Appendix 9

ICF Potential Study

Entergy New Orleans

Demand Side Management Potential Study

Summary

April 28, 2009

ICF INTERNATIONAL

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Entergy New Orleans

Potential Study

Summary

April 28, 2009

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1. Executive Summary

ICF Resources, LLC (ICF) was retained by Entergy Services, Inc. (Entergy) to assess the realizable market potential for demand side management options under several scenarios across each of Entergy's six service territories. This summary has been prepared specifically for Entergy New Orleans, LLC (ENO). ENO is an electric and gas utility serving Orleans Parish. As of December 2007, and taking into account the impacts of Hurricane Katrina, ENO provided electricity to more than 131,000 customers and natural gas to more than 86,000 customers in Orleans Parish.

Demand side management (DSM) is a set of actions, activities or measures that impact energy use, energy use patterns or customer behavior as it relates to energy consumption. DSM includes:

- **Conservation**: Reduced energy consumption through changes in life style such as increasing thermostat settings on air conditioning equipment in the summer, lower thermostat settings on water heaters, turning off lights when not in use, etc. Conservation activities typically require little to no monetary investment by the customer to reduce energy usage.
- **Energy Efficiency**: Activities / actions that typically require an investment to achieve lower energy usage such as improving insulation levels, sealing heating and cooling ducts, weather stripping, caulking, the purchase of more efficient appliances, etc.
- **Demand Response**: Activities or actions that result in changes to energy use patterns that may or may not reduce overall energy usage. Demand response programs are utilized to lessen customer usage / demand during peak periods or those times when the cost to supply energy is more expensive.

The objectives of this DSM potential study were to:

- Identify the "market achievable potential" for Entergy's service area by jurisdiction, and
- Estimate program costs to capture that achievable potential.

To achieve these objectives, ICF conducted a bottom-up analysis across the residential, commercial, and industrial sectors. This analysis was based on ENO specific data (weather, rates, customer usage, customer counts, appliance saturation data, avoided costs, etc.) For each sector, unique factors were considered, including: program costs, customer counts by type, rate structure, building types, and weather conditions. Figure 1 below highlights the elements of the analysis.

In this table, Building Types represent the number of unique building configurations modeled. For example, configurations for the residential sector include type of house (single family, multifamily, mobile homes), various ages of homes, different foundation types, HVAC systems, etc. Energy End-Uses specify the number of end uses for which energy consumption is assessed, e.g., heating, cooling, lighting, etc. Unique Weather Files specifies the number of TMY2 weather files (weather stations) that were used when modeling the buildings. DSM Measures indicate the number of energy efficiency measures that were modeled, e.g., HVAC upgrades, more efficient lighting, high efficiency refrigerators, etc.

Sectors	Building Types Modeled	Energy End-Uses	Unique Weather Files	DSM Measures
Residential	147	5	1	39
Commercial	9	5	1	21
Industrial	18	9	n/a	126

Figure 1. Key Elements of the bottom-up analysis

A multi-stage process was used to evaluate DSM options which involved identification of commercially available, non-fuel switching measures. This included identifying the potential effectiveness of each potential program (or bundle of measures), as well as a determination of the costs associated with implementing the individual programs. Once identified, the programs were evaluated using a screening process which eliminated those programs found to be not cost-effective.

After estimating the savings for each measure on an individual basis, the number of potential annual installations and the cost effectiveness were estimated for each measure. The potential savings from each measure were bundled into larger programs, implementation costs were estimated and program-level cost-effectiveness and annual savings impacts were then estimated for the 10-year analysis period (2008 – 2017).

The cost-effectiveness of the programs was evaluated under three scenarios, which were developed using three sets of utility avoided costs and other key input assumptions. These are referred to as the Reference, High and Low Case.

	Low Case	Reference Case	High Case
Gas price	$5.0 / MMBtu	$7.60 / MMBtu	$12.0 / MMBtu
CO2 price	$10 / ton by 2020	$25 / ton by 2020	$50 / ton by 2020
New capacity cost	$350 / kW	$680 / kW	$850 / kW
Net to gross ratio	Same as reference	Same as reference	Same as reference
Program cost	+20%	Baseline	-20%
Participation level	10%	Baseline	Baseline +
Incentive level	3 yr payback capped at 50% incremental measure cost	2 yr payback capped at 75% incremental measure cost	1yr payback capped at 100% inc. measure (or best judgment)

Figure 2. Market Scenarios / Assumptions to Measure DSM Potential

The results of this analysis showed the following 10-Year (2008-2017) DSM Potential for Entergy New Orleans.

		Low Case	**Reference Case**	**High Case**
Energy	Cumulative MWh Saved by 2017	57,829	114,565	171,499
	% of Total Energy Forecast	1.3%	2.6%	3.8%
	% of Sales Growth	9.7%	19.1%	28.6%
Demand	Cumulative MW Saved by 2017	40	73	102
	% of Total Demand Forecast	4.4%	7.9%	11.2%
	% of Demand Growth	48.6%	61.0%	85.8%
10-Year Cumulative Program Cost (thousands)		$18,061	$37,044	$71,115

Figure 3. 10-Year DSM Potential for Entergy New Orleans (2008-2017)

