

---

# A PROPOSED METHODOLOGY TO DETERMINE THE LEVERAGE IMPACTS OF TECHNOLOGY DEPLOYMENT PROGRAMS

---



Prepared for

U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy  
Office of Planning, Budget and Analysis

June 2008

By

James L. Wolf



**U.S. Department of Energy**

**Energy Efficiency and Renewable Energy**

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable



## **Acknowledgements**

This study was completed for the U.S. Department of Energy (DOE) under contracts from Oak Ridge National Laboratory, ORNL (Purchase Order Number 4000057380) and Technology & Management Services, Inc., TMS (Purchase Order Number 20669.)

James Wolf was the principal author. Dr. Yaw Agyeman at TMS, Inc. and Michaela Martin at ORNL were the project managers who directed the work. Jeff Dowd of the Office of Energy Efficiency and Renewable Energy (EERE) was the DOE Project Manager.

Special thanks are due to those who provided review comments that were helpful in improving the report: Bill Babiuch (National Renewable Energy Laboratory), Harley Barnes (Lockheed Martin), Joel Eisenberg (Oak Ridge National Laboratory), Gretchen Jordan (Sandia National Laboratory), Peggy Podolak (EERE), and Glen Strahs (EERE).

## **Notice**

This document was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not constitute or imply its endorsement, recommendation or favoring by the United States government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or any agency thereof.

## Table of Contents

Acknowledgements.....	i
Notice.....	i
Table of Contents.....	ii
1. Background.....	1
2. Research Methodology .....	2
3. Findings from the Document Review and Background Research.....	3
4. Defining Leverage .....	4
4.1. Approach and Definition.....	4
4.2. Conditions for Eligibility for Leverage Claims .....	6
4.2.1. Overview.....	6
4.2.2. First condition: Primary or related program activities.....	6
4.2.3. Second condition: Attributes of program contributions.....	9
4.3. Proposed Approach for Determining Leverage .....	10
4.4. Illustrations .....	11
4.5. Relationship of Leverage to Cost-Benefit Tests and Benefits Analysis.....	14
4.6. Attribution of benefits.....	16
5. Issues in Application to Technology Development Programs.....	18
5.1. Logic Models .....	18
5.2. Information Needed for Leverage Estimation and Data Availability.....	18
6. Recommendations.....	20
Appendices.....	23
Appendix 1: Industrial Technology Delivery Program Logic Model.....	23
Appendix 2.....	24

## 1. Background

The purpose of this study is to develop a methodology for leverage estimation that is relevant and useful to technology deployment programs in the Department of Energy's (DOE) Energy Efficiency and Renewable Energy (EERE) office.

The methodology recommended is intended to be helpful to the development of new standards concerning the calculation of leverage that would be deemed valid and defensible not only within EERE, but also across all technology deployment programs in the public sector, generally. It may be offered as a generalization that leverage is considered very important for a deployment program as a means to assess the program's operation, impacts and ultimate benefits. By encouraging consistency and transparency in its application, the methodology is designed to bring EERE and other energy organizations to best practices on this issue.

"Leverage" is a frequently used term in the context of innovative research, development, demonstration and deployment activities. There are numerous citations in the literature where the amount of dollars "leveraged", or other claims of leverage, are made to imply a program's effectiveness and impact. Some examples of the ways EERE programs have expressed leverage in *current* reporting include<sup>1</sup>:

- *"For every 1 dollar of program funds the program leverages 2 dollars from partners"*
- *"Projects funded by the program have leveraged \$1.8 million from non-federal sources"*
- *"Our estimates show that investment enabled by the program represents a 15:1 leveraging of the program's fiscal year 2006 budget"*
- *Our program's financial assistance activities leverage approximately a 40 percent non-federal cost share"*
- *"For every dollar it spent over its first 6 years of planning and operation, the program leveraged 5 dollars in private end-user investment in energy efficiency measures."*

Other examples range from reports by Non-Governmental Organizations on their programs<sup>2</sup>, through reports on state agency programs<sup>3</sup>, utilities reports<sup>4</sup>, to federal

---

<sup>1</sup> The quotes reflect actual language used by EERE programs in reporting leverage, but the numbers have been altered and are not attributed to any program.

<sup>2</sup> Environmental Defense, in working with Wal-Mart, reports: "Our goal in working with Wal-Mart is to leverage what the retailer does best — creating efficient systems, driving change down through its supply chain, and accessing a huge customer base — in order to dramatically advance environmental progress." See: <http://www.environmentaldefense.org/page.cfm?tagID=2101>

<sup>3</sup> See <http://www.waptac.org/si.asp?id=389>. A brief prepared by DOE but emphasizing the dollar leveraging impacts of State Weatherization Programs.

agencies, as reflected in a GAO report – GAO-7-768R – on leveraging Federal Funds for Housing, Community and Economic Development.<sup>5</sup>

Across the multiple sources explored, leverage is typically either not defined at all, or not well-defined, and the reporting of leverage is varied and inconsistent. It is therefore impossible to draw meaningful conclusions based on a single standard, since none has been found. This absence of a standard and consistently defined credible procedure for the reporting of leverage means that EERE programs, and most State and Federal deployment programs in general, have not been able to report leveraging in clear, transparent language to capture what is meant, and how it might be valued.

## **2. Research Methodology**

The research involved four steps: 1) document review; 2) in-depth interviews; 3) construction of preliminary approach to leverage estimation for EERE technology deployment programs and a vetting of the approach through three case studies; 4) finalizing the proposed methodology, with due accounting for the variation in programs.

### *Document Review / Background Research*

The first step was to review documents, including DOE program reporting of any leverage results, as well as non-DOE documents such as evaluation studies of utilities. The purpose of the review was to examine methodologies that have been employed to determine leverage for deployment programs.

### *In-Depth Interviews*

The second step was to conduct interviews with outside experts, including key evaluators, utility and state program managers, and other experts across the country, including in New York and California since these states were identified by some EERE staff as potentially having experience in addressing these evaluation type issues. The interviews were primarily conducted by phone.

### *Preliminary Method Construction and “Testing”*

The third step was to construct a preliminary approach to estimate leverage for EERE deployment programs, and examine it during interviews with staff from three EERE program offices. The interviews were conducted with personnel currently or previously responsible for deployment activities within the EERE Industrial Technology Delivery Program, EERE’s State Energy Program (SEP), and the former EERE Million Solar Roofs (MSR) Program. Although the MSR Program is no longer operating, it was believed that the lessons learned during the run of the program would be applicable to its successor program, the Solar America Initiative.

