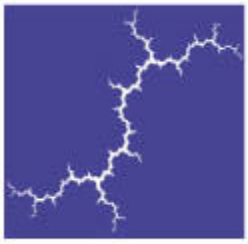

Synapse
Energy Economics, Inc.

NEEP Strategic Initiative Review:

Qualitative Assessment and Initiative Ranking for the Residential Sector

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1. Introduction

The purpose of this study is to assist Northeast Energy Efficiency Partnerships, Inc. (NEEP) in reviewing the value and future role of existing and potential residential initiatives. This study is not meant to be a definitive assessment of NEEP initiatives, but rather to help guide NEEP in considering alternatives and enhancements to its current programs.

This study draws upon several sources. First, the information regarding the potential for significant savings and the cost-effectiveness of the initiatives comes from a companion study prepared by Vermont Energy Investment Corporation and Optimal Energy Incorporated. (VEIC and OEI 2004)

Second, this study relies upon the results of a survey recently conducted for NEEP by RLW Analytics, Inc., which asked over 50 stakeholders a variety of questions regarding the NEEP initiatives reviewed here. (RLW 2004)

Third, this study included telephone interviews with several stakeholders that were identified as having useful information and opinions regarding the initiatives reviewed here. These stakeholders are listed in the references section.

Fourth, the author reviewed several studies and sources of information regarding the markets addressed by the NEEP initiatives. These sources are also listed in the references section.

Finally, the author applied professional judgment in assigning scores and making recommendations, and in filling in any gaps left by the other sources listed above.

A scoring and ranking system was developed by NEEP, in order to provide a consistent means of comparing the initiatives. The scoring and ranking system is summarized in Table 1 below.

Table 1. Method for Scoring and Ranking NEEP Initiatives

	Score of 3	Score of 2	Score of 1
Total Energy Savings	Regional energy savings fall into top third of ranked initiatives	Regional energy savings fall into middle third of ranked initiatives	Regional energy savings fall into bottom third of ranked initiatives
Electricity Demand Savings	Regional demand savings fall into top third of ranked initiatives	Regional demand savings fall into middle third of ranked initiatives	Regional demand savings fall into bottom third of ranked initiatives
Cost-Effectiveness	Regional PV of net economic benefits fall into top third of ranked initiatives	Regional PV of net economic benefits fall into top middle of ranked initiatives	Regional PV of net economic benefits fall into bottom third of ranked initiatives
Regional Value	A regional approach can achieve important impacts in all 3 areas - New England, New York and mid-Atlantic states	A regional approach can achieve important impacts in at least two of the 3 areas.	A regional approach can achieve important impacts in at least one of the 3 areas.
Likelihood of Success	Initiative meets five or more of the listed sub-criteria	Initiative meets three or four of the listed sub-criteria	Initiative meets two or fewer of the listed sub-criteria
Role for NEEP	NEEP can play a *significant* and *unique* role to achieve initiative goals, and there is strong support to do so.	NEEP can play a *significant* role and there is moderate support to do so.	There is some support for NEEP to play a significant role, but this effort may be better pursued by others or may not require regional facilitation/coordination.

2. ENERGY STAR® Appliances

2.1 Background

Initiative Title: ENERGY STAR Appliances (Part of ENERGY STAR Products Initiative).

Long-Term Goal: Permanently change the regional residential marketplace for high-efficiency residential products including ENERGY STAR refrigerators, room air conditioners, clothes washers, dehumidifiers, and dishwashers so that product sales and consumer preferences are reflected in increased market share and updated equipment efficiency standards and building code requirements.

First Year of Regional Initiative Effort: 1996

Targeted Products/Services: refrigerators/freezers, room air conditioners, clothes washers, dehumidifiers, and dishwashers

Initiative Participants: Connecticut Light and Power, The United Illuminating Company (CT); Cape Light Compact, Massachusetts Electric, NSTAR Electric, Unitil, Western Massachusetts Electric (MA); Granite State Electric, New Hampshire Electric Co-op, Public Service of New Hampshire (NH); New Jersey Clean Energy Program (NJ); Long Island Power Authority, New York State Energy Research and Development Authority (NY); Narragansett Electric (RI); Efficiency Vermont (VT); US EPA; US DOE; CEE

Regional Market Size: Approximately 15.5 million households

Current Regional Initiative Activities: Coordinated program implementation and marketing among a subset of sponsors, consumer rebates, co-op advertising, support of national ENERGY STAR program efforts, participation in national clothes washer joint promotion with major manufacturers (recently completed), implementation of regional industry solicitation to develop joint promotions with industry (retailers and manufacturers), participation (through CEE) in ENERGY STAR clothes washer specification revision process.

Current NEEP Role: Facilitate regional working group, help coordinate contractor procurement and facilitate coordinated program delivery and marketing among a subset of sponsors, participate in ENERGY STAR specification development activities, coordinate sponsor participation at National Partner meetings, research alternative program designs and new target products, track program efforts of other program administrators and regions, provide forum for information exchange among sponsors – promotional activities and evaluation results, support NEEP regional standards efforts, and participate in CEE Appliance Committee and Market Share Tracking Subcommittee activities.

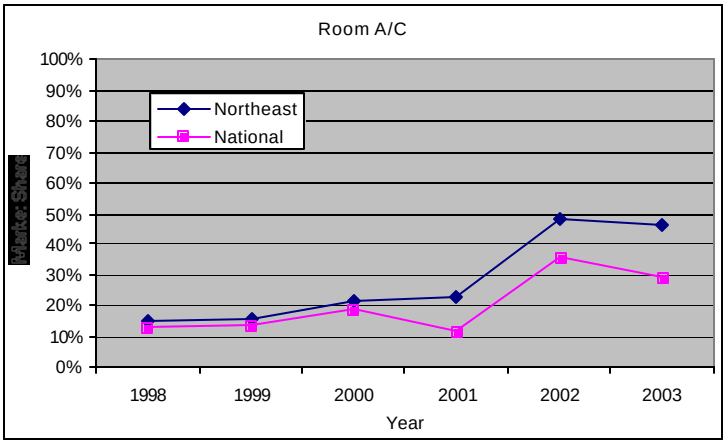
The Appliances Initiative promotes the purchase of ENERGY STAR labeled appliances by residential customers through regional stocking and marketing efforts, as well as

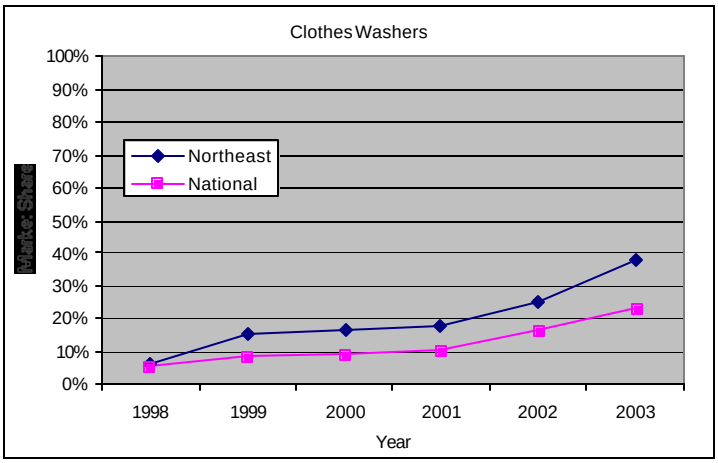
through rebates offered by some program administrators on some appliances. Sponsors participate in NEEP-facilitated Appliance and Lighting Working Group to promote the stocking, marketing and sale of ENERGY STAR appliances (principally clothes washers, room air conditioners, refrigerators, dishwashers and dehumidifiers) through joint and coordinated program activities.

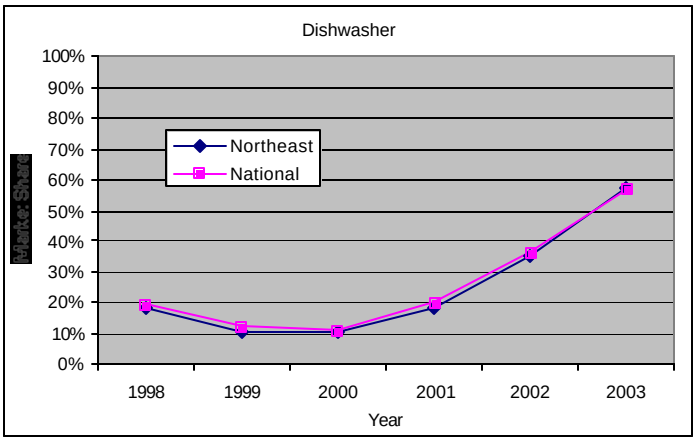
Progress to Date

- Dramatic increase in the number of manufacturers producing ENERGY STAR appliances and the number of labeled models
- Regional and state level market shares for key ENERGY STAR appliances significantly above national averages
- Enactment of federal clothes washer minimum standard (2004 and 2007 standards)
- Regionally coordinated marketing and retailer support activities
- Solicitation process to encourage the development of joint promotions with industry

The figures below indicate the market shares of the primary appliances promoted thorough this initiative – for both the Northeast and the US as a whole. In most cases, the Northeast has achieved higher market share than the US. Note that the data presented here are based on market shares of national retail chains. Year-to-year market share data may not be directly comparable because the mix of retailers reporting data has changed in some years.




Clothes Washers
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Northeast
National
1998
1999
2000
2001
2002
2003
Year


Dishwasher
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
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Northeast
National
1998
1999
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2001
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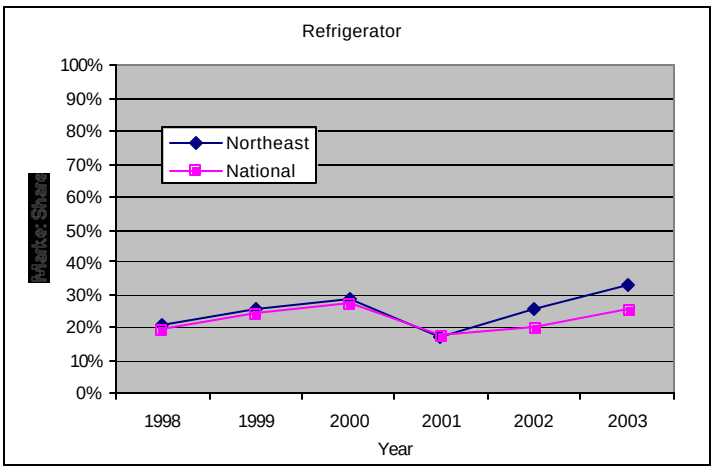
Year


Refrigerator
100%
90%
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70%
60%
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40%
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10%
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Northeast
National
1998
1999
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2001
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2003
Year

2.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. Efficient appliance measures can be implemented throughout the Northeast. The market saturation for some appliances may vary regionally, thus the potential for efficiency savings may vary accordingly. Room air conditioners are likely to have a greater potential in the southern part of the region relative to the northern part, due to the higher cooling loads there.

However, the amount of energy savings available from appliances is dwindling over time as (a) standard products become more efficient, driven, in part, by nearly two decades of federal appliance standards rulemakings, and (b) market share of efficient products increases over time. As indicated in Section 2.1, the market shares for ENERGY STAR dishwashers and room air conditioners are especially high, thus leaving less savings potential for these products.

A recent evaluation report of the Massachusetts ENERGY STAR Appliance Program (NMR et. al. 2002) noted the following savings potentials from efficiency appliances relative to non-ENERGY STAR models:

- Clotheswashers: high, 50% savings.
- Refrigerators: moderate, 10% savings.
- Room air conditioners: moderate 10% savings.
- Dishwashers: moderate, 25% savings. Savings from dishwashers have been disputed and may be significantly lower than 25%. However, some of the questions regarding dishwasher efficiency savings have been resolved recently with better testing procedures.

ENERGY STAR clotheswasher savings may be significantly reduced when a new federal efficiency standard go into effect in 2007 – unless the DOE makes the new ENERGY STAR clotheswasher specification more stringent in response to the new standard. A specification revision process is currently underway.

The energy savings from the appliances in this initiative vary by fuel type. While all of the appliances save some electricity, clotheswashers and dishwashers also save fossil fuels, depending upon the type of fuel used for water heating. Thus, the savings by fuel type for these appliances might vary across the region, depending upon water heating fuel saturations.

To date, regional support for this initiative has primarily been from electric energy efficiency program administrators. Sponsors interest in promoting these appliances might depend upon how tightly constrained they are for electric peak capacity, or if they face regional transmission or distribution constraints. As these constraints vary

throughout the Northeast, the interest in and potential savings from this initiative, or in specific appliances, i.e., room air conditioners, might vary as well.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative the greatest amount of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 4.4.[1] None of the other existing initiatives scored higher than 4.0. (However, the question referred to ENERGY STAR Products and did not break out Lighting from Appliances.)

The most recent nationwide household survey of ENERGY STAR awareness conducted by CEE suggests that there are benefits of regional lighting and appliance campaigns. The survey compares ENERGY STAR awareness and purchasing patterns in high-publicity areas (including the Northeast) with those in low-publicity areas. The survey found that "publicity from active regional energy efficiency program sponsors increases recognition, understanding and influence of the [ENERGY STAR] label." (CEE 2003, page ES-3) This finding is consistent with findings from previous years' surveys.

In assessing the role of a regional strategy for this initiative, it is useful to first consider the current barriers that hinder the broader adoption of ENERGY STAR appliances. The primary barriers include:

- Significant incremental costs of certain ENERGY STAR products (e.g., clotheswashers).
- Limited product availability. ENERGY STAR appliances are not stocked and promoted by all retailers, though this has recently become less of a barrier.
- Failure of retailer sales staff to proactively sell ENERGY STAR products to consumers. This barrier is exacerbated by high sales staff turnover.
- Lack of awareness among consumers of ENERGY STAR appliances and the energy and non-energy benefits they offer.

The regional strategies that might help address these barriers include:

- Implement cooperative regional and national promotions with industry (retailers and manufacturers) to reduce retail costs to consumer and program costs to efficient appliance program administrators.
- Coordinate and implement regional marketing and education activities that have a common and consistent theme. This type of coordination both improves the overall message to customers and reduces costs to program administrators. Marketing campaigns can help position ENERGY STAR appliances as quality products, and can help inform customers of the non-energy benefits of many of these appliances.

[1] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Coordinate the recruitment of retailers and the training of retailer staff. Training services can help emphasize the "up-selling" to ENERGY STAR products.
- Coordinate financial incentive efforts across program administrators in the region, in order to help overcome the barriers created by high initial costs.
- Coordinate regional engagements with DOE to encourage timely revisions to ENERGY STAR product specifications.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Moderate, as a result of the fact that per unit efficiency savings from appliances are dwindling over time. The greatest opportunities to address the dwindling efficiency savings include (a) work with DOE to increase the ENERGY STAR specifications for certain appliances (especially, clotheswashers and dishwashers), and (b) work to increase the federal efficiency standards for certain appliances (e.g., refrigerators).

Targeting manufacturers will help sustain impacts of programs over time. Once manufacturers are convinced they can reach a certain market share, they will retool their production processes to meet this demand, and they have a strong incentive to maintain production in order to avoid retooling again. Retailers can also help increase market share but they need more on-going support than manufacturers.

Opportunities for Coordination with Other Efforts?

