

**New York State
Department of Public Service**



Preliminary Staff Analysis

CASE 07-M-0548
***Benefits and Costs and Bill Impacts of
Energy Efficiency Program for 15 percent Reduction in
Electricity Usage by 2015***

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**Office of Electricity and Environment
James T. Gallagher, Director**

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**Department of Public Service Staff's Preliminary Analysis of Benefits and Costs and
Bill Impacts of Energy Efficiency Program for 15 Percent Reduction in
Electricity Usage by 2015**

To provide a general sense of the scale of this program, and its impacts on customers and the utility system, New York State Department of Public Service Staff conducted a preliminary analysis of the costs and benefits of reaching a 15 percent electric energy reduction target by 2015.

Staff's analysis concludes that benefits of the program will include cost savings due to reduced energy and capacity purchases and lower projected average market prices of energy. Further, benefits will result from the reduced future needs for new installed capacity, reduced emissions and increased economic development associated with the creation of new jobs. In this analysis, costs of the program were assumed to be program costs associated with implementation by an entity such as the New York State Research and Development Authority (NYSERDA), and were based on NYSEDA's historic cost of marketing and subscribing end-use customer investments in energy efficiency.

While meeting the 15 percent energy usage reduction goal represents a very substantial increase over current NYSEDA energy efficiency efforts, the cumulative benefits from such a program are expected to exceed program implementation expenditures by a factor of more than two to one.

Staff's analysis assumes that an enhanced energy efficiency program will be initiated in 2008 and will be ramped up over time to achieve a 15 percent reduction in energy usage by 2015, relative to projected energy usage in the absence of the program. Under the program New York's 2015 energy requirement would be reduced 27,400 GWh per year, which corresponds to a peak load reduction of 5,487 MW. By reducing peak load, New York could avoid the need for approximately 6,390 MW of installed capacity.

It should be noted that this is a preliminary conceptual analysis of a hypothetical program. The Commission's recently initiated energy efficiency proceeding will undertake a much more detailed analysis of the benefits and costs of various program design options.

Estimated Benefits

If the program objectives are achieved, multiple benefits will accrue to customers. The benefits of the program (for measures implemented from 2008 through 2015, with certain benefits continuing until 2025¹) are estimated to be about \$12 billion (present value in 2008 dollars) and include the following components:

- \$6.5 billion – Savings in payments for energy that would no longer be needed or consumed;
- \$2 billion – Reductions in average market prices of energy resulting from reduced energy consumption, and concomitant savings on remaining energy purchases;
- \$3 billion – Savings in capacity charges that would no longer be assessed as a direct result of peak load reductions;
- Reduced emissions as a result of less fossil fuel burned. Staff estimates emission reductions of 6,544 tons of NO_x, 9,040 tons of SO₂, and 9,123,570 tons of CO₂ in 2015²; and
- Increased economic development associated with the creation of approximately 37,000 sustained jobs by 2015 associated with program implementation.³

In preparing this analysis Staff used a number of additional assumptions. These are detailed in Addendum 1.

It should also be noted that the level of benefits actually achieved may vary from these estimates due to variations between the projections used in the analysis, as well as actual load growth, fuel prices, resource mix and locational conservation penetration. Additional factors influencing actual benefits include changes in market rules, as well as policy changes regarding energy and the environment.

¹ While benefits for efficiency measures are expected to last more than 15 years, Staff assumed that benefits would last only 10 years for the purpose of this analysis. For example, benefits for measures commencing in 2008 would last until 2018; for measures commencing in 2015, the last year of the program, benefits would last until 2025.

² Costs of SO_x, NO_x and CO₂ emission allowances are included in staff's electric production cost modeling as operating costs.

³ Based on NYSERDA staff analysis of net job creation associated with existing programs, as reported in New York Energy Smart Program Evaluation Report.

Estimated Expenditures

NYSERDA estimates that annual expenditures needed to implement the program described above, based on the current portfolio mix of energy efficiency programs (i.e. a mix of commercial/industrial, residential, low income, research and development, and peak load reduction programs at current allocation levels), and also based on historic program implementation costs experienced by NYSERDA, would be about \$865 million for each year from 2008-2015⁴. This translates to present value life-time program expenditures of slightly less than \$5 billion (in 2008 dollars). The program expenditures are assumed NYSERDA expenditures of implementing and administering the programs. Additional assumptions for this analysis are listed in Addendum 1.

These energy efficiency expenditures are expected to be invested in New York State projects, giving direct benefits to New York customers in the form of more energy efficiency building stock and incentives for installing this equipment. These expenditures will also provide opportunities for New York based companies to deliver energy efficiency services to the State's residents.

It should be noted that these are preliminary estimates and that the actual expenditures could differ, depending on the future program design, future legislative appliance efficiency standards and improved building energy codes that may be implemented, and other factors.

Bill Impact Analysis

To illustrate potential customer bill impacts of the scenario described above, Staff conducted a typical residential bill analysis using the tariff delivery rates presently in effect for National Grid residential customers in the Central New York load zone. The analysis assumes an eight year program between 2008 and 2015⁵ designed to achieve an ultimate 15 percent residential energy reduction goal. For the purpose of the Staff illustrative bill impact analysis, the overall energy reduction target was modeled by assuming that half of the residential customers, on average, would reduce their energy consumption by 30 percent, thus producing an

⁴ Incremental spending to present SBC annual spending would be about \$690M.

