STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

IN THE MATTER OF THE COMMISSION'S INVESTIGATION INTO THE POSSIBLE APPROVAL OF A SELF-DIRECT DEMAND SIDE MANAGEMENT PROGRAM FOR CERTAIN LARGE CUSTOMERS.	)))))	**CAUSE NO. 44310**
RESPONDENTS: INDIANA REGULATED ELECTRIC UTILITIES PARTICIPATING IN THE OFFERING OF CORE DSM PROGRAMS	)))	

DIRECT PRE-FILED TESTIMONY OF R. NEAL ELLIOTT, Ph.D. OF AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY ON BEHALF OF THE HOOSIER ENVIRONMENTAL COUNCIL, INC.

JUNE 27, 2013

Q1: PLEASE STATE YOUR NAME, YOUR POSITION, YOUR PHONE AND YOUR BUSINESS ADDRESS.

A. My name is R. Neal Elliott, and my business address is 529 14th St. NW, Suite 600, Washington, D.C. 20045. My business phone number is 202-487-4009. My position with the American Council for an Energy-Efficient Economy (ACEEE) is Associate Director for Research.

Q2: PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR EXPERIENCE.

A. I coordinate ACEEE's overall research efforts and am the lead author or contributing author to over a dozen research reports each year. Much of our recent work has focused on energy efficiency in the industrial and institutional sectors with particular attention to combined heat and power technologies. As a member of ACEEE's executive team, I participate in determining the strategic the direction of the organization and also have responsibilities extending to all aspects of the organization's operations.

I am an internationally recognized expert and author on energy efficiency, energy efficiency programs and policies, electric motor systems, combined heat and power (CHP) and clean distributed energy, and analysis of energy efficiency and energy markets, plus a frequent speaker at domestic and international conferences.

In 1994, I was a technical advisor to the energy efficiency collaborative with Public Service Indiana (PSI).

Prior to joining ACEEE in 1993, I was an adjunct associate professor of Civil and Environmental Engineering at Duke University and Senior Engineering Project Manager at the N.C. Alternative Energy Corp. (now Advanced Energy) where I was founding

director of the Industrial Energy Laboratory. Prior to AEC, I worked as N.C. Wood Assistance Team Leader for the Industrial Extension Service and Department of Wood and Paper Science at North Carolina State University.

I earned a Bachelor of Science and a Master of Science in Mechanical Engineering from North Carolina State University, and was a Dean's Fellow and received a Ph.D. from Duke University. I am a registered Professional Engineer in North Carolina and have six patents in the area of thermal storage and produce processing. A copy of my Curriculum Vitae is attached.

Q3: HAVE YOU PREVIOUSLY TESTIFIED BEFORE PUBLIC UTILITY COMMISSIONS?

A: Yes. I have testified before several public utility commissions, state legislatures, and congressional committees. I have given the following testimony in 2013 related to industrial energy efficiency. (1) Ohio Senate Public Utilities Committee[1], on behalf of The Ohio Manufacturers Association (OMA), April 23, 2013, regarding Review of Ohio Senate Bill 221 and its Energy Efficiency Provisions; (2) U.S. House Subcommittee on Energy and Power[2], February 26, 2013; and (3) Louisiana Public Service Commission on June 26, 2013[3].

Q4: WHAT IS THE PURPOSE OF YOUR TESTIMONY?

[1] http://www.aceee.org/files/pdf/testimony/elliott-ohio-senate-utility-committee.pdf

[2] http://www.aceee.org/testimony/elliott-house-energy-and-power

[3] http://www.lpsc.louisiana.gov/_docs/_agendas/6-26-2013%20Supplemental%20Agenda.pdf

A: The purpose of my testimony is to (1) explore the perceived barriers that have kept a robust energy-efficiency program from reaching its full potential in the industrial and large-commercial customer sector in Indiana; (2) review those companies and jurisdictions that have been especially effective in meeting these challenges through an approach referred to as self-direct; and (3) suggest that combined heat and power[4] can and should be a key part of a successful self-direct program approved by the Commission in this proceeding.

Q5: PLEASE BRIEFLY DESCRIBE THE WORK OF ACEEE IN ANALYZING REGULATORY POLICY OF DEMAND RESPONSE PROGAMS.