Yes. There are on-going opportunities to coordinate program sponsor activities with DOE's ENERGY STAR activities. There may also be opportunities for the appliance initiative with other programs offered by sponsors, including Home Performance with ENERGY STAR, residential new construction programs, and low-income efficiency programs. While there has been some level of coordination with these programs in the past, there may be untapped opportunities.

Support from Regulators?

Yes. Regulators have routinely approved program administrators' appliance efficiency programs, often with explicit approval of the regional components of the programs.

Support from Sponsors?

Moderate to high. The RLW survey found that ENERGY STAR Products (Appliances and Lighting combined) has the highest amount of stakeholder support of all the current NEEP initiatives, with a score of 3.8.[2] The Residential Working Group (which includes

[2] The survey question asked whether there is sufficient stakeholder support for a regional ENERGY STAR Products to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

several sponsors) indicated general support for the ENERGY STAR Products initiative, with a score of 3.6.

However, some sponsors may be beginning to feel that they no longer need coordination and support from NEEP – the regional relationships that NEEP has fostered could continue without on-going facilitation from NEEP. The diminishing potential for energy savings from appliances poses a risk that sponsors' interests may diminish as well.

Support from Trade Allies?

Yes. Most manufacturers and retailers like the fact that there is cooperation and coordination among program sponsors and states. Manufacturers and retailers like the cooperative campaigns. Manufacturers like the certainty of volume, when this is negotiated and agreed to. Retailers like the opportunity to get a bigger markup on ENERGY STAR products.

Potential Support From Customers? Measure Likely to be Cost-Effective?

The fact that market shares are fairly high and have been increasing, even in parts of the country without regional initiatives, suggests that customers are embracing these measures, and that they are seen to be cost-effective. Some consumers are also attracted to the non-energy benefits of these products – water savings, higher-end features, etc.

Feasibility of Initiative?

Yes. This initiative is clearly feasible, given that it has been running successfully already.

Role for NEEP

Clear and Valuable Role for NEEP

Yes. The regional strategies listed above all create a valuable role for NEEP. The following is a list of roles that NEEP has been playing in the past and could play in the future:

- Facilitate the implementation of cooperative campaigns.
- Coordinate and facilitate the implementation of regional marketing and education campaigns.
- Coordinate regional program contractor procurement for the sponsors' field support, marketing, and coupon redemption/rebate processing contractors. Coordinate financial incentives offered by program sponsors in the region.
- Coordinate regional engagements with DOE regarding ENERGY STAR specifications and federal efficiency standards.
- Assist regional standards efforts targeted to appliances, e.g., dehumidifiers.

- Work with CEE, AHAM, DOE and other stakeholders to develop more comprehensive market share tracking capabilities, particularly at the regional and state level.
- Research new opportunities for increasing market shares of appliances.
- Provide a forum for regional exchange of best practices and program successes.

The RLW survey found that stakeholders see a clear and valuable role for NEEP with regard to the existing Lighting and Appliances initiative. Of the 27 respondents, six suggested that NEEP "maintain current status," while the remaining 21 provided positive suggestions for NEEP's role, such as "facilitate communications" and "impact research."

However, the role of a regional coordinator may be shrinking under the current initiative and program designs. If regional strategies do not evolve much over time in response to changes in the market place, then sponsors will be able to implement them with less coordination. Conversely, as regional strategies become more creative and innovative, then there will continue to be a need for a regional player like NEEP.

Is NEEP the Best Organization for the Job?

Yes. NEEP is the most logical organization to run this sort of initiative, and it has played a valuable role in the past. It is well-respected, well-positioned and has a relatively high profile. NEEP has been running this initiative successfully with strong sponsor support. The Lighting and Appliance initiatives have been the principle efforts of NEEP residential activities.

Do Resources Exist to Support NEEP's Work?

Probably. There is a small risk that sponsors become less able or willing to fund this effort in the future. Note that the RLW survey found that while most sponsors expect to maintain existing levels of funding for NEEP initiatives in general, eight of them expect funding levels to decrease, while none of them expect funding levels to increase.[3]

In addition to current funding from program sponsors, NEEP has current and near-term funding from ENERGY STAR to support work with sponsors in coordinated regional implementation and marketing campaigns. Furthermore, NEEP has current and near-term foundation funding to support its work on state efficiency standards.

Challenges and Opportunities

Challenges

The biggest challenge to this initiative is the fact that the savings potential is diminishing. This is partly due to the successes of the past, where appliance technologies have achieved increased efficiency savings over time. Some appliances, e.g., refrigerators,

[3] Out of a total of 54 people surveyed, the responses included: more funding (0), less funding (8), about the same funding (14), don't know (9), and no response (23).

may be reaching a limit to the amount of efficiency savings that are available from new designs. It will become increasingly difficult to justify the costs of this initiative as the efficiency saving opportunities shrink unless the programs evolve to meet this challenge.

As sponsors become more successful and experienced at working together, they might increasingly feel that they can coordinate their own programs without the help of NEEP's facilitation. As the appliance markets evolve and the sponsors gain more experience, NEEP will need to be creative in responding to these changes in order to (a) ensure that its initiatives remain vital and successful, and (b) demonstrate to sponsors the value added that NEEP provides.

NEEP's ability to increase federal standards for appliances could be limited by protracted and highly contested rulemaking proceedings at the DOE.

Some sponsors are less involved than others in the current working group, thus making it difficult at times for NEEP to speak on behalf of all sponsors in the region.

Gas sponsors have not expressed a strong interest in supporting appliance efficiency efforts, in part due to limited savings and cost-effectiveness, as well as the smaller number of gas utilities supporting efficiency activities in the region.

The regional initiative embraces a number of different sponsor program strategies and designs. However, if sponsors begin adopting increasingly different program strategies, then it may become increasingly challenging for NEEP to maintain a regionally coordinated initiative. For example, NYSERDA has a different philosophy than some sponsors for promoting efficient measures, preferring to work more with manufacturers, retailers and other trade allies, and less with customers (e.g., it prefers cooperative campaigns to customer rebates). If other sponsors use increasingly different strategies (e.g., those targeted more to customers), then a truly regional initiative may become more challenging. On the other hand, different strategies across program sponsors may create opportunities for NEEP to help exchange information and promote best practices across the region.

One person interviewed noted that it is not clear how much the trade allies even know of or understand NEEP's role in the programs, because the current implementation contractor is the agency that works directly with them on the cooperative campaigns. If sponsors tend to use cooperative campaigns more frequently in the future, then NEEP may need to better clarify its role with regard to the program implementation contractor.

Opportunities

The key opportunities for this initiative are in finding ways to promote technological developments that will result in greater savings from efficient appliances. This could be done through increasing codes and standards, advancing research and development activities, or working directly with manufacturers, national laboratories or the Department of Energy to encourage technological development.

NEEP could actively work with DOE to develop new specifications for ENERGY STAR appliances, and new minimum federal efficiency standards. NEEP could continue to

work ASAP and others to enact model state standards legislations and assist relevant state agencies to upgrade existing state appliance efficiency standards, where appropriate.

Another opportunity may exist in expanding the types of measures that are addressed by this program. Televisions, computer equipment (e.g., the proposed 80+ program), battery chargers and other technologies that create a constant demand for electricity may offer some opportunities. However, each of these measures will have their own challenges, including the need to define the appropriate role for NEEP and potential sponsors.

Program sponsors have become increasingly interested in cooperative campaigns as a way to significantly reduce the costs and increase the impacts of this initiative. These campaigns might create opportunities for NEEP to help coordinate the sponsors' activities with manufacturers, distributors and retailers.

There has been limited but increasing interest from sponsors in appliance retirement and turn-in programs. These types of programs may offer additional savings opportunities from appliances. However, the success of these types of programs depends upon how they are designed and which appliances are targeted.

2.3 Initiative Scoring

Table 2 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 2. Scores for the ENERGY STAR Appliances Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	1
2. Electric Peak Demand Savings	1
3. Cost-Effectiveness (PV of net benefits)	1
4. Regional Value	3
5. Likelihood of Success	3
6. Role for NEEP	3
Total Score	**12**

2.4 Recommendations

NEEP should continue to offer the ENERGY STAR Appliances initiative, given the value of a regional strategy, the successes to date, and the large amount of support among stakeholders for this initiative. However, NEEP must recognize that the market for appliances is changing significantly, and must respond to these changes to keep this program vital for its sponsors.

In particular, most ENERGY STAR appliances are offering increasingly less efficiency savings over time, and some ENERGY STAR appliances are reaching relatively higher market shares. Meanwhile, sponsors have developed enough experience with this initiative that NEEP's role may become increasingly less important to them. These developments suggest that NEEP and its sponsors should seek to promote more efficient appliances than today's ENERGY STAR models, should consider additional appliances and products to promote through this initiative, and should consider new approaches for achieving its goals such as cooperative promotions.

These changes are consistent with the Enhanced Appliance initiative discussed below. Rather than introducing a separate enhanced initiative, NEEP should introduce these enhancements over time as the logical evolution and progression of the current initiative.

3. ENERGY STAR® Lighting

3.1 Background

Initiative Title: ENERGY STAR Lighting (Part of ENERGY STAR Products Initiative)

Long-Term Goal: Permanently change the regional residential marketplace for high-efficiency residential lighting products including ENERGY STAR compact fluorescent lamps (CFLs), indoor/outdoor fixtures, and ceiling fans so that product sales and consumer preferences are reflected in increased market share and updated equipment efficiency standards and building code requirements.

First Year of Regional Initiative Effort: 1997

Targeted Products/Services: compact fluorescent lamps (CFLs), light fixtures and ceiling fans

Initiative Participants: Connecticut Light and Power, The United Illuminating Company (CT); Efficiency Maine (ME); Cape Light Compact, Massachusetts Electric, NSTAR Electric, Unitil, Western Massachusetts Electric (MA); Granite State Electric, New Hampshire Electric Co-op, Public Service of New Hampshire (NH); New Jersey Clean Energy Program (NJ); Long Island Power Authority, New York State Energy Research and Development Authority (NY); Narragansett Electric (RI); Efficiency Vermont (VT); US EPA; US DOE; CEE

Regional Market Size: Approximately 15.5 million households

Current Regional Initiative Activities: Coordinated program implementation and marketing among a subset of sponsors, consumer rebates, co-op advertising, participation in PEARL (Program for the Evaluation and Analysis of Residential Lighting) quality testing activities, implementation of regional industry solicitation to develop joint promotions with industry (retailers and manufacturers), support of PNNL recessed can procurement efforts, participation in national ENERGY STAR campaigns, e.g., Change a Light, participation (through CEE) in ENERGY STAR fixture specification revision process.

Current NEEP Role: Facilitate regional working group, help coordinate contractor procurement and facilitate coordinated program delivery and marketing among a subset of sponsors, participate in ENERGY STAR specification development activities, regional representative on PEARL Board, regional representative on DOE advisory committee to develop comprehensive ENERGY STAR CFL quality assurance plan, facilitated recent revision to joint promotional RFP, track program efforts of other program administrators and regions, provide forum for information exchange among sponsors – promotional activities and evaluation results, coordinate sponsor participation at National Partner meetings, support NEEP regional standards efforts (ceiling fans), co-managed national/regional CFL market share tracking study for DOE, and participate in CEE Lighting Committee and Market Share Tracking Subcommittee activities.

The residential ENERGY STAR Lighting initiative promotes energy efficient residential lighting products, including compact fluorescent screw-base replacements for conventional incandescent light bulbs as well as complete hardwired and portable energy-efficient light fixtures. ENERGY STAR compliant bulbs and fixtures are promoted through a combination of retail price incentives and marketing campaigns.

These promotions have increasingly been developed through "joint cooperative promotions" which are chosen through a competitive bidding process. Manufacturer/retailer teams propose cooperative promotions and the winning bidders are able to implement incentive and marketing packages at a wholesale level across a number of retailers. Light fixtures are also promoted through cooperative promotions, but historically have been more commonly delivered through consumer coupons and marketing developed on a store-by-store basis. Both bulbs and fixtures are also sold through a regional ENERGY STAR lighting catalog that is supported by many of the current initiative sponsors.

Sponsors participate in a NEEP-facilitated Appliance and Lighting Working Group to promote the stocking, marketing and sale of ENERGY STAR lighting products. NEEP and sponsors play a lead role in an on-going national effort to improve CFL quality and performance, through the Program for the Evaluation and Analysis of Residential Lighting (PEARL).

Progress to Date

- Dramatic increase in the number of manufacturers producing ENERGY STAR lighting products and the number of labeled models.
- Increase in the number and type of retailers stocking these products.
- Dramatic reduction in the price of CFLs.
- Regionally coordinated marketing and retailer support activities.
- Solicitation process to encourage the development of joint promotions with industry has dramatically reduced the program costs per kWh saved for participating sponsors.
- Development and participation in PEARL process – on-going focus on resolving quality and performance issues with CFLs.

The market share of compact fluorescent light (CFL) bulbs in Massachusetts in 2002 was roughly four percent. This is approximately twice the market share of CFLs in most of the rest of the US. While Massachusetts can claim some success in this market relative to the rest of the country on average, it is clear that there is a lot of room for increasing the market share of CFLs in Massachusetts and elsewhere.

3.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. Efficient lighting measures can be implemented throughout the Northeast. The market shares for efficient lighting measures are still low in all northeastern states. Not only are lighting efficiency opportunities available across the region, they are also available to all residential customers.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative the greatest amount of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 4.4.[4] None of the other existing initiatives scored higher than 4.0. (However, the question referred to ENERGY STAR Products and did not break out Lighting from Appliances.)

The most recent nationwide household survey of ENERGY STAR awareness conducted by CEE suggests that there are benefits of regional lighting and appliance campaigns. The survey compares ENERGY STAR awareness and purchasing patterns in high-publicity areas (including the Northeast) with those in low-publicity areas. The survey found that "publicity from active regional energy efficiency program sponsors increases recognition, understanding and influence of the [ENERGY STAR] label." (CEE 2003, page ES-3) This finding is consistent with findings from previous years' surveys.

In assessing the role of a regional strategy for this initiative, it is useful to first consider the current barriers that hinder the adoption of ENERGY STAR lighting products. The primary barriers include:

- Significant incremental costs of ENERGY STAR lighting products. This issue remains a barrier, despite the significant reduction in costs in recent years, particularly for CFLs.
- Limited product availability. ENERGY STAR lighting products are not stocked and promoted by all retailers, and not all retailer types typically stock these products (e.g., grocery stores). Those retailers that do stock ENERGY STAR lighting products frequently do not stock all efficient lighting product options.
- Lack of awareness among consumers of ENERGY STAR lighting products and the energy and non-energy (e.g., reduced replacement costs from longer lifetime) benefits they offer.
- Failure of retailer sales staff to proactively sell ENERGY STAR products to consumers. This barrier is exacerbated by high sales staff turnover.

[4] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Limited features offered by ENERGY STAR lighting products, e.g., few dimmable bulbs and no candelabra-based products.
- Product quality and performance. PEARL testing has raised serious concerns regarding CFL product quality and the effectiveness of the current ENERGY STAR qualification process. If these problems translate into increased failures in the field, they could hinder customer acceptance of ENERGY STAR lighting products.