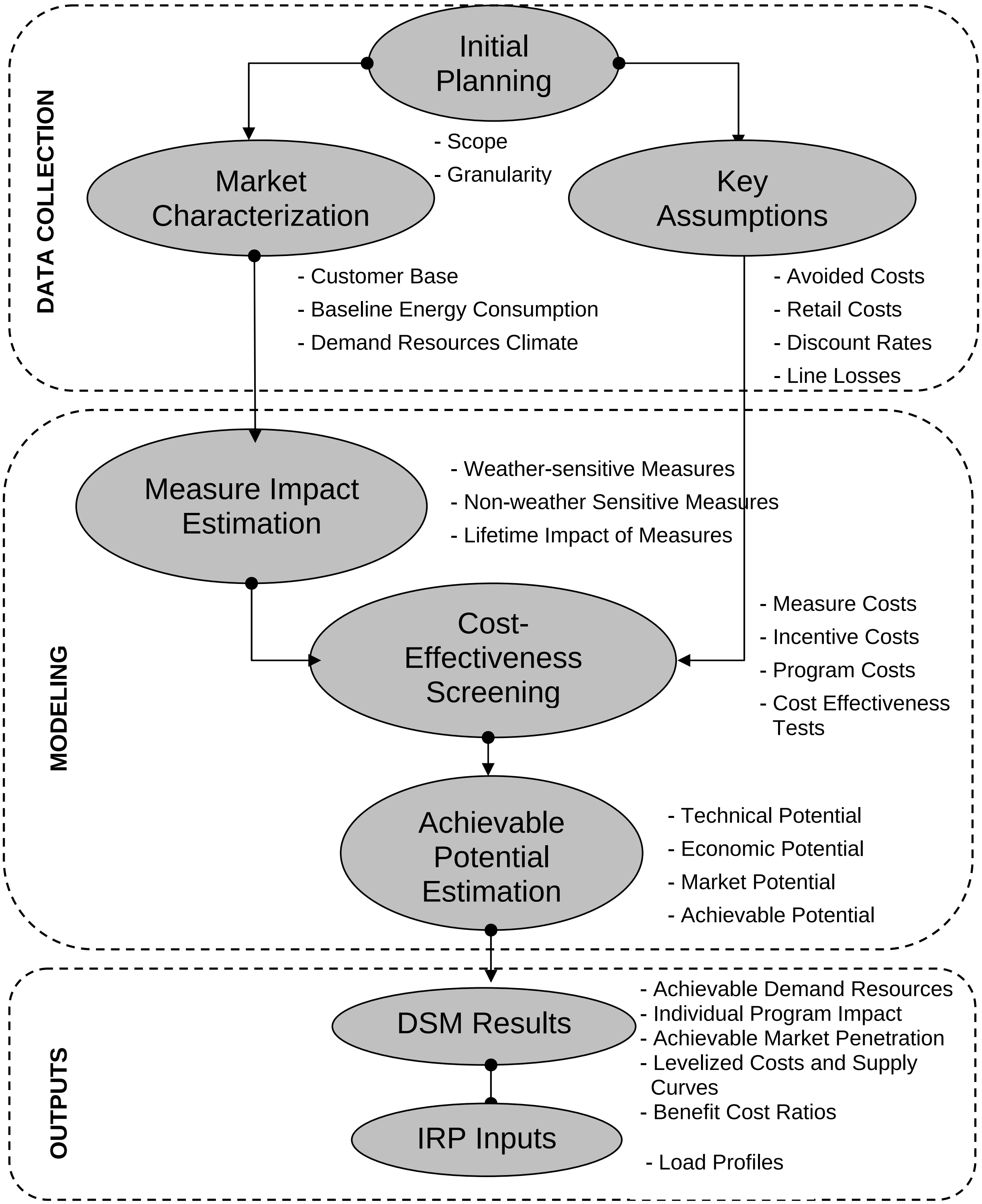
Key Assumptions:

- The estimated 10-year DSM potential assumes that all cost effective DSM programs are fully funded and implemented and appropriate regulatory treatment is given to program costs, lost net margins, and shareholder incentives.
- The range of DSM potential estimates in the Low, Reference and High scenarios are driven by the key assumptions related to avoided costs, retail costs, discount rates and line losses, and the energy consumption forecast that define these scenarios.
- These DSM potential estimates are derived from a bottom-up engineering analysis and actual results may vary based on regional market forces that may only be identified through DSM program pilots and full scale program implementation.

The remainder of this report details the methodology and results supporting these conclusions.

2. DSM Potential Assessment Methodology

The methodology used to assess the Demand Side Management (DSM) and Energy Efficiency (EE) potential for Entergy New Orleans, LLC (ENO), is illustrated in the flow chart below and described in detail throughout this section.



2.1. Data Collection

The purpose of the data collection segment is to conduct initial planning for the DSM potential analysis, identify key attributes that characterize the service territory, and define key assumptions. This section describes these activities and summarizes information gained during this initial stage.

2.1.1. Initial Planning

Scope of analysis

This analysis covered the three building sectors - residential, commercial and industrial - within Entergy's ENO service area.

The required end products of this analysis include: summaries of program savings, costs, and benefits; cost ratios for each scenario – reference, high and low – by sector; and detailed load shape impacts – both weather sensitive and non-weather sensitive – for each sector by program to serve as inputs for the integrated resource planning process.

Granularity of approach

A bottom-up approach was used for this analysis. In a bottom-up approach, the study team focuses on individual measures, including their technical feasibility and applicability, energy savings and installation costs. This method requires data on technologies' performance and costs. The measure-level analysis of the bottom-up approach can provide more support for the program design and implementation phases that follow the potential study.

The three building sector types – residential, commercial and industrial – received separate analyses due to building and process differences in each sector. Using energy consumption data published by the Energy Information Administration (EIA), further sector sub-divisions of appropriate magnitudes were created to ensure that the savings from various technologies were credited appropriately to the right categories. For example, within the residential sector, there are two foundation categories: slab-on-grade and crawlspace. Savings from a slab insulation measure would apply to the first category of homes with slab-on-grade but would not apply to homes with a crawlspace.

RESIDENTIAL

ICF began the analysis with the baseline energy consumption for the residential sector that was provided by Entergy. The residential sector was then sub-divided into categories based on the proportion of electricity consumption of each category as collected from EIA RECS 2005 data (Energy Information Administration's Residential Energy Consumption Survey).

