

Logic Models and Program Theory for Today's "Big and Bold" Energy Initiatives

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Abstract

Theory based methods have been used to evaluate energy efficiency programs for a number of years, but there is still disagreement on the role of these models, the approaches to be used and the best way to get stakeholders to accept Logic Models and Program Theories.

This paper looks at how logic models are being used in North America to understand how programs operate, as well as their importance in program design, roll-out, ability to meet goals and the evaluation of these goals and program objectives.

This paper uses results from evaluations conducted across North America to look at three issues:

1. Role: What should be the role of program theory in the design and roll-out of the program?
2. Methods: No industry standard currently exists regarding what should be in a program theory model, and how it should be formatted. What methods work best for implementers and evaluators to communicate the most needed information?
3. Acceptance: How do we ensure that program implementers refer to program theory models in their day-to-day activities?

The paper addresses the advantages of developing the program theory and logic models in consultation with the program implementers until the program has been launched and running for a couple of years. This helps avoid confusion among implementers about what defines program success. This paper also illustrates the lack of awareness of program theory and logic models among many program implementers. There is advantage to increasing awareness among implementers and illustrate how program theory can affect their program efforts.

Introduction

Energy efficiency programs are typically demand side strategies that are implemented as an intervention in the market to reduce supply side needs. Generally funded with utility ratepayer dollars, they can be thought of as social programs that are implemented for the greater social good of delaying power plant construction and saving natural resources. As with most programs that are implemented with public funds, there is a desire to know how well the programs work, and if funds are being effectively used. Evaluators have been answering these types of questions for over 40 years, beginning with the large-scale social programs started by the federal government in the 1960's.

Over time, how social programs were evaluated progressed as social science theories were applied to consider how program components worked together. While evaluators of energy efficiency programs began to use program theory and logic models within the past decade, use of theory and logic models to describe program outcomes and goals is not new. Carol Weiss of Harvard and others began thinking of evaluation of programs in terms of theory of change as early as 1972. Later researchers described program theory as:

“...a specification of what must be done to achieve the desired goals, what other important impacts may also be anticipated, and how those goals and impacts would be generated” (Chen, 1990)

And

“...assumptions about the change process actuated by the program and the improved conditions that are expected to result.” (Rossi, Lipsey, and Freeman, 2004)

Along with program theory, the use of models as a way to visually show how a program is put together to operationalize the underlying program theory followed a parallel path in use by evaluators.

Role of Program Theory and Logic Models

Our title of this paper uses the phrase “Big and Bold” - this is meant to parallel the exciting new energy efficiency programs being put into place in California. It is our contention that there is a role for program theory and logic models in not only these “big and bold” initiatives, but also in other energy programs being put into place across the country.

There are very few examples of energy efficiency programs using program theory and logic models (PT/LM) in the early stages of program development. A California program explicated a program theory and logic model “...as part of the program’s strategic business plan. The purpose of the model is to provide a succinct and useful program conceptualization for stakeholders involved in the program process.” (Austin, 2007). However, generally, the creation and use of logic models and their program theories has been the purview of evaluators as they assess energy efficiency programs. We believe that the structure provided by thinking through the theory behind a program and creating the visual model to go along with that theory should become standard practice in program design. Other areas outside of energy efficiency programs use a PT/LM approach to design programs. For example, non-profit funding agencies have manuals to help their grantees learn how to create and use LM for their programs. (Kellogg, 2004) It is our belief that evaluators can serve as the facilitators in the PT/LM development for energy programs.

In essence, all program implementers believe that the actions they take will result in the outcomes they (or the funding agency) desire. Often, the reasons why a program implementer chooses a particular activity and not others, or why the activity is targeted to certain populations in a specific manner, is not fully explained. Without such clearly expressed reasoning, a struggling program may end up with no true understanding of how to check the various influence points within their program. Even successful programs may not know why the program succeeded, or if the program could be duplicated elsewhere. Lastly, stakeholders may question the veracity of program claims for specific outcomes unless there is a plainly written document provided up front that all can understand and on which all can come to a consensus.