The regional strategies that might help address these barriers include:

- Coordinate cooperative regional and national promotions with industry (retailers and manufacturers) to reduce costs to efficient lighting program administrators. This strategy has been particularly successful recently with lighting products.
- Coordinate financial incentive efforts across program administrators in the region, in order to help over the barriers created by high initial costs.
- Coordinate and facilitate the implementation of marketing and education activities that have a common and consistent theme.
- Coordinate the recruitment of retailers and training of retailer staff. Training services can help emphasize the "up-selling" to ENERGY STAR lighting products.
- Use cooperative campaigns to specifically promote specialty bulbs that are difficult for customers to find today.
- Work with DOE, EPA and other stakeholders to address quality performance issues through PEARL and the ENERGY STAR qualification process.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Yes, there are still many opportunities to increase market share and to change consumer purchasing patterns. As noted above, the market share of CFLs in Massachusetts (and by extension, the region) and the US as a whole are still very low.

For certain products – such as torchieres and ceiling fans with lighting – there are opportunities to establish state and or federal standards, thereby creating sustained saving impacts over time.

Addressing product quality concerns would help ensure sustained customer support.

Opportunities for Coordination with Other Efforts?

Yes. As noted above, the regional lighting and appliance campaigns have been found to increase the influence of the national ENERGY STAR campaign.

There are opportunities to coordinate this initiative with residential new construction efficiency programs and with low-income efficiency programs currently offered by program administrators in the region.

Industry actors have shown a high desire to work with program administrators on regional campaigns. For example, the annual *Change-a-Light* ENERGY STAR campaign has been a focal point for multiple stakeholder groups to coordinate efforts.

Support from Regulators?

Yes. Regulators have routinely approved program administrators' lighting efficiency programs, often with explicit approval of the regional components of the programs.

In theory, lighting programs should appeal to regulators, given that they are so cost-effective and that they tend to offer the largest amount of electricity savings among residential efficiency programs. Regulators should also like the fact that lighting is an equitable program that can be made available to all residential customers.

With decreasing program and product costs, these programs will become increasingly cost-effective.

Support from Sponsors?

Moderate to high. Most sponsors are very supportive of lighting programs in general, because of the large amount of savings available and the cost-effectiveness of the programs. However, some may be beginning to feel that they no longer need coordination and support from NEEP.

The RLW survey found that ENERGY STAR Products (Appliances and Lighting combined) has the highest amount of stakeholder support of all the current NEEP initiatives, with a score of 3.8.[5] The Residential Working Group (which includes several sponsors) indicated the general support for the ENERGY STAR Products initiative, with a score of 3.7.

Support from Trade Allies?

Yes. Most manufacturers and retailers like the fact that there is cooperation and coordination among program sponsors and states.

Manufacturers and retailers like the joint cooperative campaigns. Manufacturers like the certainty of volume, when this is negotiated and agreed to. Retailers like the opportunity to get a bigger markup on the efficiency products, with little or no inventory costs. Cooperative campaigns have become increasingly regional in nature, thus trade allies could be expected to support a continued regional effort.

Between New England, New Jersey and LIPA, lighting joint cooperative campaign RFPs generated over 40 million dollars in funding requests in the summer of 2004, and a significant amount of industry co-funding.

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[5] The survey question asked whether there is sufficient stakeholder support for a regional ENERGY STAR Products to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

Potential Support From Customers?

Low to Moderate, as indicated by the low, but increasing market share.

Customers are now buying more ENERGY STAR lighting products as the costs are declining. However, the market share is still low in all areas of the Northeast, as it is nationally. Market surveys indicate that customers are not fully aware of the products and their benefits.

While evaluation surveys indicate that product quality issues do not appear to have been a significant problem in the past, they may become a bigger issue for customer acceptance in the future.

Customer acceptance may remain low until a more full line of products become widely available, including dimmable bulbs and reflector bulbs that can be used in insulated recessed cans. Currently, candelabra-based bulbs are not eligible for ENERGY STAR qualification.

Feasibility of Initiative?

Yes. This initiative is clearly feasible, given that it has been running successfully already.

Role for NEEP

Clear and Valuable Role for NEEP

Yes. The regional strategies listed above all create a valuable role for NEEP. The following is a list of roles that NEEP has been playing in the past and could play in the future:

- Coordinate and facilitate the implementation of cooperative campaigns.
- Coordinate and facilitate the implementation of regional marketing and education campaigns.
- Coordinate regional program contractor procurement for the sponsors' field support, marketing, and coupon redemption/rebate processing contractors.
- Coordinate financial incentives offered by program sponsors in the region.
- Coordinate regional engagements with DOE regarding ENERGY STAR specifications and federal efficiency standards.
- Assist regional standards efforts targeted to lighting products, e.g., torchieres and ceiling fans with lighting.
- Continue working with DOE, retailers, and other stakeholders to develop more comprehensive market share tracking capabilities, particularly at the regional and state level.

- Continue working with DOE, EPA and other stakeholders to address quality performance issues. NEEP has played an active role in representing the interests of the sponsors on the PEARL board and in discussions with DOE on issues related to quality and performance.
- Research new opportunities for increasing the market shares of ENERGY STAR lighting products.
- Provide a forum for regional exchange of best practices and program successes.

As noted above, the RLW survey found that stakeholders see a clear and valuable role for NEEP regarding the existing Lighting and Appliance initiatives.

Is NEEP the Best Organization for the Job?

Yes. NEEP is the most logical organization to run this sort of initiative, and it has played a valuable role in the past. It is well-respected, well-positioned and has a relatively high profile. NEEP has been running this initiative successfully with strong sponsor support. The Lighting and Appliance initiatives have been the principle efforts of NEEP residential activities.

Do Resources Exist to Support NEEP's Work?

Probably. There is a small risk that sponsors become less able or willing to fund this effort in the future. Note that the RLW survey found that while most sponsors expect to maintain existing levels of funding for NEEP initiatives in general, eight of them expect funding levels to decrease, while none of them expect funding levels to increase.[6]

In addition to current funding from program sponsors, NEEP has current and near-term funding from ENERGY STAR to support or work with sponsors in coordinated regional implementation and marketing campaigns. Furthermore, NEEP has current and near-term foundation funding to support its work on state efficiency standards.

Challenges and Opportunities

Challenges

Price and availability continue to be key challenges to increasing the market share of efficient lighting products.

The low market shares for ENERGY STAR lighting products suggest that NEEP and sponsors need to somehow reach out to the large number of customers that have never bought efficient lighting.

[6] Out of a total of 54 people surveyed, the responses included: more funding (0), less funding (8), about the same funding (14), don't know (9), and no response (23).

Product quality will also have an important impact on the success of this program. Problems with CFL and fixture quality and performance need to be addressed before a larger share of the market will be willing to embrace lighting measures.

Retail sales and market share data can be difficult to obtain, particularly at the regional or state level.

As sponsors become more successful and experienced, they might increasingly feel that they can coordinate their own programs without the help of NEEP's facilitation. As the lighting markets evolve and the sponsors gain more experience, NEEP will need to be creative in responding to these changes in order to (a) ensure that its initiatives remain vital and successful, and (b) demonstrate to sponsors the value added that NEEP provides.

Some sponsors are less involved in the regional working group than others, thus making it difficult, at times, for NEEP to speak on behalf of all sponsors in the region.

Mercury disposal could increase the cost of lighting programs to program administrators. This challenge might also create an opportunity in terms of researching options, costs and benefits of mercury disposal across the region.

There are some differences among key stakeholders regarding the relative priorities that should be given to promoting efficient bulbs versus efficient fixtures.

Cooperative campaigns do not result in customer-specific data, which is sometimes required by regulators in their evaluations of sponsors' efficiency programs.

One person interviewed noted that NEEP may need to do a better job of facilitating the sponsors and maintaining some form of consensus decision-making process. Concern was expressed that some sponsors are pursuing their own approaches, potentially undermining the effect of a regional approach.

One person interviewed noted that PEARL is not being implemented in a way that addresses industry concerns. For example, the process should not be used in a punitive fashion (where products that fail are de-listed). Instead, the PEARL process should be used to address product quality problems in a more collaborative fashion.

The regional initiative embraces a number of different sponsor program strategies and designs. However, if sponsors begin adopting increasingly different program strategies, then it may become increasingly challenging for NEEP to maintain a coordinated campaign. For example, NYSERDA has a different philosophy than some sponsors for promoting efficient measures, preferring to work more with manufacturers, retailers and other trade allies, and less with customers (e.g., it prefers cooperative campaigns to customer rebates). If other sponsors use increasingly different strategies (e.g., those targeted more to customers), then a regional campaign may become more challenging. On the other hand, different strategies across program sponsors may create opportunities for NEEP to help exchange information and promote best practices across the region.

One person interviewed noted that it is not clear how much the trade allies even know of or understand NEEP's role in the programs, because the current implementation contractor is the agency that works directly with them on the cooperative campaigns. If

sponsors tend to use cooperative campaigns more frequently in the future, then NEEP may need to clarify its role with regard to the program implementation contractor.

Opportunities

Since the market shares of lighting products are currently so low, there are significant opportunities for increasing them and achieving large amounts of electricity savings.

There are opportunities for establishing state and federal efficiency standards for torchieres and ceiling fans.

There are opportunities for cooperation with residential new construction programs to increase installation of bulbs and fixtures. The results from recent efforts by a few sponsors to promote both bulbs and fixtures in the new construction programs should be shared regionally. There are also opportunities for the promotion of efficient lighting in home retrofit programs such as Home Performance with ENERGY STAR.

The difficulty in obtaining CFL market share data can also be an opportunity. NEEP has played a key role in discussions with DOE to develop a national, and possibly regional or state level, CFL market share tracking mechanism. Such a tracking system may eliminate or diminish the need for customer level sales data.

Product quality problems can also create an opportunity for NEEP to continue its efforts with DOE, EPA and the PEARL process.

There is increasing interest in cooperative campaigns, which may require increased regional support efforts from NEEP.

3.3 Initiative Scoring

Table 3 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 3. Scores for the ENERGY STAR Lighting Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	3
2. Electric Peak Demand Savings	3
3. Cost-Effectiveness (PV of net benefits)	3
4. Regional Value	3
5. Likelihood of Success	3
6. Role for NEEP	3
Total Score	**18**

3.4 Recommendations

NEEP should continue to offer the ENERGY STAR Lighting initiative, as it scores high on every criterion and is widely supported by sponsors and stakeholders. Nonetheless, lighting product quality will continue to be a challenge for this market, and NEEP should assign sufficient priority and resources to this topic in order to ensure that ENERGY STAR lighting products become fully embraced in the marketplace.

As the lighting market evolves over time, and program sponsors gain experience in this market, NEEP should give significant attention to opportunities to ensure that this initiative remains vital and successful, and to demonstrate to sponsors the value added that NEEP provides.

4. ENERGY STAR® Windows

4.1 Background

Initiative Title: ENERGY STAR Windows

Long-Term Goal: Permanently change the regional residential marketplace for ENERGY STAR windows so that product sales and consumer preferences are reflected in increased market share and updated product efficiency standards and building code requirements.

First Year of Regional Initiative Effort: 2000

Targeted Products/Services: windows, exterior glass doors and skylights

Initiative Participants: Maryland Energy Administration (MD); Cape Light Compact, KeySpan Energy Delivery and NSTAR Gas (MA); New Jersey Clean Energy Program (NJ); New York State Energy Research and Development Authority (NY); Narragansett Electric (RI); US DOE; Alliance to Save Energy/Efficient Windows Collaborative

Regional Market Size: Approximately 15.5 million households. Retail window replacement market estimated to be 3.8 million windows in 2005 growing to 3.9 million in 2014.

Current Regional Initiative Activities: Coordinate related program activities with subset of regional sponsors and national program and policy efforts, conduct research and facilitate development of market share tracking systems, support of national ENERGY STAR program efforts, implementation of windows retailer training programs (on-going), participation in ENERGY STAR windows specification revision process.

Current NEEP Role: Facilitate the implementation of NEEP's coordinated multi-state ENERGY STAR windows marketing and implementation plan with participating initiative sponsors and other stakeholders (Maryland Energy Administration, Efficient Windows Collaborative, window manufacturers and local retailers), plan and facilitate advisory group meetings, prepare and distribute information and documents related to program activities, coordinate program activities with related regional and national program and policy efforts, and conduct research and facilitate development of market share tracking systems to support the regional initiative.

This residential windows initiative consists of promoting purchase of ENERGY STAR labeled windows by retail customers, whether directly or through the installation contractor. NEEP offers retailer training, with sponsor support, as a key initiative service. In developing this initiative, and during its initial roll-out, NEEP has taken a more active implementation role than with other residential initiatives. NEEP is currently completing a retail-training pilot in Massachusetts co-funded by KeySpan and DOE. Additional training is either underway or planned in Massachusetts, Maryland and New Jersey. Future efforts may also address proper installation practices and additional code

upgrade opportunities. Much of the current funding for this initiative is through a grant form DOE that will expire in 2005.

Progress to Date

- Completed regional windows market assessment, including manufacturer and retailer surveys, state-level market share estimates, and program recommendations.
- Revised ENERGY STAR windows specifications became effective in 2003.
- Developed retailer training curriculum – key program recommendation arising from regional market research.
- Facilitated support from window industry - manufacturers and retailers - to support and participate in regional retailer training efforts.
- Have offered retailer training in multiple locations in Massachusetts (support from KeySpan Energy, Cape Light Compact, and GasNetworks) and Maryland (Maryland Energy Administration and the Alliance to Save Energy). Training is planned for New Jersey in 2005.
- Presented preliminary proposal to Massachusetts Board of Building Regulations and Standards Energy Code Advisory Committee to upgrade current replacement window requirement to ENERGY STAR criteria.

A study conducted for NEEP in 2002 by Quantec and Nexus Market Research made some estimates of the penetration of ENERGY STAR windows in the Northeast states, using manufacturer and retailer sales data. The authors estimated that the market share of ENERGY STAR windows was 43% on average in the eight Northeast states. The state-by-state estimates are provided below.

- Connecticut: 38%
- Maine: 50%
- Massachusetts: 54%
- New Hampshire: 38%
- New Jersey: 25%
- New York: 35%
- Rhode Island: 32%
- Vermont: 43%.

The authors of the Quantec study caution that the small sample sizes in some states make these state estimates less reliable than the regional average.

4.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes, there are energy savings throughout the Northeast region. However, the amounts and types of fuel saved differ between the northern and the southern parts of the region. In the northern states, the savings are primarily related to space heating and thus will be more in the form of gas and oil savings than electric. In the southern states, there will be more savings associated with air conditioning and thus there will be electric savings as well as gas and oil.

One of the key issues with regard to savings potential is the efficiency gains relative to state building codes:

- The ENERGY STAR requirements relative to the *windows replacement* market offer a clear increase in efficiency over most current state building codes in the Northeast. As states adopt more stringent standards that explicitly cover replacement windows, the savings from ENERGY STAR windows in the replacement market will diminish.
- The ENERGY STAR requirements in the *new construction* market offer efficiency savings in some states, but potential efficiency losses in others, depending upon the building code. There are cases in most states where the building code requires U-factors that are more stringent than the proposed ENERGY STAR standards. However, there are certain types of homes where the ENERGY STAR requirements would represent a savings over code, and there are other elements of building codes that would encourage windows that are more efficient than ENERGY STAR requirements. As codes are upgraded, savings may shrink or disappear entirely in states where there is a current increment between code and ENERGY STAR.
- In the Northeast the market for replacement windows is much larger than the new construction market. Also, in the replacement market most current state energy codes do not cover replacement windows and many windows are installed without a building permit.
- Many new homes are not currently built to building code requirements. Therefore, an ENERGY STAR windows program could result in energy savings over new construction practices, even in those states where ENERGY STAR requirements are not more stringent than code requirements. Furthermore, a windows initiative could achieve energy savings through efforts to assist code enforcement.