The resulting residential sub-categories were single family, multi-family, and mobile homes. Each of these three categories was further subdivided into two vintages, existing homes and new homes. Single family homes of both vintages were further sub-divided into homes with two different foundation types, slab-on-grade and crawlspace. All categories were then divided into homes with the following system types:

- Central AC with Gas Furnace
- Central AC with Electric Resistance
- Heat Pump with Electric Backup
- Window AC with Electric Resistance
- Window AC with Gas Furnace

Each of these home types was modeled separately with individual DOE-2.1E models. DOE-2.1E is an hourly simulation software that is nationally-recognized as a standard computer program for performing energy analysis on buildings. The first step in simulation is to calibrate the baseline model. Each residential baseline DOE-2.1E model was calibrated to ensure that its simulated energy use was representative of the baseline energy consumption data provided by ENO. The complete process for simulating measures is explained in detail in Section 2.2.1.

COMMERCIAL

ICF started with the baseline energy consumption for the commercial sector that was provided by Entergy. The commercial sector was sub-divided into categories of building types based on information from EIA CBECS 2003 data (Energy Information Administration's Commercial Building Energy Consumption Survey). Each building type was then modeled with unique characteristics and system types. The commercial building sub-divisions were:

- Education
- Food-Service
- Healthcare – Inpatient
- Lodging – Hotel-Motel
- Retail – Small
- Office – Small / Healthcare - Outpatient
- Office – Large
- Assembly
- Warehouse
- Food Sales

Each of these building types was also modeled separately with individual DOE-2.1E models. Each commercial baseline DOE-2.1E model was modeled using typical characteristics extracted from EIA CBECS 2003 data. For the commercial sector, calibration of baseline consumption was done at the sector level rather than at the building level.

INDUSTRIAL

The industrial sector was sub-divided based on industrial electricity consumption data provided by Entergy, segmented by SIC code. The total industrial energy consumption was sub-divided into the energy consumption by industry type, resulting in the following categories:

- Stone, Clay, Glass, and Concrete Products
- Fabricated Metal Products, Except Machinery and Transportation Equipment
- Apparel and Other Finished Products Made From Fabrics and Similar Materials
- Rubber and Miscellaneous Plastics Products
- Chemicals
- Paper and Allied Products
- Lumber and Wood Products, Except Furniture
- Petroleum Refining and Related Industries
- Food
- Primary Metal Industries
- Industrial and Commercial Machinery and Computer Equipment
- Electronic and Other Electrical Equipment and Components, Not Computers
- Leather and Leather Products
- Textile Mill Products
- Printing, Publishing, and Allied Industries
- Furniture and Fixtures
- Transportation Equipment
- Tobacco Products

Although electricity use or sales data were available by industry group (2-digit SIC code), these data were not available by end-use application (e.g., motors, air conditioning, etc). ICF developed the end use allocation using EIA MECS 2002 data (Energy Information Administration's Manufacturing Energy Consumption Survey), which shows end-use application electricity consumption by SIC group. The following industrial sub-categories were developed by breaking the total electricity use data down by the percentage of electricity used by each SIC end use application:

- Process Heating
- Machine Drive
- Other Process Use
- Facility Lighting
- Other
- Process Cooling and Refrigeration
- Electro-chemical Processes
- Facility HVAC
- Other Non-process Use

However, these end-use applications are still highly aggregated. Since the industrial sector DSM measures target more specific applications than those available from MECS, further refinement had to be achieved. For example, the DSM measures targeting 1-5 hp compressors would not be applicable to the entire electricity use for machine drives because each industry has different applications of machine drives (e.g., compressors, fans, pumps, drives), and each has different motor size (i.e., hp) characterization. To refine the target market down to more specific DSM target applications, several data sources (internal and publicly available sources) were used[1].

A total of 136 target applications were ultimately analyzed for the industrial sector. Examples of target applications analyzed include:

- Power Recovery
- Energy Star Transformers
- Bakery - Process (Mixing) - O&M
- Drives Spinning Machines – O&M
- Refinery Controls
- Air Conveying Systems
- V-Belts Replacement
- Drives - EE Motor

For the industrial sector, most measures were non-weather sensitive and the savings were calculated based on published data rather than DOE-2.1E simulations.

This process of disaggregation across the three building sectors allowed ICF to generate baseline energy consumption particular to each category described above, which was necessary to calibrate ICF's model at the appropriate level of granularity.

2.1.2. Market Characterization

A market characterization analysis was conducted to understand the building characteristics and energy consumption of the customer base in ENO's service territory. This analysis was also necessary to achieve the level of granularity described in Section 2.1.1 and to identify the target markets and DSM programs expected to provide needed savings from energy efficiency projects.

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[1] The data sources used for this part of the project are presented below.

1) For machine drive DSM measures:
   a. MECS 2002
   b. U.S. Department of Energy, United States Industrial Motor Systems Market Opportunities Assessment, December 2002
   c. U.S. Department of Energy, Assessment of the Market for Compressed Air Efficiency Services, June 2001
   d. Harry L. Brown, et al, Energy Analysis of 108 Industrial Processes, prepared for U.S. Department of Energy, September 1985
   e. Internal (EEA/ICF) data on industrial energy use
2) For process heating DSM measures:
   a. MECS 2002
   b. Harry L. Brown, et al, Energy Analysis of 108 Industrial Processes, prepared for U.S. Department of Energy, September 1985
   c. Internal (EEA/ICF) data on industrial energy use
3) For process cooling DSM measures:
   a. MECS 2002
4) For lighting DSM measures:
   a. MECS 2002
   b. Internal (EEA/ICF) data on industrial energy use
5) For air conditioning DSM measures:
   a. MECS 2002
   b. Internal (EEA/ICF) data on industrial energy use
6) For other DSM measures:
   a. MECS 2002

Building characteristics

Using current local data supplemented with regional and national data sources, baseline building characteristics were established for both new and existing construction in the residential and commercial building sectors[2].

For new construction, modeling inputs such as insulation values were based on Louisiana code requirements, which at the time of the analysis were the IRC- 2006: 2006 International Residential Code for One- And Two-Family Dwellings for the residential sector, and ASHRAE 90.1-2004, and 2006 IECC for buildings not covered by ASHRAE, for the commercial sector.