While documentation of the program can include both the theory and implementation, program write ups generally are long and involved. The ability of program implementers to easily discuss their program *theory* versus *implementation* with a group of stakeholders is often blurred by their intimate knowledge of the implementation aspects of the program and the tendency for groups to create tangential conversations on areas of immediate interest. A logic model coupled with a description of the program theory is extraordinarily useful. The model creates a visual that most people can follow and

obtain a quick understanding of why the actions taken within the program are expected to lead to the ultimate desired outcomes of a program. We should be clear that there are both implementation logic models and program theory logic models that can be created (as well as some hybrid type of models that show both). In this paper, we are discussing program theory logic models – those graphics that have high level activity type of boxes and clearly show the paths from the activities to the desired outcomes of a program. These are differentiated from program flow diagrams that can be called implementation logic models.

The construction of a program theory and logic model provides a common knowledge and language between program implementers, evaluators, and stakeholders. It allows for a more precise conversation about what is occurring within a program and why the program actions should produce the expected outcomes. An experienced program designer/implementer can use theory and logic models to think through components of their program and assure themselves that they have covered all their bases as they attempt to create and implement their program.

An important role that experienced evaluators can play is to work with the implementers and funding organization to create and use PT/LM's to set evaluation research goals and target evaluation resources. Evaluations of Statewide Marketing and Outreach efforts in California (Opinion Dynamics 2007 and Equipoise 2006) used this direct interaction with implementers of Statewide advertising efforts such as Flex Your Power and Reach for the Stars, and with representatives of the funding agency – in this case - the California Public Utilities Commission (CPUC). Working sessions, were used to facilitate the mutual agreement of market actor roles and responsibilities and the program's ultimate goals and objectives. After consensus was reached, PT/LM's were created which were then circulated and reviewed with all the stakeholders to ensure that the models accurately reflected what occurred during these working sessions. This approach works extremely well in cases where there are:

- A number diverse stakeholders
- A complex program with many activities and possible outcomes
- No previous PT/LM's in place; and/or
- Little agreed upon documentation or history of the program's goals and objectives