It is important to note that recently proposed changes to model residential energy codes effectively require ENERGY STAR windows in much of the Northeast. As building codes are upgraded this way, and are effectively enforced, the additional savings available from ENERGY STAR windows will diminish significantly.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative a moderate to high amount of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 3.8.[7] The Residential Working Group (which includes several program sponsors) showed even greater support, with a score of 4.1.

In assessing the role of a regional strategy, it is useful to first consider the barriers that currently hinder the adoption of ENERGY STAR window products. The primary barriers include:

- ENERGY STAR windows cost more than standard windows. Window retailers estimate that the incremental retail cost of an ENERGY STAR window is about 15% above the cost of a standard window. Window retailers believe that price is by far the greatest market barrier for ENERGY STAR windows.
- Many homebuilders and home contractors are still not aware of the value and benefits of ENERGY STAR windows.
- The majority of window retailers and wholesalers have little, if any, knowledge of ENERGY STAR windows, of what the ENERGY STAR label represents, or of the value and benefits to customers of ENERGY STAR windows.
- Many homeowners are not aware of the value and benefits of ENERGY STAR windows. However, homeowners are responsible for purchasing only a small portion (roughly 8%) of windows.
- Building codes in some states do not necessarily require the use of ENERGY STAR windows.
- Many new homes are not built to the current building codes, and many windows in the replacement market are not required to meet the building code.

The primary regional strategies that might help address these barriers include:

- Coordinate and implement marketing, education and staff training activities for window retailers.
- Coordinate and implement education and training activities targeted to homebuilders and home contractors.
- Coordinate cooperative campaigns with retailers and manufacturers to help market ENERGY STAR windows and or to reduce the retail price of ENERGY STAR windows.
- Investigate financial incentive options to encourage retail staff to promote ENERGY STAR windows or to reduce the retail price of ENERGY STAR windows.

[7] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Develop a program targeted to home builders and home contractors to promote the compliance with building codes. Develop a program targeted to local officials to promote the enforcement of building codes.
- Work with DOE to establish more stringent specifications for ENERGY STAR windows, so that the U-Factor requirements represent a significant improvement over the 2000 International Energy Conservation Code (IECC).

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Yes. If window retailers, homebuilders, and home contractors can be sufficiently educated and trained to promote ENERGY STAR windows, then the market shares for this product may be pushed up to higher levels on a sustained basis.

Improvements to state building codes, and better compliance and enforcement of state building codes, will have long-lasting benefits. Similarly, more stringent ENERGY STAR specifications will have long-lasting benefits, especially given the relatively high market share that ENERGY STAR windows have already achieved.

A campaign targeted to manufacturers might be able to have a significant impact on the ENERGY STAR windows market with a relatively small amount of funding and resources. In the Northwest, a similar campaign was able to increase the market share of ENERGY STAR windows from roughly 15% in 1997 to roughly 65% in 2001. This campaign required less than a million dollars per year for a few years. Most of the effort entailed working closely with manufacturers; cooperative campaigns, assisting with marketing and promotion, and technical assistance with regard to ENERGY STAR labeling.

Opportunities for Coordination with Other Efforts?

Yes. A regional campaign would obviously coordinate with the DOE ENERGY STAR windows campaign, including activities by the Efficient Windows Collaborative. A regional effort could also coordinate ENERGY STAR windows promotions with residential new construction programs, Home Performance With ENERGY STAR programs, and even with ENERGY STAR product programs. As an example, Efficiency Vermont is creating an "ENERGY STAR Center" in hardware stores, where a variety of ENERGY STAR products are placed in one area and marketed together.

Support from Regulators?

Support might be mixed, depending upon the savings potential and the cost-effectiveness in each state. For example, Massachusetts regulators have supported KeySpan's participation in the ENERGY STAR Windows initiative, but it is not clear that they would support an electric company's participation in a stand-alone windows program. The New Jersey ENERGY STAR Products program has had a windows component for several years, but it has been fairly inactive.

Support from Sponsors?

Support will depend upon the type and location of the sponsor. Gas utilities are in a better position to support this initiative throughout the Northeast, because of the gas savings and cost-effectiveness throughout the region. However, there are less gas utility efficiency programs in the Northeast relative to electric utility efficiency programs, and NEEP has fewer gas utility sponsors than electric. Electric utilities in the southern part of the region are in a position to support this initiative because of the air conditioning savings.

That there are currently only five sponsors for the existing windows initiative suggests that sponsor support is light, though, this may be partly due to the fact that the initiative is relatively new.

The RLW survey found that the ENERGY STAR Windows initiative has one of the lowest amount of stakeholder support, relative to the other initiatives, with a score of 2.7.[8] The Residential Working Group (which includes several sponsors) indicated a slightly higher amount of support for the ENERGY STAR Window initiative, with a score of 3.1.

Support from Trade Allies?

Yes. Most national windows manufacturers already produce ENERGY STAR windows, and many retailer offer ENERGY STAR windows. These market actors would presumably welcome regional activities to help sell their products, as they have in the Northwest.

Potential Support From Customers?

Yes. The relatively high levels of market share for ENERGY STAR windows, even prior to the NEEP initiative, suggests that customers, or at least their contractors, have embraced this product.

Feasibility of Initiative?

Yes. This initiative is clearly feasible, given that it has been running successfully already. However, the limited savings in some regions of the Northeast might may make it difficult to significantly increase sponsor support.

Role for NEEP

Clear and Valuable Role for NEEP

Yes. The regional strategies listed above create a valuable role for NEEP. The following is a list of roles that NEEP could play in this initiative:

[8] The survey question asked whether there is sufficient stakeholder support for a regional ENERGY STAR Windows initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Coordinate and implement marketing, education and staff training activities for window retailers.
- Coordinate and implement education and training activities targeted to homebuilders and home contractors.
- Coordinate cooperative campaigns with retailers and manufacturers.
- Investigate financial incentive options to encourage retail staff to promote ENERGY STAR windows or to reduce the retail price of ENERGY STAR windows.
- Develop a program targeted to home builders and home contractors to promote the compliance with building codes. Develop a program targeted to local officials to promote the enforcement of building codes.
- Work with DOE to establish more stringent specifications for ENERGY STAR windows.
- Work to upgrade state energy codes to levels that meet or exceed current ENERGY STAR specifications.

The RLW survey found moderate support for NEEP's role with this initiative. Of the 19 respondents, seven suggested that NEEP "maintain current status," and eight offered positive suggestions such as "interact with standards" and "support training." Two respondents suggested that NEEP drop the program, and two suggested that NEEP "make or stay at a minor role."

Is NEEP the Best Organization for the Job?

Yes. This type of initiative is consistent with NEEP's mission. There are no other organizations that are better suited or are already doing this job regionally.

Do Resources Exist to Support NEEP's Work?

Not clear. Again, this may depend upon NEEP's ability to increase the support from sponsors, and/or leverage direct industry support of NEEP's efforts. Much of NEEP's current initiative funding comes from DOE (as well as EPA), which might be a source of additional funding in the future.

Challenges and Opportunities

Challenges

The ENERGY STAR U-Factor requirements do not always represent a significant improvement over current building code standards. In addition, the efficiency savings from windows may shrink even further if state energy codes place more stringent standards on windows.

Increasing the amount of sponsor support may be challenging, due to the limited number of gas efficiency programs and the limited amount of electric efficiency savings in the northern part of the region.

NEEP's ability to increase state building code standards could be significantly limited by protracted state proceedings. Similarly, the potential for promoting code compliance and enforcement is limited by the many local actors involved and the need to modify priorities and practices that have become ingrained over time.

It is important the windows are installed properly in order to achieve their savings. Anecdotal evidence indicates that windows are frequently not installed properly.

Opportunities

As the experience in the Northwest indicates, it may be possible to achieve a large amount of savings with relatively little funding through the leveraging of industry support.

Some states (e.g., Connecticut and New York) are considering the introduction of gas utility efficiency programs, which would increase the opportunity to get more sponsors for this initiative.

Federal tax incentives may become available in the near future for energy efficiency home improvements. These could help increase the market share for ENERGY STAR windows both as a result of the increased attention to home energy efficiency and as a result of the tax break.

The Alliance to Save Energy, through the Efficient Windows Collaborative, works with manufacturers and others to support ENERGY STAR windows, and thus creates opportunities for NEEP to pursue similar efforts at the regional level.

Actions to increase ENERGY STAR U-Factor requirements could increase the savings potential from windows. However, given that the specification was updated last year after a fairly contentious three-year process, it is unlikely that DOE will consider further revisions to this specification in the near-term.

4.3 Initiative Scoring

Table 4 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 4. Scores for the ENERGY STAR Windows Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	1
2. Electric Peak Demand Savings	2
3. Cost-Effectiveness (PV of net benefits)	2
4. Regional Value	3
5. Likelihood of Success	2
6. Role for NEEP	3
Total Score	**13**

4.4 Recommendations

NEEP should continue to offer the ENERGY STAR Windows initiative. The potential energy savings are low relative to other residential initiatives, and NEEP has not yet generated a lot of sponsor support. Nonetheless, there are a number of opportunities for regional efforts to help increase the market share of ENERGY STAR windows in the Northeast, and NEEP is well-suited to undertake such efforts.

5. Residential ENERGY STAR® HVAC

5.1 Background

Initiative Title: Residential ENERGY STAR HVAC

Long-Term Goal: Permanently change the regional residential marketplace for high-efficiency residential heating and cooling equipments, systems and installation practices including ENERGY STAR central air conditioners, heat pumps, furnace fans, boilers, so that product sales and consumer preferences are reflected in increased market share and updated equipment efficiency standards and building code requirements.

First Year of Regional Initiative Effort: 1997

Targeted Products/Services: central air conditioners, heat pumps, furnaces, furnace fans, boilers, and best practices for equipment/system sizing, installation (airflow and charging), and duct sealing.

Initiative Participants: Connecticut Light and Power, The United Illuminating Company (CT); Cape Light Compact, Massachusetts Electric, NSTAR Electric and Gas, Western Massachusetts Electric (MA); New Jersey Clean Energy Program (NJ); New York State Energy Research and Development Authority (NY); Narragansett Electric (RI); Efficiency Vermont (VT); US EPA; CEE

Regional Market Size: Approximately 15.5 million households; 12,000 heat pumps, 300,000 central air conditioners, and 148,500 gas furnaces per year.

Current Regional Initiative Activities: Organize regional meetings to inform individual program administrator efforts and to address opportunities for coordinated program activities to increase market impacts, work with US DOE, US EPA, ASAP and other national and regional stakeholders to influence revised ENERGY STAR specifications and national equipment efficiency standards, support the incorporation of improved HVAC installation practices in state energy codes, pursue research on the benefits of contractor training, the development of a market-based duct sealing model, and the demand impacts of very efficient cooling equipment, support the work of CEE and others to develop market share estimates..

NEEP Role: Research, develop and facilitate regional market transformation strategies for residential HVAC, plan and facilitate Working Group meetings, manage on-going STAC research efforts (funded, in part, by NYSERDA and the New Jersey Clean Energy Program), participate in DOE standards rulemaking proceedings and EPA ENERGY STAR specification revisions, coordinate sponsor participation at National Partner meetings, participate in relevant state energy code development efforts, work with NATE, BPI and others (directly and through CEE) to support contractor training and certification efforts, participate in CEE HVAC Committee and Market Share Tracking Subcommittee activities.

The residential HVAC initiative promotes program components designed to encourage energy-efficient central cooling and heating equipment, and to encourage proper installation practices. The equipment component involves rebates offered for the purchase of ENERGY STAR compliant residential HVAC equipment. The installation component is required in order to qualify for the equipment rebate and involves documentation of proper sizing, system refrigerant charge and airflow across the evaporator coil. Note that there are variations in sponsors' current HVAC program efforts, e.g., not all offer rebates (NYSERDA), nor do all require proper installation as a condition for rebates (MA).

The Residential HVAC Working Group meets semi-annually and serves as an information exchange among sponsors with similar program objectives – proper sizing and installation of high efficiency equipment – and as an opportunity to engage industry.

In 2004, NEEP is managing a major research effort with NYSERDA and the New Jersey Board of Public Utilities (STAC research funded through NASEO) that will characterize the northeast residential heating and cooling market and complete specific in-field research tasks. NEEP also participates in national standards setting efforts and, through CEE, in the development of HVAC market share tracking systems and a residential cooling equipment database (which is now being maintained by ARI).

Progress to Date

- Participated in CAC standards rulemaking process. Helped prevent delay in SEER 13 standard. Participating in ongoing furnace rulemaking with ASAP, ACEEE and others.
- Increasing incorporation of best installation practices in sponsor program offerings.
- Sponsor development and implementation of furnace fan efficiency criteria and program incentives.
- Participated in CEE Residential HVAC Committee to enhance existing certification mechanisms as they relate to HVAC system efficiency.
- Participating in the revised ENERGY STAR specifications revision process, which may include an installation component.
- Managing STAC research to assess benefits of HVAC contractor training, assess current HVAC market, develop a market-based duct sealing program model, and recommend a regional market transformation strategy.

5.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. There are significant savings available from each state in the Northeast. Some states have more savings potential than others, depending upon space heating and air conditioning demands, saturations and fuel choice. Most of the electricity savings from this initiative will be from air conditioning equipment and installation practices, leading to significantly greater savings opportunities in the southern part of the region where the cooling loads are greater. This initiative will also seek to increase the efficiency of furnace fans, thereby offering electric efficiency savings in all states, especially those in the northern regions and those with high penetrations of space heating furnaces.

From a heating perspective, there still are large opportunities to increase the market share of ENERGY STAR furnaces and boilers, with significant savings opportunities throughout the region.

HVAC has historically been the most under-attended market in the residential sector. The potential for savings –especially demand savings – is very large.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative a high amount of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 4.0.[9] The Residential Working Group (which includes several program sponsors) showed even more support, with a score of 4.6.

In assessing the role of a regional strategy, it is useful to first consider the barriers that currently hinder the adoption and proper installation of ENERGY STAR HVAC. The primary barriers include:

- The cost of ENERGY STAR HVAC is higher than standard alternatives.
- Most homeowners are not aware of the benefits of ENERGY STAR HVAC systems, of proper installation practices, or of efficient furnace fans.
- Most HVAC contractors are not aware of the benefits of ENERGY STAR HVAC systems
- Most HVAC contractors are not well trained on proper HVAC installation practices.
- Most HVAC contractors and homeowners are not aware of the benefits of duct sealing, and there are no practical standards for duct sealing services.

[9] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

HVAC equipment tends to be produced by manufacturers on a national basis. So the regional strategies targeted to manufacturers should focus on marketing efforts and opportunities to reduce the retail cost of ENERGY STAR HAVC systems. In contrast, HVAC installation work takes place on a relatively local level; therefore there are lots of regional issues related to this aspect of the HVAC initiative.