For existing construction, characteristics of older vintage buildings were modeled. An average age of more than 20 years for existing households was assumed based on information from Entergy[3]. Simulations were used to ensure that ICF's assumptions were roughly calibrated to historical consumption data provided by Entergy.

The building characteristics modeled are shown below in Figure 4 through Figure 8.

Residential Housing Characteristics (Single Family)		
Detail	**Existing**	**New**
Foundation Types Modeled	Slab-on-Grade & Crawlspace	
Number of Stories	1	2
Sq Ft per Floor	2000	1050
Window Area	12%	14%
Ceiling/Attic Insulation	R-24	R-30
Wall Insulation	R-11	R-13
Floor Insulation over Crawlspace	R-9	R-13
Window U-Value/SHGC	0.65/0.55	0.70/0.40
Number of Panes per Window	1	2
Infiltration	0.48 ACH	0.48 ACH

Figure 4. Modeled Characteristics of Single Family Homes

Residential Housing Characteristics (Multi Family)		
Detail	**Existing**	**New**
Foundation Types Modeled	Middle Floor, Outside	
Total Sq Ft	1100	1200
Window Area	10%	11%
Ceiling/Attic Insulation	R-24	R-30
Wall Insulation	R-11	R-13
Window U-Value/SHGC	0.65/0.55	0.70/0.40
Number of Panes per Window	1	2
Infiltration	0.48 ACH	0.48 ACH

Figure 5. Modeled Characteristics of Multi family Homes

[2] The industrial sector was not included in this process because the energy use in the industrial sector is driven by processes where as the residential and commercial sectors are driven by the building and occupant characteristics.

[3] Slide 43 of Appliance Saturation Data \ Project RASS Final Report May 18 2006 revised.ppt.

Residential Housing Characteristics (Mobile)		
Detail	Existing	New
Foundation Types Modeled	Crawlspace	
Sq Ft per Floor	1400	1500
Window Area	12%	12%
Ceiling/Attic Insulation	R-24	R-30
Wall Insulation	R-11	R-13
Floor Insulation over Crawlspace	R-9	R-13
Window U-Value/SHGC	0.65/0.55	0.70/0.40
Number of Panes per Window	1	2
Infiltration	0.48 ACH	0.48 ACH

Figure 6. Modeled Characteristics of Mobile Homes

Commercial Building Characteristics					
Sector	Total Sq Ft	# of Stories	Wall Insulation	Attic Insulation	Floor to Floor Height
Education	21,393	2	R-13	R-15	12
Food Service	5,524	2	R-11	R-13	12
Healthcare - Inpatient	235,000	4	R-11	R-13	12
Lodging - Hotel-Motel	29,769	3	R-11	R-13	12
Retail - Small	12,122	2	R-11	R-13	12
Office - Small-Outpatient	9,523	2	R-11	R-13	12
Office - Large	158,414	10	R-11	R-13	12
Assembly	11,488	2	R-11	R-13	12
Warehouse	14,662	2	R-11	R-15	18
Food Sales	1,900	2	R-11	R-13	12

Figure 7. Modeled Characteristics of Commercial Buildings #1

Commercial Building Characteristics					
Sector	Total Sq Ft	Slab Insulation	Window U-Value / SHGC	Plug Loads (W/SqFt)	Infiltration (ACH)
Education	21,393	R-5	0.66 / 0.50	0.5	0.5
Food Service	5,524	R-19	0.66 / 0.50	1.5	0.2
Healthcare - Inpatient	235,000	R-19	0.66 / 0.50	2.0	0.1
Lodging - Hotel-Motel	29,769	R-19	0.66 / 0.50	0.5	0.5
Retail - Small	12,122	R-19	0.66 / 0.50	0.5	0.5
Office - Small-Outpatient	9,523	R-19	0.66 / 0.50	1.0	0.3
Office - Large	158,414	R-19	0.66 / 0.50	1.0	0.2
Assembly	11,488	R-19	0.66 / 0.50	0.5	0.2
Warehouse	14,662	R-5	0.66 / 0.50	0.5	0.5
Food Sales	1,900	R-19	0.66 / 0.50	2.0	0.2

Figure 8. Modeled Characteristics of Commercial Buildings #2

Customer base energy consumption

Entergy provided data on recorded energy consumption and customer count by county for each company between October 2006 and September 2007[4]. These data were used as a starting point to create the appropriate baseline share of consumption for each customer category. Figure 9 provides existing customer count and energy usage by category for ENO.

[4] Entergy document : Retail_Usage_CustomerCount_101207

Customer Category		Average Annual Customers	Total Consumption (MWh)	% of Total Customers	% of Total Consumption
C	Commercial	12311	1682822	9.9%	40.6%
G	Government	1086	691475	0.9%	16.7%
I	Industrial	2667	568104	2.1%	13.7%
K	Entergy	0	0	0%	0.0%
L	Lighting	352	49579	0.3%	1.2%
R	Residential	108345	1153801	86.8%	27.8%
Total		124760	4,145,781	100%	100%

Figure 9. ENO Baseline Consumption and Customers

ICF obtained data on new construction in the state of Louisiana from the U.S. census[5]. To calculate the number of new building starts applicable to ENO only, a proportion of this state data was taken. The proportion used was based on a comparison of the number of existing homes in all of Louisiana, and the number of customers provided by Entergy. The calculated annual new construction rate for ENO was 1.3%. The annual new sector units in ENO territory was calculated by multiplying existing sector units with this growth rate. The number of units calculated for the residential sector is shown in Figure 10.

