ACEEE Testimony

American Council for an Energy-Efficient Economy

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To the New Jersey Board of Public Utilities

Hearing on:
Revised CRA Straw Proposal

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Introduction

I am here testifying on behalf of the American Council for an Energy-Efficient Economy (ACEEE), a national nonprofit organization that has worked on energy efficiency programs and policies for more than 30 years. We have also been involved in various New Jersey energy efficiency issues since the 1990s. I serve as ACEEE's Executive Director.

In our opinion the Revised CRA Straw Proposal contains some very useful analysis and information, but overall the level of funding and savings recommended falls significantly short of what would be a least-cost path for New Jersey ratepayers. New Jersey used to be a leader in energy efficiency programs but in recent years has fallen to the "middle of the pack" and the Revised Straw Proposal would continue this situation. In this testimony I will make some recommendations on how the proposal and programs can be improved over a several-year period, increasing benefits for ratepayers without requiring a rate increase this next year.

In the following sections I discuss:

- Why Utility Energy Efficiency Programs?
- Energy Efficiency and Jobs
- Best Practices for Utility-Sector Energy Efficiency Programs Around the Nation and New Jersey's Relative Performance
- Review of the Revised Straw Proposal
- Conclusions

Why Utility-Sector Energy Efficiency Programs?

The primary reason most states encourage and support utility-sector energy-efficiency programs is to save consumers money. This is reflected under policy goal two in the Revised CRA Straw Proposal, which is to "reduce the total cost of energy to consumers, both residential and business, thereby enhancing the competitiveness of New Jersey's economy." Energy efficiency programs generally save consumers money because they reduce energy consumption and because it generally costs a utility less to save a kWh than to generate a kWh, and these cost savings are passed on to consumers. Energy efficiency programs particularly make sense if new power plants will be needed in future years, since energy efficiency programs generally cost utilities less than half the cost per kWh of building and operating a new power plant. This is illustrated in Figure 1 below. For energy efficiency, the costs are based on a 2009 ACEEE review of evaluation results from 14 states with extensive energy efficiency programs.[1]

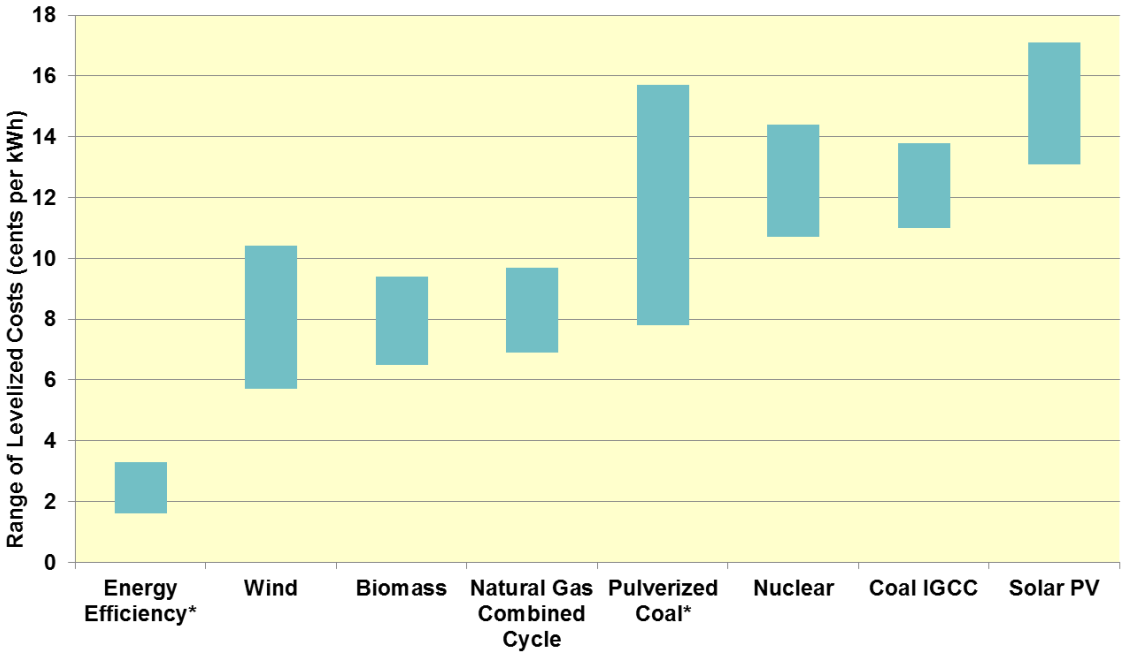
In the case of New Jersey, my understanding is that the Oyster Creek generating plant is due to close in 2019 and at that point its 630 MW output will need to be replaced. Energy efficiency programs can supply that load, but plans and budgets need to be put in place soon, so that the needed savings are fully in place by 2019.