The primary regional strategies that might help address the market barriers include:

- Coordinate and implement cooperative campaigns with HVAC manufacturers to market ENERGY STAR HVAC systems, and to find ways to reduce the incremental retail cost of ENERGY STAR HVAC systems.
- Work with trade allies across the region to develop consistent definitions of best practices for HVAC equipment installation.
- Coordinate and implement a program for HVAC contractor installation training and certification. The program could target and coordinate with installation networks such as the local chapter of the Air Conditioning Contractors of America (ACCA).
- Provide regional perspective to the ENERGY STAR program to inform the evolution of HVAC specifications as the SEER 13 federal standard is implemented.
- Conduct regional research and coordination with trade allies and US EPA to develop commonly accepted technical requirements for duct sealing services.
- Coordinate comments to US DOE on proposed furnace and boiler standards to ensure that they properly address furnace fan efficiency and address regional consumer demand for efficient equipment.
- Facilitate exchange between existing HVAC program administrators regarding effective program strategies and opportunities for regional coordination.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Yes, depending upon the initiative strategy. The new federal CAC standards that take effect in 2006 will limit the opportunity to achieve efficiency savings from HVAC equipment efficiency upgrades. The EPA is currently discussing whether and how to revise the ENERGY STAR specification, in light of the new federal standards. The current EPA proposal addresses both efficient HVAC equipment as well as installation practices.

If qualified installation practices can be entrenched in the industry, this will lead to sustained and significant efficiency savings over time. This could be accomplished through promoting training and certification programs.

If this initiative can improve the furnace and boiler efficiency standards that DOE is currently developing, then it will create long-lasting energy savings.

Opportunities for Coordination with Other Efforts?

Yes. There are many opportunities to coordinate with the Consortium for Energy Efficiency, the US EPA, the North American Technician Excellence (NATE) certification, and the State Technology Advancement Collaborative (STAC), as well as the GasNetworks in Massachusetts and New Hampshire. There may also be increasing opportunities to coordinate with other efficiency programs, such as Home Performance with ENERGY STAR (through which NYSERDA addresses its HVAC opportunities in existing homes) and new construction programs.

Support from Regulators?

Yes. Regulators have approved the existing sponsors' participation in this initiative.

Support for this program may increase over time with the increased attention on peak electricity demand savings.

Support from Sponsors?

Yes. The RLW survey found a reasonable amount of support for this initiative, with a score of 3.3.[10] The Residential Working Group (which includes several sponsors) indicated the greatest amount of support for this initiative (among all existing residential initiatives), with a score of 3.9.

Currently the list of sponsors does not include Maine, New Hampshire or Vermont. This is probably due, in part, to limited amount of space cooling required in these states. Also, the gas utilities in Massachusetts and New Hampshire have been primarily addressing this market through their GasNetworks consortium.

Support from Trade Allies?

Yes, and there is potential for increasing this support. Manufacturers are generally interested, and there may be opportunities to work with them in the coming years with the advent of the new efficiency standards in 2006.

Some installation contractors are likely to be interested, while others will not due to the perception that it would increase their costs or be an unnecessary distraction. Those that are interested will probably support the development of lists of qualified, certified contractors – in order to provide added value to their customers.

Potential Support From Customers?

Moderate. Customers are not typically aware of the potential savings from their CAC equipment or systems. Customers are likely to support the more efficient products if they

[10] The survey question asked whether there is sufficient stakeholder support for a regional ENERGY STAR HVAC initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

are properly educated on the economic benefits. They are likely be even less informed about proper installation practices and duct sealing.

Feasibility of Initiative?

Yes. This initiative is clearly feasible, given that it has been running successfully, though at a fairly low level, already. The increasing interest in demand savings will help the feasibility of this initiative.

Role for NEEP

Clear and Valuable Role for NEEP

Yes. The regional strategies listed above create a valuable role for NEEP. The following is a list of roles that NEEP could play in this initiative:

- Coordinate and implement cooperative campaigns with HVAC manufacturers.
- Work with trade allies across the region to develop consistent definitions of best practices for HVAC equipment installation.
- Coordinate and implement a program for HVAC contractor installation training and certification.
- Work with DOE to inform the evolution of ENERGY STAR HVAC specifications as the new SEER 13 standard is implemented.
- Conduct regional research and coordination with trade allies and US EPA to develop commonly accepted technical requirements for duct sealing services.
- Work with American Council for an Energy Efficient Economy and the Appliance Standards Awareness Project to coordinate comments to DOE on proposed furnace and boiler standards.
- Facilitate exchange between existing HVAC program administrators regarding effective program strategies and opportunities for regional coordination.
- Work to include HVAC installation and duct sealing requirements in state energy codes. California has recently adopted performance based duct sealing requirements in its energy code.

The RLW survey found general support for NEEP's role on this initiative. Of the 13 respondents, four suggested that NEEP "maintain current status," and several provided positive suggestions for NEEP's role, such as "promote training" or "include new sponsors." On respondent suggested that NEEP drop the program, and two suggested that NEEP "make or stay at a minor role."

There has been little regional coordination among current sponsor programs in the past. The programs currently offered differ across the region. Manufacturers would like more coordination. Unlike lighting and appliances, most program administrators have not been

working on this market for long, and thus are likely to continue to see value in a regional initiative.

NEEP is currently involved, with the support of NYSERDA and the New Jersey BPU, in research on (a) regional heating and cooling savings opportunities, (b) the development of a market-based duct sealing model, and (c) the impact of super efficient cooling equipment on system peak. This research will be completed by the end of 2005. The results of this review might help NEEP further refine its potential role in this market.

Is NEEP the Best Organization for the Job?

Yes. While there are many organizations that address this market in some way (see above), there are not any that do what NEEP does or could do on a regional basis.

Do Resources Exist to Support NEEP's Work?

Probably. There is a small risk that sponsors become less able or willing to fund this effort in the future. Note that the RLW survey found that while most sponsors expect to maintain existing levels of funding for NEEP initiatives in general, eight of them expect funding levels to decrease, while none of them expect funding levels to increase.[11]

In addition to current funding from program sponsors, NEEP has current and near-term funding from ENERGY STAR to support or work with sponsors in coordinated regional implementation and marketing campaigns. Furthermore, NEEP has current and near-term foundation funding to support its work on state efficiency standards.

Challenges and Opportunities

Challenges

Once the new federal CAC standards come into effect in 2006, the savings from promoting efficient equipment only will be harder to obtain. Preliminary analysis by the DOE suggests that an ENERGY STAR specification of SEER 14 would only be cost-effective for a small portion of customers in the US, even in southern parts of the country. However, this analysis does not consider avoided capacity benefits.

Transforming the market for HVAC installation contractors to ensure that installation practices are permanently improved may require a long-term effort, and will be challenging due to the large number of installation contractors.

This industry is heavily dependent upon seasonal cycles for planning, production and distribution. NEEP may need to better understand and work within these cycles. NEEP will also need to inform manufacturers and distributors of the program planning cycle of its sponsors, so that industry can properly plan its marketing and promotional activities.

[11] Out of a total of 54 people surveyed, the responses included: more funding (0), less funding (8), about the same funding (14), don't know (9), and no response (23).

It maybe difficult for NEEP to increase sponsorship support of this initiative, especially in the northern part of the region.

Opportunities

The biggest opportunity may be in improving practices for installation, tune-ups, and duct sealing. However, the installation and maintenance contractors are a very fractured market, and thereby making it more difficult to achieve lasting savings.

Manufacturers are probably the easiest group to work with in the short term, because most of them have ENERGY STAR products. The "efficiency" issue has their attention as a result of the new federal CAC standard and on-going efforts to revise the ENERGY STAR specification. These new standards and specifications create an opportunity for the region to reach out to manufacturers and offer assistance on how to best leverage them.

Most programs only address new systems, and there has only been a limited amount of sponsor effort on tune-ups of existing systems. There may be opportunities to research how best to capture these untapped efficiency savings.

5.3 Initiative Scoring

Table 5 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 5. Scores for the Residential HVAC Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	3
2. Electric Peak Demand Savings	3
3. Cost-Effectiveness (PV of net benefits)	3
4. Regional Value	3
5. Likelihood of Success	3
6. Role for NEEP	3
Total Score	**18**

5.4 Recommendations

NEEP should continue to offer the ENERGY STAR HVAC initiative. The potential savings from this market are significant. This initiative has a relatively high regional value, high likelihood of success, and a fairly clear role for NEEP. Furthermore, this program offers a foundation for the Enhanced HVAC program, which also offers considerable value to NEEP and its sponsors.

6. ENERGY STAR® Appliance Enhancements

6.1 Background

See Section 2.1 for a description of the current ENERGY STAR Appliances initiative.

The Enhanced ENERGY STAR Appliance initiative would promote more stringent program specifications for existing appliances. The new program specifications would be based on applicable CEE SEHA (Consortium for Energy Efficiency Super-Efficient Home Appliances) Tier appliance specifications (see table below). In the event of multiple SEHA Tiers, the choice was based on product availability and significance of savings produced.

Appliance	% Above Federal Standards for ENERGY STAR Qualification	CEE SEHA Tier 1	CEE SEHA Tier 2
Clothes Washers	50% better Modified Energy Factor (MEF 1.42)	Same as ENERGY STAR and 9.5 Water Factor (WF)	1.60 MEF and 8.5 WF (highest possible standard = 1.8 MEF and 5.5 WF but very few products qualify)
Dishwashers	25% (EF 0.58)	Same as ENERGY STAR	none
Refrigerators	15%	20%	25%
Room Air Conditioners	10%	15%	20%

6.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. More efficient appliances could be adopted throughout the Northeast. See Section 2.2 for a discussion of the regional savings potential and the extent to which savings opportunities are dwindling from the existing ENERGY STAR Appliances program.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative a very high score when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 4.1.[12]

Section 2.2 lists the primary market barriers that hinder the further adoption of ENERGY STAR Appliances, and the types of regional strategies that could address these barriers. Additional regional strategies that could be applied through this Enhanced Appliance Initiative could include the following:

- Coordinate and facilitate research on the technical potential and the costs and benefits of promoting appliances that exceed ENERGY STAR specifications.
- Coordinate activities of efficiency program administrators that are seeking to promote appliances that exceed ENERGY STAR specifications.
- Develop and implement cooperative campaigns with manufacturers and retailers to help market appliances that exceed ENERGY STAR specifications. Marketing activities should be designed to minimize dilution of the ENERGY STAR brand's equity and possible customer confusion if multiple efficiency levels are promoted.
- Develop and implement cooperative campaigns with manufacturers and retailers to help reduce the potential increased retail prices associated with more stringent specifications for ENERGY STAR appliances that exceed ENERGY STAR specifications.
- Coordinate regional engagements with DOE regarding appliances that exceed ENERGY STAR specifications.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Potentially. By pushing customers to purchase higher efficiency appliances, this initiative can support on-going and future ENERGY STAR specification revisions and DOE appliance standards upgrades. If this initiative eventually results in more stringent ENERGY STAR specification or appliance efficiency standards, then there will clearly be long-term, sustained savings.

Opportunities for Coordination with Other Efforts?

Yes. See Section 2.2 for a discussion regarding the existing initiative.

[12] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

Support from Regulators?

Probably. Regulators have shown strong support for the existing ENERGY STAR Appliance program, and are likely to support this enhancement once the potential for additional savings and the cost-effectiveness is demonstrated.

Support from Sponsors?

Yes. The RLW survey found that this initiative has the highest amount of stakeholder support of all the proposed new NEEP initiatives, with an average score of 3.5.[13]

For some sponsors, these enhancements might be necessary to maintain their support for the ENERGY STAR Appliances initiative, given the dwindling savings from that initiative, and the fact that sponsors are requiring less and less support from NEEP over time.

For some sponsors, NEEP may need to clearly demonstrate the need and the benefits of this enhancement relative to their current program designs.

Support from Trade Allies?

Probably. Support from trade allies is going to be critical in order to achieve the goals of this initiative, and thus should be a priority for the region. NEEP and its sponsors should identify and demonstrate how trade allies, especially retailers, will benefit. Revised training curriculum may need to be developed and implemented for retailers.

Potential Support From Customers?

Possibly.

However, customer support is seen by some as becoming less and less relevant. For appliances, the customers are not in the market long enough. Some people believe that if the manufacturers make the products and retailers stock and promote them, then customers will adopt them at the point of purchase.

Others counter that customer education and support is critical for long-term transformation of the appliance market. The existence of resources like *Consumer Reports* suggests that customers want and need to be educated about big purchases. Also, the more expensive a product and the longer its life, the more a customer is likely to seek and rely upon product education and information.

Feasibility of Initiative?

Yes. However, the feasibility of this initiative will depend upon whether there is sufficient sponsor support.

[13] The survey question asked whether there is sufficient stakeholder support for an enhanced ENERGY STAR Appliance initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

Role for NEEP

Clear and Valuable Role for NEEP

Yes. The regional strategies listed above create a valuable role for NEEP. The following is a list of roles that NEEP could play in this initiative:

- Coordinate and facilitate research on the technical potential and the costs and benefits of promoting appliances that exceed ENERGY STAR specifications.
- Research and disseminate lessons learned from other regions that have undertaken similar efforts (e.g., the Northwest and California).
- Coordinate activities of efficiency program administrators that are seeking to promote appliances that exceed ENERGY STAR specifications.
- Develop and implement cooperative campaigns with manufacturers and retailers to help market appliances that exceed ENERGY STAR specifications.
- Develop and implement cooperative campaigns with manufacturers and retailers to help reduce the potential increased retail prices.

The RLW survey found mixed support for NEEP's role on this proposed initiative. Of the 15 respondents, one said it was "not a NEEP role," two said that "CEE would be better at it," two said that such efforts are "already in process," one said that NEEP should "continue existing program and role," one said not to move "without national standards in place," and one said that he/she "foresees diminishing returns on effort." The remaining seven respondents offered positive suggestions for NEEP's role, such as "coordinate utilities" and "sharpen message."

Is NEEP the Best Organization for the Job?

Yes. NEEP is well-suited to implement a regional campaign of this nature. NEEP has successfully facilitated the current ENERGY STAR Appliance initiative, and this is a logical evolution of that program.

Do Resources Exist to Support NEEP's Work?

Probably. NEEP may be able to rely upon sponsor funding for the existing ENERGY STAR Appliance initiative, as this enhancement would be an incremental change, not a new initiative.

In addition to current funding from program sponsors, NEEP has current and near-term funding from ENERGY STAR to support work with sponsors in coordinated regional implementation and marketing campaigns. Furthermore, NEEP has current and near-term foundation funding to support its work on state efficiency standards.

Challenges and Opportunities

Challenges

High incremental costs might pose a significant barrier to customers.

Promoting a different standard than ENERGY STAR will make it difficult to develop marketing strategies and messages that are consistent with those of the ENERGY STAR campaign. Promoting a different standard also creates the potential to send confusing messages to customers. It dilutes the ENERGY STAR brand and encouraging multiple levels of efficiency. This may be particularly confusing if incentives are only provided for those appliances that exceed the ENERGY STAR requirement, but are not provided for those that just meet the ENERGY STAR requirement.