A: The American Council for an Energy-Efficient Economy (ACEEE), a nonprofit, 501(c)(3) organization, acts as a catalyst to advance energy efficiency policies, programs, technologies, investments, and behaviors. We believe that the United States can harness the full potential of energy efficiency to achieve greater economic prosperity, energy security, and environmental protection for all. ACEEE carries out its mission through various research and education efforts. Since its founding in 1980, ACEEE has become known as America's leading center of expertise on energy efficiency policy, programs and technologies. That reputation is based on the high quality, credibility, and relevance of our work, as well as our bipartisan approach. ACEEE's thorough and peer-reviewed technical work is widely relied on by policymakers, business and industry decision-makers, consumers, media, and other energy professionals. ACEEE has more than thirty professional staff with backgrounds in science, economics, engineering, public policy,

[4] A useful definition of Combined Heat and Power (CHP) can be found on the U.S. EPA CHP Partnership website: http://www.epa.gov/chp/basic/index.html

utility regulation and energy efficiency program management. Several staff members are lawyers, Certified Energy Managers, Professional Engineers and have earned doctorates. Among ACEEE's best known work is our State Energy Efficiency Policy Scorecard, which analyzes and ranks each state on their policy and program efforts, documents best practices, and provides recommendations for ways in which states can improve their energy efficiency performances. The State Scorecard,[5]now in its 7th edition serves as a benchmark for state efforts on energy efficiency policies and programs each year, encouraging states to continue strengthening efficiency commitments as a pragmatic and effective strategy for securing environmental benefits and promoting economic growth. A key element in analyzing each state's energy efficiency programs, the Scorecard evaluates state policies, programs and regulations for advancing investment in combined heat and power.

A more complete description of our work, especially our focus on energy policy, can be found at www.aceee.org.

Q6. PLEASE EXPLAIN THE SPECIFIC STEPS TAKEN TO PREPARE YOU TO PROVIDE THIS TESTIMONY IN INDIANA.

Through my work at ACEEE, policies of state legislatures and commissions are under constant evaluation and analysis. Indiana is no exception and has been included in a number of ACEEE evaluations, such as those referenced later in my testimony. Additionally, in preparing this testimony, I reviewed and consulted a number of documents either produced by or approved by this Commission, including Orders in

[5] Ben Foster, et. al. 2012. *The 2012 State energy Efficiency Scorecard*. ACEEE Research Report E12C. http://www.aceee.org/research-report/e12c

Docket Numbers 43955 (Duke EE Riders)[6] and 42693-S1 (DSM plans)[7], as well Dr. Brad Borum's Staff Report[8] in this Cause. I also have reviewed some of utility-specific DSM plans on file with the Commission.

I have done so with a focus on addressing the questions raised by the Commission in its March 28, 2013 order, setting the scope of this proceeding, to wit:

> *1. Whether the Commission should consider approval of a structured self-direct DSM program for large customers served by jurisdictional electric utilities and a discussion of the reasons that such a program should or should not be approved.*
>
> *2. If the Commission should consider approval of a structured self-direct program, the specific details concerning the recommended program, including:*
>
> *a. Customer and project eligibility requirements, including the appropriate minimum threshold and whether and how to allow multiple facility aggregation;*
>
> *b. Appropriate program incentive offerings, funding mechanism and use of funds;*
>
> *c. Funding and program oversight, including the evaluation, measurement and verification of energy savings;*
>
> *d. Relationship of the program with the utilities' existing Core and Core Plus DSM programs; and*
>
> *e. Whether and how the currently available Core Plus custom programs may be used or modified to provide for a structured self-direct program.*
>
> https://myweb.in.gov/IURC/eds/Modules/IURC/CategorySearch/viewfile.aspx?contentid=0900b6318019c1f4 (Order at 2).

Q7: PLEASE EXPLAIN YOUR UNDERSTANDING OF THIS PROCEEDING AND HOW IT RELATES TO A GOAL OF ENHANCING ENERGY EFFICIENCY.