---

<sup>4</sup> For example, the Southern California Edison Program will “leverage the integration and outreach campaigns offering information...” See

[http://www.californiaenergyefficiency.com/pagdocs/SCE\\_Mar22\\_ProgramConceptPapers.doc](http://www.californiaenergyefficiency.com/pagdocs/SCE_Mar22_ProgramConceptPapers.doc)

<sup>5</sup> See: <http://www.gao.gov/new.items/d07768r.pdf>

### *Finalizing the Approach*

The fourth step was to develop, based on the previous three steps, a recommended methodology for EERE to adopt in estimating leverage for the deployment programs. The proposed methodology is to be cognizant of the practical issues that may arise from utilizing the methodology in the context of EERE deployment programs. This includes recognizing differences among programs and potential difficulties in data collection or other aspects, and highlighting the implications for benefits analysis. Process recommendations were also developed during this fourth step.

## **3. Findings from the Document Review and Background Research**

Two key EERE program-related documents were identified for review, due to their specific efforts to estimate and report leverage benefits. Additionally, documents from non-EERE sources were reviewed, such as reports from utility sponsored programs, with the aim of understanding how the concept of leveraging is defined and estimated across different disciplines.

Specific to the review of EERE documents, the literature search found two instances where a precise definition of “leverage” was detailed. One came from a report by Oak Ridge National Laboratory (ORNL) that defined leverage in the context of the EERE-sponsored Industrial Assessment Center (IAC) program to be: “...support received by the IAC-sponsored centers in excess of the core funding from DOE for activities beyond the centers’ basic mission of conducting assessments.”<sup>6</sup>

The second definition found was in the context of EERE’s Weatherization Assistance Program (WAP). The Program’s definition of leveraging was:

*“Leveraging activities include paying for agency staff or hiring consultant staff to explore and develop partnerships with property owners, utility companies, and other entities that will generate non-Federal resources for Weatherization. Other allowable activities include: holding leveraging meetings; preparing technical materials/briefs; or facilitating voluntary match funds from a non-Federal source. The leveraged resources should expand energy efficiency services and/or increase the number of DOE-eligible dwelling units weatherized.”<sup>7</sup>*

These two definitions did provide concrete examples and limitations on what would constitute leverage if an evaluator or program manager were seeking to estimate it. However, the IAC and WAP definitions did not place the concept of leverage in a larger context to understand precisely what was meant by it, or to ensure that its use was consistent with how it may be used by others.

---

<sup>6</sup> Leveraging Benefits Attributable to Centers within the Industrial Assessment Center Program, ORNL, Michaela Martin, Bruce Tonn, Susan Schexnayder, February, 2002.

<sup>7</sup> See Weatherization Program Guidance, section 1.7 for program year 2008.

Similarly, the examination of other reports of leverage found the term frequently used in the context of reporting dollar results, but without a precise definition. The interviews conducted also revealed no precise definition of leverage, and comments on how the term leverage was used revealed that it varied in different contexts, depending on whether it was a formal report, a claim in a press release or a general description of a program's effects.

## **4. Defining Leverage**

The definitions, eligibility conditions, and approach to leverage estimation presented in this section are relevant to technology deployment programs in the public sector, generally, not only to EERE.

### **4.1. Approach and Definition**

The approach recommended in this report is to use the concept of program logic - e.g., logic models and the terminology associated with them - as a starting point to define leverage. A program logic model is a characterization or representation of the program that demonstrates how the program's designed structure will apply resources to produce outputs and achieve intended outcomes consistent with the goals, vision, and mission.<sup>8</sup>

Logic models provide therefore a very helpful foundation for considering leverage. A detailed logic model presents the entire chain of events necessary to achieve a program's objectives. It illustrates the pathways from activities to outputs to outcomes. Studying it highlights the activities undertaken, and the outputs and interim outcomes that are needed to achieve the ultimate outcomes. The necessary resources that are needed to undertake an activity, or produced by an activity, are also shown. Accordingly, the concept of leverage fits very well within the logic model structure and the structure lends itself to assist in defining exactly what leverage is for a particular program.

There are several resources available that can assist in learning more about logic models and how to prepare them.<sup>9</sup>

---

<sup>8</sup> A "logic model" is not a mathematical formulation; rather it is a graphical or tabular characterization of the underlying logical relations between a program's resources, activities, outputs and outcomes.

<sup>9</sup> These include:

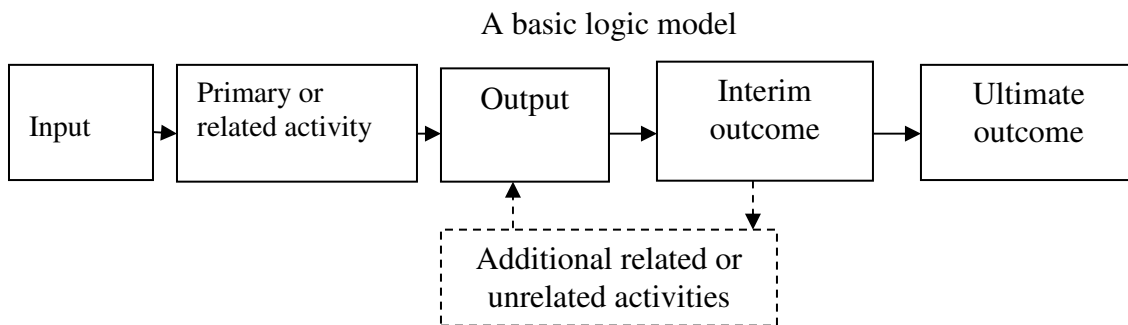
- Logic Model Development Guide ([PDF 529 KB](#)), W. K. Kellogg Foundation (2001)
- Using Logic Models in Managing Performance of Research and Technology Programs: An example for a Federal energy efficiency and renewable energy program ([PowerPoint 297 KB](#)), Jordan, Gretchen; Mortensen, John; Reed, John; Teather; April 2004. See [http://www1.eere.energy.gov/ba/pba/program\\_evaluation/publications.html](http://www1.eere.energy.gov/ba/pba/program_evaluation/publications.html)
- University of Wisconsin — Extension: Logic Models — W. K. Kellogg Foundation, "Logic Model Developed Guide: Using Logic Models to Bring Together Planning, Evaluation, & Action;" December 2001. [wkcf.org](http://www.wkcf.org)



Having a program logic model is not required for using the leverage estimation approach described in this report. However it is essential that program staff know the differences between activities, outputs and outcomes and be able to identify each, to minimize confusion and possible error.

Conceptually, a program's logic can be represented graphically as typically flowing as follows:

Figure 1



### **Definitions**

- **Inputs (resources)** are the elements required by an organization, program, or project to initiate and/or sustain activities (examples, time, money, skills)
- **Activities** are what the program does (examples - outreach, audits/assessments)
  - **Primary activities** - Activities undertaken to achieve the limited specified purposes of the program pursuant to statute, regulation or administration policy.
  - **Related activities** –Activities undertaken which are broadly consistent with achieving the general goals and direction of the program, but not the specific focus as determined above.
  - **Unrelated activities** – Activities that do not relate to either the specific or broadly determined general goals of a program but may in any event save energy.
- **Outputs** are the direct results of a program's activities (brochures mailed, appointments scheduled, assessments completed)
- **Interim (short- or intermediate-term) outcomes** are what EERE's partners and target audiences do in response to the activities (examples - change practices, install equipment)
- **Ultimate (long-term) outcomes** are the ultimate goals EERE is trying to achieve (examples - Btus saved, emissions reduced)

## 4.2. Conditions for Eligibility for Leverage Claims

### 4.2.1. Overview

Assessing leverage requires considering two key conditions to establish a valid claim of leverage: - “*primary or related program activities*” and “*attributes of the program contribution*.”