This is illustrated by the following rough calculation:

[1] Friedrich et al. 2009. *Saving Energy Cost Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs.* Washington, DC: American Council for an Energy-Efficient Economy. https://www.aceee.org/research-report/u092.

276,348 MWh saved from NJCEP in 2011 per the Revised Straw Proposal
/ 4221 MWh/MW average for utility EE programs per U.S. DOE Energy Info Administration[2]
= 65 MW of generating capacity saved per year

Figure 1. Relative Cost per kWh of Different Utility System Resources



*Notes: Energy efficiency average program portfolio data from Friedrich et al. 2009 (ACEEE); All other data from Lazard 2012. High-end range of advanced pulverized coal includes 90% carbon capture and compression. [3]

In addition, it is unclear at this point if the new natural gas capacity that is associated with the Long-term Capacity Agreement Pilot Program (LCAPP) will go forward or not. Energy efficiency can make up any shortfall from this project, likely at lower cost given the more than $1 billion in potential subsidies involved.[4]

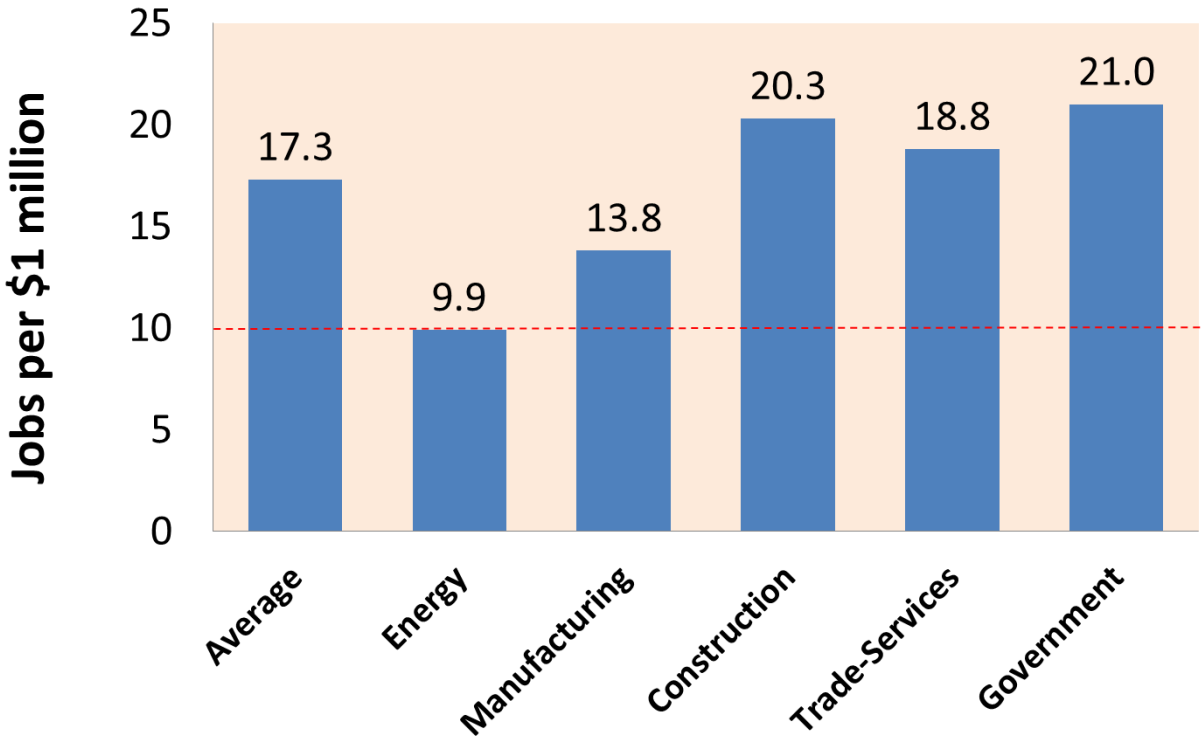
At current rate of savings, roughly 455 MW of capacity can come from energy efficiency programs over the 2014–2020 period (7 years times 65 MW per year). But as I discuss below, savings can be approximately tripled, resulting in more than 1,300 MW of new capacity by 2020.

