

# Measuring the Depth of Energy Efficiency

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## Introduction

This poster presents a methodology for measuring the extent to which planned savings by end use from five residential portfolios mirror the reservoir of efficiency opportunities in a typical building. The more that efficiency's investments reflect its opportunities the deeper are the savings. In Massachusetts, the policy for achieving all cost-effective energy efficiency is to go deeper first and then broader, i.e. to serve more customers. Developing a metric that measures the depth of efficiency savings helps to advance energy security, climate and employment policies.

The poster describes the reservoir of efficiency opportunities as the Optimal Yield and the planned savings from residential portfolio as the Actual Yield. Dividing the Actual Yield by the Optimal Yield produces the Yield Index, the metric for deep savings.

## Data

### Portfolio Savings

The Massachusetts' energy efficiency database has measure-level savings associated with end use categories.

### Reservoir of Efficiency Opportunities

The US Department of Energy's National Energy Modeling Software (NEMS) for a typical New England home provides the consumption data by energy task. The poster shows both the consumption data (Usage) and efficiency technical potential (Potential).

### End Use (EU)

In order to compare planned savings with technical potential, the poster applies the MA end use categories to the NEMS' energy tasks.

### Optimal Yield

The summing of the percentage of each end use's technical potential multiplied by the percentage of the corresponding end use's building usage is the Optimal Yield.

### Actual Yield

The summing of the percentage of each end use's planned savings multiplied by the percentage of the corresponding end use's building usage is the Actual Yield.

## Efficiency Yield Index Algorithm

The equation for Efficiency Yield Index is:

$$\text{Efficiency Yield Index} = \frac{\sum_{i=1}^n \frac{\text{EU}_i \text{MMBTU}_{\text{Annual}}}{\text{EU}_{\text{Total}} \text{MMBTU}_{\text{Annual}}} \times \frac{\text{EU}_i \text{MMBTU}_{\text{NEMS-Usage}}}{\text{EU}_{\text{Total}} \text{MMBTU}_{\text{NEMS-Usage}}}}{\sum_{i=1}^n \frac{\text{EU}_i \text{MMBTU}_{\text{NEMS-Potential}}}{\text{EU}_{\text{Total}} \text{MMBTU}_{\text{NEMS-Potential}}} \times \frac{\text{EU}_i \text{MMBTU}_{\text{NEMS-Usage}}}{\text{EU}_{\text{Total}} \text{MMBTU}_{\text{NEMS-Usage}}}}$$