- *Primary or related program activities* - First, the claimed leveraged resources must relate to a primary or related activity – not an unrelated activity, output, interim or ultimate outcome. This condition focuses on the party other than program whose resources are being considered to having been leveraged by the program. Resources brought by another party for outcomes might be considered as benefits of a program, but would not be counted as leveraged resources within this definition.
- *Attributes of program contribution* - Second, the claim will have to be evaluated against three factors relating to the program’s contribution, and pass against them as a whole package rather than pass all three of them on an individual basis. The three factors are: the timing, character, and amount of the program contribution. This condition focuses primarily on the program, but the other party’s actions in terms of timing, character and amount of contribution may be weighed and considered.

Each of these two conditions for eligibility for leverage is further discussed below.

### 4.2.2. First condition: Primary or related program activities

Examining the conceptual logic model in Figure 1, one can find three areas to focus on for possible definitions of leverage:

1. Money or other resources<sup>10</sup> induced for *activities*:
  - a. To the initial primary activity.
  - b. To “related” activities.
  - c. To “unrelated” activities.
2. Money or other resources induced for *outputs* of activities.
3. Money or other resources induced for *outcomes*:
  - a. To interim outcomes
  - b. To ultimate outcomes

---

<sup>10</sup> At times the term money alone may be used, but in all cases of considering leverage, other resources provided should also be considered.

To elaborate on the differences among these program elements and highlight the importance of clearly defining the program elements, the Industrial Assessment Center (IAC) program is used to illustrate some implications of the differences in definitions<sup>11</sup>.

In terms of activities for the IAC, the *initial primary activity* done with DOE sponsorship is described as follows:

“The IACs provide eligible small- and medium-sized manufacturers with no-cost energy assessments.”<sup>12</sup> In addition, the program web page also notes that: “...the IACs serve as a training ground for college students, the next-generation of energy savvy engineers.”<sup>13</sup> The ORNL report also noted “the centers basic mission of conducting assessments.”<sup>14</sup>

However, the student training that occurs as part of the IAC program activities could be viewed as a second primary activity to achieve an intended result of trained students, or perhaps a related activity, or even a “by-product” additional primary activity of the audits offered.

Depending on the program, there can be more than one initial primary activity. The claims of leverage in such a case should be evaluated separately for each activity.

This highlights the importance of characterizing the program logic and clearly defining activities, outputs and outcomes, and also primary, related and unrelated activities when determining leverage. In the case of the IACs, for example,

- A *related activity* could be the audits conducted by these centers for firms which are not eligible as small to medium sized manufacturers.
- An *unrelated activity* performed by these centers might be the research and development (R&D) that some of them undertake. Whether the R&D is related or unrelated would depend on the nature of the R&D, including such factors as whether the need for the R&D project grew out of an audit conducted as a primary activity.
- The *output* from the activity of an audit could be the audit report or some specific energy efficiency improvement recommendations.

---

<sup>11</sup> The IAC is used here as illustrative of the differences between primary activities, related activities, and outcomes, not because any particular claim of leverage was made for any particular element.

<sup>12</sup> <http://www1.eere.energy.gov/industry/bestpractices/iacs.html>.

<sup>13</sup> Ibid.

<sup>14</sup> Leveraging Benefits Attributable to Centers within the Industrial Assessment Center Program, ORNL, Michaela Martin, Bruce Tonn, Susan Schexnayder, February, 2002. See: <http://www.ornl.gov/~webworks/cppr/y2001/rpt/113018.pdf>

- The *interim outcome* might be the investment by the firm- with or without other assistance such as utility rebates - in energy efficient equipment.
- The *ultimate outcome* is the energy and environmental benefits realized by the investments.

There are some who might seek to claim leverage based on program “outcome results;” for example, based on additional money invested by the audited manufacturer to install a recommended energy efficiency improvement (e.g., an efficient motor). In this case, leverage is being claimed for a result (interim outcome) of a program and not the program activity. In reviewing some of the claims of leverage in the literature, it appears that outcomes may be claimed in some instances as leverage, but since leverage was never precisely defined, it is not clear. Nevertheless, in the approach recommended here, leverage should not be claimed for the amount spent for any output, or interim or ultimate outcome. They may be outputs or “outcome benefits” of the program, and appropriately claimed as such, but should not count specifically as “leveraged” resources.

As a case in point, one manager in the Northwest stated that an argument could be made that leverage could be extended through the whole logic model. In the hypothetical case of a state providing some funds for advertisements of Energy Star products (e.g., windows), he opined that leverage could include: 1) the amount of money others provided for the advertisements (the initial primary activity); 2) the incremental costs the consumer spent to buy the energy efficient window (an interim outcome); and even 3) the dollars spent to expand a factory to manufacture the efficient windows if the expansion was due to the increased demand for that product resulting from the advertising that the State sponsored (a related ultimate outcome). Attribution questions aside (whether the state could claim credit for the outcome) the importance of clearly defining leverage is illustrated by this hypothetical.

These varied assertions that different program elements can be the basis for a leverage determination illustrate the importance of a clear definition of primary or related program activities as a precursor for the determination of leverage.

Initially focusing on activities brings meaning to leverage in the context of how many resources were obtained for activities needed to help realize the interim outcome or “result”, not how many dollars were spent directly on the outcome result. The outcome result may, in proper circumstances where attribution has been established, be considered a benefit of a program, but this is an outcome benefit or impact that should be not confused with leverage.

It is acknowledged that at many times it will require judgment and a careful examination of the charter and stated objectives of the program to determine what is a related versus unrelated activity. The determination of what constitutes primary and “related” activities will clearly depend on both the written charter and authorization for the program, as well as how it is being operationalized in practice. The logic model for a program, or a good

understanding of the program's logic elements, should provide an excellent beginning point for this exploration.

#### **4.2.3. Second condition: Attributes of Program contributions**

Just being part of a primary or related activity does not ensure that the other party's resources should be counted as having been leveraged by a program. For a program to be able to claim to have leveraged another party's resources, there are three additional attributes of the program's contribution that need to be examined.

The *timing* of the program involvement is the first factor that should be examined. Was the program the initiator of the activity idea and did it provide the seed or initial money? If so, leverage claims may be more credible than if the program was "last to the party" after others had conceived the idea and assembled most of the resources necessary.