Energy Efficiency and Jobs

Given the state of the economy, job creation is an important priority. Fortunately, energy efficiency tends to be very labor-intensive, helping to create jobs. First, jobs are created designing, manufacturing, and installing efficiency measures. Second, as consumers and businesses save on their energy bills, they respend the savings, generating additional jobs. Figure 2 shows how more jobs are generated per dollar invested in construction and services (where most of the energy efficiency jobs are) than in the energy sector (which is capital but not labor intensive).

[2] 4221 MW/MWh is the ratio of energy to demand savings for energy efficiency programs in 2010, the most recent year available in the EIA compilation of program impacts: http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0813.
[3] Lazard Ltd. 2012. "Levelized Cost of Energy Analysis—Version 6.0." New York, NY: Lazard, Ltd.
[4] Kaltwasser, Jared. 2012. "State Releases new LCAPP numbers." *NJBiz*. Oct. 3. http://www.njbiz.com/article/20121003/NJBIZ01/121009938&source=RSS.

Figure 2. Jobs per Million Dollars of Revenue by Key Sectors of the U.S. Economy



Source: ACEEE. 2011. *How Does Energy Efficiency Create Jobs*. http://www.aceee.org/fact-sheet/ee-job-creation. Based on input-output coefficients from the IMPLAN model.

Best Practices for Utility-Sector Energy Efficiency Programs Around the Nation and New Jersey's Relative Performance

Nationwide, in 2012, according to the Consortium for Energy Efficiency (CEE), U.S. utility-sector energy efficiency budgets totaled $7.1 billion. Energy efficiency budgets have been steadily increasing for more than a decade, as shown in Figure 3. This figure also shows projected future spending as estimated by Lawrence Berkeley National Laboratory.[5]