It may be difficult to obtain sponsor support to promote efficient equipment other than the ENERGY STAR products. Sponsors are likely to be concerned about the problem of sending mixed and confusing messages.

It is currently difficult to obtain market share data for ENERGY STAR appliances across all retailers. Most data are restricted to national retail chains.

Opportunities

The reduced savings potential from the ENERGY STAR Appliances program creates an opportunity for NEEP to demonstrate that this is a strategic evolution of the program, and that NEEP is being proactive and creative in response to the evolving marketplace.

Given that manufacturers are so important for this initiative, and that manufacturers tend to support cooperative campaigns, NEEP may have an opportunity to use cooperative campaigns to develop manufacturer support.

The current lack of market share data creates an opportunity. NEEP could continue its on-going discussions with AHAM through CEE to develop better appliance market share tracking systems.

These efforts will also support ongoing and future ENERGY STAR specification revisions and DOE appliance standards upgrades by promoting the sales of the most efficient appliances.

6.3 Initiative Scoring

Table 6 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 6. Scores for the Residential Appliance Enhancements Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	2
2. Electric Peak Demand Savings	2
3. Cost-Effectiveness (PV of net benefits)	1
4. Regional Value	3
5. Likelihood of Success	2
6. Role for NEEP	3
Total Score	**13**

6.4 Recommendations

NEEP should proceed with the Enhanced Appliance initiative. It only offers a moderate amount of energy savings and peak demand savings, and it is not as cost-effective as other NEEP initiatives being considered. However, there are many regional strategies that could be pursued through this initiative, and NEEP is well-positioned to play a key role in pursuing them. Most importantly, this initiative is a natural evolution of the existing ENERGY STAR Appliances initiative, and will help make that initiative more valuable, more vital, and more responsive to market developments.

NEEP should always be investigating new approaches for achieving the goals of this initiative. For example, cooperative campaigns offer a promising approach to increasing the market shares of appliances for lower costs.

One of the biggest challenges limiting the likelihood of success of this initiative is the need to develop a marketing campaign that does not conflict with or cause confusion regarding the ENERGY STAR campaign. NEEP should give considerable attention to addressing this challenge.

7. Home Performance With ENERGY STAR®

7.1 Background

Proposed Initiative Title: Home Performance with ENERGY STAR.

Long-Term Goal: Create a robust and self-sustaining contractor infrastructure to deliver comprehensive residential retrofit services.

First Year of Regional Initiative Effort: Proposed initiative.

Targeted Products/Services: energy diagnostics services; installation of energy efficient building envelope, HVAC systems, lighting, hot water, and appliances in residential low-rise existing construction; contractor training and certification.

Initiative Participants: Proposed initiative.

Regional Market Size: Approximately 12 million non-multifamily households.

Current Regional Initiative Activities: Active program in New York (NYSERDA). Other programs either in development or recently in the field, e.g., Efficiency Vermont, Cape Light Compact, LIPA, and New Jersey Clean Energy Program.

NEEP Role: Proposed initiative.

The proposed Home Performance with ENERGY STAR initiative is based on the program of the same name, pioneered by NYSERDA. While the NYSERDA version has been operational for a few years, counterpart programs of other NEEP sponsors have only just begun, soon will begin or still are under consideration. Nevertheless, it is expected that many sponsors will have an operational Home Performance with ENERGY STAR program in the next ten years targeting the same market: homeowners wishing to improve building performance by engaging suitable trained and experienced contractors capable of whole-building diagnostics and work scope development for a comprehensive retrofit.

7.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. Every state has existing homes that could be significantly more efficient. Most of the space heating impacts would result in fossil fuels savings, and these may be greater in the northern part of the region than the southern part. All of the air conditioning impacts would result in electricity savings, and these would be significantly higher in the southern part of the region.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative moderate support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 3.6.[14]

In assessing the role of a regional strategy, it is useful to first consider the barriers that currently hinder residential customers from adopting the types of efficiency measures promoted through Home Performance With ENERGY STAR. The primary barriers include:

- Many residential customers are not aware of the full opportunities for and benefits of improving home efficiency performance.
- Many of the home efficiency measures require significant up-front costs, particularly in light of the fact that many residential customers do not see reducing their energy bills as a high priority.
- Residential customers experience high transaction costs (i.e., a lot of hassle) associated with finding, hiring and working with building contractors that are necessary for improving home energy performance.
- Many building contractors that residential customers might hire for work on their homes are not properly trained or certified to install a comprehensive set of home energy performance measures.

Many efficiency program administrators in the Northeast already have programs addressing exiting homes, and several utilities in the Northeast are already implementing or considering the Home Performance with ENERGY STAR program. This level of activity could suggest that there is a need for regional coordination, in order to promote consistency and best practices. Alternatively, it could mean that there is little need for regional coordination because the program administrators are already addressing this market.

The primary regional strategies that might help address the market barriers include the following:

- Develop and coordinate a regional marketing strategy. Some efficiency program administrators may have small marketing budgets available, and would benefit from materials that are developed on a regional basis. Also, a regional marketing campaign might be more effective at educating homeowners and home contractors about the program.
- Develop a regional program financing package. NYSERDA uses Fannie Mae to help buy down the cost of the loan used to finance efficiency measures. In Vermont the volume of the work is not large enough to tap into this sort of financial support. A regional effort might be able to pool sponsors to get better financing packages for all.

[14] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Develop and implement contractor training programs. Some contractors might want to work in more than one utility service territory or more than one state. A regional contractor training campaign would assist this. Vermont is in the early stages of implementing the Home Performance with ENERGY STAR program, and has found it challenging to get certified contractors.
- Develop and implement a regional strategy to address quality assurance. Quality control efforts might benefits from a regional approach or from the pooling of sponsor resources.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Probably. The greatest opportunities to sustain impacts over time are a result of (a) installing building shell measures with a relatively long measure life, (b) improving the quality of home energy auditors and contractors by promoting the Building Performance Institute (BPI) certification, (c) installing efficient HVAC systems using best practices, and (d) educating customers to the benefits of comprehensive energy efficiency improvements. .

Opportunities for Coordination with Other Efforts?

Yes. EPA is looking for program sponsors. NYSERDA would also welcome the opportunity to help promote this initiative more widely in the region. There are many on-going efforts to address the existing homes market – these could benefit from regional coordination, including existing sponsor retrofit, weatherization, and HVAC programs. There may also be opportunities to coordinate with the training and certification activities of the Building Performance Institute (BPI) and NATE.

Support from Regulators?

Probably. Regulatory support might vary depending upon the amount of electric or gas savings available in a particular state, and the cost-effectiveness test used (e.g., utility cost versus societal versus TRC tests).

Support from Sponsors?

Potentially. There has been increased interest in this program among program administrators recently, though some sponsors may need to be convinced of the potential savings and the cost-effectiveness. In those states where more traditional retrofit programs are in operation already, sponsors may be reluctant to support major overhauls.

The RLW survey found relatively little support for this initiative, with an average score of 2.9.[15] The Residential Working Group (which includes several sponsors) indicated the same amount of support for this initiative, with a score of 2.9.

Support from Trade Allies?

This could be challenging. The key trade allies for this initiative are the home performance contractors, which include building shell contractors, HVAC contractors, and remodeling contractors. All three types of contractors need to be BPI-certified in order to participate in this program.

Efficiency Vermont has had trouble finding certified contractors. While contractors appear to be interested, they are not yet convinced that a Home Performance With ENERGY STAR program would have funding for a long enough period to make it worth their while.

Potential Support From Customers?

Potentially. Customers that are made fully aware of the benefits are likely to support this. Support will vary depending upon the payback period of each measure, or package of measures, which will depend upon the home and the particular measures recommended for each home.

Each customer is not in this market frequently, i.e., customers are not likely to participate in this program very often. So there may be less value in educating customers of the benefits of this program, relative to the value of educating home performance contractors.

Feasibility of Initiative?

Yes. However, the feasibility of a regional initiative will depend upon the degree of support from efficiency program administrators.

Role for NEEP

Clear and Valuable Role for NEEP

Yes. The regional strategies listed above potentially create a valuable role for NEEP. The following is a list of roles that NEEP could play in this initiative:

- Develop and coordinate the implementation of a regional marketing strategy for program sponsors.
- Develop a regional program financing package for program sponsors.
- Facilitate the development and implementation of contractor training programs.

[15] The survey question asked whether there is sufficient stakeholder support for a regional Home Performance With ENERGY STAR initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Develop and implement a regional strategy to address quality assurance.
- Facilitate the exchange of information regarding best practices for home energy performance programs throughout the region.

Of the 14 respondents to the RLW survey question on this issue, four noted that this initiative is "not a NEEP role," and two noted that they are unsure and that this initiative would be a "challenging prospect." The remaining eight respondents offered more constructive suggestions for NEEP's role, such as "build common approaches" and "coordinate with weatherization folks."

Is NEEP the Best Organization for the Job?

Yes. NEEP is well-positioned to undertake this job on a regional basis.

Do Resources Exist to Support NEEP's Work?

Could be challenging. NEEP would have to generate support from sponsors by demonstrating (a) the need for this initiative, and (b) the value that NEEP could add beyond existing activities. This may be more true than for other initiatives, given the low level of support indicated by the RLW survey, and the fact that so many program administrators already offer programs targeted to existing homes.

On the other hand, NEEP may be able to tap into resources from NYSERDA to support this initiative. It could also use some of its ENERGY STAR funding.

Challenges and Opportunities

Challenges

One key challenge will be to fully engage a critical mass of the home performance contractors involved. There is a large number of such contractors throughout the Northeast and they may not be well coordinated (i.e., through associations or trade groups). It may be challenging to entice a large percentage of the home performance contractors to get the training and certification necessary to support this initiative.

It may be a challenge to identify and demonstrate the value of coordinating existing homes programs throughout the region. To the extent that NEEP needs to encourage consistency throughout the region (e.g., with a financing package), it may be difficult to reach agreement across all program sponsors. The Home Performance with ENERGY STAR program includes so many different program components, relative to other NEEP initiatives, that it may be necessary to allow for a large degree of custom designs by different sponsors.

It may be difficult to generate enough sponsor support for this initiative, given that many of the current NEEP sponsors are electric utilities, but much of the energy savings from this initiative are from fossil fuels. Current NEEP gas sponsors have not yet expressed much interest in this initiative, or in the Home Performance concept., but this may be a result of the fact that an initiative has not yet been fully developed.

The current NEEP ENERGY STAR HVAC initiative addresses some of the key energy efficiency savings available from a Home Performance with ENERGY STAR program. This overlap could limit the savings and viability of each program.

Opportunities

EPA has developed a sound program and is looking for regions to promote it in. NYSERDA has begun implementing this program and has attracted the attention of other program administrators in the region. NEEP could coordinate with these organizations and build upon the momentum that they have generated. EPA and NYSERDA might be able to dedicate resources to support a Northeast regional campaign, including marketing materials, research, training materials, and staff support time.

7.3 Initiative Scoring

Table 7 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 7. Scores for the Home Performance With ENERGY STAR Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	2
2. Electric Peak Demand Savings	1
3. Cost-Effectiveness (PV of net benefits)	2
4. Regional Value	2
5. Likelihood of Success	2
6. Role for NEEP	3
Total Score	**11**

7.4 Recommendations

NEEP should give further consideration to developing the Home Performance With ENERGY STAR initiative. It is not among the highest scoring initiatives, but it may be worth pursuing if NEEP finds that it has sufficient sponsor support and resources.

If NEEP chooses to pursue this initiative, the first step should be to further identify and clarify what its role and strategy should be. NEEP could meet with key sponsors, EPA, NYSERDA, and contractors that currently deliver residential retrofit programs (e.g., Conservation Services Group, Honeywell Utility Solutions, RISE, etc.), to generate ideas for how to develop a successful NEEP initiative. The next step would be working with efficiency program administrators to develop the necessary critical mass of sponsor support to carry this initiative forward.

8. Residential New Construction

8.1 Background

Proposed Initiative Title: Residential New Construction

Long-Term Goal: Permanently change builder practices and consumer preferences regarding the incorporation of energy efficient features – building envelope, HVAC systems, lighting, hot water, and appliances - in new home construction.

First Year of Regional Initiative Effort: Proposed initiative

Targeted Products/Services: Incorporation of energy efficient building envelope, HVAC systems, lighting, hot water, and appliances in residential low-rise new construction.

Initiative Participants: Proposed initiative

Regional Market Size: Approximately 150,000 new homes per year

Current Regional Initiative Activities: ENERGY STAR Homes programs are offered in all states in the region except for Maine. No on-going overall regional coordination, though several organizations address certain program aspects on a regional or sub-regional basis, e.g., Northeast HERS Alliance and the Conservation Services Group (program contractor for several of the ENERGY STAR Homes programs in the region).

NEEP Role: Proposed initiative

The Residential New Construction initiative is based on, and builds upon, the existing ENERGY STAR Homes programs offered in the region. Each of the existing programs is based on EPA's ENERGY STAR Labeled Homes standard of 86 points on the Home Energy Rating System (HERS) scale. The current HERS rating and ENERGY STAR standards encompasses space heating, cooling and water heating. Most of the regional programs then layer on additional requirements and incentives, resulting in further energy savings beyond the ENERGY STAR standards of 30% savings relative to baseline code construction. These additional measures typically include a mechanical ventilation system, proper HVAC sizing and quality installation practices, tight ducts, more efficient lights and appliances.

This analysis assumes that – regardless of what NEEP does – utilities will continue to offer Residential New Construction programs based primarily on EPA's ENERGY STAR Homes program. This analysis also accounts for the fact that in 2006 the national HERS Technical Standards will be changing, and will require homes to save approximately 10% more energy in order to receive the same 86 point HERS score.

The NEEP initiative considered here would seek to (a) promote best practices in residential new construction programs throughout the region; (b) promote higher HERS

scores for participating homes; and (c) promote more efficient lighting and appliance measures in participating homes.

8.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. There are savings opportunities from nearly all new homes being constructed in the Northeast. Most of the savings from this program are from space heating and air conditioning measures. The space heating measures will primarily result in fossil fuel savings, which will be slightly greater in the northern part of the region with greater heating demands. The air conditioning measures will result in electric savings, including peak demand savings, which will be significantly greater in the southern part of the region. The penetration rates of central air conditioning systems in new homes have increased in recent years, and have made a significant contribution to the growth in peak summer electricity demand – even in the northern parts of the region.

Some sponsors have already moved toward promoting higher HERS scores and promoting more efficient lighting and appliances, which means there may be fewer saving available in those jurisdictions.

Role for a Regional Strategy?

Potentially. The stakeholders surveyed by RLW gave this initiative a modest amount of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 3.4.[16]

The need for a regional strategy may be limited by the amount of activity among efficiency program administrators in this market already.

In assessing the role of a regional strategy, it is useful to first consider the barriers that currently hinder the goals of this initiative. The primary barriers include:

- There has not been a regional forum or representative to engage EPA regarding the regional needs relative to the national ENERGY STAR Homes program.
- There is no regional forum for program administrators to exchange information on residential new construction program experiences and best practices, as well as new developments in the residential construction industry.
- Not all program models are the same. For example, program administrators in Connecticut offer homebuilders a Builder Option Package (BOP) instead of using the standard Home Energy Rating System (HERS) approach.

