STAFF MEMORANDUM

To: Commissioners and Advisors

From: Brian Rounds, Ross Pedersen and Ryan Soye

RE: EL11-002 In the Matter of the Application of Black Hills Power, Inc. for Approval of Energy Efficiency Programs, Tariffs and Cost Recovery Mechanism

June 21, 2011

On January 25, 2011, Black Hills Power, Inc. (BHP) filed a proposal to implement a three year Energy Efficiency Solutions Plan (EESP). The EESP expands on the company's current energy efficiency efforts and creates a new cost recovery mechanism in BHP's tariff. The new mechanism will be expressed as a separate line item on customer bills and includes the recovery of both expenses and lost margins associated with the program.

The filing is the result of a collaborative effort between BHP and Commission Staff (Staff) over the past year. In June of 2010, Staff initiated a series of workshops to discuss various issues concerning ratepayer-funded energy efficiency programs. BHP's filing is a product of those workshops and subsequent informal discussions with Staff. Staff submits this memorandum in support of BHP's proposed EESP.

ENERGY EFFICIENCY SOLUTIONS PLAN

BHP's proposed plan includes a suite of energy efficiency programs covering residential, commercial and industrial customers. For residential customers, the plan includes rebates, audits and educational programs. For commercial and industrial customers, only rebates are available. The programs attempt to reduce both the amount of kilowatt-hours (kWh) consumed and the kilowatts (kW) needed in a cost-effective manner.

In preparation of its plan, BHP acquired the services of Applied Energy Group (AEG) to develop the estimated energy saving potential from a portfolio of programs designed to meet specific goals. This study was used to determine a desirable mix of efficiency efforts to include in the EESP.

For residential customers, five programs are planned.

1) The Residential Water Heating program will offer rebates to new and existing residential customers that choose to install an electric tank water heater with an energy factor of at least 0.94.

2) The Residential Heat Pump program will offer rebates for new geothermal or air source heat pumps, as well as the retro-commissioning of existing air source heat pumps.

3) The Refrigerator Recycling Program will offer a cash incentive to customers willing to give up old, inefficient refrigerators.

4) The Residential Audits and Weatherization Team programs will provide customers with an assessment of their home's energy use and offer a few low-cost ways to improve it.

5) The School-Based Energy Education program seeks to teach middle school-aged children how to use energy more efficiently and will include some low-cost measures, such as CFLs and low-flow showerheads.

Commercial and industrial customers will have access to prescriptive rebates on lighting, motors and variable frequency drives, as well as custom rebates for equipment not covered by the prescriptive rebates.

COST-EFFECTIVENESS

In order to determine whether a program is cost-effective, one must weigh the program's costs against its benefits. However, determining which costs and which benefits should be included in this decision can be difficult. As such, a number of different benefit cost tests have been developed in order to determine the cost-effectiveness of specific programs. The most common tests include the Participant Cost Test (PCT), the Utility Cost Test (UCT), the Ratepayer Impact Measure (RIM) test, the Total Resource Cost (TRC) test and the Societal Cost Test (SCT).

The following table is a simplified explanation of which costs and benefits are used for each test:

	+Benefits	**-Costs**
PCT	+Lost Revenues (Participant Bill Savings) +Incentives Paid by Utility +Tax Benefits Received by Participant	-Participant Expenses
	The Performance Cost Test shows whether the program is good for the participants and is best used to adapt program design.	
UCT	+Avoided or Deferred Supply Costs +Avoided or Deferred Plant Investment	-Program Overhead Costs -Incentives Paid by Utility
	The Utility Cost Test shows whether the program is good for the utility.	
RIM	+Avoided or Deferred Supply Costs +Avoided or Deferred Plant Investment	-Program Overhead Costs -Incentives Paid by Utility -Lost Revenues (Participant Bill Savings)
	The Ratepayer Impact Measure test shows whether average prices for non-participants increases over the life of the program as a result of Lost Revenues.	
TRC	+Avoided or Deferred Supply Costs +Avoided or Deferred Plant Investment +Tax Benefits Received by Participant	-Program Overhead Costs -Incentives Paid by Utility -Participant Costs
	The Total Resource Cost test tells whether the program will lower total system costs.	
SCT	+Avoided or Deferred Supply Costs +Avoided or Deferred Plant Investment +Avoided Externalities	-Program Overhead Costs -Incentives Paid by Utility -Participant Costs
	The Societal Cost Test is identical to the TRC, but takes externalities into account. It tells whether the program is better for society as a whole.	