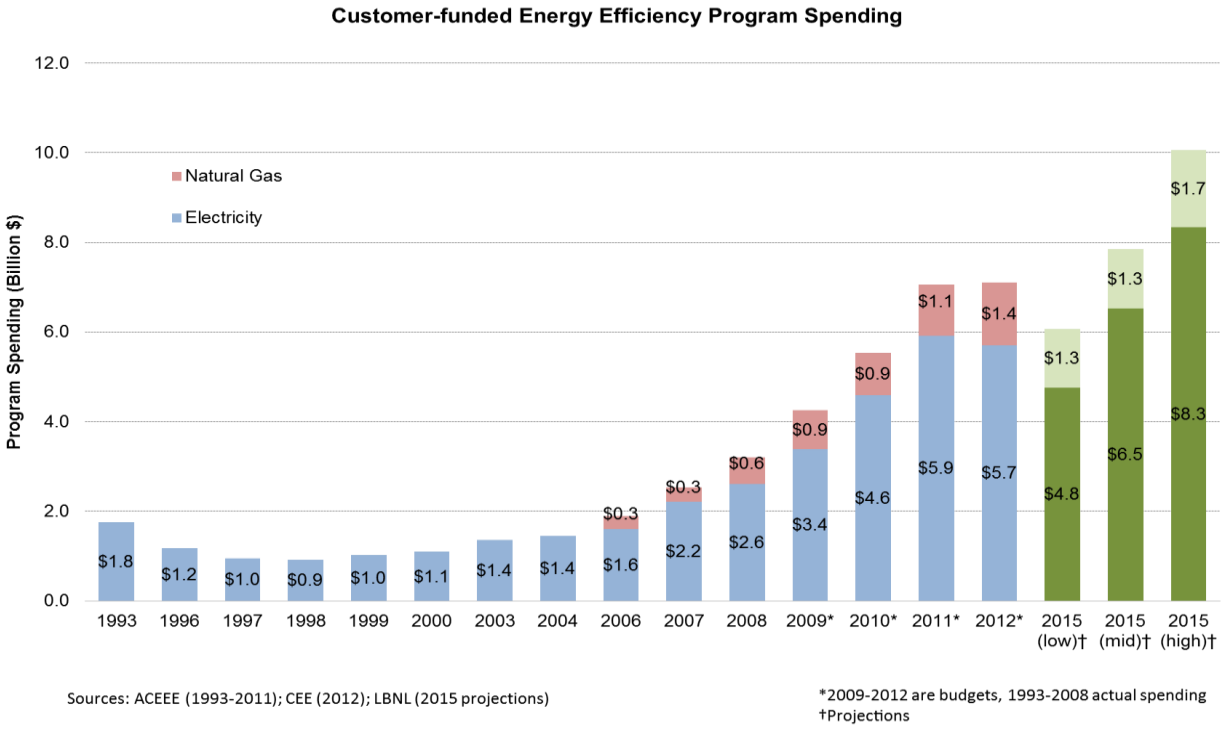
Likewise, energy savings achieved have also been steadily increasing. In 2010, *incremental* electricity savings (i.e., savings from measures installed in 2010) totaled 18.4 billion kWh, which was about 0.5% of national electricity sales.[6] In 2011, CEE estimates total annual electricity savings (i.e., savings in 2011 from measures installed in 2011 and in earlier years) totaled 117.4 billion kWh,[7] which was about 3.1% of national electricity sales.[8]

New Jersey, according to the ACEEE *2012 State Energy Efficiency Scorecard*, spends 2.05% of electric utility revenues on electricity programs, slightly more than the national average of 1.60%.

[5] Barbose et al. 2013. *The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025.* Berkeley, CA: Lawrence Berkeley National Laboratory. http://emp.lbl.gov/publications/future-utility-customer-funded-energy-efficiency-programs-united-states-projected-spend.
[6] Foster et al. 2012. *2012 State Energy Efficiency Scorecard*. Washington, DC: American Council for an Energy-Efficient Economy. http://aceee.org/research-report/e12c.
[7] CEE. 2013. *2012 State of the Efficiency Program Industry Report*. Boston, MA: Consortium for Energy Efficiency. http://library.cee1.org/content/2012-state-efficiency-program-industry-report/.
[8] Based on national 2011 electricity retail sales of 3750 TWh per EIA.

Incremental electricity savings were 0.4% of electricity sales, slightly below the national average. In contrast, the leading states are spending more than 5% of revenues and achieving incremental savings of about 2% of electricity sales. In the 2012 Scorecard, New Jersey ranks 13th among the American states in funding for electricity efficiency programs as a percent of utility revenues and 25th on incremental electricity efficiency savings achieved. On the other hand, New Jersey was 6th on natural gas efficiency spending per residential customer.

Figure 3. Funding for Utility Sector Energy Efficiency Programs in the U.S.