A: Energy efficiency represents the least cost resource available to Indiana in meeting its short and long-term energy needs. As demonstrated by the experiences of other Midwest states, large customers represent among the most cost-effective opportunities for energy

[6] https://myweb.in.gov/IURC/eds/Modules/IURC/CategorySearch/viewfile.aspx?contentid=0900b6318018536c

[7] https://myweb.in.gov/IURC/eds/Modules/IURC/CategorySearch/viewfile.aspx?contentid=0900b6318015884b

[8] https://myweb.in.gov/IURC/eds/Modules/IURC/CategorySearch/viewfile.aspx?contentid=0900b6318019b3bb . I note with gratitude that Dr. Borum referred to several ACEEE research reports in his own presentation.

efficiency savings and demand reduction. It is thus important that these savings be included in any energy efficiency program portfolio to insure that all customers benefit from lower energy efficiency resource costs. Establishing a new demand side management option that provides large industrial customers flexibility in concert with fulfilling their obligation could insure that these important energy efficiency resources are available to the Indiana marketplace. The addition of these low-cost efficiency resources would lower the overall demand for energy to suppress future energy prices for customers of all classes including large customers as ACEEE's recent analysis in Ohio[9] demonstrated. The "self-direct" style of program being considered by the Commission could address many of the large customers' concerns while creating unique opportunities for large customers to take advantage of their energy efficiency opportunities. Involvement of large customers in energy efficiency goals will ensure that the full electric price containment benefits of energy efficiency are available to all customers.

Q8. PROVIDE A SUMMARY OF YOUR TESTIMONY AND RECOMMENDATIONS HERE.

A: Based upon my experience in the analysis of ratepayer funded energy efficiency programs, properly constructed industrial energy efficiency programs offer some of the lowest cost energy resources available. Our analysis of successful programs in other states indicates that similarly structured programs could work in Indiana. In addition to reducing customer costs, energy efficiency can also reduce overall system costs and

[9] Max Neubauer, Ben Foster, R. Neal Elliott, David White, and Rick Hornby. 2013. *Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State*, ACEEE Research Report E 138, http://aceee.org/research-report/e138

improve reliability. We recommend stakeholders in Indiana work together to devise a self-direct program that meets the needs of large commercial and industrial customers while also meeting the long term energy needs of the State of Indiana and have included a framework to start that discussion.

Q9. DESCRIBE THE OPPORTUNITY FOR UNREALIZED ENERGY EFFICIENCY THAT IS PRESENTED HERE VIA INDUSTRIAL AND LARGE COMMERCIAL CUSTOMERS.

A. Large industrial and commercial facilities represent some of the greatest opportunities to mitigate future investments in new generation and transmission. Because many of the facilities are energy-intensive economies of scale can be realized. As energy costs are often part of a manufacturing facility's variable cost of production, there are existing motivations to leverage. Specifically, 31% of the nation's energy use is in manufacturing[10] much of concentrated in energy-intensive industries such as the primary metals, chemical, forest products, and automotive sectors that have significant representation in Indiana.

While the cost of energy efficiency overall ranges from 2 to 6 centers per kWh[11], the program cost for the industrial sector tended to be at the lower end of that range[12]. This cost effectiveness presents an opportunity to avoid more costly investments in utility

[10] U.S. DOE Energy Information Agency (EIA)

[11] Katherine Friedrich, Maggie Eldridge, Dan York, Pattie Witte and Marty Kushler,. 2009. *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs.* ACEEE Report No. U092.

[12] Anna Chittum and Seth Nowak. 2012. *Money Well Spent: 2010 Industrial Energy Efficiency Program Spending.* ACEEE Report No. IE121.

infrastructure in the future. As the Indiana economy recovers and old commercial and industrial facilities are updated and new ones built. Encouraging investments in energy efficiency now locks those savings in for many years to come.

Many facilities in Indiana also have an opportunity to improve their energy efficiency and reliability through investments in high-efficiency distributed generation. As I will discuss later in my testimony this suite of technologies known as Combined Heat and Power (CHP) offers customers, utilities, and other stakeholders many benefits.

Q10. WHY HAVE SOME LARGER CUSTOMERS BEEN SLOW TO FULLY EMBRACE ENERGY-EFFICIENT PROGRAMS?

A. Large industrial customers often resist participation in energy efficiency programs because from their perspective they are already motivated by the market to make investments in energy efficiency that are cost effective. While conceptually this is an appealing rationale, ACEEE research has demonstrated it to be untrue[13]. Many firms conflate capital allocation decisions with evaluations of cost effectiveness. Market forces on the macro scale are complex, imprecise and seldom without flaws. Within individual organizations, they are filtered by complex considerations that go beyond simple economic considerations. Not the least of these are situations arising from a capital allocation decisions made by firms (e.g., the desire for very short-term "payback" requirements) that leave many energy efficiency opportunities un-captured, particularly

[13] Anna Chittum. 2011. *Follow the Leaders: Improving Large Customer Self-Direct Programs*, ACEEE Research Report 112, http://aceee.org/research-report/ie112.