[16] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Most customers buying homes are not aware of the opportunities or benefits of ENERGY STAR Homes, and are even less aware of the opportunities and benefits of going beyond the requirements of ENERGY STAR Homes.
- Only a small percentage of homebuilders have fully embraced the ENERGY STAR Homes approach, and even less have adopted practices that go beyond the requirements of ENERGY STAR Homes.
- Many homebuilders and customers buying homes perceive the incremental costs as a barrier, despite the fact that they tend to be a very small portion of the total cost of a new house.

The primary regional strategies that might help address these barriers include the following:

- Establish and facilitate a regional forum to engage EPA on issues regarding the ENERGY STAR Homes program.
- Establish and facilitate a regional forum for the exchange of information among program administrators and other stakeholders.
- Develop and implement a regional education and training program targeted to homebuilders in order to encourage them to embrace ENERGY STAR Homes as standard practice.
- Identify options for coordinating existing residential new construction programs with other initiatives, particularly the Appliances and Lighting initiatives.
- Develop a process for engaging with large home developers, because many of them work across state and utility boundaries.
- Ensure coordination of ENERGY STAR Home's training with other energy code training.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Yes. Particularly if the home builders can be moved to adopt ENERGY STAR Homes' requirements, and even exceeding ENERGY STAR Homes requirements, as standard practice. Further, as these practices become more common, it may facilitate future energy code upgrades.

Opportunities for Coordination with Other Efforts?

Yes. This initiative can help achieve savings beyond the EPA's ENERGY STAR Homes program. Also, as noted below, there are several organizations that help coordinate issues related to residential new construction programs. The existence of these organizations creates both opportunities and challenges for NEEP.

Support from Regulators?

Potentially. NEEP and program sponsors would need to demonstrate the value that the initiative would add over the existing programs.

Support from Sponsors?

Potentially. NEEP would need to demonstrate the value that the initiative would add over the existing programs. At least two residential initiative sponsors have expressed an interest in a NEEP-facilitated new construction initiative.

The RLW survey found relatively little support for this initiative, with an average score of 2.8.[17] The Residential Working Group (which includes several sponsors) indicated slightly greater support for this initiative, with a score of 3.1.

Support from Trade Allies?

Probably. Some trade allies could have a lot to gain here, and could be key in making for a successful initiative. For example, some program sponsors in Massachusetts have encouraged contractors to contribute to the Residential New Construction Programs in return for advertising and sponsorship. This type of approach could be used regionally to help engage trade allies.

Potential Support From Customers?

Potentially. Customers typically support more efficient homes if the increased efficiency does not significantly increase the purchase price. To the extent that a Residential New Construction initiative can help maintain low incremental costs to customers, then customers are likely to embrace more efficient homes over time.

Feasibility of Initiative?

Potentially. In order for this initiative to be feasible, NEEP will have to generate sufficient support among sponsors – i.e., NEEP will have to demonstrate that a regional initiative can provide value beyond what program sponsors are already doing.

Role for NEEP

Clear and Valuable Role for NEEP

Potentially. The regional strategies listed above might create a valuable role for NEEP. Potential NEEP activities include the following:

- Establish and facilitate a regional forum to engage EPA on issues regarding the ENERGY STAR Homes program.

[17] The survey question asked whether there is sufficient stakeholder support for a regional Home Performance With ENERGY STAR initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Establish and facilitate a regional forum for the exchange of best practices and program information
- Assist sponsors with training and technical materials. For example, NEEP could assist with updating the HERS rating manual.
- Develop and implement a regional education and training program targeted to homebuilders in order to encourage them to embrace ENERGY STAR Homes as standard practice.
- Identify options for coordinating existing residential new construction programs with other initiatives, particularly the Appliances and Lighting initiatives.
- Develop a process for engaging with large home developers, because many of them work across state and utility boundaries.
- Use results for the regional initiative and sponsors' programs to support state energy code upgrades.

The stakeholders responding to the RLW survey did not see a clear and valuable role for NEEP. Three of the eleven respondents said that this is not a NEEP role, and three more said that they are unclear of NEEP's role. The other responses did not clarify the role for NEEP much, with suggestions like "avoid HERS," "drop lighting," and "use BOP instead of HERS."

NEEP may find that it is challenging to identify a unique and valuable role with this initiative, because so many sponsors already offer residential new construction programs and there is considerable coordination in the region already.

Is NEEP the Best Organization for the Job?

Potentially. However, there already are other organizations that provide coordination on issues related to residential new construction programs:

- In Massachusetts, New Hampshire and Rhode Island, the Joint Management Committee (JMC) helps coordinate the residential new construction programs offered by the utilities in those states.
- The Northeast HERS Alliance is an ad hoc group that provides a forum for training and other implementation issues regarding HERS.
- RESNET is another network of residential home energy raters.
- There currently is a lot of informal coordination in this market due to the limited number of actors working on residential new construction programs. Conservation Services Group (CSG) and Vermont Energy Investment Corporation (VEIC) are both very active in this market in many states in the Northeast, and frequently coordinate efforts and share information on an informal basis.

Program sponsors may wish to make these sorts of coordination activities more formal as part of a NEEP initiative, or they may see a NEEP role as redundant with these activities.

Do Resources Exist to Support NEEP's Work?

Could be challenging. NEEP would have to generate support from sponsors by demonstrating (a) the need for this initiative, and (b) the value that NEEP could add beyond existing activities. This may be more true than for other initiatives as many sponsors already offer residential new construction programs and there is considerable coordination already.

On the other hand, NEEP may be able to tap into some of its ENERGY STAR funding to support this initiative.

Challenges and Opportunities

Challenges

The existence of many, apparently successful, residential new construction programs makes it difficult to identify and demonstrate a unique role for NEEP.

There may be philosophical differences in new construction program design that limit the amount of coordination among sponsors. For example, NYSERDA tends to place greater emphasis on transforming the infrastructure of home builders. It hopes to get home builders to understand the value of efficient homes so that they will continue to build ENERGY STAR homes in the future with less and less incentives. Other program sponsors place greater emphasis on incentives to home buyers in order to reduce the incremental cost of efficiency improvements.

If these philosophical differences are not reconciled between sponsors, there may be fewer opportunities for NEEP to provide regional coordination.

With regard to efforts to coordinate residential new construction programs with other efficiency programs, NEEP may find it challenging to reconcile the ENERGY STAR Homes program lighting package, which is fixture-based, with programs that encourage a mix of both bulbs and fixtures.

Opportunities

The significant potential for energy savings and the relatively high net benefits suggest that there should be great interest in this market. In addition, residential new construction markets tend to be of interest to regulators and program administrators because of the lost opportunities. Furthermore, EPA has demonstrated a great interest in the residential new construction market and the ENERGY STAR Homes program.

Utilities offering residential new construction programs in the Northwest and in Connecticut are using BOP, where builders are offered a prescriptive set of measures to choose from. This costs much less for the builders and appears to be more cost effective approach for this market. NEEP may be able to play a role in advancing this sort of modification to existing programs.

The Northeast does not have as many large tract homebuilders as other parts of the country, nor does it have as much new construction activity as other parts of the country.

The greater number of homebuilders in a less active market may increase the need for regional coordination from an organization like NEEP. Alternatively, it may create more challenges.

NEEP could play a role in a regional campaign to promote "green" residential building practices through residential new construction programs. However, it is uncertain how much sponsor regulator support NEEP could generate for this sort of campaign.

Air conditioning duct sealing can be an important efficiency measure for new homes and is much more cost-effective and feasible at the time of home construction. NEEP may be able to play a role in researching and disseminating information regarding recent developments and best practices with regard to duct sealing in new homes.

8.3 Initiative Scoring

Table 8 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 8. Scores for the Residential New Construction Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	3
2. Electric Peak Demand Savings	3
3. Cost-Effectiveness (PV of net benefits)	3
4. Regional Value	2
5. Likelihood of Success	2
6. Role for NEEP	2
Total Score	**15**

8.4 Recommendations

NEEP should give further consideration to developing the Residential New Construction initiative. This initiative offers a significant potential for regional energy savings at relatively low costs. However, NEEP may not be able to play a unique or a significant role in this market, due the substantial amount of current activity and coordination among efficiency program administrators and trade allies.

If NEEP chooses to pursue this initiative further, it should consider holding a summit meeting with key actors in the residential new construction market to generate ideas for how to develop a successful NEEP initiative. The next step would be working with efficiency program administrators to develop the necessary critical mass of sponsor support to carry this initiative forward.

9. Residential HVAC Enhancements

9.1 Background

For a description of the current ENERGY STAR HVAC initiative, see section 5.1. The enhanced HVAC initiative is based on a quicker institution of minimum installer training requirements and on the inclusion of additional measures such as duct sealing.

9.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Yes. However, as noted in section 5.2 some states may have significantly more savings than others, depending upon cooling demand and saturation of air conditioning.

Role for a Regional Strategy?

Yes. The stakeholders surveyed by RLW gave this initiative a high degree of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 3.9.[18] This is almost as high as the average score that stakeholders gave the existing NEEP HVAC initiative. It is also interesting to note that, with regard to this question on regional strategy, the respondents to the RLW survey gave the highest scores to the enhancements of the current initiatives (ENERGY STAR Products and ENERGY STAR HVAC).

In assessing the role of a regional strategy, it is useful to first consider the barriers that currently hinder the goals of this initiative. The primary barriers include:

- Most HVAC contractors are not well trained on proper HVAC installation practices.
- Most HVAC contractors and homeowners are not aware of the opportunities for and benefits of duct sealing.
- Most HVAC contractors do not have the proper training to support duct sealing practices.
- Building codes in the Northeast do not fully address duct-sealing issues, particularly from a performance perspective.

The primary regional strategies that might help address the market barriers include:

[18] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

- Work with trade allies across the region to expedite the development of consistent definitions of best practices for HVAC equipment installation.
- Coordinate and implement an expedited program for HVAC contractor installation training and certification.
- Conduct regional research and coordination with trade allies and US EPA to develop commonly accepted technical requirements for duct sealing services.
- Facilitate research to develop a market-based duct sealing model and infrastructure.
- Coordinate and implement an expedited program for training and certification for duct-sealing practices.
- Promote the development of state building code requirements that apply to air conditioning duct sealing.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Yes. If HVAC contractors can be moved to make improved installation and duct sealing procedures part of standard practices, there will be significant sustained impacts over time.

Opportunities for Coordination with Other Efforts?

Yes. As with the current HVAC initiative, there are many opportunities to coordinate with the US EPA, the North American Technician Excellence (NATE) certification, and the State Technology Advancement Collaborative (STAC), as well as NYSERDA's Home Performance with ENERGY STAR program in New York and the GasNetworks in Massachusetts and New Hampshire.

Support from Regulators?

Probably. The significant amount of savings and the cost-effectiveness suggest that regulators are likely to support this. Increased interest in peak electric demand savings will help as well.

It may be important to establish the value, benefits and successes of the current initiative, before introducing more aggressive efforts. On the other hand, the enhanced initiative could be seen as a natural progression of the current initiative.

Support from Sponsors?

Potentially. The RLW survey found a moderate amount of support for this initiative, with a score of 3.0.[19] The Residential Working Group (which includes several sponsors)

[19] The survey question asked whether there is sufficient stakeholder support for a an Enhanced HVAC initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

indicated greater support for this initiative, with a score of 3.6. It is interesting to note that the RLW survey found that the current HVAC NEEP initiative has slightly higher support than the enhanced version, with a score of 3.3.

Support from Trade Allies?

Probably. Installation contractors will be the primary target of this initiative. Sponsors may need to educate them about the potential benefits of improved HVAC installation and duct sealing in order to obtain their support. Given that this is a relatively fractured industry with many players, this education process could be a challenge.

Potential Support From Customers?

Moderate. Customers are not typically aware of the potential savings from their CAC systems. Customers are likely to support the more efficient products if they are properly educated on the economic benefits.

Feasibility of Initiative?

Potentially feasible. Addressing the installation and duct sealing practices will be challenging, due to the large and fractured infrastructure of contractors that install and maintain CAC systems.

Role for NEEP

Clear and Valuable Role for NEEP

Modest. Based on the regional strategies listed above, the most likely roles for NEEP include the following:

- Work with trade allies across the region to expedite the development of consistent definitions of best practices for HVAC equipment installation.
- Coordinate and implement an expedited program for HVAC contractor installation training and certification.
- Conduct regional research and coordination with trade allies and US EPA to develop commonly accepted technical requirements for duct sealing services.
- Facilitate research to develop a market-based duct sealing model and infrastructure.
- Coordinate and implement an expedited program for training and certification for duct-sealing practices.
- Promote the development of state building code requirements that apply to air conditioning duct sealing.

The stakeholders responding to the RLW survey did not indicate a very clear and valuable role for NEEP on this initiative. Of the nine respondents, two noted that they were "unclear of the potential," one noted that he/she was "unclear of regional need," one felt that the initiative "needed more work," and one noted that it would be "challenging to

get stakeholder support." The other respondents provided more positive responses such as "real opportunity for NEEP," "need to move now," "focus on duct sealing," and "expand base of contractors."

Is NEEP the Best Organization for the Job?

Yes. NEEP can play a role in sharing information, assisting with training and certification efforts, and technical support. This initiative is more technical than some, and NEEP's technical skills may prove to be valuable.

Do Resources Exist to Support NEEP's Work?

Not clear. NEEP may need to demonstrate the success of the existing ENERGY STAR HVAC initiative before it can generate enough sponsor support for the enhanced initiative.

Challenges and Opportunities

Challenges

Educating, training and encouraging HVAC contractors to embrace improvements to HVAC installation and duct-sealing practices may be challenging because this is a relatively fractured industry with many players.

Some utility sponsors already offer HVAC programs, and may not be open to enhancing them at this point in time. On the other hand, as the new 2006 federal CAC standard approach sponsors may be looking for opportunities to increase efficiency savings from HVAC installation practices and duct sealing.

NYSERDA addresses HVAC installation practices through its whole-house approach, in the Home Performance With ENERGY STAR program. To the extent that other states adopt this whole-house approach, it may create conflicts with an enhanced HVAC initiative. Alternatively, there may be opportunities to coordinate an enhanced HVAC initiative with home energy performance programs offered by program administrators.

Duct sealing in existing homes is sometimes very challenging due to inaccessibility of some ducts. There is one technology that can be used to address this problem, but it is a proprietary technology available from a single vendor.

Opportunities

The significant size of the energy savings, and the size of the net economic benefits, suggests that this initiative is likely to be supported by sponsors and regulators, and eventually the improved CAC measures should gain acceptance by customers.

There may be opportunities to engage manufacturers in their efforts to respond to EPA's revised ENERGY STAR specification, which may include an installation component.

There may be opportunities to develop and implement training programs at trade and vocational schools to ensure that the next generation of HVAC contractors are properly trained.

The fact that state building codes do not adequately address air conditioning duct sealing practices creates an opportunity to obtain long-term savings through the development of new codes.