Sources: ACEEE (1993-2011); CEE (2012); LBNL (2015 projections)

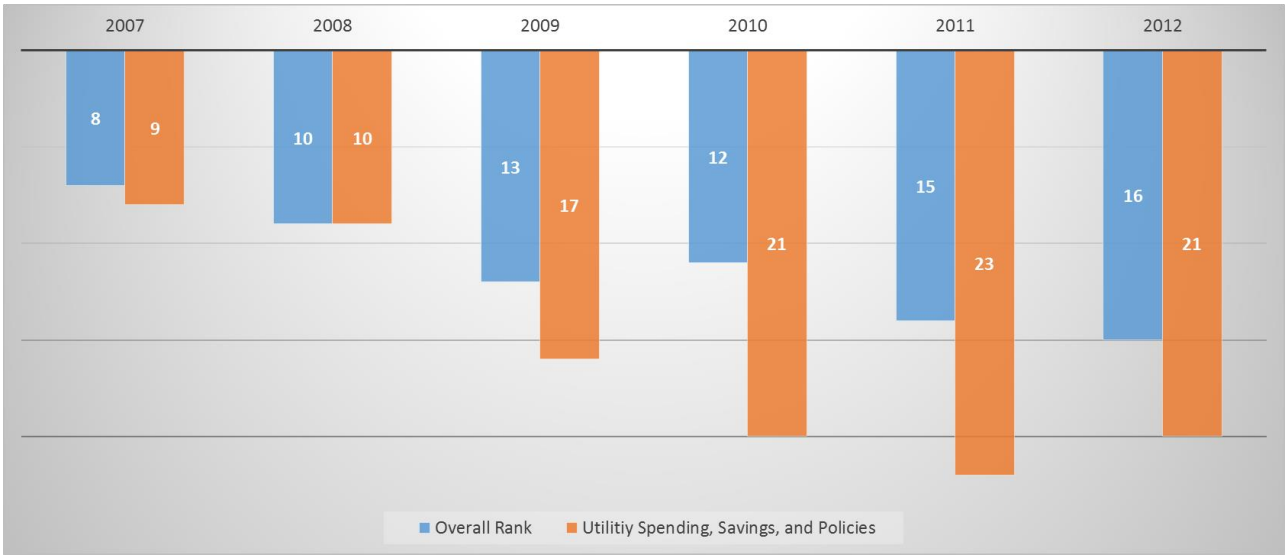
*2009-2012 are budgets, 1993-2008 actual spending
†Projections

More broadly, policy goal one in the Revised Straw Proposal is to "maintain New Jersey's leadership position in the promotion and use of energy efficiency and renewable energy, so the state remains attractive to new residents and business investment." Based on our research, as shown in our State Energy Efficiency Scorecards since 2007, New Jersey used to be in a leadership position, but in recent years New Jersey has been "middle of the pack." In our 2007 Scorecard, New Jersey ranked eighth overall and ninth on utility-sector spending, savings, and policies. Since then, New Jersey has steadily fallen in the ranks as other states have passed New Jersey. In 2012, New Jersey ranked 16th overall and 21st on utility spending, savings, and policies. This progress is illustrated in Figure 4.

Review of the Revised Straw Proposal

We have reviewed the Revised Straw Proposal and find many useful features in the proposal. For example, the proposal includes multiple analyses to help guide budget setting including a comparison with selected other states and studies by both EnerNOC and AEG. The proposal is correct in noting that program efforts for non-residential customers are limited and can usefully be expanded. The proposal also includes a substantial focus on combined heat and power (CHP), which both saves energy and can also provide critical backup power as experience during Super Storm Sandy showed. We also support the focus on improved program evaluation.

