# ENERGY EFFICIENCY AND CONSERVATION MEASURE RESOURCE ASSESSMENT FOR THE YEARS 2008-2027

*Prepared for the*

**Energy Trust of Oregon, Inc.**

Final Report

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By

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## Project Overview

The goal of this project was to provide Energy Trust of Oregon, Inc. (Energy Trust) with the amount and cost of potential energy efficiency and renewable energy measures that could provide electricity and natural gas demand-side savings for Oregon consumers by 2027 within the Energy Trust service territory. This resource assessment is designed to inform strategic planning, the project development and selection process, and for use in utility resource planning. By 2027, a technical potential of approximately 651 Average Megawatts (aMW) of electric savings and 148 million annual therms of gas savings were identified in this study[1].

**Table 1: Summary of Technical Potential by Utility**

| **Electric Utilities** | **PGE aMW** | **PPL, aMW** | **Both Utilities, aMW** |
|---|---|---|---|
| Residential | 32 | 67 | 99 |
| Commercial | 179 | 123 | 270 |
| Industrial | 223 | 82 | 305 |
| Total (Including cross-utility impact) | | | 651 |
| **Natural Gas Utilities** | **NNG, Mmtherm** | **CSG, Mmtherm** | **Both Utilities, Mmtherm** |
| Residential | 76 | 21 | 97 |
| Commercial | 38 | 2 | 40 |
| Industrial | 15 | | 15 |
| Total (Including cross-utility impact) | | | 153 |

Stellar Processes and Ecotope, Inc., reviewed existing demographic and energy efficiency measure data sources to identify and quantify the resource potential. The contractors created updateable planning tools to develop these estimates and for Energy Trust to incorporate in their ongoing planning processes. The tools to evaluate the cost of individual measures and packages of measures considers the measure life, equipment and installation, annual O&M expenses, and the discount rate employed by the Energy Trust to produce levelized costs and a Benefit Cost Ratio (BCR). Levelized costs are useful to compare on a comparable basis program options and conservation strategies that have different measure lives. The BCR provides a comparison to long-term benefits that include the lifetime and load shape value of the savings. In this sense,

[1] Electric measure savings are quantified in average MW as well as peak MW savings for summer and winter heavy demand periods. Gas savings are quantified in annual therms.

the BCR is a more thorough comparison and is the index used to screen for cost-effectiveness.

It is important to note that program related costs are not included because Energy Trust staff directed that they are outside the scope of this study. It is equally important to note that the levelized costs shown in this study are the entire societal cost of efficiency measures for situations where existing, working equipment is retrofit, and the incremental cost of efficiency when considering new purchases of efficiency versus standard equipment. The incentive costs to the Energy Trust are often only a portion of these “total measure costs”. This study provides the basic information on the cost of measures, which the Energy Trust will combine with their knowledge of markets and programs and incentives to develop estimates of total program costs to the society and (separately) to the utility system.

While this project was not intended to provide program design, it does identify and quantify estimates of electricity and gas use and measures of activity (such as number and energy use of households or total floor space) in the target markets for the industrial / agriculture, residential, and commercial sectors. Residential savings potential is quantified by housing type for new and existing single family, multifamily, and manufactured homes. Commercial savings are quantified on a square footage basis for typical business type designations such as retail, grocery, and large and small office spaces. The industrial analysis quantifies savings and costs by process type such as wood products, food, and electronics.

Determining the applicability of potential measures to specific segments or subsectors of the commercial and industrial building stock can be difficult. For these segments, many “cross cutting” measures such as lighting improvements for commercial applications or motor efficiency improvements for industrial customers were analyzed. Cross cutting measures can be applicable across a wide variety of circumstances and building types. In the industrial sector, many measures are relevant for specific applications or processes rather than in discrete building types. The industrial technical potential section discusses the assumptions used to determine measure applicability.

## Summary of Results

The resource potential can be considered “technical” or “achievable”. The technical potential is an estimate of all energy savings that could be accomplished immediately without the influence of any market barriers such as cost and customer awareness. As such, it provides a snapshot of everything that could be done. Technical potential does not present what can be saved through programs; it would be impossible to get every customer to install every possible measure. Furthermore, some resources may cost more than the Energy Trust or participants wish to pay. The achievable potential represents a more realistic assessment of what could be expected – taking into account the fact that not all consumers can be persuaded to participate and other real world limitations.

The following figures and tables summarize the results of this analysis for 2027. In providing summary statistics for this section, we screened measures to a BCR of 1 or better. This provides a summary of the savings potential that has a reasonable chance of being cost effective when compared to avoided energy costs. Although the list of

cost-effective measures does not include the highest cost measures, the supply curves and detailed tables of measures in the Technical Appendix lists all measures considered in this study. Both supply curves show some additional potential just beyond the current cost-effectiveness screen. Should higher avoided costs occur, there would be more additional measures available for conservation programs.