Staff has come to rely most on two tests: the TRC and RIM tests. Of approximately twenty states that have formally defined benefit cost methodologies, eleven use the TRC test. Of the nine remaining states, five use the SCT. Low RIM test scores indicate that the utility will be selling a lot less energy than predicted when rates were set, meaning that non-participants (those that don't take advantage of the programs, and/or don't use less energy in the long run) are likely to see an increase in rates eventually. However, a RIM score as high as 1.0 is rarely achieved because of its emphasis on lost margins. To think of this another way, if Google ran an educational campaign on the impacts of CFLs and convinced 1,000 customers to replace one incandescent with a CFL, the impact on lost margins would be so great that the net effect on non-participants (those that chose not to install CFLs) would be a relative increase in rates. In summary, a program which included no costs would likely have a RIM score of less than 1.0. Consequently, Staff has taken the position that the TRC test provides the best overall test of cost-effectiveness for the purposes of program selection, with the RIM test providing some comparative information between programs on the distribution of benefits to non-participants.

The proposed suite of programs is projected to have a TRC of 1.19 for the first year, 1.25 for the second, and 1.28 for the third. Looking closely at each program, one will notice the program with a TRC of less than 1.0 is the Residential Audit program. This program was proposed and continues to be supported by Staff. Although it does not prove to be cost-effective through the TRC test, Staff believes it has two intangible benefits that are immeasurable. First, this program allows all ratepayers the opportunity to benefit from the EESP as participants. The availability of this program should help reduce the number of non-participants. Second, an energy audit is much more involved than a rebate check. If a customer chooses to participate, a Building Performance Institute (BPI) certified technician shows up at their door and proceeds with a thorough inspection of the home, including a blower-door test. Aside from the measurable results of the low-cost installations made by the technician, the customer becomes educated and informed on how to save more energy in the future. The educational benefit is not quantifiable, and thus is not included in the benefit cost test. As such, Staff believes it is the unquantifiable nature of the Residential Audit program's benefits that results in a low rating. Therefore, Staff continues to support the Residential Audit program set forth in BHP's filing.

BHP estimates the following impacts over the first three years of the plan:

Year	Cost	Life cycle cost per kWh Saved	Annual kWh Savings	Annual kW Savings	TRC
1	$593,424	$0.018	3,040,227	737	1.19
2	$809,100	$0.016	4,460,710	1,107	1.25
3	$1,027,302	$0.016	5,887,514	1,450	1.28

RECOVERY OF LOST MARGINS

BHP is concerned with recovering two components of costs associated with the EESP: program expenses and lost margins. The recovery of program expenses is a given. The utility is not required to provide these programs[1], and the recovery of their expenses should be timed closely with their implementation. Lost margins are much more controversial. By requesting the recovery of lost margins, the utility is effectively saying that the reduction in kWh sold is negatively affecting their bottom line. Fixed costs that were placed into the variable portion of their rate (based on projected sales) now run the risk of not being recovered with this reduction of sales. It is a legitimate issue, but the calculation of those lost margins has proven to be extremely difficult.

In calculating lost margins, a large number of variables need to be taken into consideration. Each of these variables can have a major effect on the final outcome, and each of these variables can be highly contentious and difficult to calculate. To illustrate, consider an energy efficiency program that gives away compact fluorescent light bulbs (CFLs). Assume a 15W CFL is replacing a 60W incandescent bulb that is on four hours a day, recognizing an immediate peak capacity savings of 45W and an annual energy savings of 65.7 kWh (45W x 4 hours x 365 days). However, this is simply the maximum or gross savings from one bulb. What if the customer already has CFLs installed in their home (free riders)? What if the customer takes the CFL home but never installs it (installation rate)? What if the customer is not pleased with the light and uninstalls it or it doesn't live up to its life expectancy (persistence/failure)? What if the customer decides to leave the light on longer because he or she is saving so much energy (rebound effect)? What if a customer sees the energy saving benefits of CFLs through the program, and ends up buying their own CFLs (free driver/spillover effect)? What if incandescent light bulbs are being phased out over the next three years?

In order to determine the amount of energy saved by the CFL program, all of these what ifs must be answered. The percentage of free riders and free drivers, the installation rates, life expectancy rates, failure rates and the rebound effect must be determined in order to find the net effect of the program. A study can be performed to gather this information, but not inexpensively. Furthermore, not only will a study need to be done to find this net-to-gross ratio, but that study will require annual updates. As such, significant amounts of extra time and money will need to be spent to verify and update these values even after the initial study. Although working with true figures is ideal, the actual calculation of lost margins would be contentious, unreliable and expensive. When viewed in the context of the proportionally small budgets for energy efficiency, requiring this study is not justifiable.

Looking at the time and cost involved, Staff has avoided a true calculation of lost margins. In one proposal by NorthWestern Energy[2], the actual calculation of lost margins was approved by the Commission with Staff's recommended conditions. As a result of those conditions, though, the Company chose not to implement the program. With other utilities, the Commission has

[1] Although regulated utilities are not specifically required to provide energy efficiency programs, Staff notes that in Docket EL08-028, the Commission's Order Adopting Modified Electric PURPA Standards expressly requires that "[e]ach electric utility shall…integrate cost-effective energy efficiency resources into the plans and planning processes of the electric utility; and adopt policies establishing cost-effective energy efficiency as a priority resource".