Figure 4. New Jersey's Rank in the ACEEE Energy Efficiency Scorecard, 2007–2012



Source: http://aceee.org/sector/state-policy/scorecard

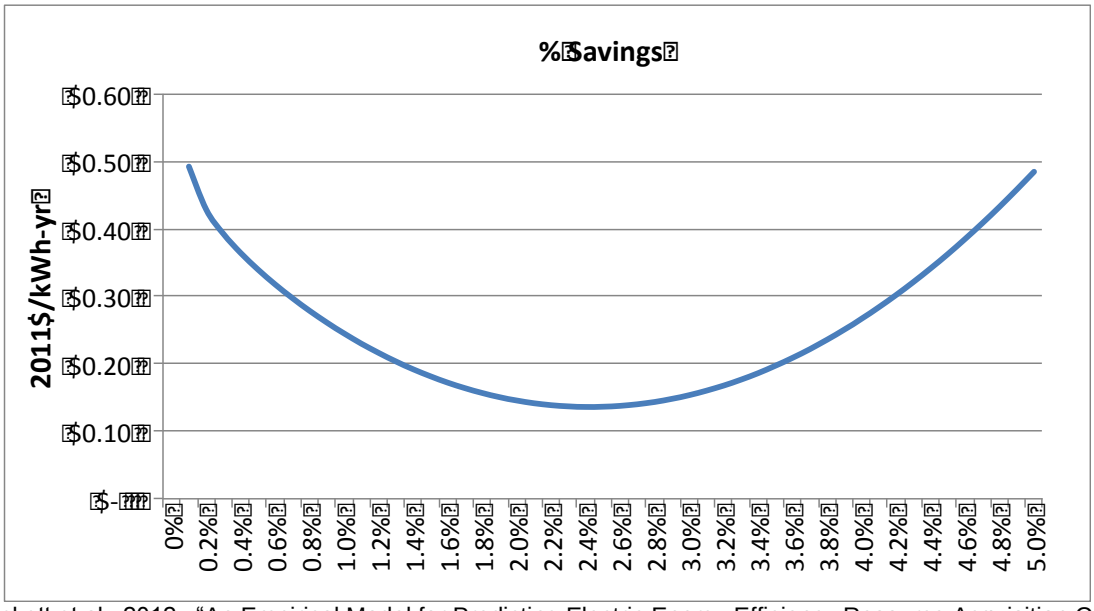
While there are many useful parts to the proposal, it falls short in a number of respects in our view.

First, since goal #1 in the proposal is for New Jersey to be a leader, then energy savings targets need to be set at leadership levels. In this regard, we suggest planning a ramp-up to about 1.5% per year electric savings as a percent of sales, and about 1.0%[9] per year natural gas savings. Regarding the electric target, Vermont has exceeded 1.5% for many years, California has exceeded this level in some years (e.g., 2010 and 2011), and Massachusetts and Rhode Island began reaching this level in 2012.[10] The EnerNOC summarized in the Revised Proposal found this level of savings in the "Achievable High Potential" scenario, and also nearly reaches this level in the 2016 "50/50 Scenario." Regarding the natural gas savings target, systematic data on gas savings is not readily available, but our understanding is that the 1% per year savings level has been achieved in Vermont (regularly) and Minnesota and Iowa (some years). ACEEE plans to collect more systematic data on this issue as part of our 2013 State Scorecard. Our suggestion for a 1% per year savings target included CHP, as discussed below. Without CHP, the target might need to be lowered to about 0.8% per year. The Revised Proposal calls for 0.8% per year residential savings, and we believe similar savings can be achieved for business customers.

In our experience, these electric and natural gas savings goals can be obtained cost-effectively. The Revised Proposal expresses the opinion that costs increase beyond about 1% per year electricity savings. We are not sure that this is the case. For example, an analysis by Plunkett et al. based on a regression analysis of actual cost data estimates that costs decline until savings reach 2.5% savings per year (see Figure 5), after controlling for other factors.

[9] This includes CHP, as discussed below. Without CHP, 0.8% might be a reasonable target.
[10] 2010 information from the ACEEE *2012 State Energy Efficiency Scorecard*. 2011 information is from data for a forthcoming ACEEE report. 2012 information from discussions with utilities in those states.

