incentive for qualified lighting projects. While this is a good start, it does not address the other building systems that, combined, make up the majority of most business’s electric usage. These systems include heating, cooling, ventilation, and motors, and there are large opportunities available for measures such as building management systems, HVAC tuning and optimization, demand control ventilation, variable speed drives, industrial process improvements, etc.

Further, efficiency experience in other jurisdictions has shown that many types of commercial and industrial electricity users do not respond to performance-based incentive programs such as that being offered in West Virginia. Reasons for this lack of participation vary, but may include constraints of time/resources, lack of reliable information, and split incentives. As a result, a set of efficiency programs and initiatives have developed to better meet the needs of specific market segments with high savings potential

As a result of these two considerations, we make the following recommendations for FirstEnergy’s C&I portfolio in West Virginia.

* Create prescriptive rebates that do not need preapproval for common measures
* Expand the current performance-based incentive to apply to all cost-effective measures where no prescriptive rebates are available
* Implement a small business direct install program
* Offer cost-sharing for technical studies and retro-commissioning
* Implement a program for C&I new construction
* Develop specific approaches for municipalities and other market sectors

### Expand Current Incentive Program

The current incentive of $0.05 per annual kWh is a good start for FirstEnergy’s C&I efficiency program. However, by limiting the incentive to only lighting measures, FirstEnergy unnecessarily restricts the amount of savings potential available. We therefore recommend expanding this incentive to apply to any cost-effective measure; there is no reason why a lighting project should be eligible for an incentive but not a variable speed drive project of the same cost-effectiveness. This change will bring FirstEnergy’s West Virginia Efficiency program much more in line with what the offerings in FirstEnergy’s service territories in other states.

While performance based programs are an integral part of any efficiency programs, they often have high administrative costs, as the savings of each project needs to be calculated and confirmed and each measure assessed for cost-effectiveness. Further, these programs typically require preapproval, large amounts of paper work, and often take a long time to get an incentive approved. These factors combine to form a significant barrier to participation for C&I customers.

As a result, we recommend implementing pre-set prescriptive rebates that do not require pre-approval for common efficiency measures that are known to be cost-effective in an average installation. This streamlining of program processes will spur participation in the program, and at the same time reduce administrative costs for FirstEnergy. FirstEnergy offers such prescriptive incentives in its territories in Maryland, Ohio, and Pennsylvania. Ohio, for example, offers prescriptive incentives for T5s, T8s, CFL bulbs and fixtures, LED exit signs, photo sensors, occupancy sensors, premium efficiency motors, traffic signals, commercial kitchen equipment, commercial water heaters, laundry machines, smart strips, vending machine occupancy controls, and HVAC equipment.

### Small Business Direct Install

Traditional C&I prescriptive and custom programs often have difficulties getting smaller commercial customers to participate in their programs, as these entities often have limited available capital, may be in leased spaces, and do not have the time or knowledge to worry about energy efficiency. To help get around these obstacles, many efficiency program administrators implement some variety of a Small Business Direct Install Program (SBDI). This program offers free site visits and the direct-installation of certain common and cost-effective measures. Lighting is typically the largest component of the program, but faucet aerators or simple refrigeration measures can also contribute. SBDI programs normally set fairly aggressive incentive levels (70% is typical) in order to facilitate participation by businesses without much capital, and may include inexpensive and highly cost-effective measures such as CFLs and faucet aerators for free. First Energy currently offers a SBDI Program to its customers in Maryland; we believe that a SBDI program would provide significant benefits for FirstEnergy’s West Virginian customers.

 SBDI programs are typically implemented by contractor third-party vendors who are responsible for recruiting program participants, scheduling visits, and delivering all the program services. As in the appliance turn-in program, direct install programs can easily be contracted out to one or more third party implementers with standardized audit and measure pricing. This both facilitates an easy customer experience and can provide some cost efficiencies. A focus on lighting and other easy to install and highly cost-effective measures tends to result in fairly high program TRC. For example, Massachusetts’s 2011 program had a TRC of 3.6, Colorado’s evaluated 2010 SBDI program had a TRC of 2.3, and Baltimore Gas and Electric’s 2009-2010 program achieved a TRC of 2.12. For further information, SMECO has written up a good implementation plan summarizing the logic and objectives of the program.[[9]](#footnote-9)

### Technical Studies and Retro-commissioning

Technical studies address one of the largest barriers to efficiency in the C&I sector: lack of knowledge on how to identify and implement efficiency improvements. Technical studies are best included as an offering under the C&I program offering performance-based incentives, so that any project that results from the study can be incented on the basis of energy savings. The costs for technical studies are shared and support is typically restricted to the large customers that are most likely to have energy savings potential to justify the project cost. For example, NYSERDA pays 50% of the study cost up to the lesser of $1,000,000 or 10% of a facility’s annual energy costs. The best performing efficiency programs have relationships with many certified technical firms with varying expertise in areas such as industrial processes, data centers, long term energy management, HVAC systems, CHP, and retro-commissioning. This enables the program administrator to direct the customer towards a contractor who is familiar with the efficiency program and who meets the needs of the specific building or application.