	Existing Customers				Effective New Sector Units			
Company	SF	MF	Mobile	Total	SF	MF	Mobile	Total
EAI	455,881	46,757	75,980	578,618	3,633	373	605	4,611
EGSI-LA	263,497	21,958	31,369	316,824	3,143	262	374	3,779
EGSI-TX	277,086	20,525	41,050	338,661	5,265	390	780	6,435
ELL	532,483	37,587	50,116	620,186	5,908	417	556	6,881
EMI	304,181	25,654	32,983	362,818	4,039	341	438	4,817
ENO	**87,759**	**19,502**	**1,083**	**108,344**	**1,098**	**244**	**14**	**1,356**

Figure 10. Residential Existing and New Customers by Type of Home

Figure 11 is based on RECS data and shows the detailed percentage distribution for all categories, except foundation types, considered for the residential sector. The categories in this detailed breakdown are not mutually exclusive; rather the heating and cooling categories overlap.

[5] http://www.census.gov/const/C40/Table2/t2yu200712.txt

Entergy Supplied % of Total	Entergy Supplied Energy Usage (MWH)	Housing type	% of housing stock per Client	Customers	Electricity used in MWH	End-use	% of Electricity used in MWH	Electricity used in MWH	Fuel source	% of end-use by fuel source	Households
3.5%	1153801	Single-family	41.9%	45570 (Total 108757)	483452	Heating	10.6%	51159	Gas	74.8%	34,071
									Electric	18.7%	8,518
									Oil	4.7%	2,129
									Other	1.9%	852
						Central AC	20.6%	99760	Central AC	78.1%	35,613
						Win AC	2.1%	10232	Window AC	16.5%	7,497
									No AC	5.4%	2,460
						DHW	10.6%	51159	Gas	62.3%	28,374
									Electric	37.7%	17,196
						Appliances	56.1%	271143	Electric	90.6%	41,286
									Gas	9.4%	4,284
		Single-family attached	15.0%	16274	172648	Heating	10.6%	18270	Gas	74.8%	12,167
									Electric	18.7%	3,042
									Oil	4.7%	760
									Other	1.9%	304
						Central AC	20.6%	35626	Central AC	78.1%	12,718
						Win AC	2.1%	3654	Window AC	16.5%	2,677
									No AC	5.4%	879
						DHW	10.6%	18270	Gas	62.3%	10,133
									Electric	37.7%	6,141
						Appliances	56.1%	96829	Electric	90.6%	14,744
									Gas	9.4%	1,530
		Multi family	42.7%	46487	493178	Heating	10.6%	52188	Gas	74.8%	34,757
									Electric	18.7%	8,689
									Oil	4.7%	2,172
									Other	1.9%	869
						Central AC	20.6%	101767	Central AC	78.1%	36,329
						Win AC	2.1%	10438	Window AC	16.5%	7,648
									No AC	5.4%	2,510
						DHW	10.6%	52188	Gas	62.3%	28,945
									Electric	37.7%	17,542
						Appliances	56.1%	276597	Electric	90.6%	42,116
									Gas	9.4%	4,371
		Mobile	0.4%	426	4522	Heating	10.6%	479	Gas	74.8%	319
									Electric	18.7%	80
									Oil	4.7%	20
									Other	1.9%	8
						Central AC	20.6%	933	Central AC	78.1%	333
						Win AC	2.1%	96	Window AC	16.5%	70
									No AC	5.4%	23
						DHW	10.6%	479	Gas	62.3%	265
									Electric	37.7%	161
						Appliances	56.1%	2536	Electric	90.6%	386
									Gas	9.4%	40

Figure 11. ENO Residential Breakdown Detail

The information gathered from the existing customer count, and the percentage distribution based on RECS data shown in Figure 11 was combined to produce the breakdown shown in Figure 12 for the residential sector. The most common HVAC systems were modeled with each set of architectural characteristics. Each unit in this sector represents a home. This count total matches the information provided by Entergy for ENO.

Residential Sector Units (homes)		Existing	New
Single-family	Gas Furnace / Central AC	43,880	549
Single-family	Gas Furnace / Window AC	12,286	154
Single-family	Heat pump - Elec Backup	3,510	44
Single-family	Electric Res / Central AC	21,940	275
Single-family	Electric Res / Window AC	6,143	77
Single-family	Gas Furnace w/ No AC	0	0
Single-family	Electric Furnace w/ No AC	0	0
Multi Family	Gas Furnace / Central AC	2,730	34
Multi Family	Gas Furnace / Window AC	6,826	85
Multi Family	Heat pump - Elec Backup	780	10
Multi Family	Electric Res / Central AC	4,485	56
Multi Family	Electric Res / Window AC	4,681	59
Multi Family	Gas Furnace w/ No AC	0	0
Multi Family	Electric Furnace w/ No AC	0	0
Mobile	Gas Furnace / Central AC	152	2
Mobile	Gas Furnace / Window AC	379	5
Mobile	Heat pump - Elec Backup	43	1
Mobile	Electric Res / Central AC	249	3
Mobile	Electric Res / Window AC	260	3
Mobile	Gas Furnace w/ No AC	0	0
Mobile	Electric Furnace w/ No AC	0	0
All Sectors	All Systems	108,345	1,356

Figure 12. Residential Breakdown of Units

For the commercial sector breakdown shown in Figure 13, the units represent individual buildings. This count does not match the number of customers provided by Entergy because for the Commercial sector, each customer may represent a single building, or multiple buildings on a single meter such as in a campus setting, or a part of a building such as a retail store in a strip mall. Therefore, the focus here is on representing the baseline energy consumption for the commercial sector by modeling representative buildings and sector units that together make up the baseline energy consumption. In this approach, the total baseline energy consumption per commercial sub-sector (e.g., education) is derived from the proportionate building energy use for that building type for that census division (Source: CBECS). This is divided by the simulated baseline consumption per building for that building type to derive the number of units.