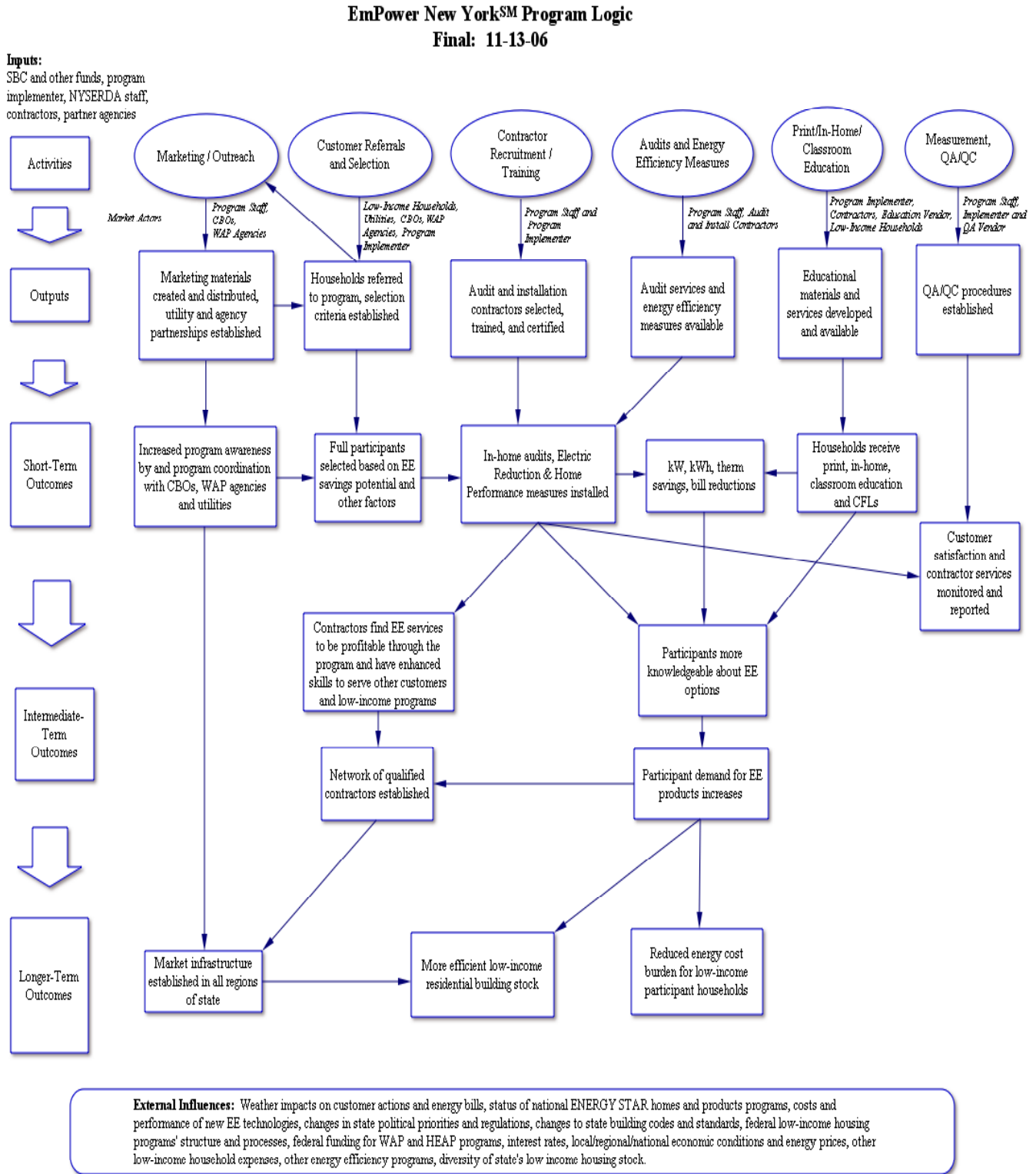
When properly constructed, the program theory logic model highlights how key activities bring about expected outcomes. The models also highlight specific "links" that may require clarification and/or further exploration. There is a path indicating where data could be collected based on the various changes slated to occur. When used as an interactive tool between funding agencies and implementers, program theory and logic models can also be used to set agreed indicators of program success and detail where monitoring may be helpful to assure that desired outcomes are occurring and program goals are being met.

Methods of Constructing Program Theory and Logic Models

Multiple evaluations have used program theory and logic models as part of the initial evaluation assessment of a program. There really is no standard of what should be in a model, and there is considerable disagreement among evaluators about what constitutes a concept that should be in a model. Chapter Two in Wholey (2004) provides a good history of logic models as well as tips for various stages in the creation and use of logic models. However, most evaluators agree that activities, outputs, and