9.3 Initiative Scoring

Table 9 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 9. Scores for the Residential HVAC Enhancements Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	3
2. Electric Peak Demand Savings	3
3. Cost-Effectiveness (PV of net benefits)	3
4. Regional Value	3
5. Likelihood of Success	2
6. Role for NEEP	2
Total Score	**16**

9.4 Recommendations

NEEP should proceed with the Enhanced HVAC initiative. This initiative clearly offers important efficiency savings opportunities, and NEEP can play a key role in moving this market. NEEP does not necessarily need to implement this enhanced program immediately. Instead, it may prefer to focus its attention on achieving and demonstrating the success of the current HVAC ENERGY STAR initiative first.

Over the course of the next few years, NEEP should introduce these enhancements to the HVAC initiative, possibly in coordination with revised ENERGY STAR HVAC specifications in 2006. These enhancements would not necessarily require a new initiative, but instead be introduced as the logical evolution and progression of the current initiative.

10. Heat Pump Water Heaters

10.1 Background

Proposed Initiative Title: Heat Pump Water Heaters

Long-Term Goal: Increase the availability and consumer and contractor preference for heat pump water heaters while addressing technical concerns related to product performance and reliability.

First Year of Regional Initiative Effort: Proposed initiative

Targeted Products/Services: Heat pump water heaters.

Initiative Participants: Proposed initiative

Regional Market Size: Replacement market is approximately 225,000 units per year based on a regional 19 percent electric hot water penetration, 15.5 million households and an average 13 year measure life for conventional electric water heaters.

Current Regional Initiative Activities: There have been past efforts in Connecticut and more recently in New York. These efforts have repeatedly faced performance and reliability problems

NEEP Role: Proposed initiative

The NEEP Heat Pump Water Heater (HPWH) initiative would promote the use of air-source heat pump technology to heat domestic water, with some back-up electric resistance heating during periods of high loads. This technology promises to provide significant savings relative to standard electric-resistance water heaters.

NYSERDA recently began a HPWH program, but has redirected some of its program efforts because of problems with product performance, and the fact that one of the three manufacturers has gone bankrupt. NYSERDA is currently looking for better products, and continues to be optimistic that the promise of this technology will be met in the near future through superior designs and manufacturing processes, probably from China.

10.2 Qualitative Assessment

Regional Value

Savings Potential Regionally Distributed?

Potentially. However, HPWH result in the greatest savings when they replace electric resistance water heaters. Gas and oil water heaters tend to be more efficient and cost less to run than electric heaters. So the potential for regional savings depends upon the extent to which electric water heaters are regionally distributed.

Also, HPWHs tend to cool the ambient air. If the HPWH has to be installed within a living space, the additional heating required in the winter will offset some of the savings of the HPWH. In the summer, the additional cooling from the HPWH may help reduce air conditioning loads.

Role for a Regional Strategy?

Modest at best. The stakeholders surveyed by RLW gave this initiative the least amount of support when asked whether a "regional strategy strongly improves the potential to achieve long-term market effects and energy savings," with an average score of 2.9.[20] The respondents from the Residential Working Group (which includes several sponsors) gave an even lower score of 1.7 in response to this question.

Manufacturers will be looking to develop a national market for HPWHs. In fact, the major water heater manufacturers will need to see enough demand at the national level before they will even develop a product. Therefore, a regional campaign alone might not be enough.

In assessing the role of a regional strategy, it is useful to first consider the barriers that currently hinder the goals of this initiative. The primary barriers include:

- There is very limited product availability.
- Few heating and plumbing contractors carry HPWHs.
- The units have had a long history of reliability problems.
- Consumers are unfamiliar with the technology.
- There is a significant incremental cost premium.

The primary regional strategies that might help address the market barriers include:

- Development of a competitive regional procurement strategy
- Work with other regions, possibly through CEE, to coordinate efforts on this product on a more national basis (also see below).
- Work with NYSERDA to explore a regional expansion of their current program efforts.

Likelihood of Success

Opportunities to Sustain Impacts Over Time?

Potentially, over the long-term. If an initiative could help bring a reliable, affordable product to the market, then there would be significant impacts that would be sustained over time. However, this goal is not likely to be achieved within the next few years.

[20] A score of 1 means strongly disagree, while a score of 5 means strongly agree.

Opportunities for Coordination with Other Efforts?

Potentially, over the long-term. CEE is currently investigating HPWH opportunities. They are considering conducting a large market study of the potential for HPWH across the US. They have received some interest from the US Department of Energy, from a national laboratory and from some water heater manufacturers. The goal of the study is to identify whether there is enough housing units suitable for HPWHs, and whether there would be enough consumer demand for a major water heater manufacturer to enter the market for HPWHs. CEE has not decided yet whether to undertake the study.

Support from Regulators?

Unlikely in the near-term. Regulators are likely to be concerned about the cost of HPWHs, as well as product performance issues.

Support from Sponsors?

Unlikely in the near-term. Sponsors are also likely to be concerned about the cost of HPWHs, as well as product performance issues, though NYSERDA remains committed to the technology.

Some utilities have had problems with HPWH programs that they have run in the past, and thus may be very reluctant to pick this technology up again.

The RLW survey found very little support for this initiative, with an average score of 2.3.[21] The respondents from the Residential Working Group (which includes several sponsors) offered greater support for this initiative, with a score of 3.0.

Support from Trade Allies?

Potentially. However, there are few current manufacturers. Efforts to bring in one or more major water heater manufacturers into the market might be successful, but may be an expensive undertaking.

Potential Support From Customers?

Unlikely in the near-term. HPWHs are currently too expensive for customers to support. They cost roughly $1,400 to $2,000 relative to a cost of $300 for a standard electric resistance water heater. The cost will have to be significantly reduced before customers will begin accepting these measures.

Also, HPWHs have been plagued with product performance problems. A program in Connecticut resulted in the installation of 4,000 HPWHs, but found a 15% failure rate for the equipment installed.

[21] The survey question asked whether there is sufficient stakeholder support for a regional HPWH initiative to succeed. A score of 1 means strongly disagree, while a score of 5 means strongly agree.

Feasibility of Initiative?

Unlikely in the near-term. It would be difficult to offer a successful initiative until (a) one or more major water heater manufacturers start producing HPWHs, (b) costs are reduced significantly, and (c) product quality issues are resolved.

Role for NEEP

Clear and Valuable Role for NEEP

Not in the short-term. The technology is not yet ready for a initiative of the sort that NEEP conducts. None of the major water heater manufacturers produce a HPWH. The three manufacturers that do produce HPWHs are small and continue to have performance problems.

The stakeholders responding to the RLW survey did not see a clear and valuable role for NEEP. Of the 13 respondents, seven noted that they are "unclear of potential" for NEEP role, and two noted that they do not see this as a NEEP role. Three respondents noted that NEEP may be able to play a role in demonstrating product reliability, making the product more viable from the customer perspective, and coordinating a campaign. One respondent noted that HPWHs offer "great potential."

Is NEEP the Best Organization for the Job?

If the technology becomes ready for an initiative of this sort, then NEEP would be well-placed and well-suited to launch a regional campaign.

Do Resources Exist to Support NEEP's Work?

Unlikely in the short-term, due to the challenges of generating sponsor support.

Challenges and Opportunities

Challenges

The lack of a major water heater manufacturer that offers a HPWH is the greatest challenge facing this initiative. The CEE research (mentioned above) might help generate support from some major manufacturers. CEE estimates that at best it might take two to five years to get major manufacturer support. Then it might take several more years before the customers support the market enough for major manufacturers to develop and increase their production of HPWHs.

There is little current sponsor support for the technology, let alone for a regional initiative.

Opportunities

The HPWH efficiency savings potential – on a per-unit basis – are significant. Therefore this technology is likely to continue to receive attention, and has the potential for a successful initiative in the future.

Once a major manufacturer adopts the HPWH technology, then there will probably be many opportunities for NEEP to generate sponsor support, coordinate a regional campaign, and work with manufacturers to push this product (e.g., with cooperative campaigns).

NYSERDA remains committed to developing the technology and their efforts should be tracked.

10.3 Initiative Scoring

Table 10 presents the resulting scores for this initiative. The scores for the first two criteria (savings and cost-effectiveness) are based on the quantitative analysis of the residential sector initiatives. The scores for the remaining three criteria are based on the qualitative assessment described in the previous section.

Table 10. Scores for the Residential Water Heaters Initiative

Initiative Criteria	Score (1 to 3)
1. Relative Size of Regional Savings	1
2. Electric Peak Demand Savings	1
3. Cost-Effectiveness (PV of net benefits)	1
4. Regional Value	2
5. Likelihood of Success	1
6. Role for NEEP	1
Total Score	**7**

10.4 Recommendations

NEEP should not develop a HPWH initiative at this time. The savings potential is low, the technology is not ready for such an initiative, and there is not enough support for such an initiative. NEEP should instead monitor the development of this technology over time, as well as the activities of NYSERDA, and consider an initiative after at least one major manufacturer has entered the market and begun addressing the cost and performance issues.

11. Summary of Scores and Recommendations

Table 11 presents the scores for all of the initiatives in one table, in order to compare scores across all the residential initiatives. The sections below provide a brief summary of the recommendations for each initiative.

Table 11 Summary of Initiative Scores

Criterion	Appli-ances	Light-ing	Wind-ows	HVAC	App. Enhancd	HP w/ ES	RNC	HVAC Enhancd	HPWH
Total Energy Savings	1	3	1	3	2	2	3	3	1
Electric Peak Savings	1	3	2	3	2	1	3	3	1
Cost-Effectiveness	1	3	2	3	1	2	3	3	1
Regional Value	3	3	3	3	3	2	2	3	2
Success	3	3	2	3	2	2	2	2	1
Role for NEEP	3	3	3	3	3	3	2	2	1
Total	**12**	**18**	**13**	**18**	**13**	**11**	**15**	**16**	**7**

ENERGY STAR Appliances

NEEP should continue to offer the ENERGY STAR Appliances initiative, given the value of a regional strategy, the successes to date, and the large amount of support among stakeholders for this initiative. However, NEEP must recognize that the market for appliances is changing significantly, and must respond to these changes to keep this program vital for its sponsors.

In particular, most ENERGY STAR appliances are offering increasingly less efficiency savings over time, and some ENERGY STAR appliances are reaching relatively higher market shares. Meanwhile, sponsors have developed enough experience with this initiative that NEEP's role may become increasingly less important to them. These developments suggest that NEEP and its sponsors should seek to promote more efficient appliances than today's ENERGY STAR models, should consider additional appliances and products to promote through this initiative, and should consider new approaches for achieving its goals such as cooperative promotions.

These changes are consistent with the Enhanced Appliance initiative discussed below. Rather than introducing a separate enhanced initiative, NEEP should introduce these enhancements over time as the logical evolution and progression of the current initiative.

ENERGY STAR Lighting

NEEP should continue to offer the ENERGY STAR Lighting initiative, as it scores high on every criterion and is widely supported by sponsors and stakeholders. Nonetheless, lighting product quality will continue to be a challenge for this market, and NEEP should assign sufficient priority and resources to this topic in order to ensure that ENERGY STAR lighting products become fully embraced in the marketplace.

As the lighting market evolves over time, and program sponsors gain experience in this market, NEEP should give significant attention to opportunities to ensure that this initiative remains vital and successful, and to demonstrate to sponsors the value added that NEEP provides.

ENERGY STAR Windows

NEEP should continue to offer the ENERGY STAR Windows initiative. The potential energy savings are low relative to other residential initiatives, and NEEP has not yet generated a lot of sponsor support. Nonetheless, there are a lot of opportunities for regional efforts to help increase the market share of ENERGY STAR windows in the Northeast, and NEEP is well-suited to undertake such efforts.

ENERGY STAR HVAC

NEEP should continue to offer the ENERGY STAR HVAC initiative. The potential savings from this market are significant. This initiative has a relatively high regional value, high likelihood of success, and a fairly clear role for NEEP. Furthermore, this program offers a foundation for the Enhanced HVAC program, which also offers considerable value to NEEP and its sponsors.

Enhanced Appliances

NEEP should proceed with the Enhanced Appliance initiative. It only offers a moderate amount of energy savings and peak demand savings, and it is not as cost-effective as other NEEP initiatives being considered. However, there are many regional strategies that could be pursued through this initiative, and NEEP is well-positioned to play a key role in pursuing them. Most importantly, this initiative is a natural evolution of the existing ENERGY STAR Appliances initiative, and will help make that initiative more valuable, more vital, and more responsive to market developments.

NEEP should always be investigating new approaches for achieving the goals of this initiative. For example, cooperative campaigns offer a promising approach to increasing the market shares of appliances for lower costs.

One of the biggest challenges limiting the likelihood of success of this initiative is the need to develop a marketing campaign that does not conflict with or cause confusion regarding the ENERGY STAR campaign. NEEP should give considerable attention to addressing this challenge.

Home Performance With ENERGY STAR

NEEP should give further consideration to developing the Home Performance With ENERGY STAR initiative. It is not among the highest scoring initiatives, but it may be worth pursuing if NEEP finds that it has sufficient sponsor support and resources.

If NEEP chooses to pursue this initiative, the first step should be to further identify and clarify what its role and strategy should be. NEEP could meet with key sponsors, EPA, NYSERDA, and contractors that currently deliver residential retrofit programs (e.g.,

Conservation Services Group, Honeywell Utility Solutions, RISE, etc.), to generate ideas for how to develop a successful NEEP initiative. The next step would be working with efficiency program administrators to develop the necessary critical mass of sponsor support to carry this initiative forward.

Residential New Construction

NEEP should give further consideration to developing the Residential New Construction initiative. This initiative offers a significant potential for regional energy savings at relatively low costs. However, NEEP may not be able to play a unique or a significant role in this market, due the substantial amount of current activity and coordination among efficiency program administrators and trade allies.

If NEEP chooses to pursue this initiative further, it should consider holding a summit meeting with key actors in the residential new construction market to generate ideas for how to develop a successful NEEP initiative. The next step would be working with efficiency program administrators to develop the necessary critical mass of sponsor support to carry this initiative forward.

Enhanced HVAC

NEEP should proceed with the Enhanced HVAC initiative. This initiative clearly offers important efficiency savings opportunities, and NEEP can play a key role in moving this market. NEEP does not necessarily need to implement this enhanced program immediately. Instead, it may prefer to focus its attention on achieving and demonstrating the success of the current HVAC ENERGY STAR initiative first.

Over the course of the next few years, NEEP should introduce these enhancements to the HVAC initiative, possibly in coordination with revised ENERGY STAR HVAC specifications in 2006. These enhancements would not necessarily require a new initiative, but instead be introduced as the logical evolution and progression of the current initiative.

Heat Pump Water Heaters

NEEP should not develop a HPWH initiative at this time. The savings potential is low, the technology is not ready for such an initiative, and there is not enough support for such an initiative. NEEP should instead monitor the development of this technology over time, as well as the activities of NYSERDA, and consider an initiative after at least one major manufacturer has entered the market and begun addressing the cost and performance issues.

12. References

The following people were surveyed by phone for their input to this initiative review:

Richard Faesy, Vermont Energy Investment Corporation

Lisa Hammer, Aspen Systems

David Holland, Honeywell Utility Solutions

Stephanie Jones, Consortium for Energy Efficiency

David Lieshman, Applied Proactive Technologies

Jim Massie, Conservation Services Group

Chris Neme, Vermont Energy Investment Corporation

Jeff Pratt, independent consultant

Glenn Reed, Northeast Energy Efficiency Partnerships, Inc.

John Taylor, Consortium for Energy Efficiency

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