Figure 5. Percentage Savings Effect on Cost of Savings



Source: Plunkett et al. 2012. "An Empirical Model for Predicting Electric Energy Efficiency Resource Acquisition Costs in North America: Analysis and Application." In *Proceedings of the 2012 ACEEE Summer Study on Energy Efficiency in Buildings*. http://aceee.org/files/proceedings/2012/start.htm [look in author index under Plunkett].

Also, even if costs increase beyond 1% per year, as long as the programs are cost-effective, ratepayers will still save money. If programs are limited to 1% savings per year and cost-effective savings are left on the table, rates will go up more because the supply-side resources needed are more expensive than the demand-side resources. The Revised Proposal expresses concerns that increased energy efficiency budgets may increase costs for non-participants. But this concern ignores three ameliorating factors. First, non-participants one year may be participants in a future year. Over many years, experience by other program operators is that the vast majority of customers are participants. Second, if new power plants can be avoided, even non-participants may benefit from lower rates. For example, ACEEE just examined this issue for Ohio and found that while their energy efficiency programs will save participating consumers $3.4 billion through 2020, over the same period wholesale cost reductions that benefit all ratepayers (participants and non-participants) will save an additional $2.2 billion.[11] Third, all ratepayers help pay for new power plants, even if their electricity use is not increasing. Either the same should be applied to energy efficiency programs or some variation of the "no losers test" needs to be applied to new power plants.

Our suggested goals are roughly triple current efforts and we estimate it will take about three years to reach these savings targets. Thus, for example, on the electric side a goal of 1% savings can be set for the coming year (as proposed in the Revised Proposal), 1.25% in the second year, and 1.5% in the third year. A similar ramp-up can be established for natural gas savings.

Second, our understanding, based on discussions with several people familiar with the New Jersey programs, is that there is inadequate marketing of the programs. Marketing is as important as incentives for achieving high program participation rates. This is illustrated in Table 1 below from a study done many years ago on a solar and heat pump water heater program. Participation rates were substantially higher when marketing was combined with rebates. There are other studies with similar

[11] Neubauer et al. 2013. *Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State*. Washington, DC: American Council for an Energy-Efficient Economy. http://www.ohiomfg.com/communities/energy/OMA-ACEEE_Study_Ohio_Energy_Efficiency_Standard.pdf.

findings. If the only tool you have is incentives, then programs will cost more. We recommend that marketing efforts be ramped up over the next year so that the NJCEP can reach more citizens and businesses.

Table 1. Participation Results from BPA Pilot Program for Solar and Heat Pump Water Heaters

Treatment group	Number of sales	Sales per 1000 households
Low incentive, low promotion	4	1.9
Low incentive, high promotion	57	3.3
High incentive, low promotion	38	11.0
High incentive, high promotion	319	41.2

* Based on first two years of the program.

Source: Geller, 1986. "Lessons from Utility Experimentation with Appliance Efficiency Incentive Programs." In *Proceedings of the 1986 ACEEE Summer Study on Energy Efficiency in Buildings*, 6.50-6.54.

Third, we are troubled that substantial sums of money that are being collected from ratepayers to fund clean energy programs are not being spent, and instead returned to the general fund as surplus. In our view, if marketing were increased and programs for non-residential customers expanded, the budget could be fully spent. Non-residential programs are important because the commercial and industrial sectors are now under-served by New Jersey's programs and these sectors are generally where the largest and most cost-effective savings can be obtained.

Of course we realize that the Governor and Legislature have come to depend on these funds to help balance the budget. Also, with a new program administrator just getting started, time will be needed to ramp up programs to the levels we suggest. Therefore, we recommend that the BPU work towards a three-year budget for the NJCEP. Either a three-year budget could be included in a revised plan, or a one-year budget could be approved now, with a three-year budget starting next year. In either case, the budget for the next year can be as proposed in the Revised Proposal, but then ramping up actual clean energy spending over the next two or three years so as to reach our proposed savings targets. An added advantage of establishing multi-year targets is these make planning for aggressive programs more possible, such as allowing for multi-year sales cycles for large new construction and industrial projects. Many of the leading states, including California, Massachusetts and Vermont, now plan programs on a three-year cycle. With a multi-year ramp-up from current levels, the Governor and Legislature will have time to plan for other ways to balance the budget, without having to steal funds from the Clean Energy Program.