CHP.[14] The result is that numerous and significant cost-effective energy efficiency opportunities exist if the funds are available.

Q11. ARE THERE MORE FORMIDABLE CONCERNS THAT ARISE FROM THE CERTAINTY OF A PROGRAM?

A. Yes. Large customers do have two important, legitimate concerns about utility energy efficiency programs: are the program offerings available to the large customers responsive to the firms' energy efficiency needs; and do these programs subsidize competitors' operations?

Q12. HAS THERE BEEN A REGULATORY RESPONSE TO THESE CONCERNS?

A. Yes. In response to these concerns, a new form of program structure has emerged—the self-direct program. In a self-direct program, all or a portion of the energy efficiency charge or rider that a large customer pays is allocated to the customer for energy efficiency investments by that firm. ACEEE has studied 23 of these programs and found a wide variation in structure and requirements[15].

Q13. DO ANY OF THESE PROGRAMS STAND OUT AS WORTHY OF SPECIAL ATTENTION BY THIS COMMISSION?

[14]. R. Neal Elliott 2012. "Combined Heat and Power Is Heating Up, But Are We Ready to Take Advantage of the Opportunity?" ACEEE Blog http://aceee.org/blog/2012/01/combined-heat-and-power-heating-are-w.

[15] Ibid

A. Yes. Among the more interesting of these programs are those offered by Xcel Energy in Colorado, Rocky Mountain Power (RMP) in Utah and Wyoming, and Puget Sound Energy (PSE) in Washington State.

Q14. PLEASE DESCRIBE THESE PROGRAMS IN MORE DETAIL, STARTING WITH XCEL ENERGY-COLORADO.

A. Xcel Energy runs its self-direct program like any other industrial offering. The same staff offer custom, prescriptive and self-direct programs to industrial and large commercial customers with average demand greater than 2MW. Self-direct customers continue to pay into the program through unitary charges and are reimbursed through a rebate. Customers may earn rebates of up to 50% of the incremental project costs, up to a cap of either $525kW or 10 cents per kWh. If customer choose to self-direct, they may not take advantage of Xcel Energy's other incentive and rebate programs.

Xcel Energy holds its self-direct customers to the same cost-effectiveness tests as any of its other efficiency customers. While self-direct customers provide their own engineering analysis, they must meet the same total resource cost tests as all the other industrial and commercial offerings. Customers can get pre-approval for self-direct projects from Xcel technical staff and have two years to complete the project and earn their rebate. Xcel is responsible for reviewing project implementation and project total resource cost analysis.

Xcel Energy is "just as confident" in the savings reported by self-direct customers as in savings reported through its other efficiency programs. It views its self-direct program as

equally responsible for producing efficiency that maximizes ratepayer funds and believes that self-direct program is a "good steward" of ratepayer funds.

Xcel Energy does not offer credit for previously made efficiency investments. Its position is that its self-direct program can only claim savings that they have "influenced" and that this is in keeping with the position regulators have taken on other programs regarding issues of free ridership and cross subsidization.

Q15. DESCRIBE ROCKY MOUNTAIN POWER'S PROGRAM IN UTAH AND WYOMING.

A. Although not generally thought of as industrial states, both Utah and Wyoming have many large energy-intensive industrial facilities. Many of these are associated with the primary metals industries just as in Indiana. Rocky Mountain Power (RMP) views its self-direct option as one of a suite of programs targeted at industrial and large commercial entities. RMP's self-direct program is a project-based rate credit program that offers up to 80% credit of eligible project costs back to customers as a rate credit against the 3.7% cost-recovery charge all customers pay. RMP even allows customers to aggregate multiple meters to meet the program's minimum use requirements, and customers can also spread the rate credit among multiple meters. Eligible self-direct projects must have a payback of 1-5 years and must meet other cost-effectiveness tests as required.

RMP finds its self-direct program to be highly cost-effective, with Total Resource Cost test results very similar for self-direct projects as other demand side management program projects. It believes that its rate credit approach encourages greater efficiency among its participants because as a self-direct customer begins to near the end of a current credit period it is more likely to seek out new efficiency projects in order to avoid paying the full cost recovery fee. RMP finds customer satisfaction to be very high in its self-direct program and does not believe the administration of the self-direct program has any negative effects on the administration of its other demand side management programs.