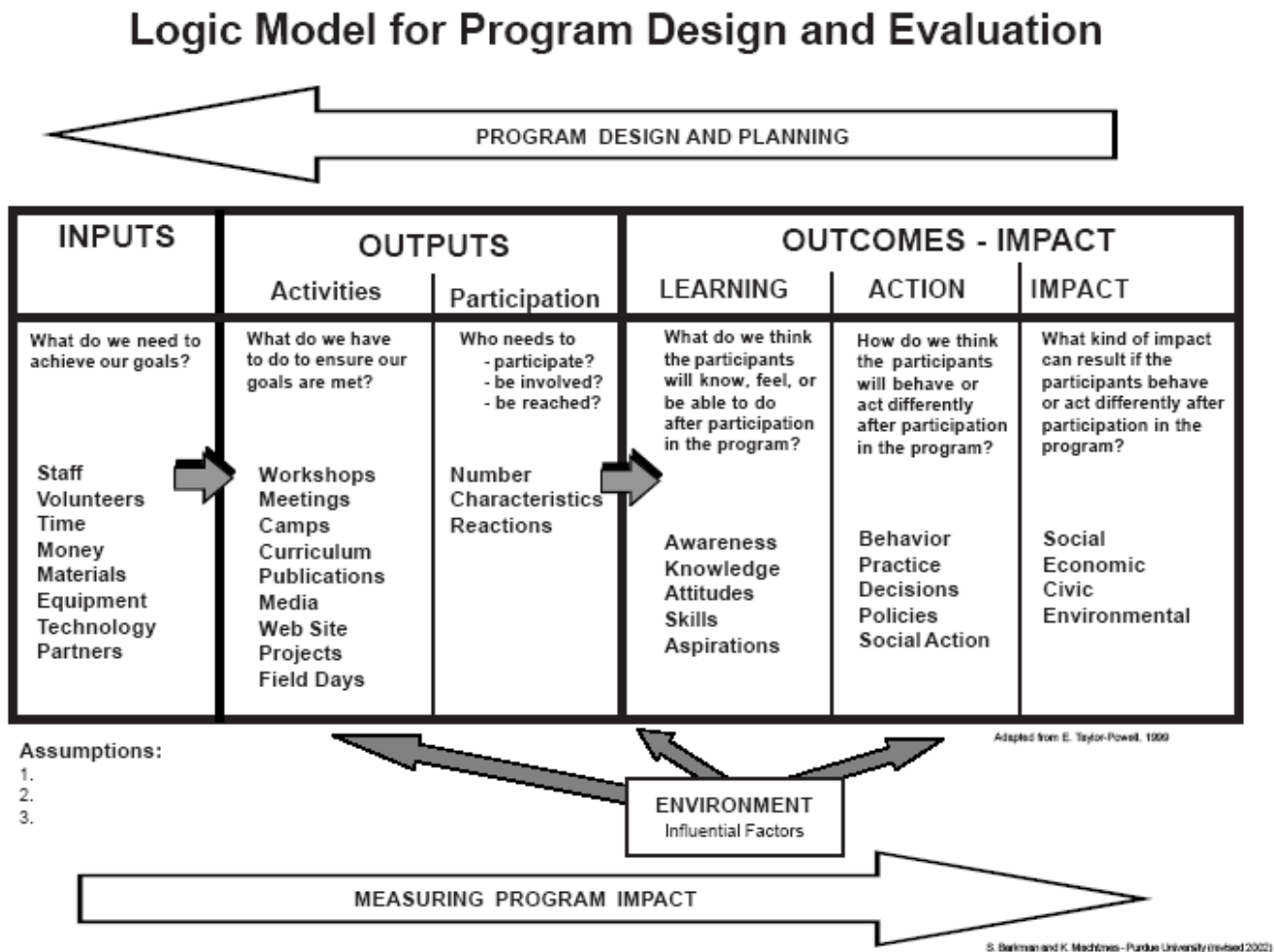
outcomes should be presented in the model in some way. One example of a logic model is from a program developed by the New York State Energy Research and Development Authority (NYSERDA, see Figure 1). Here, the developers chose to clearly state the timelines associated with the different outcomes.

Figure 1. NYSERDA Logic Model (Engel 2007)



A different program theory logic model (Figure 2) shows an entirely different type of logic model provided as a generic-use type of model.