We also recommend that the BPU consider establishing an Energy Efficiency Resource Standard (EERS) that establishes savings targets beyond three years. Legislation enacted in 2007 authorizes the BPU to establish such targets, which have been shown to work well in other states.[12]

In terms of programs needed to achieve these goals, the residential programs look to us to be fairly comprehensive and the Revised Proposal shows higher savings as a percent of sales from the residential sector. However, additional savings can likely be achieved through marketing and through

[12] Sciortino et al. 2011. *Energy Efficiency Resource Standards: A Progress Report on State Experiences.* Washington, DC: American Council for an Energy-Efficient Economy. http://aceee.org/research-report/u112.

program enhancements such as better integrating electric and gas programs, promoting advanced appliances (those that exceed ENERGY STAR), and considering programs to influence resident behavior. The majority of needed savings will need to come from the commercial and industrial sectors, including from CHP systems. We recommend that these programs be substantially expanded, including adding a commercial new construction program and an industrial process program. A commercial new construction program is important because it is better to build right the first time rather than building inefficient buildings and having to retrofit them later. An industrial process program can achieve large and very cost-effective savings by working closely with industry to help implement projects to improve production lines, particularly when production lines are overhauled. Such programs can save substantial energy, helping to make New Jersey's factories more competitive and helping to reduce the loss of manufacturing jobs.

Our recommendation to do more on the business side also applies to natural gas programs as there are large potential gas savings in the commercial and industrial sectors. Furthermore, we recommend that the BPU conduct a proceeding to consider ways for natural gas utilities to get credit for savings goals for net primary energy savings[13] from CHP systems. In most of the country, natural gas utilities are very bullish on CHP and therefore they can often be effective marketers for CHP.

Details on best practice programs in each of these areas are provided in a recent ACEEE report entitled *Frontiers of Energy Efficiency: Next Generation Programs Reach for High Energy Savings.*[14]

One other point to note: The Revised Proposal notes that the NJCEP has a cost of about $0.20/kWh saved. We presume these are costs per kWh saved in just one year, and ignore kWh saved in subsequent years. Overall, $0.20 per first year kWh saved works out to about $0.02 per lifetime kWh saved, which is much less expensive than any other resource. As I discussed previously, ACEEE research has found that the average cost per lifetime kWh saved is $0.025–0.03 in states with substantial programs.[15] While some states may have less expensive programs, many of these are states that are still harvesting inexpensive CFL savings. And some of these less expensive states are ones that measure savings on a gross basis, without accounting for free riders, which increases the claimed energy savings, thereby decreasing the cost per kWh. In other words, we do not find the costs in New Jersey to be significantly out of line with other states. While efforts to improve the cost-effectiveness of programs will always be useful, the fact remains that in New Jersey, as in these other states, energy efficiency is by far the least-cost energy resource available.

Conclusion

The BPU should affirm the proposed budget for the next year and also affirm the increased focus on business programs, CHP, and evaluation. However, the BPU should plan to ramp up marketing efforts, savings targets, and budgets over the subsequent two years, so that by the end of the three-year period, New Jersey can escape the "middle of the pack" and again be among the leaders.

[13] Net savings mean savings in natural gas at a power plant and from a separate boiler, minus the natural gas used by the CHP system.
[14] Available for free download at: https://www.aceee.org/research-report/u131.
[15] Friedrich et al. See Footnote 1. We are also in the process of revising this analysis and will publish updated results on about 20 states in the summer of 2013. Our preliminary findings are that costs to the utility are now averaging about $0.03 per lifetime kWh saved.