The *character* of the contribution that both the program and other parties supplied is important in evaluating whether the program "leveraged" other contributions. A program's provision of unique skills for participation in an activity may be more significant in inducing other parties than the program just supplying money. It is a factor that may vary by each activity- in some cases money may be more important; in other cases, the unique aspects of a program's contribution- skills, in-kind, etc., may be more important.

The nature of the contribution supplied by the other parties also needs to be examined. Was it direct funding, the value of staff time, or what? The more unique the resources provided by a party, the more credit it should be given as to having "leveraged" the participation of others. Indeed, the private party or other party may have leveraged the program, and not the reverse.

The *amount* of resources contributed also needs to be examined. How significant were they as an inducement? Absent extraordinary circumstances, it is unlikely that \$1 of resources contributed for a \$100 advertisement is likely to have leveraged the other \$99. The significance of the contribution needs to be examined and established for a credible claim of leverage to be sustained.

The perception of each party is also important. If there are only two parties, can each claim to have "leveraged" the other? If there are three or more parties, is only one party entitled to claim "leverage" of the resources provided by another, or can each claim to have leveraged a different participant? (For example, where there is a utility, Federal agency and a State agency all participating in a project.)

It should be recognized, as discussed below (Section 4.4) that even if one attributes the contribution of the program's partners as having been leveraged by the program, it does not necessarily follow that all the benefits of the activity should therefore be attributable to the program. This explains, in part, why it is important to distinguish between resources leveraged for the activities that would produce some benefit, and the benefit

itself. Establishing leverage does, however, provide additional credence to a claim of benefits for the activities' outcomes.

Although primary / related activity and contribution attributes are two different concepts, each is necessary to establish a valid determination of leverage.

#### **4.3. Proposed Approach for Determining Leverage**

To summarize the approach recommended here, the following needs to be established for a technology deployment program to be able to claim that it has leveraged money or other resources:

1. The money or other resources claimed to be leveraged are provided by another party for a primary or related activity in the program logic; not to an unrelated activity, an output, or interim or ultimate outcome.

To determine whether an activity is primary or related as opposed to an unrelated activity, the program's legislative authorization or other charter, as well as its actual operation, must to be carefully examined and should be detailed in leverage claims.

2. Even if the money or other resources were provided for a primary or related activity, additional questions must be asked and satisfactorily answered to determine whether these resources provided by another party were leveraged. These questions concern:
  - a. The timing of the contribution. At what stage did the program get involved in conceptualizing the primary or related activity? Who first initiated the idea or program? The earlier in the timeline, the more a claim of leverage by the program may be justified.
  - b. The character of the contribution. In some cases, a program supplying unique skills may carry more weight to justify claims of leverage than just the program supplying money. How active was the program in terms of conceptualizing and defining the activity - and helping shape it?
  - c. The amount of the contribution. What percentage of the total value of resources did the program provide for the primary or related activity? The lower the proportion of the program funds provided (which would result in higher claims of leverage) the more justification for claims of leverage need to be found in the character or timing of the contribution.

The answers to the three questions under the second condition are more judgmental than the first, but should be detailed when claims of leverage are made.

Replication of an activity initially sponsored by a program can under proper circumstances be considered to have been leveraged by the program. This concept is discussed more in Section 4.4 (Case B, page 13) highlighting the differences between leverage and cost-share.

It is worth highlighting that in this proposed determination of leverage, merely establishing cost-sharing by another party is not sufficient to justify a claim that these resources have been “leveraged.” These differences between leverage and cost-sharing are illustrated in Section 4.4.

#### 4.4. Illustrations

In the approach developed, one could have a project which is: 1) simultaneously cost-shared and leveraged; 2) cost-shared, but not leveraged; 3) leveraged but not cost-shared; or 4) neither cost-shared nor leveraged. Illustrative case examples of the differences between leverage and cost-share follow.

An example of how the above recommended definition would be applied to the IAC Program, and how the approach may differ somewhat from that utilized by ORNL (cited report, footnote 14) is informative. This discussion is not intended as a criticism of the ORNL report, but it is being used just to highlight differences in the approaches.

The following table presents a portion of the data reported for different IAC activities in the ORNL report<sup>15</sup>:

Table 1: IAC influencing leverage support data reported by ORNL

Program logic element	Dollars spent	Description
Beyond base audits	\$3.5 million	Audits for other sized firms
Miscellaneous, including R&D	\$1.52 million	R&D or other activities
Collaborating on Audits	\$33,080	Undefined
Other	846,900	Supporting IAC operations, technical assistance , client identification and educational activities
Total	\$5.9 million	

The activities of the program are discussed above (Section 4.2.2, page 7). Using the data in the above table will illustrate case examples that can be represented in the following table:

Table 2: Examples of possibilities of cost-share versus leverage

<sup>15</sup> See page 5. <http://www.ornl.gov/~webworks/cppr/y2001/rpt/113018.pdf>

<u>Cost-share</u>	<u>Leverage</u>	
	Yes	No
	Yes	No
	Case C	Case D
	Case B	Case A

*Case A: No cost-share or leverage*

Given the definition of activities and purpose of the IAC program found on the web site, the DOE funding (\$3.9 million per year reported in the ORNL 2002 report) is to conduct the activity of audits *at no charge* for a targeted population of small to medium sized firms. Focusing on the activity in logic model terms, this is a primary activity. Since there is no cost-share or funding provided by the firms for these audits, there would be zero dollars leveraged by any DOE funding for the primary activity. This can be considered as an example of a program activity with no cost share and no leverage.

*Case C: Cost-shared and leveraged*

If the firms had been required to cost-share in the activity, or voluntarily provided some financial or other resources (value of staff time to participate, etc.), or utilities or others provided resources for the audits, then claims of leverage *might* be justifiable for the primary activity. There was \$33,080 listed as “collaborating” on the assessments.<sup>16</sup> However, it is not specified what this collaboration was. If this amount was devoted to the activity of audits for the targeted population, it could be considered leverage for the primary activity in the context proposed in this paper, *if* the tests of timing, character and amount of the EERE contribution justified such a claim. In this case, it appears likely that the EERE contribution would pass these tests and therefore this amount could be considered to have been leveraged. Otherwise, it would be a cost-shared activity with no leverage.

Another example which illustrates a case where there can be both cost-sharing and leverage is the hypothetical case of the energy star advertisement for efficient windows mentioned on page 8. If DOE had the idea for the ad, provided 10% of the initial funding and convinced others, such as utilities and private firms, to provide the remaining 90% of the cost of the ad, the advertisement from DOE’s perspective would be both cost shared and 90% leveraged. The test of the funding being provided for a primary or related activity and the test examining the attributes of the DOE funding- including idea initiator and timing, would both be passed to find that leverage had been established.