Figure 2. Alternate Program Theory and Logic Model Structure*

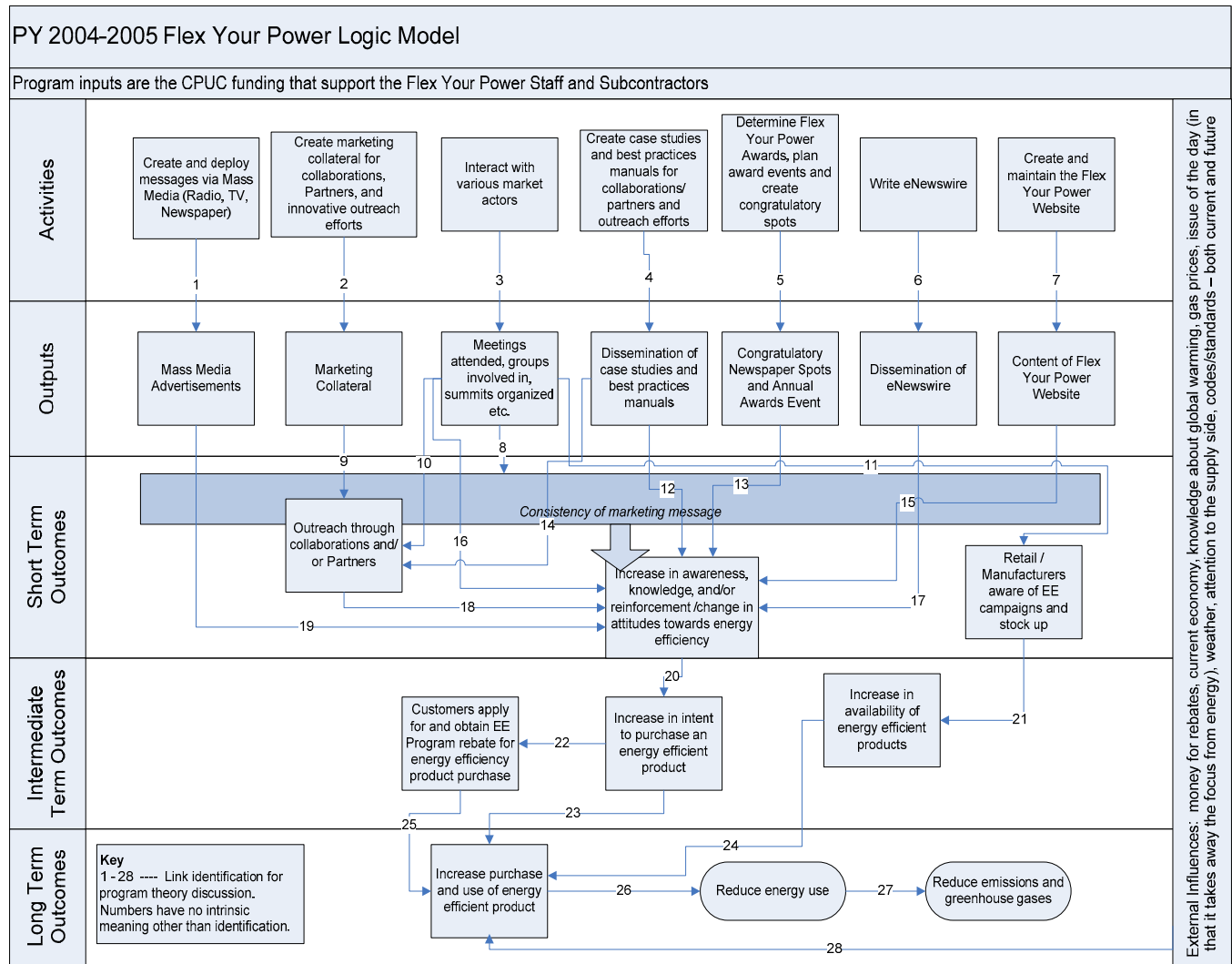


*Source of Figure: (http://www.humanserviceresearch.com/youthlifefskillsevaluation/logic_model.gif)