Figure 1 shows that the estimated savings from all electricity measures would reduce electricity use by 651 aMW of technical potential for cost-effective measures. Figure 2 shows the distribution of potential electric savings across market segments.

**Figure 1: Electricity Supply Curve**

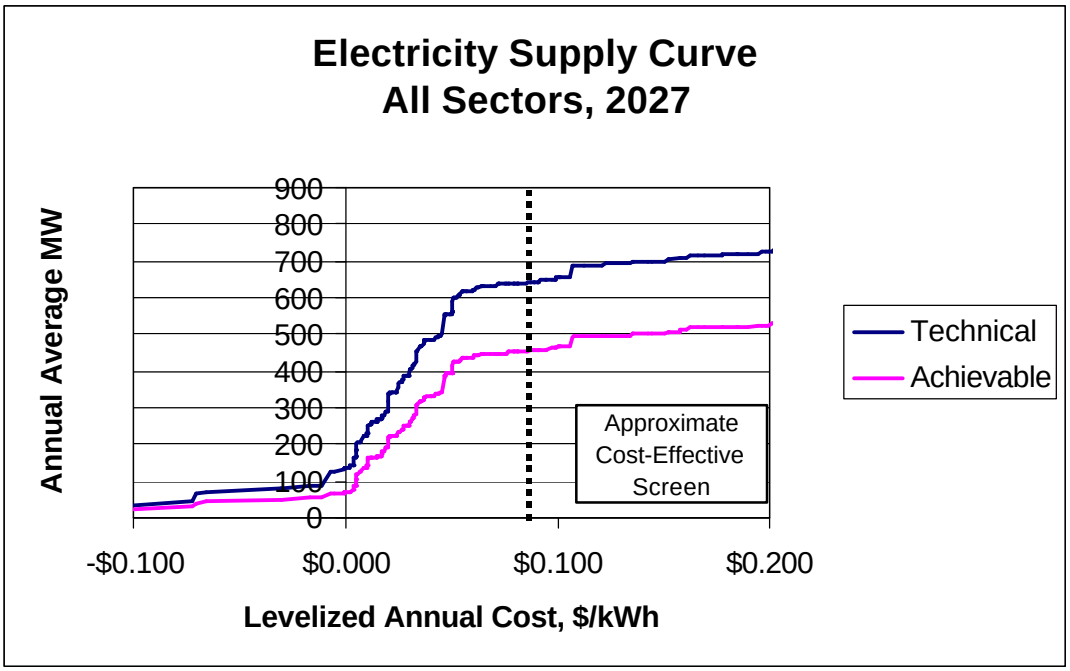



**Figure 2: Electricity Technical Potential**

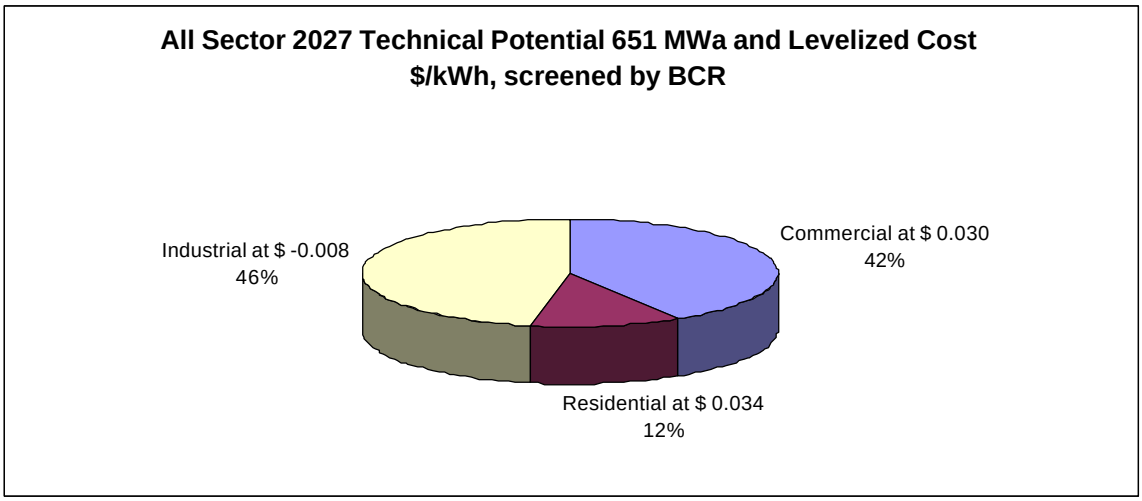
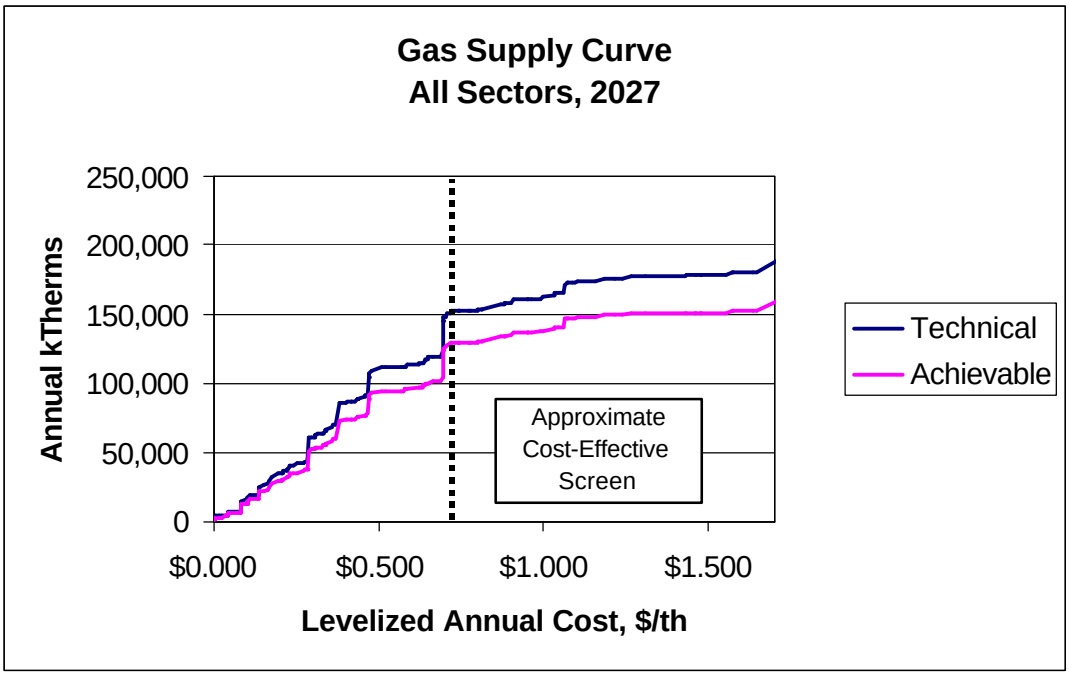