Commercial Sector Units		Existing	New
Education	Chiller/Boiler	348	2
Food Service	AC / Gas Packaged	261	1
Healthcare - Inpatient	Chiller/Boiler	6	0
Lodging - Hotel-Motel	PTAC	81	0
Retail - Small	AC / Gas Packaged	304	1
Office - Small-Outpatient	AC / Gas Packaged	555	3
Office - Large	Chiller/Boiler	22	0
Assembly	AC / Gas Packaged	522	3
Warehouse	AC / Gas Packaged	863	4
All Sectors	All Systems	2962	14

Figure 13. Commercial Breakdown of Units

For the industrial sector, the breakdown is shown as units of energy consumption expressed in kilowatt-hours. Two steps were taken to breakdown the industrial sector energy consumption. First the total consumption for ENO was broken into share, by SIC code, as shown in Figure 14. Then this was further divided into baseline consumption by end use as shown in Figure 15.

ENO	Industry Type	MWh								
SIC Codes		Process Heating	Process Cooling & Refrig	Machine Drive	Electro-Chemical Processes	Other Process Use	Facility HVAC	Facility Lighting	Other Nonprocess Use	Other
SIC20	Food	3,289	27,348	49,335	-	287	7,288	6,937	1,425	6,349
SIC21	Tobacco Products	-	-	-	-	-	-	-	-	-
SIC22	Textile Mill Products	-	-	-	-	-	-	-	-	-
SIC23	Apparel And Other Finished Products Made From Fabrics And Similar Materials	-	-	-	-	-	-	-	-	-
SIC24	Lumber And Wood Products, Except Furniture	624	66	8,847	2	23	859	897	45	-
SIC25	Furniture And Fixtures	-	-	-	-	-	-	-	-	-
SIC26	Paper And Allied Products	-	-	-	-	-	-	-	-	-
SIC27	Printing, Publishing, And Allied Industries	423	753	8,349	30	31	3,076	1,924	466	1,991
SIC28	Chemicals	10,518	26,106	160,816	39,516	422	18,013	13,066	3,758	6,156
SIC29	Petroleum Refining And Related Industries	919	475	9,209	10	17	386	302	45	-
SIC30	Rubber And Miscellaneous Plastics Products	-	-	-	-	-	-	-	-	-
SIC31	Leather And Leather Products	-	-	-	-	-	-	-	-	-
SIC32	Stone, Clay, Glass, And Concrete Products	4,684	805	13,518	-	141	1,437	1,110	306	724
SIC33	Primary Metal Industries	-	-	-	-	-	-	-	-	-
SIC34	Fabricated Metal Products, Except Machinery And Transportation Equipment	1,310	198	2,504	33	11	574	535	115	401
SIC35	Industrial And Commercial Machinery And Computer Equipment	532	348	2,030	67	94	1,336	753	277	244
SIC36	Electronic And Other Electrical Equipment And Components, Except Computer Equipment	-	-	-	-	-	-	-	-	-
SIC37	Transportation Equipment	540	255	2,451	56	74	1,074	839	233	159
SIC00	Other	10,921	7,059	42,963	206	516	24,031	17,224	5,019	-

Figure 14. Total Consumption by SIC Code

Technology	Sector	Sector SIC Codes	Total Sector Units
Compressed Air-O&M	Non-Residential	All	55,952,838
Compressed Air - Controls	Non-Residential	All	55,952,838
Compressed Air - System Optimization	Non-Residential	All	55,952,838
Compressed Air- Sizing	Non-Residential	All	55,952,838
Comp Air - Replace 1-5 HP motor	Non-Residential	All	292,023
Comp Air - ASD (1-5 hp)	Non-Residential	All	292,023
Comp Air - Motor practices-1 (1-5 HP)	Non-Residential	All	292,023
Comp Air - Replace 6-100 HP motor	Non-Residential	All	8,087,544
Comp Air - ASD (6-100 hp)	Non-Residential	All	8,087,544
Comp Air - Motor practices-1 (6-100 HP)	Non-Residential	All	8,087,544
Comp Air - Replace 100+ HP motor	Non-Residential	All	47,573,271
Comp Air - ASD (100+ hp)	Non-Residential	All	47,573,271
Comp Air - Motor practices-1 (100+ HP)	Non-Residential	All	47,573,271
Comp Air - Power recovery	Non-Residential	SIC 29	1,405,989
Comp Air - Refinery Controls	Non-Residential	SIC 29	1,405,989
Comp Air - Energy Star Transformers	Non-Residential	All	55,952,838
Fans - O&M	Non-Residential	All	72,699,687
Fans - Controls	Non-Residential	All	72,699,687
Fans - System Optimization	Non-Residential	All	72,699,687
Fans- Improve components	Non-Residential	All	72,699,687
Fans - Replace 1-5 HP motor	Non-Residential	All	5,836,018
Fans - ASD (1-5 hp)	Non-Residential	All	5,836,018
Fans - Motor practices-1 (1-5 HP)	Non-Residential	All	5,836,018
Fans - Replace 6-100 HP motor	Non-Residential	All	53,581,785
Fans - ASD (6-100 hp)	Non-Residential	All	53,581,785
Fans - Motor practices-1 (6-100 HP)	Non-Residential	All	53,581,785
Fans - Replace 100+ HP motor	Non-Residential	All	13,281,884
Fans - ASD (100+ hp)	Non-Residential	All	13,281,884
Fans - Motor practices-1 (100+ HP)	Non-Residential	All	13,281,884
Fans - Optimize drying process	Non-Residential	SIC 24/25	1,074,159
Fans - Power recovery	Non-Residential	SIC 29	873,203
Fans - Refinery Controls	Non-Residential	SIC 29	873,203
Fans - Energy Star Transformers	Non-Residential	All	72,699,687
Pumps - O&M	Non-Residential	All	57,673,721
Pumps - Controls	Non-Residential	All	57,673,721
Pumps - System Optimization	Non-Residential	All	57,673,721
Pumps - Sizing	Non-Residential	All	57,673,721
Pumps - Replace 1-5 HP motor	Non-Residential	All	2,728,526
Pumps - ASD (1-5 hp)	Non-Residential	All	2,728,526
Pumps - Motor practices-1 (1-5 HP)	Non-Residential	All	2,728,526
Pumps - Replace 6-100 HP motor	Non-Residential	All	26,483,177
Pumps - ASD (6-100 hp)	Non-Residential	All	26,483,177
Pumps - Motor practices-1 (6-100 HP)	Non-Residential	All	26,483,177
Pumps - Replace 100+ HP motor	Non-Residential	All	28,462,018
Pumps - ASD (100+ hp)	Non-Residential	All	28,462,018
Pumps - Motor practices-1 (100+ HP)	Non-Residential	All	28,462,018

