

# **STREAMLINING PROCESSES AND EXPANDING OFFERINGS TO REACH MID-SIZED BUILDINGS - MID-TERM ADJUSTMENTS OF THE NEW BUILDING EFFICIENCY PROGRAM**

*Greg Stiles, Program Manager  
Energy Trust of Oregon, Inc. 851 SW Sixth Ave, #1200, Portland, OR 97204,  
Phone: (503) 445-7615, Fax (503) 546-6862, [greg.stiles@energytrust.org](mailto:greg.stiles@energytrust.org)*

*Earl Johnson, PE, LEED, CEM and Thomas M. Giffin, PE, LEED  
Science Applications International Corporation*

## **Abstract**

This paper presents the issues and key decision-making criteria in “tuning-up” the New Building Efficiency program after approximately 1½ years of operation. The Program has undergone several expansions to serve wider markets, to streamline processes of the program, and to simplify and expand the technologies offered on a prescriptive basis. The paper describes the considerations and trade-offs in refining and expanding the processes, operations and technical offerings of the Program, shows how mechanisms are used to reduce the administrative costs, and presents experiences, issues, and results that arose from the Program streamlining and refinement. The experiences of “tuning-up” the program designs, processes, and offerings provide working and successful models for other state, utility, and public purpose fund programs. The expanded and simplified program approaches applied in Oregon can assist in creating both market- and cost-effective programs for the new and renovated building market elsewhere.

## **Introduction**

The New Building Efficiency program (NBE) has been designed, and consistently implemented over the past 2½ years with a high degree of success, reliability, and innovation. Processes and systems for the Program have been proven reliable, and numerous enhancements are continually made to improve the Program operations, its offerings, and its delivered results. In 2004 the Program supported over 20% of the new construction starts, comprising 40% of the floor space, achieving a high penetration in Oregon’s commercial new construction market.<sup>a</sup> Further, the Program has cost-effectively delivered current savings and built a pipeline of energy savings extending out to 2008.

- Nearly 35,000 MWhs in total have been put into the energy savings pipeline with \$3.3 million incentives for an average incentive of \$0.094 per kWh.
- Over 117,000 Decatherms of natural gas savings are committed, for an average incentive rate of \$0.67 per therm, far below market costs.

After approximately 1½ years of operation, NBE began to undertake several expansions to serve wider markets, to streamline processes of the program, and to simplify and expand the technologies offered on a prescriptive basis as part of a continual improvements process. Examining the considerations and trade-offs in refining and expanding the processes, operations and technical offerings of the Program shows how market mechanisms are used to reduce the administrative costs. Also, the experiences,

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<sup>a</sup> “*Evaluation of the Energy Trust of Oregon’s New Building Efficiency Program*,” submitted to Energy Trust of Oregon by Nexus Market Research, Inc. and Hescong Mahone Group. August 26, 2005.

issues, and results that arose from streamlining and refining the program designs, processes, and offerings provide working and successful models for other state, utility, and public purpose fund programs.

## **Background**

The NBE program promotes higher energy efficiency, above the already aggressive State of Oregon Non-Residential Energy Code, for new and renovated construction projects through multiple levels of financial incentives, covering prescriptive measures to customized high performance building energy analysis and modeling. The Program opened for business in October 2003 but wasn't fully operational until January 2004. Science Applications International Corporation, SAIC, is the Program Management Contractor, performing the detailed design, management and implementation in cooperation with, and under contract to Energy Trust of Oregon, Inc.<sup>b</sup> More details on the New Building Efficiency program may be found at: [www.energytrust.org/newbuildingefficiency](http://www.energytrust.org/newbuildingefficiency).

The purpose of the New Building Efficiency program is, in simple terms, to “buy” electric and natural gas energy savings from commercial new buildings. Acquiring energy savings is the leading objective, with market transformation and technology development taking secondary levels of importance with the program. Participants to the program include any new construction or major renovation of commercial, industrial and mixed-use buildings, as well as multi-family housing, located within the participating utilities' service territory.

Services offered by the New Building Efficiency program include financial incentives for energy-efficient design that exceeds Oregon's energy code requirements. The value of the incentive is dependent upon the amount of energy saved annually. The Program offers two tracks.