*Case D: Cost-shared but not leveraged*

The R&D conducted by the IAC centers do not appear to be either a primary or related activity to the conduct of audits. They may be very valuable and produce results that do save energy, but at first examination these activities would appear to be “unrelated”

<sup>16</sup> Leveraging Benefits Attributable to Centers within the Industrial Assessment Center Program, ORNL, Michaela Martin, Bruce Tonn, Susan Schexnayder, February, 2002, page 5.



activities in terms of the IAC program mission. Accordingly, they would not be eligible to count as “leveraged resources” by the EERE program. However, if DOE supplied some of the money as well for this research as part of this program, it might be considered as cost-shared but not leveraged.

Another clearer illustration of cost-share but no leverage can be found in a different hypothetical concerning the advertisement for energy star windows. Suppose that the utility had conceived of the idea of the advertisement, had secured private sponsorship for it, and then approached DOE for the remaining 10% of the costs. DOE would not pass the tests for timing and idea initiation when examining the attributes of the EERE contribution. The activity would be cost-shared from DOE’s perspective, but the ability for DOE to claim it had leveraged the utility and private sector resources seems very tenuous. It appears that the utility and private sector has leveraged DOE resources; not the other way.

These two different examples in Case D highlight the fact that for another party’s resources to have been considered leveraged by a program, two tests must be passed 1) the other party’s resources must be supplied by it for a primary or related activity, and 2) the program’s contribution must pass the scrutiny applied to questions concerning the timing, character and amount of its contribution.

#### *Case B: Leveraged but not cost-shared*

This case is perhaps the most surprising developed by this analysis. One might easily ask how something can be leveraged if it is not cost-shared.

The \$3.5 million reported leveraged dollars for conducting assessments beyond the base contract, including for firms not eligible due to their size for the DOE sponsored services, may be such a case. It might be a “related” activity to the base audits for different sized firms and appropriate to count as leveraged if the timing, character and amount of EERE resources met the examined requirements. The audits might be able to be undertaken as a result of the training the students got at the IACs. Since EERE apparently put no money into these audits because the firms targeted did not meet the eligibility criteria for the program, this might be a case where there is no cost-sharing but the DOE primary spending has achieved leverage for these resources. The primary activity induced a related activity whose costs could be considered leveraged.

Another example of an activity that might be leveraged but not cost-shared is the replication of an activity. If audits for firms were continued to be conducted by an IAC due to the technical training staff at the Center had received, and these audits had been paid for by the firms receiving them, a utility or some other entity, then the cost of these audits – the activity – could be considered to have been leveraged but not cost-shared by the EERE program. The benefits that resulted from them – i.e., saved energy if the results of the audits were implemented – could be counted as benefits of the EERE program. To count as leveraged, the audits should only be counted for a reasonable number of years from the initial training given; reasonable needs to be defined on a case-by-case basis.

Cases A through D illustrate that when considering leverage that it is advisable to consider separately 1) resources induced to assist in the activity funded by the program to produce a particular output or interim outcome from 2) resources induced to conduct other activities that may be “related” in a broad sense to accomplish similar objectives of the original program activity and 3) resources induced to assist in unrelated activities that might produce energy savings but are fundamentally different from the primary activity. Clearly, to make these distinctions, precise definitions of the program’s activities, objectives and purposes are needed.

In conducting their assessment, ORNL reported that the IAC directors surveyed about these reported “leveraged” projects indicated that it was “likely” to “extremely likely” that support for the projects (that were considered to have been leveraged) was due to the existence of the IAC program”<sup>17</sup> and would have been unlikely or extremely unlikely to occur without it. This is quite properly a question for attribution and should be considered in any cost-benefit analysis. Establishing a claim of “leveraged” resources may give a program more credence to claim benefits than if the resources obtained were just cost-shared for a project.

If the DOE funding for the IAC was to provide core support for a variety of activities at the IAC, then perhaps the broader claims of leverage presented in the ORNL report could be justified. This illustrates the importance of specifying what the program funds are specifically designed to be used for when leverage is being evaluated, and focusing on the program logic elements.

It is emphasized that these judgments about the hypothesized cost-share and leverage illustration made above are not final judgments in this case about the operation of the IAC program. Neither the IAC’s legislative language, the attributes of the EERE contribution, nor other factors have been explored in depth for these purposes. The examples presented here are solely to illustrate how different judgments can be made once the facts recommended to be considered are explored in depth. If this is done, the above judgments might or might not change.

Leverage might be assessed in the context of an overall evaluation of a program and its benefits. EERE has prepared a guide on how to manage evaluation studies.<sup>18</sup>

#### **4.5. Relationship of Leverage to Cost-Benefit Tests and Benefits Analysis**

An important question to ask as we define leverage is to determine *why* do we want to know if, and how much, a program has leveraged resources? It may relate to an assessment of the costs and benefits of the program. Or, leverage may be presented as a

---

<sup>17</sup> Ibid, page 3.

<sup>18</sup> See EERE Guide for Managing General Program Evaluation Studies,  
[http://www.eere.energy.gov/ba/pba/pdfs/evaluation\\_mgmt\\_guide\\_final\\_2006.pdf](http://www.eere.energy.gov/ba/pba/pdfs/evaluation_mgmt_guide_final_2006.pdf)

“benefit” (in a broad sense) in and of itself. Alternatively, leveraging may be viewed as a leading indicator of the market potential of a particular product because it demonstrates marketplace interest. However it is presented, extreme care needs to be taken and the definition of leverage must be precise so it is not misused.

If leverage is defined as recommended here – additional resources for the primary or related activity to achieve the output or outcome and a program satisfies the test examining the attributes of its contribution – then the more money a program can leverage to accomplish a primary or related activity, the more cost-beneficial *from the program’s perspective* it may at first appear to be. This is because the percentage of cost that a program is providing to accomplish the result is decreasing. This does not alter, however, the need to also look at results from the perspective of both the other participants, and society as a whole.

An illustration of the importance of assessing the different perspectives can be illustrated using the hypothetical facts presented in Table 3. In this hypothetical, a DOE program contributes \$2 to a project; a private party contributes \$4 to the project (“leveraged” by the program), and two alternative benefits result: \$5 in one case, \$8 in the other. Depending on the level of benefit, very different assessments are warranted.

Table 3: Illustrative Cost-benefit Results

	Activity Cost	Benefits
DOE	\$ 2	
Private	\$ 4	
Total	\$ 6	Case 1: \$5 or Case 2: \$8

In Case 1, viewed from the perspective of DOE, \$5 of benefits from an investment of \$2 appears to be good. Similarly, from the private party’s perspective the \$5 benefit from spending \$4 makes it a good investment. However, from a societal perspective, this is not cost-beneficial. The total societal cost is \$6 for an achieved benefit of only \$5.

Accordingly, as observed by one manager and program evaluator in a Northeastern State, the more money one leverages for the same results (*assuming* the more money leveraged does not increase the results achieved or allow the government agency - DOE or others - to decrease its contribution), the higher the cost side is of a cost-benefit assessment where leverage is defined as supporting the activity to achieve the result. Managers in this State have specifically decided not to calculate leverage and just compute cost-share<sup>19</sup>.