Pumps - Power recovery	Non-Residential	SIC 29	5,432,827
Pumps - Refinery Controls	Non-Residential	SIC 29	5,432,827
Pumps - Energy Star Transformers	Non-Residential	All	57,673,721
Drives - Bakery - Process (Mixing) - O&M	Non-Residential	SIC 20	889,207
Drives - O&M/drives spinning machines	Non-Residential	SIC 22/23	0
Drives - Air conveying systems	Non-Residential	SIC 24/25	8,846,964
Drives - Replace V-Belts	Non-Residential	All	113,694,880
Drives - Drives - EE motor	Non-Residential	All	113,694,880
Drives - Gap Forming papermachine	Non-Residential	SIC 26	0
Drives - High Consistency forming	Non-Residential	SIC 26	0
Drives - Optimization control PM	Non-Residential	SIC 26	0
Drives - Efficient practices printing press	Non-Residential	SIC 27	6,284,351
Drives - Efficient Printing press (fewer cylinders)	Non-Residential	SIC 27	6,284,351
Drives - Light cylinders	Non-Residential	SIC 27	6,284,351
Drives - Efficient drives	Non-Residential	SIC 27	6,284,351
Drives - Clean Room - Controls	Non-Residential	SIC 28, 36	55,340,128
Drives - Clean Room - New Designs	Non-Residential	SIC 28	55,340,128
Drives - Drives - Process Controls (batch + site)	Non-Residential	SIC 28, 32, 33	61,417,349
Drives - Process Drives - ASD	Non-Residential	All	210,482,160
Drives - O&M - Extruders/Injection Moulding	Non-Residential	SIC 30	0
Drives - Extruders/injection Moulding-multipump	Non-Residential	SIC 30	0
Drives - Direct drive Extruders	Non-Residential	SIC 30	0
Drives - Injection Moulding - Impulse Cooling	Non-Residential	SIC 30	0
Drives - Injection Moulding - Direct drive	Non-Residential	SIC 30	0
Drives - Efficient grinding	Non-Residential	SIC 32	5,700,247
Drives - Process control	Non-Residential	SIC 32, 33	13,517,728
Drives - Process optimization	Non-Residential	SIC 32	13,517,728
Drives - Drives - Process Control	Non-Residential	SIC 33	0
Drives - Efficient drives - rolling	Non-Residential	SIC 33	0
Drives - Drives - Optimization process (M&T)	Non-Residential	SIC 34, 35, 37, 38	6,985,120
Drives - Drives - Scheduling	Non-Residential	SIC 34-39	49,947,884
Drives - Machinery	Non-Residential	SIC 34-38	6,985,120
Drives - Efficient Machinery	Non-Residential	SIC 39/21/31	42,962,764
Drives - Energy Star Transformers	Non-Residential	All	113,694,880
Bakery - Process	Non-Residential	SIC 20	11,942,043
Drying (UV/IR)	Non-Residential	SIC 22/23	0
Heat Pumps - Drying	Non-Residential	SIC 24/25	11,362,083
Top-heating (glass)	Non-Residential	SIC 32	646,089
Efficient electric melting	Non-Residential	SIC 33	0
Intelligent extruder (DOE)	Non-Residential	SIC 33	0
Near Net Shape Casting	Non-Residential	SIC 33	0
Heating - Process Control	Non-Residential	SIC 33	0
Efficient Curing ovens	Non-Residential	SIC 34 - 39	386,993
Heating - Optimization process (M&T)	Non-Residential	SIC 34, 35, 37	386,993
Heating - Scheduling	Non-Residential	SIC 34, 35	1,841,657
Energy Star Transformers	Non-Residential	All	33,760,396
Efficient Refrigeration - Operations	Non-Residential	SIC 20	27,347,682
Optimization Refrigeration	Non-Residential	SIC 20	27,347,682
Energy Star Transformers	Non-Residential	SIC 20	27,347,682
Other Process Controls (batch + site)	Non-Residential	SIC 28	422,190

Efficient desalter	Non-Residential	SIC 29	16,705
New transformers welding	Non-Residential	SIC 34,35,37,38	178,110
Efficient processes (welding, etc.)	Non-Residential	SIC 36	0
Process control	Non-Residential	SIC 39/21/31	515,691
Power recovery	Non-Residential	SIC 29	16,705
Refinery Controls	Non-Residential	SIC 29	16,705
Energy Star Transformers	Non-Residential	All	1,614,260
Centrifugal Chiller, 0.58 kW/ton, 500 tons	Non-Residential	All	-
Centrifugal Chiller, 0.51 kW/ton, 500 tons	Non-Residential	All	39,135
Window Film-Chiller	Non-Residential	All	986,202
EMS-Chiller	Non-Residential	All	78,270
Cool Roof - Chiller	Non-Residential	All	17,375,941
Chiller Tune Up/Diagnostics	Non-Residential	All	78,270
Cooling Circ. Pumps - VSD	Non-Residential	All	78,270
Energy Star Transformers - Chillers	Non-Residential	All	58,076,342
DX Tune Up/Advanced Diagnostics	Non-Residential	All	45,658
DX Packaged System, EER=10.9, 10 tons	Non-Residential	All	45,658
Window Film - DX	Non-Residential	All	575,285
Evaporative Pre-Cooler	Non-Residential	All	45,658
Prog. Thermostat-DX	Non-Residential	All	45,658
Cool Roof - DX	Non-Residential	All	10,135,965
Energy Star Transformers - DX	Non-Residential	All	58,076,342
RET 2L4'Premium T8, 1EB	Non-Residential	All	56,634
CFL Hardwired, Modular 36W	Non-Residential	All	41,154
Metal Halide, 50W	Non-Residential	All	41,154
Occupancy Sensor, 4L4' Fluorescent Fixtures	Non-Residential	All	48,733
Energy Star Transformers	Non-Residential	All	43,585,823
Replace V-belts	Non-Residential	All	11,690,490
Membranes for wastewater	Non-Residential	SIC 22/23	0
Energy Star Transformers	Non-Residential	All	11,690,490
Industrial Demand Response	Non-Residential	All	132
CHP with Incentive	Non-Residential	All	0
CHP with Incentive	Non-Residential	All	0
CHP with Incentive	Non-Residential	All	0