- The Standard Track consists of prescriptive fixed unit incentives for specific types of high efficiency equipment and motivates customers primarily through the incentive offer. The application form is available as a spreadsheet and encourages self-service for defined energy efficient equipment and controls. In addition, applications requesting incentives less than \$3,000 are not required to obtain pre-approval from the Program before implementing the project.
- The Custom Track requires an energy analysis to determine the amount of savings above the energy code. The incentive amount is based on \$0.10 per annual kWh saved, plus \$0.80 per annual therm saved. For a package of multiple measures, incentives are based on the total interactive savings for the project.

The entire Program and its processes are built for a direct contractual relationship with the building owner or developer. Since any decision made on the project that would affect incentive levels requires the approval of the owner, or their representative, and the Program to interact with the project team at a higher level than traditional rebate programs. Owner involvement has also led to wider and earlier participation as incentive amounts must be approved by the Program prior to the owner purchasing or

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<sup>b</sup> The Energy Trust of Oregon began operation as a non-profit, charitable organization in March 2002 to fulfill a mandate to invest “public purposes funding” for energy efficiency, conservation and renewable energy resources in Oregon. The mandate emerged from 1999 energy restructuring legislation (Senate Bill 1149) that included a 3% public purposes charge to the rates of the two largest investor-owned utilities. Subsequent action by the Oregon Public Utility Commission encouraged the startup of a new non-profit organization to administer the funds created by the legislation. The state's largest natural gas utility voluntarily decided to participate. A portion of the funding also is dedicated to low-income housing energy assistance and K-12 school energy conservation efforts. Energy Trust is dedicated to changing how Oregonians use energy by promoting energy efficiency and clean renewable energy for Oregon customers of Pacific Power, Portland General Electric and NW Natural.

installing each measure. In being consistent with how the building design and construction marketplace is structured and operated, clear responsibilities and consistent objectives are created within the existing design and construction teams participating in the Program. While the program agreement is primarily with the owner, it is common that the architect or engineer will act as the owner's representative, consistent with their other professional duties on the project. Furthermore, by making all incentive payments directly to the owner, the Program maintains, and can even reinforce, the owner's relationships with the design and construction teams.

### **Continual Improvement**

Since Program inception, SAIC and Energy Trust have applied a continual improvement process to look for opportunities to better apply all of the tools, knowledge and personnel resources that are already in place for the Program implementation, to capitalize and expand on offerings and processes of the NBE program, and to pursue innovative and effective approaches to improve the savings results and the cost-effectiveness.

Facing such challenges as reducing free ridership rates, reaching into small and medium-size building markets, streamlining program processes, and delivering marketing and outreach more cost-effectively, among others, several questions continually emerged to the forefront of the NBE program planning and execution.

1. How can the Program be made to be more sustainable in terms of incentive payments, services and implementation?
2. Can market channels be used to a greater degree to continue to reduce the cost of the Program?
3. Can prescriptive incentives be expanded to reduce the technical assistance costs or expand markets?
4. What motivators, beyond incentives, can be used to support energy efficiency decision-making?
5. What methods and means can effectively serve small and medium buildings?
6. Can program resources be deployed more effectively by focusing on key building types, or market sectors?
7. Can external market factors such as Energy Code revisions, green building interests, rising energy costs be leveraged to influence building energy efficiency?

### **Emerging Enhancements**

In early 2005, after the Program had been fully in the market for about 16 months, the levels of participation became sufficient to be able to identify trends in the type of Program participants and the contribution to the energy savings from the different program tracks. Early indications from the program staff, and the accumulation of participant project data showed the same trends.

Table 1 below shows the participation statistics for different building sizes for both the Standard and the Custom Tracks.