Q16. DESCRIBE THE UNIQUE FEATURE OF PSE'S PROGRAM.

A. PSE self-direct program is unique in the country in that it is a long-term program (spanning multiple years) that combines a dedicated incentive funding structure based on customer contributions with a competitive bidding process for funds unused by the customers at the end of the period. Companies that take service from PSE under several rate schedules are eligible to participate in the self-direct program, but most become eligible due to their taking of 3-phase service at greater than 50,000 volts.

Self-direct customers continue to pay their energy efficiency charge, but PSE tracks individual customer contributions for their own individual use. Customers have access to 82.5% of their contributed change. PSE retains 7.5% for administration of the program, and 10% to fund certain broad energy efficiency efforts jointly funded by all customers (e.g., market transformation activities of the Northwest Energy Efficiency Alliance).

While participants in other PSE commercial and industrial programs are limited to maximum incentives of 70% of measure cost, self-direct customers may fund up to 100% of measure cost.

After an initial non-competitive phase (e.g. 24 months) of a program cycle, all unused funds are pooled together into a public pool of funds, and PSE issues a competitive RFP for program-eligible customers to compete for remaining funds. The projects funded as a result of this competitive bid process are generally more cost-effective than those funded during the first two years, as customers compete against each other to make an economic case for their projects.

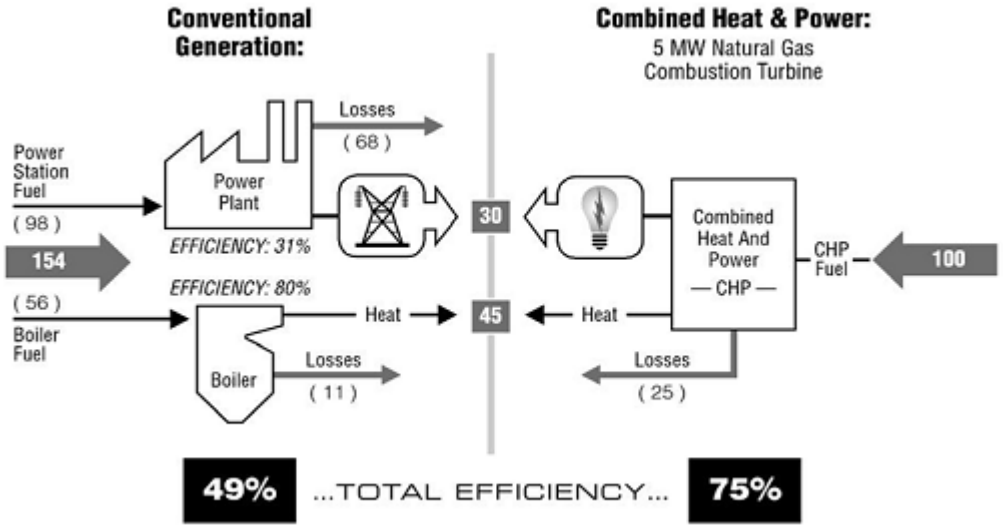
All projects must meet PSE's avoided cost requirements. Though the customer submits their own proposal and measurement and verification plan, PSE reviews the proposal and plan. Upon approval, PSE enters into a funding allocation agreement with the company and conducts a post-installation inspection after the measure is implemented.

Q17. WHAT LESSONS CAN BE DRAWN FROM PROGRAMS SUCH AS THESE?

A. The prime takeaways are that creative plans can be put into place that offer incentives to induce investment in energy efficiency in a manner that maximizes benefits for participants and non-participants alike, and that large customer concerns about program responsiveness and competitor subsidization can be addressed.

Q18. WHAT IS COMBINED HEAT AND POWER (CHP) AND WHAT IS THE IMPORTANCE OF IT TO INDUSTRIAL ENERGY EFFICIENCY?

A. Among the most important energy efficiency opportunities in the industrial sector is combined heat and power (CHP), which generates power and thermal energy simultaneously in an integrated system. By virtue of its ability to provide both thermal and electrical power, CHP is more efficient than traditional generation technologies and as such has the ability to lower costs for host facilities as well as utilities and all other customers. [16] As depicted in the graphic below, CHP technologies are much more efficient than separate generation and thermal energy system because heat that is normally wasted in conventional power generation is recovered to meet existing thermal demands. Benefits to owners include: lower overall energy costs, improved reliability and reduced thermal energy consumption..