Noteworthy in these first two examples, and in most logic models we have seen, is the use of non-numbered arrows from box to box in the model. However, we contend that these arrows must be labeled and the underlying program theory discussed for each of the arrows (“links”) in which change is expected. Figure 3 shows an example of arrow numbering from a recent evaluation effort of the Flex Your Power program.. For clarity, this means that arrows from outputs to outcomes and from any short-term to longer-term outcomes should have discussion that clearly ties theory to that specific link. Labeling each link (as shown in Figure 3)helps clarify the structure of how a program assessment could proceed. Evaluators should closely review all the links to determine how to assess the various components in a program as shown in the model. Possible performance indicators that tie directly to each link should be clearly stated, along with how data to determine success of each indicator would be

collected. Especially for outcome related links, testable hypotheses can be created for impact assessments.

Figure 3. Flex Your Power Logic Model. (ODC 2007)



There are inevitable choices that must occur when research desires bump against resource constraints. The use of logic models with numbered links and associated evaluation tasks clearly shows to a funding agency what can, and cannot, be answered through the evaluation.

Acceptance of Program Theory and Logic Models

Given that many energy efficiency program implementers currently do not create their own program theory and logic models, what are the best practices for an evaluator to use to help facilitate their use? Engel (2007) provided several suggestions based on experience working with many program implementers and evaluators. She indicated that identifying the value of the process, being prepared and keeping meeting focused, and balancing the level of detail in the models are helpful when introducing

program theory and logic models to implementers. Early program theory proponents felt that working with program managers to create an explanatory logic model from scratch was the best way to create a model.

There are occasions where bringing all the stakeholders together and conducting a working session can be productive; however, this can be a time-consuming process requiring considerable effort involved in educating the program managers about what is being attempted by the logic models and why. Creating a “straw-man” program theory and logic model based on what is written about a program, and taking it to the first meeting can streamline the process. Having the draft model in front of them, allows program implementers to quickly see how their program is being structured by the evaluator and allows them to more easily get up to speed and provide useful feedback. Recently, we have found that this streamlined approach has been met with acceptance, and buy-in, from program implementers and managers at organizations such as Sempra, Hydro Quebec and the CPUC.

Conclusions

In the future, we see the role of program theories and logic models continuing to evolve in the energy efficiency program field. Early examples of the use of PT/LM in evaluation for energy efficiency programs can be seen in a market effects evaluation that occurred on the Food Service Technology Center in California (Equipoise, 1999) and an impact evaluation of an agricultural program (Equipoise 2004). The same agricultural program was evaluated two years later and the previously created PT/LM was used to set the evaluation research based on what had already been assessed. (Equipoise, 2006) It is expected that the use of PT/LM will increase in California with the evaluation Protocols put in place by the California Public Utilities Commission that states: “Though a PT/LM is not required, it is an important tool to ensure that the evaluation research design can measure the program’s behavioral impacts.” (TecMarket Works Team 2007)

Recently there has been a surge in the creation and use of energy program theories and logic models. In the past few years NYSERDA has been using PT/LM to determine how to evaluate multiple programs as seen in the example shown above in Figure 1 (Engel 2007). Work in Southern California created approximately 60 logic models within a short period of time to help programs get ready for impact evaluations. Program theories and logic model creation have also been imported north of the U.S. border with Hydro Quebec recently requiring Opinion Dynamics to create program theories and logic models as part of their on-going program evaluation efforts. The challenge for evaluators and implementers will be to work together to create models in the early stages of program development and to use these models to effectively communicate program objectives and outcomes.

Too often, programs are put together based on institutional knowledge of those involved, are not assessed until late in the program cycle, and have unclear measures of accomplishment. As California and the nation looks towards creating “Big and Bold” programs to expand and focus energy efficiency within the larger picture of global warming, program theory and logic modeling should play a prominent role. By setting up in advance what to monitor,, establishing agreed upon outcomes, reaching consensus on measures of success, and using proper techniques for evaluation the “Big and Bold” programs can mitigate the future needs of the country.

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