		Participation Distributions			
Track	Building Size Range	Projects by Percentage	Annual kWh	Annual Therms	SF
Standard	> 100KSF	8.6%	2.1%	1.0%	24.2%
	> 50KSF < 100 KSF	3.3%	2.4%	0.2%	3.3%
	>10KSF < 50KSF	28.7%	7.4%	1.2%	9.8%
	< 10KSF	14.4%	0.7%	0.4%	1.1%
<b>Standard Total</b>		<b>55.0%</b>	<b>12.5%</b>	<b>2.8%</b>	<b>38.3%</b>
Custom	> 100KSF	14.8%	57.9%	69.9%	45.2%
	> 50KSF < 100 KSF	10.0%	7.1%	5.6%	9.8%
	>10KSF < 50KSF	17.7%	22.3%	21.6%	6.4%
	< 10KSF	2.4%	0.2%	0.0%	0.2%
<b>Custom Total</b>		<b>45%</b>	<b>87%</b>	<b>97%</b>	<b>62%</b>

As can be observed on Table 1, several trends were emerging for the Program including the following:

1. The Custom Track was mostly used by larger projects, and the vast majority of all energy savings were delivered through this track.
2. In terms of the number of projects, the Standard Track has a slight majority at 55%, but these provided very little energy savings.
3. Buildings larger than 100,000 square feet provided the majority of savings.
4. There was no particular trend either in the savings or number of project for smaller buildings less than 100,000 square feet between the different program tracks.

Further, the experience of the Program representatives indicated that there was a disconnect in the Program offerings for buildings that tended to be between 20,000 and 70,000 square feet. At this building size range, participation through the Standard Track alone offered limited energy measure incentives, typically smaller and not up to the full potential of the building project. However, the building project was not large enough to support the energy analysis requirements under the Custom Track. In effect, the project would be “upside down” where the available energy savings and the corresponding savings incentives, were not enough to justify the cost of the energy analysis, thus not making participation in the NBE program financially worthwhile.

A balance of several features and processes were implemented to coordinate with, and to operate within, the building development, design, and construction marketplace to minimize barriers to participation, to maximize return to the Program and building owner, and to appeal to a wide range of building projects. Several strategic enhancements were implemented for the NBE program including:

1. **Streamlining and Simplifying Program Processes** to make participation easier and to provide more accurate and complete information to reduce the amount of Program time and effort for correction of errors, and ultimate approval.
2. **Expanding Program Offerings** to encourage greater uptake of improved energy practices, to simplify qualification, and to reduce the participation costs for small- to medium-sized buildings.
3. **Enhancing Technical Tools and Information** to encourage greater and better application of more advanced energy efficiency measures across more market participants.

### Strategic Program Improvements

The following discuss the strategies and the challenges and issues that emerged in developing the detailed components to support these strategies. To address wider markets and reduce transaction costs

for both the Program and the participants, streamlined processes, prescriptive incentives, and the ability of “self-service” were expanded. Streamlining the processes for the submittal, approval and verification of projects faced issues regarding program business risk exposure, technical verifications, and business/legal ramifications. Expanding technical measures under the prescriptive incentives were challenged to pass societal benefit-cost tests, yet decisions were not solely based on the “numbers.” Especially for the underserved mid-sized buildings, decisions also included issues of market transformation influences, appropriate technology applications, and the potential funding exposure for the Program. Also, specific incentive mechanisms were developed to integrate with LEED® NC<sup>c</sup> and to encourage LEED® NC Certification to extend into more areas of the new construction market.

### ***Approaches for Control of Free Ridership***

While the NBE program to date has reached far into the new building market of Oregon with 20% penetration of new construction projects by number and 40% by area,<sup>d</sup> the control of free ridership is an over-arching challenge that is an integral part of nearly all strategies. While this Program was primarily a resource acquisition focus, free ridership was recognized as a potential factor in this Program, as it is with many energy efficiency programs dealing with new construction. Nonetheless, the control and reduction of free ridership was a major factor considered in the modification of the Program.

Controlling free ridership was embedded through many integral elements of the Program offerings. While the strategies encompassed several enhancements to the savings requirements and the incentive offerings, they also include several other elements to support the control of free ridership, and even encourage spillover. For example, elements that support control of free ridership include:

- Simplified processes encourage participation from those who previously had not considered incorporating energy efficiency measures.
- Adding more prescriptive incentive offers encourage a greater number of participants to add efficiency measures.
- Conducting webinars to expose progressive building practices that may move some projects to take on more aggressive energy savings.
- Delivering tools and guidelines to encourage A&Es and equipment suppliers to include more advanced energy measures in projects.