In part, this was due to both the difficulties of accounting for leverage, and also because it was recognized that the more leverage attributed to the program *if the results do not change*, the worse the cost-benefit assessment would be from a societal perspective.

<sup>19</sup> Conversations with managers in one Northeastern State.

Program managers in this State viewed the money that was being leveraged as going to the “cost” side of an activity, not to the “benefits” that accrue from it.

In Case 2, the \$4 leveraged from private cost-share to the \$2 DOE investment results in \$8 being achieved as benefits. Thus there is a net benefit, and the investment is good from the perspective of DOE, the private party and society.

#### **4.6. Attribution of benefits**

How leverage is defined can have important implications for benefits analysis. In terms of any cost-benefit test, the activities are recognized as the costs of the program. The interim and ultimate outcomes are usually recognized as the benefits. The interaction between attribution for leverage and attribution for the benefits are important and related questions.

A legitimate claim of leverage of resources for an activity would appear to justify a DOE program’s claiming more of the benefits that may result than if an activity is only cost-shared. The program would have had a more proactive role to justify its claim of leverage, and therefore perhaps an easier case to justify a claim to the benefits. The benefit claim should focus on interim or final outcomes, not on money cost-shared or leveraged for activities.

Separating leverage of activities from “benefit results” (e.g., outcomes) and the right to “claim” the benefits is very important in this context. This analytical distinction is critical since it may relate to the calculation of either retrospective or prospective benefits, either for a cost-benefit test, reporting as required under GPRA, or eventually credit for carbon reductions in a carbon marketplace. The “benefits” claims for outcomes produced by leveraged activities is becoming more important, and perhaps more controversial, as markets evolve.

To illustrate in the IAC context cited above, the leveraged resources that were claimed for related activities - audits of facilities of a different size - may produce energy saving results if the audit’s recommendations are implemented. In this case, if the program can legitimately claim credit with proper attribution to have leveraged the resources to conduct these audits - even though the IACs put in no direct money for them (Case B in Table 2) – can the program also claim the credit or benefit of the energy savings? It would not appear appropriate to count the amount of money for the leveraged resources devoted to a related activity as a “benefit” per se in these calculations because they are still for an activity in logic model terms. They should just be treated as “leveraged resources.” But it would appear the *outcome results* from these leveraged resources should be counted as benefits from the program (and recognizing that the costs of the program had increased from a societal perspective to account for the cost of these activities).

The answer to the question concerning rights to claim these benefits may, however, very well depend on answering the question *claim credit for what purpose*. Is the benefit claim

for purposes of GPRA - or is it for purposes of claiming carbon reductions for the program - or even perhaps the money for carbon reductions from the implemented project? There is no doubt that the private party which actually paid for the audit (private firm or utility) or the private firm which implemented the project may also be seeking to claim the benefits of the results in a market context.

One approach looking at the benefits is to focus on the attribution. Another suggested is that the total benefits - or “benefit pool” - produced needs to be calculated and reported independently, and then appropriately “divided” or agreed to in advance so that each party gets its fair share for the right purposes. The private party may have no objection to the program claiming all the benefits for GPRA purposes, but it might strongly object if there are market values to the carbon credits and Government agency’s claim for GPRA purposes disadvantaged it from claiming credit in the marketplace. This illustrates the problem that there may be multiple benefit claims, depending on the venue, which might, if totaled, exceed the actual benefits achieved by the project. As one utility interviewee stated, “If you total all the claims of energy savings for this project, you exceed the total amount of energy ever produced for these purposes.”

This issue of attribution of benefits is illustrated and has already arisen in the context of credit in California for the Renewable Portfolio Standard (RPS) program. Utilities wanted to claim ownership of the renewable energy credit certificates (RECs) - issued for solar panels installed by a homeowners who utilized a utility provided incentive - and use these as part of their RPS obligation. State incentives, some from the utilities through rebates and public benefit wires charges, provided almost 30% of the cost of the installations. Utilities claimed that but for these rebates, most of the solar installations would not have been done. However, homeowners and solar installers strongly objected to the utility’s position, saying that the utility had no rights to these certificates, which did have value in the marketplace. The homeowners stated that since they paid the bulk of the cost for the installation, they should have all the rights to it from an ownership perspective. See: <http://www.renewableenergyaccess.com/rea/news/story?id=46534>.

Consumer advocates sided with the utilities, because they feared that ratepayers were paying twice for the solar installations - once through the rebate incentives and secondarily through the RECs the utility would have to purchase to satisfy the RPS requirements. The California Public Utilities Commission (CPUC) reversed its initial proposed decision to grant the utility ownership of the certificates and decided to allow the homeowner to keep title to the certificate, although this may be appealed.<sup>20</sup>

As can be seen, the issues of attribution for leverage and benefit claims are becoming more complex and intertwined. They do involve a high degree of judgment.

---

<sup>20</sup> See, Decision of California Public Utilities Commission, D.05-05-011, January 11, 2007.

## **5. Issues in Application to Technology Development Programs**

This section discusses two application issues identified during the course of the interviews with EERE personnel currently or formerly responsible for deployment programs within the Industrial Technologies Delivery Program, the State Energy Program (SEP) and the Million Solar Roofs (MSR) Program.

### **5.1. Logic Models**

Of the three programs, only the Industrial program had a logic model in fairly complete detail.<sup>21</sup> The State Energy Program had an early draft of a preliminary logic model at a “high level”.<sup>22</sup> The MSR program did not have a logic model.

What is most important, however, is the familiarity of the personnel with the logic model concepts, since the methodology designed and recommended here is somewhat dependent on managers understanding of their program’s logic, its different elements and the difference between activities, outputs and outcomes. The industrial program manager was very familiar with the concepts; the personnel from the SEP were less familiar with the concepts; the million solar roof program personnel were unfamiliar with them.

When explained in depth, all personnel understood the difference between activities and outcomes and generally agreed that the activities were the proper place to focus for determining leverage. All stated, however, that the concepts of logic models and their use and application would need to be explained in more depth to the program managers if it was going to be used for these purposes. Logic models would need to be developed and refined with the active participation of program managers, a project currently underway in EERE.

### **5.2. Information Needed for Leverage Estimation and Data Availability**

The EERE industrial program manager did not foresee any particular difficulties in utilizing the available program logic model to develop leverage results. He noted, however, that they currently do not gather the full information that would be deemed necessary for leverage estimation. However, he stated that he did not believe it would be too difficult to obtain, but noted that it is essential that the types of information sought be specified.

---

<sup>21</sup> See Appendix 1

<sup>22</sup> See Appendix 2

The full information necessary for leverage estimation includes:

- Identified program logic elements, particularly the primary, related and unrelated activities and any additional activities that are byproducts of achieved interim outcomes.
- Attributes of the program contributions, including -
  - Amount of program contribution in relation to total activity cost and the source of and amounts of other contributions to the activity;
  - Timing - both when the program got involved (e.g., beginning, end, in-between) and who initiated the involvement; and
  - Character of the contribution (private contributions, as well as contributions from other programs within the agency or other Federal agencies - to avoid double counting).
- In the case of grant programs, where funds are used by other entries for activities, the sources of other resources being used for the activities by the grant recipients should be identified (to the extent possible).
- Cost-share data for all parties involved.