[2] Docket GE09-001, available at http://puc.sd.gov/dockets/GasElectric/2009/ge09-001.aspx

recognized the effect of lost margins and tried a number of different methodologies to compensate the utility for lost margins. Otter Tail Power Company is currently using a performance incentive in lieu of lost margin recovery. In acknowledgment of their lost margins, Montana-Dakota Utilities and MidAmerican Energy Company are getting what we call a "flat return" on their expenses based on their overall rate of return.

The term "flat return" is a misnomer in this case. These utilities are not actually earning a return on an investment. They are collecting an incentive (in lieu of lost margins) based on a set percentage of their program expenses. The confusion stems from the fact that the parties settled on their last approved rate of return as that percentage. Because the number was merely a settlement between Staff and the utility, it would have been less confusing to base the percentage on Kent Hrbek's retired jersey number (14) than return on investment. For that reason, from this point forward, Staff will refer to this method as the "fixed percentage incentive".

Staff prefers the fixed percentage incentive method. It is extremely simple, and the time and cost associated with lost margin calculations are saved. However, as we discovered over the last year, the utilities that have chosen not to implement energy efficiency programs did not believe the small incentive covered their lost margins. Throughout the workshop process with all six regulated utilities, compelling evidence began to appear that our current lost margin recovery methods are inadequate. As such, Staff focused on finding a new methodology. The utilities wanted to be compensated for lost margins, and Staff wanted to recognize some of the intangible benefits the utility receives by offering these programs. For instance, demand side management becomes a valuable component of a balanced generation portfolio and can be considered a hedge against the increasing costs of supply-side solutions. The programs offer a number of customer satisfaction and relations benefits for the utility as well. The audit program can be used as a high bill complaint tool. Customer confusion can result when customers see natural gas providers and neighboring cooperatives offering energy efficiency programs, but their utility does not. Also, as implementer of the programs, the utility is put in the position of actually helping customers lower their bills. Furthermore, if the utility has the opportunity to keep a percentage of off-system sales, the correct application of these programs could increase those revenues. Finally, some of these lost margins will be offset by "found margins" – or load growth.

Staff's proposal was to use the fixed percentage incentive currently in place, but settling on a higher percentage of expenses that attempts to net the utility's costs and benefits. However, a major drawback of this method is timing. Lost margins from one year's programs will continue to accumulate year after year until the utility comes in for a rate case and adjusts their rates. With this method, Staff is attempting to move all of those lost margins into a net present value. In the end, Staff settled with two of the three remaining utilities on the fixed percentage incentive, using an incentive of thirty percent of expenses.

Although thirty percent appears high in comparison to what has currently been approved, Staff believes the actual value of lost margins is significantly higher. However, some of those costs should be offset by the benefits obtained by the utility. A review of BHP's proposed EESP and savings projections helps to illustrate this concept:

Assume the following:

- BHP's annual program costs will be $593,424, $809,100 and $1,027,302 in the first three years.
- BHP projects annual savings of 3,040,227 kWh, 4,460,710 kWh and 5,887,514 kWh in the first three years.
- During the year a measure is installed, it is credited with one half a year's worth of savings.
- BHP comes in for a rate case after 4 years.

Over the three year program, BHP would receive thirty percent of expenditures to make up for lost margins:

- ($593,424 + $809,100 +$ 1,027,302) x (0.30) = $728,947.80

How does this translate into lost margins?

- Year 1 Savings – 3,040,227 kWh x 3.5 years = 10,640,794.5 kWh
- Year 2 Savings – 4,460,710 kWh x 2.5 years = 11,151,775 kWh
- Year 3 Savings – 5,887,514 kWh x 1.5 years = 8,831,271 kWh
- Total Savings – 10,640,794.5 + 11,151,775 + 8,831,271 = 30,623,840.5 kWh
- Lost margins – $728,947.80 / 30,623,840.5 kWh = $0.0238/kWh

Given that BHP has an actual lost margin rate of between $0.04 and $0.05 per kWh, Staff believes a fixed percentage incentive of thirty percent of expenses is reasonable.

COST RECOVERY

In all energy efficiency programs implemented in the past decade, program costs have been recovered by expensing and recovering them over the period they are incurred. Also, in every case the Commission has approved a budget for a portfolio of programs prior to implementation. Once the programs go into effect, the utility recovers the expenses of the programs through an energy efficiency rider that is separated out on the customer's bill. After the budget period is over, the balance is trued-up. If the utility overspends, the incentive is based on the approved budget.

BHP proposes to recover costs as described above, filing annual program and rate adjustments no later than April 30th of each year. The initial year of the program will start September 1, 2011 and end May 31, 2012. The initial rate will be $0.0008/kWh for residential customers and $0.0009/kWh for commercial and industrial customers. The second year of the program will run from June 1, 2012 to May 31, 2013, with the third year beginning June 1, 2013 and ending May

31, 2014. At this time, both BHP and Staff consider this to be a pilot program with an initial three-year commitment.

RECOMMENDATION

Staff recommends the Commission approve BHP's proposed EESP and authorize the EESA rate, effective September 1, 2011.