Projects in large facilities – and especially industrial process projects – usually have significantly lower costs per energy saved than other efficiency opportunities. For example, industrial assessment centers (university centers that perform site visits to industrial facilities and give detailed reports on possible efficiency improvements) provided enough very low-cost recommendations to bring the average simple payback of all identified measures to less than one year. Further, Xcel Minnesota’s 2011 process efficiency program saved 50 GWh of electricity at $0.09 in program costs per first year kWh saved – well under the cost of saved energy for a typical EE program. Finding a few large industrial projects can have very significant impact on the costs and savings of an entire efficiency portfolio and more than justifies the added costs of paying for technical assistance.

Retro-commissioning is a specific type of technical study that involves verifying that building systems are performing according to intent, that equipment O&M procedures are being performed correctly, and that proper control strategies and other building energy optimizations are in place. While retro-commissioning reports will sometimes recommend potential capital upgrades, the focus is to ensure that the existing equipment is operating as intended. Since savings typically come from low-cost operational improvements as opposed to equipment purchases, retro-commissioning is usually highly cost effective. A recent LBNL study looked at over 10,000 energy-related deficiencies found during commissioning and found an average payback of 1.1 years and a cost-benefit ratio of 4.5.[[10]](#footnote-10)

In light of this evidence of plentiful low-cost savings due to operational deficiencies, many program administrators offer retro-commissioning programs or offer separate incentives within an existing custom/retrofit program. It is possible to further increase cost-effectiveness through an incentive structure that, for example, requires a minimum facility size for participation and/or requires participants to sign a memorandum of understanding that they will implement any measures identified that are under a certain payback. For more information on retro-commissioning program, see EEERE.[[11]](#footnote-11)

### C&I New Construction

Commercial new construction programs provide an important opportunity to capture efficiency when efforts can be cheapest and most effective. While many programs administrators bundle incentives geared towards time-of-sale equipment replacements and other “lost opportunity” measures, this section focuses on new construction and major renovations. FirstEnergy currently runs a C&I new construction in Maryland, aimed to help new buildings achieve a LEED rating. Incentives are available to offset 50% of total LEED certification fees, as well as $0.05/kwh saved up to $15,000.

Penetrating the commercial new construction market can be difficult, as there are many actors involved in designing and building a new building. While efficiency is best integrated into the design from the beginning of the process the project may take multiple years to go from design to construction. Due to these challenges, new construction programs work best alongside extensive outreach to architects, developers, engineers, and other stakeholders. Succesful programs include extensive support for technical assistance, including engineering studies, green building services (such as energy modeling), and commissioning. In order to encourage deep savings, new construction programs are often tiered, with projects using less energy as a percent of the baseline receiving more money.

Helped in part by large new construction projects that help balance the more expensive smaller projects and administrative expenses, commercial new construction projects often save energy at a fairly low price. For example, in California’s 2011 programs, Pacific Gas & Electric’s commercial new construction program achieved a TRC of 2.8, Southern California Edison’s program achieved 6.05, and San Diego Gas & Electric’s Program came in at 1.96. A 2008 ACEEE paper gives a good description of how Oregon’s new construction program was able to achieve savings at a levelized cost of energy of less than 2 cents per kWh.[[12]](#footnote-12) A study managed by the Pacific Gas and electric gives more information on general best practices.[[13]](#footnote-13)

### Municipalities and Other Market Sectors

Although C&I customers are grouped together for the purpose of efficiency programs, in reality they are very diverse group of actors, with varying needs, decision-making processes, and obstacles to investing in efficiency. The most effective commercial efficiency programs are aware of these differences and tailor their marketing approaches and delivery approaches to each segment. While eventually FirstEnergy can develop tailored approaches for multiple market segments, for now we recommend focusing on developed a tailored offering for municipal customers.

Municipalities are an important segment for efficiency for a few reasons. First, they typically operate on very tight budgets that leave little room for equipment replacements or improvements, even when the return on these investments is very good. Second, they often own the city street lights and water or wastewater treatment plants, both of which provide excellent efficiency opportunities. A best-practice municipal program would provide a suite of efficiency measure specific to streetlights and wastewater treatment plants, offer financing for capital improvements, and include outreach strategy geared towards municipal officials with decision making-power. See the Massachusetts web page for information on their efforts at municipal customer outreach.[[14]](#footnote-14)

We look forward to working with First Energy, the West Virginia Public Service Commission, and all of the stakeholders involved in these discussions to ensure that Mon Power’s customers have the opportunity to achieve significant savings through achievement of energy efficiency.

Sincerely,

Jim Kotcon Zachary M. Fabish

Conservation Chair, West Virginia Chapter Staff Attorney

Sierra Club Sierra Club

1. CBECs data shows 36% of C&I electricity use is for lighting in WV’s census region. This means ~23% of sales are from C&I lighting. Assume Low income customers make up another 10%, or ~30% of residential sales. [↑](#footnote-ref-1)
2. <http://www.puc.pa.gov/pcdocs/1199843.pdf> [↑](#footnote-ref-2)
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5. http://www.eebestpractices.com/pdf/SummaryProfileReport\_R13.PDF [↑](#footnote-ref-5)
6. Appendix 4: Energy Smart Program Description. http://tinyurl.com/adksxg4 [↑](#footnote-ref-6)
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14. http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/energy-audit-program-eap.html [↑](#footnote-ref-14)