⁵ Underlying sales growth was assumed pursuant to the NYISO Gold Book.

overall 15 percent residential energy savings target. This assumption was then used to produce illustrative bill impact information for both participating (conserving) and non-participating customers. Further details about the methodology and assumptions used are included in Addendum 2.

Staff's analysis showed non-participant first year bill increases ranging from 2 percent to 4 percent, due primarily to the introduction of full annualized program cost recovery in rates the first year. Incremental annual bill increases (after the first year) for non-participating customers were less than 0.5 percent for the second and remaining years of the program through 2015. Participating customer bills showed first year decreases ranging between 12 percent and 25 percent, depending on the usage level reflected in the bill.

Bill savings for customers who began their participation after the first year of the energy efficiency program (they were non-participants in the first year of the program) range between 14 percent and 28 percent, depending on usage; slightly higher incremental savings than first year participants because the expressed savings after the first year do not reflect the incremental, concomitant, annualized conservation program cost offset included in the first year impacts. Participant bills following their first year of participation in the program increased less than 0.5 percent per year (the same as non-participant annual bill increases) due to the need to recover increasing levels of net lost revenue as total conservation achieved increases through the program years.⁶

Conclusion

Staff's analysis supports its belief that a 15 percent energy usage reduction target by 2015 is an ambitious, but achievable goal. Embarking on a program of this scale should provide tangible and significant benefits to the ratepayers of New York. Achieving this goal will significantly reduce New York's dependence on imported fuels and energy, reduce customer bills, and reduce strains on the distribution system under peak load conditions.

⁶ These estimates portray the isolated bill impacts, all else being equal, of a 15 percent energy use reduction by 2015 (including a 0.75 percent annual reduction in average commodity prices) in a revenue decoupled environment where all lost net delivery revenues are coincidentally reflected and recovered in the bills of participating and non-participating customers. The analysis does not, therefore, portray actual customers' bills for the year 2015.

Addendum 1

Major Assumptions Used in Analysis of Program Benefits Estimation

- Energy savings are expected to begin in 2009 and ramp up over time (2009-2011, 3.75%; 2012-2014, 9%; 2015, 15%)
- Energy price estimates are derived from MAPS runs for years 2012 and 2015
- Energy efficiency program measures in this analysis were assumed to have a ten year life.
- Capacity reductions are assigned as follows: 1/3 to New York City, 1/6 to Long Island, and 1/2 to Rest of State.
- Capacity prices were derived using current NYISO demand curve reference prices plus inflation – reference prices are used from 2012 onward; only half that value is used for 2009-2011.
- All of the benefits and costs are discounted at a 10 percent discount rate for computing present value
- The starting point for the MAPS analysis was a database in which a schedule of new generating capacity additions was modeled to generally satisfy the NYCA Installed Reserve Margin and New York City and Long Island local capacity requirements. The study, however, required Staff to reduce the amount of generating capacity commensurate with the capacity needs that resulted from the energy efficiency initiative. Half of that reduction consisted of the retirement of existing generating units, while the other half was achieved by reducing the amount of new generation additions.

Major Assumptions Used in NYSERDA Analysis of Program Expenditures

- Average life of measures ranges from 11.3 years for Residential programs to 17.6 years for Commercial/Industrial programs, for a weighted average of 16.4 years.
- Program expenditures are based on actual NYSERDA program expenditures from 1999 through 2006 for all programs. Includes Commercial/Industrial, Residential, Low-Income, Research and Development and Peak Reduction programs. Includes all incentives, administration, and evaluation costs. Incentives represent the portion of the incremental cost of the energy efficiency measure paid by NYSERDA. Expenditures are adjusted for inflation to reflect 2007 dollars.
- Peak MW and annual GWh impacts of existing programs are based on actual data to-date. It is assumed that future programs can continue to achieve the same peak and energy impact per dollar spent.

Addendum 2

Methodology Used in Bill Impact Analysis

Program costs assumed in the bill impact analysis (\$62 million per year for National Grid residential customers) were assumed to be fully absorbed in rates during the first year of the study (2008), thereby producing bill impacts for both participating and non-participating customers only within the first year of the study. NYSERDA provided Staff with statewide program cost estimates; National Grid's allocation is roughly 26 percent of the statewide total and of that amount, National Grid's residential allocation is roughly 35 percent, resulting in an overall National Grid residential allocation of approximately 9 percent (0.26 times 0.35) of the statewide cost.

Recoveries of net lost delivery revenues were calculated strictly based on the assumed effects on kWh sales. Zero inflation was assumed throughout the study period on delivery rates and commodity prices. The cumulative beneficial effects of energy reductions on future average commodity prices were equated to an annual adjustment of -0.75 percent relative to the base case (2007) commodity price.

Using these assumptions, typical National Grid residential bill impact analyses were developed for varying monthly consumption levels between 100 and 2000 kWh for both participating and non-participating customers. Participating customer bills reflect the effects of reduced consumption. In other words, the 100 kWh participating customer's bill was actually calculated using consumption of 70 kWh. The non-participant 100 kWh monthly bill assumes consumption of 100 kWh (no energy reduction).