The strategic approach for the NBE program incorporates many inter-related components to deliver a comprehensive and effective approach to the free ridership challenges.

### ***Serving Buildings Less Than 100,000 Square Feet***

Reaching into the small- to medium-sized new building market presents several challenges. Often buildings in these size ranges do not take the “typical” design and construction approaches. Design-build approaches, or standard designs are used in many of these buildings. Furthermore, the energy savings that may be obtained from projects in this size range can be limited such that the cost of an energy analysis may not be justified, even with financial incentives. Therefore, key strategic approaches to this part of the building market should attempt to lower the participation costs. Several

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<sup>c</sup> The Leadership in Energy and Environmental Design (LEED) Green Building Rating System® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. LEED® NC is for new commercial construction and major renovation projects. LEED is a product of the US Green Building Council.

<sup>d</sup> “*Evaluation of the Energy Trust of Oregon’s New Building Efficiency Program*,” submitted to Energy Trust of Oregon by Nexus Market Research, Inc. and Hescong Mahone Group. August 26, 2005.

enhancements have been developed to provide more cost-effective paths for this small- and medium-sized building market to participate in the NBE program. Several of these inter-related items include, in summary:

- Additional Equipment in the Standard Track
- Service Incentive of \$500 for the Standard Track assistance
- Increased Standard Track Maximum to \$50,000
- Incentives for LEED® NC Certification
- Quick Calculators for standard measures

The below strategies were undertaken to include inter-related elements to address both the control of free ridership and the reduction of the cost for participation in the small- to medium-sized building projects.

### ***Strategy 1 - Streamlining and Simplifying Program Processes***

This strategy encompasses all elements that have the objective to make participation easier and to provide more accurate and complete information to reduce the amount of Program time and effort for correction of errors, and ultimate approval of projects. In effect, this strategy reduces the cost for both the participant and for the Program.

The NBE program has endeavored to continuously improve the Program processes as part of the day-to-day operations. These continual improvements often manifest themselves in a series of small, almost unnoticed improvements to the Program involving such areas as specific protocol or policies that need to be clarified or developing internal protocol for work flow handling and reviews, or designing and delivering improved technical processes for the energy analysts. They are embedded in the on-going activities and the daily operation of the Program.

Many noteworthy enhancements to the Program processes have greatly improved the ease of participation and the quality of information provided to the Program, several which are discussed below.

**Revision to Application Forms** was implemented as a mid-term improvement for the Program. The forms for all tracks and elements of the Program were changed to make their completion easier for the participants, and to improve the quality of information received by the Program. All forms were put on Excel and an electronic submission of the form is required; previously all forms were in a Word or PDF format and were largely completed by hand and submitted by paper copy. Going to Excel offered several improvements including:

- Auto-completion of repetitive information, such as names and addresses, was possible across the integrated application spreadsheet.
- Different forms that are needed at different stages of the project could be linked, for example, the original application data can carry through to the completion submittal forms.
- Automatic checks can be done on the information entries to improve the quality of the data received, for example, date sequences are checked to ensure that they are in chronological order.
- Energy savings calculation and other data attributes that are needed by the Program, but that are no concern to the Participants, can be integrated into the forms in hidden worksheet calculations.

The conversion to Excel with electronic (e-mail) submittal also supports improvements to the Program processes.

**Modified Program Processes** were put in place for several areas and for several reasons, but overall, these revisions were intended for: 1) allowing more streamlined and easier processing, 2) capturing more and better participation, or 3) providing more clear information to the participants about the Program processes.