For one of the activities in the industrial technologies logic model (“Create and organize knowledge and infrastructure” - See Appendix 1) he stated that there is a way to get the information for a “credible ballpark” estimate. For another activity (“Outreach”), he believed that leverage could be measured even though it might not lead to a specific attributable benefit. For both the “training and delivery practices” and “technologies” activities, he believed that information on the contributions that were obtained and potentially leveraged could be obtained. He noted that whoever was doing the evaluations would have to exercise care so there would not be double counting since the industrial program frequently obtained contributions from other EERE programs as well as other federal programs.

The State Energy Program personnel stated that obtaining the data on the amount of resources devoted to activities might be very difficult. It was noted that all of the SEP activities are within the control of the States, not the federal State Energy Program. From EERE’s perspective, the program is run essentially as a grant program. Each State determines what programs it will implement. There is no current SEP record of who initiates the activities, the character of the contribution, or the amount of the contribution for activities in relation to other parties.

It was noted that the SEP funds dozens of individual programs and activities. At times it is very unclear “who is doing what to whom,” as one program manager stated, when resources are assembled. Similarly, for other grant programs, like the DOE Weatherization Assistance Program (WAP) - which is operated separately from the SEP block grant programs - there are many sources of funds going into a low-income home and it is unclear who may have initiated projects. It will be very hard for programs like the WAP to obtain data since local agencies primarily implement it.

The State could - although probably currently does not - keep track of these items and particularly what other resources are being used for the activities. If EERE desires to obtain this information, it should be sought without undue burdensome record keeping on the States. It was thought that NASEO might be a vehicle to try to obtain data.

## 6. Recommendations

Based on the assessment performed for this study, the following recommendations for estimating and reporting leverage are made for EERE technology deployment programs. These recommendations are applicable to other energy deployment programs, as well as to State and Federal agencies, generally.

### Recommendation 1: Defining Leverage

It is recommended that leverage be defined as: “*Money or other resources<sup>23</sup> induced under specified conditions by a program for participation in a primary or related activity, to accomplish an output or interim or ultimate outcome.*”

### Recommendation 2: Conditions for Eligibility

Determination of leverage requires consideration of two conditions for eligibility - “*primary or related program activities*” and the “*attributes of the program contributions.*”

- *Primary or related activity:* It is recommended that leverage be determined by first focusing on the activity - and not the output, interim outcomes or ultimate outcomes. In terms of activities, it is recommended that leverage only include the primary and related activities, and not unrelated activities. Feedback from interim outcomes that lead to “additional” related activity as a by-product of the achieved outcomes can also be included in a leverage determination.
- *Attributes of the program contributions:* It is recommended that the attributes of the program’s and the other party’s contributions be examined. There are three key factors that should be considered to evaluate whether a program has

---

<sup>23</sup> The other resources, for example, could be staff time of another organization, provision of equipment, or anything of value that is not a direct monetary contribution.



“leveraged” resources once it has been determined that the resources were devoted to a primary or related activity. These factors are:

- The timing of the contribution. Did the program’s contribution come in at the beginning or at the very end? Who was the “idea initiator?”
- The character of the contribution both the program supplied and the other parties supplied.
- The amount of the contribution in relation to the total activity cost.

### Recommendation 3: Expressing Leverage Results in Reports

It is recommended that in the reporting on leverage should describe the factors that went into the judgment in a detailed and transparent manner. Precise definitions should be used so the concepts are clear. It is also recommended that all reporting on leverage be separated into two categories: 1) leverage for primary activities, and 2) leverage for related activities. To warrant a claim of leverage, the three program contribution attributes (timing, character, allocation) should be discussed in depth. Finally, it is recommended that cost-share information be reported separately. All benefit claims should be traceable to determine exactly what resources are claimed to have produced the benefits.

### Recommendation 4: Process Considerations:

- It is recommended that the methodology proposed in this report be actually implemented to determine leverage for three existing programs. One of the programs that should be considered is the grant-based program where the primary EERE activity is to provide grants to States or others who administer the program.
- The Office of Planning and Budget should train and assist EERE programs in understanding, developing and using logic models. Having a program logic model is not required for using the leverage estimation approach described in this report. However it is essential that program staff know the differences between activities, outputs and outcomes and be able to identify each, to minimize confusion and possible error.
- Publish an EERE Standard Operating Procedure (SOP) for estimating leverage of deployment programs - to codify the recommendations in this report. The SOP should:
  - Contain the definition of leverage proposed herein or as modified depending on the results of the case studies.
  - Explain why the concept of leverage is important.
  - Describe the two conditions necessary for a leverage determination - primary or related activity and attributes of program contribution
  - Explain the logic model concept and how it can be used to clearly identify primary or related activities.

- Explain that there is no “hard and fast rule” for the three attributes of a program’s contribution, but what is important is the transparency so that analysts can judge for themselves whether leverage has been achieved based on what is reported. All assumptions should be made clear.
- Explain how leverage differs from cost-share.
- List information needed to calculate and report leverage
- Describe how leverage results should be reported
- Explain how leverage may relate to benefits analysis.

These process recommendations for the Office of Planning, Budget and Analysis are designed to be implemented sequentially. Alternatively, however, the first two could be done concurrently, with the results fed into the third. Although it is also possible to undertake all three concurrently, the loss of case-study results to feed into the SOP makes this the least desirable option. It is recognized that a sustained commitment to the approach described in this report will be needed for EERE, or any other federal agency, to be successful in improving the way it estimates leverage for deployment programs.

# Appendices

## Appendix 1: Industrial Technology Delivery Program Logic Model

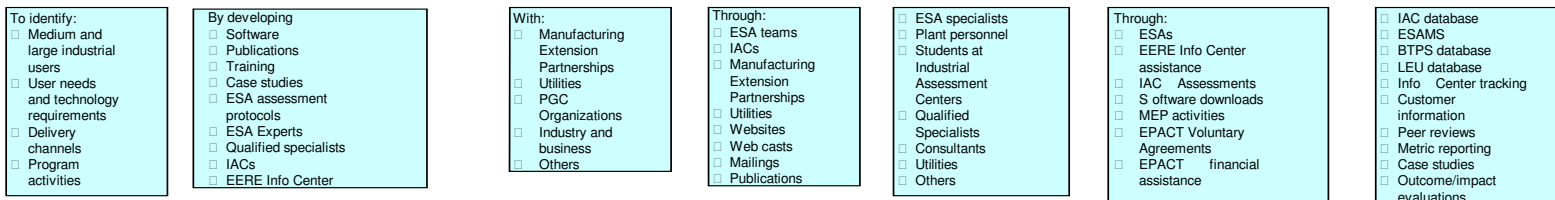
The Industrial Technology Delivery Program uses these resources