[17]

[16] The U.S. Department of Energy's definition of CHP can be found on-line at: http://www1.eere.energy.gov/manufacturing/distributedenergy/chp_basics.html

[17] Source: U.S. Environmental Protection Agency (EPA)

Benefits to utilities and the electrical system include: reduced system energy consumption and overall emissions, reduced demand and grid congestion, deferred or avoided investments in generation and distribution infrastructure, improved system reliability[18] and diversity, and enhanced energy security[19]. These benefits are well known in Indiana as there are already three dozen facilities in the state with over 2200 MW of installed capacity.

Q18. PLEASE DISCUSS THE MERITS OF INCLUDING AND PROMOTING COMBINED HEAT AND POWER WITHIN A SELF-DIRECT PROGRAM.

A. Including CHP as an eligible technology in a self-direct program is an efficient mechanism to address the opportunity and one that also eliminates the need to address it elsewhere. Many states include CHP in their renewable portfolio or energy efficiency resource standards (RPS, EERS). Depending upon the RPS or EERS goals, a single large CHP system might by itself meet that target thereby discouraging other investments in renewable energy or energy efficiency.

The system benefits of CHP can be determined on a performance basis that provide credit to the customer in an unbiased method. Investments in lower efficiency technology are not prevented nor discourage while investments in higher efficiency technologies are rewarded. While the contribution of CHP to an RPS or EERS might be limited for the reason cited above, there would be no need to do so in a self-direct program.

[18] Anna Chittum, 2012, "How CHP Stepped Up When the Power Went Out During Hurricane Sandy," ACEEE Blog, http://aceee.org/blog/2012/12/how-chp-stepped-when-power-went-out-d

[19] DOE SEE Action. 2013. *Guide to Successful Implementation of State Combined Heat and Power Policies*. http://www1.eere.energy.gov/seeaction/chp_policies_guide.html

Including CHP in a self-direct also opens up an easier method for customers to include such systems in larger projects. Customers would need to work with only one program as opposed to two if the credits for CHP were to come through a separate program such as an RPS or EERS.

Administratively for utilities, the burden is likely to be lower with one program than two. Treating CHP as any another energy efficiency investment as opposed to something with special status is likely to be easier as well.

Q19. IS THE TIMING RIGHT FOR INDIANA TO MORE AGGRESSIVELY PURSUE THESE ENERGY ECONOMIES VIA CHP?

A. Yes, I believe it is, and here is why. The determination of that value that CHP brings to a system is dependent upon many variables but in general is the difference between the additional fuel required by the CHP system to produce a given amount of power and the average fuel required to produce an equal amount by conventional electricity generation in the state. Conventional utility generation is around 33% efficient[20] at delivering electricity to customers, while the conversion of the incremental fuel required for a CHP system to generate electricity is above 75% efficient[21].

Self-direct customers investing in CHP would receive credit for the net difference between the incremental fuel required for the CHP system compared to the average grid generated electricity in the state. As the savings is on-going, credit could be performance

[20] DOE Energy Information Administration Annual Energy Review 2007

[21] DOE. Oakridge National Laboratory. 2008. *Combined Heat and Power, Effective Energy Solutions for a Sustainable Future*. http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_report_12-08.pdf

based for a predetermined period of time and provided upon a quarterly or annual verification.

Future retirement of coal-fueled generation is another reason for Indiana to give increased consideration to CHP. In recent analysis[22] we determined that Indiana could replace up to 21 percent of the potential retirements with CHP if utilities and large customers are provided the proper incentives. In our analysis, we determined that there exists approximately 56 MW of CHP that is currently economically viable, but that number increases to 611 MW with a market structured to encourage such investments.[23]

The lower number is possible with proper signals from utilities such as inclusion in a resource planning standard, favorable interconnection standards and standby rates, and greater natural gas price stability. The larger number requires policies that put CHP on par with other generation assets a utility or power generation company might pursue[24]. As CHP is a cleaner technology than conventional generation, it is also a potential mechanism to meet the requirements of the State Implementation Plan (SIP) for reducing NO_x levels. Indiana's SIP includes energy efficiency set-asides that provide credits to projects that reduce electricity consumption. Since CHP is at least 40 percent more efficient than central generation, it could be an eligible technology for the energy

[22] Anna Chittum and Terry Sullivan. 2013 *Coal Retirements and CHP Investment Opportunity*, ACEEE Research Report IE 123, http://www.aceee.org/sites/default/files/publications/researchreports/ie123.pdf

[23] Even this number may be on the conservative side. I am aware of estimates by other research groups that place the potential CHP in Indiana at a much higher level.