- **Electronic submittal procedures** were developed to require that the participants submit applications via e-mail. Initially, it was intended that electronic signatures be used, however, business and legal restrictions prohibited this approach. Energy Trust is not ready in terms of staff and logistics to set-up the infrastructure to support electronic signatures. Alternately, the Program can now accept either an original or FAX signature which is sent in complement to the electronically transmitted applications. A waiver policy was established so that any applicant without e-mail could still participate, but this is intended to be the rare exception.
- **Custom and High-Performance Tracks were combined** into one single track, now called Custom Track. The initial design specified two tracks with the Custom track intended for measure-level analysis with a lower incentive maximum of \$100,000. The High-Performance Track was intended to be for more comprehensive, whole building energy analyses and integrated building projects with a maximum of \$200,000. Over the first year of the Program the experience showed that projects differed not by their energy analysis approach, but rather in the scale of their energy savings. There was little or not distinction between the two tracks, otherwise. Therefore, since both these track already required analyses to be submitted, they were combined into one Custom Track. The incentive maximum was also set to \$200,000 for all Custom projects.
- **A Project Notification process** was established to allow for the capture of projects that were early in their development. It was found fairly soon after the Program entered the market that there were many interested parties who were planning to build, but had not yet developed their building project sufficiently to describe the potential energy efficiency measures, even at a schematic level. Therefore, this Project Notification allows the Program to register these “not-yet-defined” projects, and to help in the early development stages.
- **A Professional Engineer’s Certification process** was added to provide a streamlined sign-off for energy analyses that are submitted under the Custom Track. Typically, the Program reviews energy studies and model results as part of the project approval process. However, in some cases, and especially with larger, more complex building projects, the energy analysis can become very complex and integral to the on-going design processes. Under these situations, the Program seeks to work with the building designers, and to accept the studies that should be available from these processes. This process gives the participant an option to have a Professional Engineer stamp and certify that the energy analysis complies with the Program requirements, ASHRAE guidelines, and reasonable practice protocol. Under such acclamation, the Program then only needs to perform a cursory review, saving time for both the Program and the participant.
- **Analytical Guideline and Submittal Requirement processes** have been developed and evolving over the Program life. Detailed energy analysis modeling guidelines and processes were designed and documented to provide clear direction of the various program requirements for the Custom Track energy analysts. Over the course of the Program operation, as individual projects participated, new situations arose that caused on-going refinements to the analysis guidelines. These have been developed in consensus with the building design and energy analysis community. As major issues

arose, proposed solutions and approaches were both solicited from and screened by these energy analysis practitioners.

### ***Strategy 2 - Expanding Program Offerings***

Increasing and modifying portions of the incentive offerings of the NBE program is a primary strategy that affects both the quantity and the reliability of the achieved energy savings. This strategic area also includes improvements to the program offerings to the new building market that encourage greater uptake of improved energy practices, help to control free ridership, and potentially increase the participation of small- to medium-sized buildings.

After the first 1½ years of the NBE program operating in Oregon’s new building market, several enhancements were made to expand the offerings, responding to the opportunities and needs of the market.

**Additional Standard Track incentives** were developed to expand the energy efficient equipment and technology offerings. Since these are in essence “pre-qualified” energy efficiency measures, an energy analysis is not part of the participant’s submittal. Unit incentives for energy-efficient chillers, air-to-air heat exchangers, water source heat pumps, geothermal heat pumps, and demand controlled ventilation have been added to the prior equipment of lighting, motors, air-conditioners, variable speed drives and efficient natural gas equipment. The intent is to reduce the cost for participation by eliminating the need to do an energy analysis, and to encourage the uptake of more aggressive energy efficiency measures. Both of these effects can attract more buildings in the less than 100,000 square foot size range.

The assessment of additional equipment for the Standard Track generally required that each measure pass the Benefit-Cost (B/C) tests required for all program measures. However, since these measures are assessed for “typical” building applications that assumes many general characteristics, several other issues became considerations.