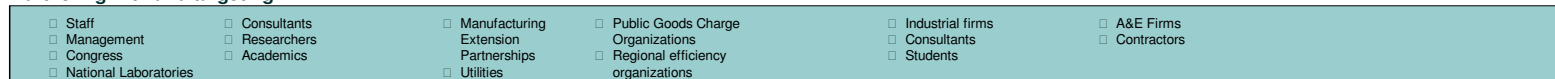
To conduct these activities



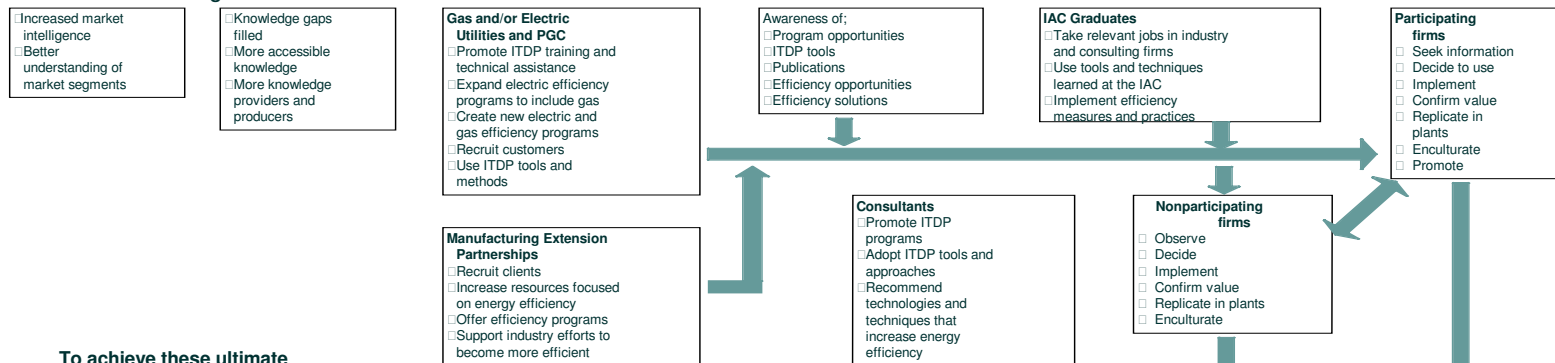
Producing these outputs



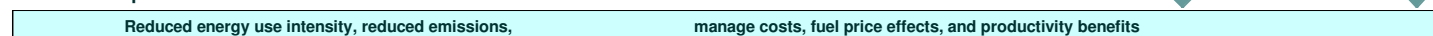
Partnering with and targeting



To induce the following interim outcomes

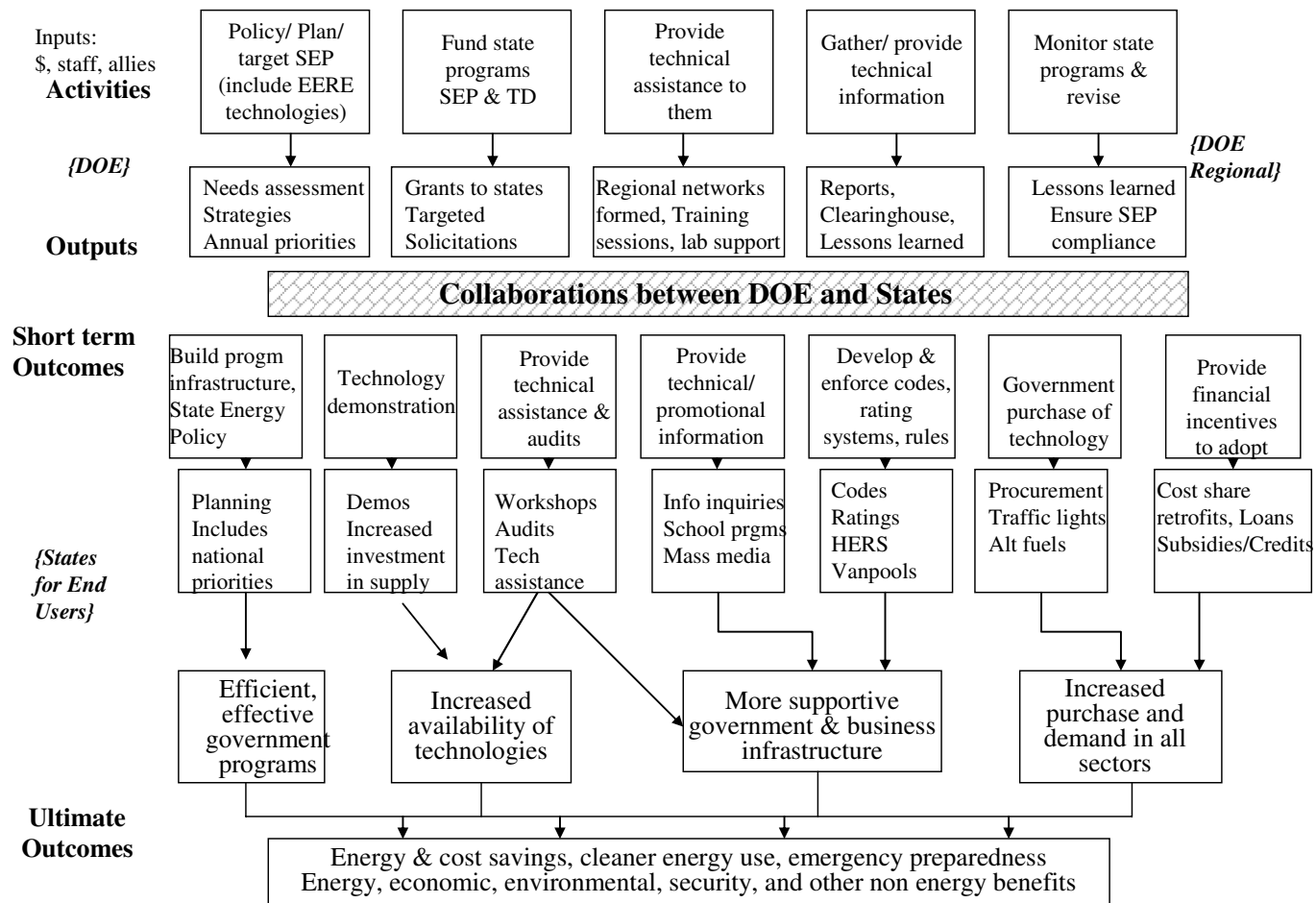


To achieve these ultimate outcomes/impacts



## Appendix 2

### State Energy Program High-level Logic Model



Source: Prepared by EERE's Planning, Budget and Analysis Office and the State Energy Program, February 5, 2004