[24] Ibid.

efficiency set-asides. Credits for CHP system could be developed using an output-based measurement system and provided to CHP installations on a net NO_x reduction basis.

Q20. WHAT CONSIDERATIONS SHOULD GUIDE THE COMMISSION HERE?

A. ACEEE feels that an approach similar to the examples above should be considered in Indiana. To be successful, the details of a proposal need to be worked out in a dialog among all stakeholders. We suggest the following structure as a starting point for these discussions with the explicit understanding that suggested values are subject to negotiation:

- Large customers currently participating in Core Plus program could elect to participate in a self-direct option. Their obligation to pay the energy efficiency rider would not change however the utility would track these payments.
- The majority of the payments, we suggest 90%, be reserved for the customer to receive back to make investments in energy efficiency in its own facilities. Once a project is proposed, the customer requests release of the funds to pay for the project.
- Customers can use self-direct fees to cover up to 80% of project costs. These costs would be recovered as credits applied against monthly charges until the eligible project cost is met.
- Customers will have three years to spend the "escrowed" portion of the funds for energy efficiency investments. This will encourage larger and more complex projects.
- If after three years a firm has not used all the funds in its escrow account, the utility should pool all remaining funds from self-direct customers and make these funds able to

other customers on a competitive basis, using cost of energy savings as the determining factor.

- Combined heat and power projects should be eligible for funding. The net energy savings benefit should be determined on a performance basis.
- Projects should meet the same cost effectiveness criteria as Core Plus projects. Measurement and validation could be left to customers provided there is a vetting and approval process by the utility.
- A small portion of the payments, we suggest 10%, would be used by the utility for administration of the program including educational programs that benefit large customers and evaluation of the savings, thus ensuring that this program is working successfully and the investments meet cost effectiveness requirements specified by the Commission.

Once a customer elects the self-direct option, it should accept that it has an obligation to provide the utility with the information it needs for proper resource planning. With such an agreement and effective measurement and validation, a self-direct program has the potential to deliver lowest cost energy resources to the statewide DSM program.

Q21. WOULD SUCH AN APPROACH EFFECTIVELY ADDRESS CONCERNS RAISED OVER SUCH A PROGRAM IN OTHER FORUMS?

A. Yes. Implementing such a self-direct option for large consumers should address the primary concerns we have heard from large consumers:

- *Getting value from the energy efficiency rider assessed by utility:* The funds paid by the large customers should be available to fund energy efficiency projects in their own facilities, and should be prioritized to meet the strategic needs of the company. The creation of a dedicated energy efficiency fund is a strategy that a number of large companies such as BASF and the Dow Chemical Company have used to ensure that funds are available for these strategically important investments to the firm. This pool of funds also allows customers to receive internal approval for energy efficiency projects that may have previously been ignored or not prioritized.
- *Subsidization:* Funds should be reserved for each customer so that concerns about subsidization of competitors or other customer classes is addressed.
- *Responsiveness:* Responsibility to prioritize projects should stay with customers. This should address concerns about program responsiveness and cost effectiveness.

Q22. MIGHT THIS CREATE SOME ADDITIONAL MARKET OPPORTUNITIES FOR PARTICIPANTS?

A. Yes. In addition to the direct savings that the large customer can realize from energy efficiency investments, they could also bid these energy efficiency savings into the wholesale market. Depending upon the wholesale market structure in place in the future, customers could choose to bid these in themselves, aggregate through a third-party, or choose to have the utility bid these into the market on their behalf acting as an aggregator.

Q23. WILL THIS ALSO ADDRESS CONCERNS OF NON-PARTICIPANTS?

A. Yes. From the general consumer's perspective this approach ensures that the low-cost energy efficiency savings available from large customers are available to reduce market demand and help contain future electricity price increases. By having the utility responsible for evaluation, other consumers can be assured that the investments result in cost-effective savings. This approach also assures consumers that savings are realized in the most cost effective manner and that energy costs are kept lower for everyone, including large consumers.

Q24. CAN YOU SUMMARIZE YOUR RECOMMENDATIONS?