- While the B/C tests were determined for each case, they were reviewed with the intent of identifying trends of cost-effectiveness, rather than holding to specific pass/fail requirements. For example, it was found that heat pumps generally above 5 tons were marginally failing B/C tests. However, it was agreed to maintain incentives for this equipment because the degree of the B/C failure was minimal, and furthermore, the Program’s exposure would be limited since most heat pumps, especially water source and ground source heat pumps, are applied at sizes less than 5 tons.
- Setting the incentive levels also raised several issues. The overall objective was to establish a financial incentive that would be significant enough to encourage the market to apply the energy efficient equipment, but to not have the incentive amount be more than the incremental cost. Generally, an upper boundary of 70% of incremental cost was considered as a target. For some of the technologies however, the incremental costs could be quite small. For example, in some cases, demand controlled ventilation could be easily implemented with only a few sensors if a building automation system was already in the building project. Therefore, a balance between the potential incentive amount and the incremental cost was determined for each of the measures.
- Ensuring that the energy efficient equipment and control options exceeded Code requirements was integrated into the assessment and the design of the Standard Track approach. For example, chillers are required to exceed minimum efficiency levels, but because chiller efficiencies are individual to each machine configuration, the financial incentives were designed to be a dollar per unit of

efficiency rate. While this requires a more detailed incentive calculation on the Program application, this encourages the market by delivering increasing incentive amounts as the chiller efficiency increases.

**Increasing the Standard Track Incentive Maximum to \$50,000** per project (up from \$25,000) was done to encourage greater use of this program path. This is especially pertinent to better serving the small- to medium-sized buildings where the energy savings potential and project budgets do not always support use of the Custom Track. This modification is intended to encourage greater participation for buildings that are less than 100,000 square feet. Additionally, this change benefits all Custom Track projects by allowing energy analyses to be foregone, at the analyst's and owner's discretion, for measures that are widely accepted as energy efficient and cost-effective.

**Service Incentive of \$500 for Standard Track applications** was instituted to support vendors, contactors, and representatives to complete the Program applications and supporting documents for participants. While the Standard Track does not require energy analyses, it does require product documentation submittals. Oftentimes, these submittals are beyond the technical knowledge of the participant, therefore, this incentive was added to encourage that those involved in the equipment supply to develop the Program submittal information. This allows a channel for the participant to get help in completing the application and supporting documentation submittals, and it benefits the Program by receiving higher quality, more complete submittals. While this service incentive is deducted from the other Standard Track incentive amount and is still paid to the owner, the suppliers and the owners are free to make their own financial arrangements.

**An incentive offering for LEED<sup>®</sup> NC Certification** was developed to encourage building projects to complete the full certification process with the US Green Building Council – the actual throughput to LEED<sup>®</sup> Certification is only about 10% for LEED<sup>®</sup> registered projects at present.<sup>c</sup> This offer impacts small- and medium-sized buildings by being only applicable for those less than 100,000 square feet. It was reasoned that larger buildings that were pursuing LEED<sup>®</sup> NC Certification typically had the resources to complete the process. However, it was observed by the Program representatives both here in Oregon, and in other states that many of the small- to medium-sized buildings that start pursuit of LEED<sup>®</sup> NC do not carry through to Certification. The participant's process is streamlined because procedures were developed to allow for the NBE program to accept LEED<sup>®</sup> NC energy savings results. The Program processes are streamlined by accepting the LEED<sup>®</sup> NC Certification issued by the USGBC for the building, avoiding detailed review of the energy analyses. Incentive amounts were based on average Energy Use Intensities (EUIs) of energy savings by building types in the northwest. The incentive amount is determined based on the number of Energy and Atmosphere Credit 1 points that the building receives. Alternately, the participant may elect to submit a detailed energy analysis through the Custom Track if that would provide a greater incentive amount. However, the analysis and submittals would be required to also fulfill all of the Custom Track requirements under this option.

### ***Strategy 3 - Enhancing Tools and Information***

To encourage greater and better application of more advanced energy efficiency measures across more market participants, several technical assistance tools and information resources were added to the Program. The strategy is to provide easy-to-use tools and supporting information that encourages the analysis of energy efficiency options in specific buildings projects. The Custom Track of the NBE program offers incentives for projects based on the amount of savings that are achieved. Standardized

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<sup>c</sup> U.S. Green Building Council's LEED registration and certification statistics. Website: [www.usgbc.org](http://www.usgbc.org)

analysis tools and information sources support easier participation by making energy analyses easier for the design community, and also support suppliers and vendors of the related energy equipment.