Figure 3 shows that natural gas conservation measures could reduce consumption by an estimated 153 million therms. Note that only small industrial customers are included in this gas supply curve. The larger industrial natural gas customers are not included within the Energy Trust mission. Figure 4 shows the distribution of potential natural gas savings across market segments.

**Figure 3: Natural Gas Supply Curve**



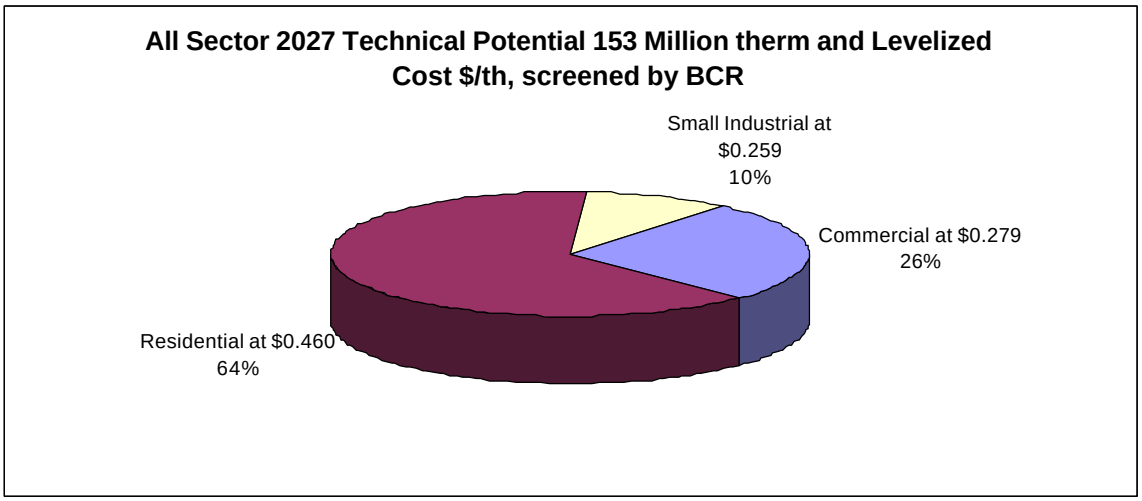


**Figure 4: Natural Gas Technical Potential**