A. Yes. The Commission should move forward with a self-direct program that recognizes and encourages investments in energy efficiency by industrial and large commercial customers. CHP should be considered among the energy efficiency investment opportunities that are included under this self-direct program. There is a significant amount of capacity in play and the Commission should support its timely production and incorporation into the state's resource mix.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

CERTIFICATE OF SERVICE

I, Robert K. Johnson, certify that the attached Direct Pre-Filed Testimony of R. Neal Elliott, Ph.D. was served upon all persons on the Commission's official service list this 27th day of June 2013.

/s/ *Robert K. Johnson*
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Current Responsibilities

Coordinates ACEEE's overall research efforts, manages research and program staff, and conducts research on industrial and agricultural energy efficiency and combined heat and power (CHP). Previously was a Senior Associate, from1995-2008, and a Research Associate, from 1993-1995, at ACEEE. Prepares analyses of industrial energy use, efficiency potential and technology development, and proposals of policies to promote greater efficiency. An internationally recognized expert and author on energy efficiency, energy efficiency programs and policies, electric motor systems, CHP and clean distributed energy, and analysis of energy efficiency and energy markets. Develops government and private sector initiatives on Combined Heat and Power, and is the past president, past board and executive committee member, and past Chair of the Legislative Policy Committee of the U.S. CHP Association. Oversaw the establishment of ACEEE's State Clean Energy Resource Project that collects data on state energy efficiency policies, oversaw the development of ACEEE's annual State Policy Scorecard, and prepares state-specific energy efficiency potential and policy assessments. Is a frequent speaker at domestic and international conferences.

Research Areas of Interest

- Industrial energy efficiency technologies, programs and policies
- Combined heat and power (CHP) and distributed energy
- Energy markets (including natural gas, oil, coal and electricity)

PREVIOUS EXPERIENCE

Engineering Project Manager (1986-1987) 1986 - 1993
Senior Engineering Project Manager (1987-1993)
North Carolina Alternative Energy Corporation
Responsibility in the Agricultural and Industry Program areas including work with the furniture, textile and word products manufacturing, and produce and poultry industries. Of particular note is the nationally recognized poultry lighting retrofit activities and produce-cooling, annual-thermal-storage demonstration. Team leader on a $1 million agricultural thermal storage demonstration project, and developed the concept and over saw the establishment of the Industrial Electrotechnology Laboratory, a demonstration and technical assistance facility located at North Carolina State University.

Adjunct Assistant Professor, Department of Textile Engineering, Chemistry and Science 1991 - 1992
North Carolina State University
Participated in research activities, lectured to textile engineering students, advised textile engineering students on their senior projects and served as a resource to graduate students.

Adjunct Assistant Professor, Department of Civil and Environmental Engineering 1986 - 1992
Duke University

Taught engineering analysis course, participated in research activities.

EDUCATION

Duke University – Ph.D., Civil and Environmental Engineering 1986
Dean's Fellow, College of Engineering – 1983

North Carolina State University – MS, Mechanical Engineering
1981

North Carolina State University – BS, Mechanical Engineering
1978

REPRESENTATIVE PUBLICATIONS

Louisiana's 2030 Energy Efficiency Roadmap: Saving Energy, Lowering Bills, and Creating Jobs. 2013. ACEEE.

Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State. 2013. ACEEE.

Saving Money and Reducing Risk: How Energy Efficiency Enhances the Benefits of the Natural Gas Boom. 2012. ACEEE.

A Defining Framework for Intelligent Efficiency. 2012. ACEEE.

The Long-Term Energy Efficiency Potential: What the Evidence Suggests. 2012. ACEEE.

Avoiding a Train Wreck: Replacing Old Coal Plants with Energy Efficiency. 2011. ACEEE.

Where Have All the Data Gone? The Crisis of Missing Energy Efficiency Data. 2010. ACEEE.

Energy Efficiency in the American Clean Energy and Security Act of 2009: Impacts of Current Provisions and Opportunities to Enhance the Legislation. 2009. ACEEE.

Industrial Energy Efficiency Programs: Identifying Today's Leaders and Tomorrow's Needs. 2009. ACEEE.

Trends in Industrial Investment Decision Making. 2008. ACEEE.

PROFESSIONAL ACCOMPLISHMENTS

Member Strategic Advisory Group, Institute for Industrial Productivity

Member Advisory Board Industrial Energy Technology Conference, 15-year service award

Licensed Professional Engineer in North Carolina, Seal No. 14483

U.S. Combined Heat and Power Association, 2003 Combined Heat and Power Champion

International District Energy Association, 1999 Chairman's Award