Technical tools and related information guides can be used to increase energy measures in the small- to medium-sized building projects, and can help to reduce or control free ridership by educating and empowering “non-engineering” new building parties to assess more advanced energy measures.

**Analysis Standards and Guidelines** were developed and established. These “Analytical Guidelines” for the NBE program that are distributed to, and used by all those submitting Custom Track applications. They describe the detailed requirements and sequencing of measure analysis methods, the cost-effectiveness screening approaches, and the data submission requirements. The methods are intentionally flexible to accept various modeling tools that best serve the individual project needs such as whole building versus individual measure analysis. This has been specifically commended by the design and energy analysis community. While a standardized approach may make program administration easier, care must be taken so as not to limit the energy analysts’ choices of modeling or calculation.

There are many different ways to determine energy savings ranging from full-scale building simulation models, to bin analyses, to spreadsheets, to manufacturer’s calculations. The policy of the Program is that it is left to the project to determine the best method in each instance. While enhancement of the Analytical Guidelines is continually done as new situations and questions emerge from the analysts, the flexibility to accept analysis methods that are “appropriate” for the building project and the energy measures being assessed is an important feature to encourage participation, especially in the small- to medium-sized buildings.

Further, allowing the specific analysis approach to be determined by the energy analyst is very consistent with fact that the NBE program pays incentives to the owner. This allows for the owner and his analyst to independently reach agreement on the analysis approach and costs, without involving the Program. Since many building projects also have the energy analysis done by their design team, this approach does not interfere with the on-going market practices and relationships.

**Compatibility with other State programs** is also established through the NBE procedures and guidelines. The Oregon Department of Energy (ODOE) administers the State Energy Efficient Design (SEED) program for State buildings, and the Business Energy Tax Credit (BETC) program. Both of these are programs that encourage energy efficiency, and they both have energy analysis requirements and guidelines. The NBE program procedures are designed to be compatible with these programs to minimize additional work on behalf of the participants, and consistency with ODOE is maintained. For example, SEED has strict energy modeling standards where energy efficiency measures are modeled together as a bundle, showing interactive effects. NBE accepts all different types of energy models but requires that savings, incremental cost and measure life be shown for each individual measure. In order to not further complicate SEED projects participating in NBE, NBE accepts SEED models as they are, with no changes or additional requirements. Further, the Analytical Guidelines are compatible with BETC requirements since BETC energy savings estimates can use any creditable analysis method.

**Quick Calculators** were developed to assess the energy savings for targeted energy efficiency measures. An assessment of “freeware” available from various sources for commercial building energy efficiency measures revealed that very few calculators gave appropriate output data for the information

needs of the NBE program since many were used to support the sale of a product. The primary problem was that most reported estimated energy *cost* savings, and not actual energy savings.<sup>f</sup>

As a result, SAIC adapted several in-house calculators to be applicable to the NBE program. These Quick Calculators estimate energy savings and energy cost savings over a full 8,760 hour yearly model using local weather data. Outputs are also linked to provide standard reports for presentation of the findings. Quick Calculators were done for the following energy efficiency measures:

1. Energy-Efficient Chillers
2. Demand Controlled Ventilation
3. Enthalpy Economizers
4. Total and sensible Air-Side Heat Recovery
5. Reduced lighting power (with heating and cooling interaction)
6. Variable Speed Drive applications, and
7. Efficient windows

The objective was to provide easy-to-use, yet reliable, energy analysis calculations that can be used in the Custom Track application.

**A Participant Manual** was developed for the program to improve the clarity of the processes and procedures for participating in the Program. While directions and guides for Program were previously included in fact sheets, on the website, and on the applications form instructions, the Program's experience was that many participants did not fully understand all that was available to them, nor how they could apply for each of the different Program offerings. The one-stop Participant Manual serves to better communicate the detailed steps of the Program makes participating easier for all parties. It is most useful in explaining the Program to participants who do not have the support of a complete design team, as is often found in the small- and medium-sized buildings.

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<sup>f</sup> Some calculators that were found effective were SkyCalc for skylight analysis in "big box" buildings, an air-conditioning efficiency analyzer from PNNL, and those available from Renewable Energy Technology Screen (RETScreen).