Figure 15. Industrial Breakdown of Units

This market characterization of the sub-divisions within each building sector helped to get a relative magnitude of the baseline consumption of each category and helped to ensure that savings for the various measures were applied only to the appropriate baseline consumption categories.

2.1.3. Key Assumptions for Cost-Effectiveness Screening

Avoided costs

Entergy provided avoided costs for energy as monthly prices for each month spanning from 2007 to 2035. Energy prices were provided for three products:

- Base Load: 7x24 (seven days per week, 24 hours per day)

- Off-Peak: 7x8 (7 days per week, 8 hours per day)
- Wrap: Off-peak evening and weekend

ICF used these three avoided cost types to represent appropriate hours of the week as shown in Figure 16. The 7x24 product that had relatively higher costs was used for peak hours between 7 am and 11 pm on weekdays. The 7x8 product with lower prices was used to represent night time hours. The Wrap product that had average prices was used for weekend daytime hours. The prices changed for every month and every year. Figure 16 shows an example of avoided costs for energy generation (per MWh) for July 2035. The nominal dollar amounts were converted into real 2007 dollar amount for the analysis.

Mo/Yr	12am - 7am	7am - 11pm	11pm-12am
Weekday	7 x 8	7 x 24	7 x 8
Weekend	7 x 8	Wrap	7 x 8

Jul'35 Nominal	12am - 7am	7am - 11pm	11pm-12am
Weekday	133.79	223.67	133.79
Weekend	133.79	172.94	133.79

Jul'35 Real	12am - 7am	7am - 11pm	11pm-12am
Weekday	71.76	119.96	71.76
Weekend	71.76	92.75	71.76

Figure 16. Avoided Costs for Energy Generation

Figure 17 shows the avoided costs for capacity provided by Entergy in the following format:

		Reference	Low	High
Baseline Capital Cost 2008$	$/kW	680	350	850
Levelized Fixed Charge Rate	%	10.833%	10.833%	10.833%
Levelized Cost	$/kW-yr	73.66	37.92	92.08
Fixed O&M	$/kW-yr	6.25	6.25	6.25
Subtotal	$/kW-yr	79.91	44.17	98.33
Line Losses	%	7.4172%	7.4172%	7.4172%
Reserve Margin	%	16.8%	16.8%	16.8%
Avoided Generation Costs	$/kW-yr	99.27	54.86	122.14
Avoided T&D Costs	$/kW-yr	2.93	2.93	2.93
Total Avoided Capacity Cost	$/kW-yr	102.19	57.79	125.07

Figure 17. ENO Avoided Costs for Capacity

Retail rates

Research was conducted to determine the 2007 energy retail rates for ENO. These rates were analyzed to represent average monthly retail rates per kWh and kW and were then extrapolated to produce a range of retail rates extending from 2008 to 2035. The extrapolation trend was assumed to be in direct proportion to the trend of avoided costs of energy. This approach is in agreement with the historical trends observed in the EIA data.

Figure 18 below shows the retail rates from 2008 to 2017. In the model, this data stream continues to 2035.

Retail Costs	Residential	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Per kWh	$0.114	$0.130	$0.133	$0.127	$0.124	$0.118	$0.114	$0.106	$0.109	$0.112	$0.111
Per kW	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Per Therm Gas	$1.404	$1.594	$1.63	$1.563	$1.523	$1.456	$1.399	$1.302	$1.341	$1.373	$1.361

Retail Costs	Non-Residential	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Per kWh	$0.098	$0.111	$0.113	$0.109	$0.106	$0.101	$0.097	$0.091	$0.093	$0.095	$0.095
Per kW	$6.280	$7.135	$7.294	$6.994	$6.816	$6.515	$6.259	$5.827	$5.999	$6.143	$6.089
Per Thm	$1.226	$1.393	$1.42	$1.365	$1.331	$1.272	$1.222	$1.138	$1.171	$1.199	$1.189

Retail Costs	Industrial	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Per kWh	$0.082	$0.093	$0.095	$0.091	$0.088	$0.085	$0.081	$0.076	$0.078	$0.080	$0.079
Per kW	$6.280	$7.135	$7.294	$6.994	$6.816	$6.515	$6.259	$5.827	$5.999	$6.143	$6.089
Per Thm	$1.226	$1.393	$1.42	$1.365	$1.331	$1.272	$1.222	$1.138	$1.171	$1.199	$1.189

Figure 18. Retail Rates Assumed for the Residential, Commercial and Industrial Sectors

Discount rates, line losses and reserve margin

Discount rates, line losses and reserve margin data were provided by Entergy. The rates used for the three sectors are shown in Figure 19.

	Res	Com	Ind
Company Discount Rate	7.70%	7.70%	7.70%
Participant Discount Rate	7.70%	7.70%	7.70%
Line Losses	8.00%	7.86%	4.42%
Reserve Margin	16.80%	16.80%	16.80%

Figure 19. ENO Discount Rates

Energy consumption forecast

Entergy provided energy consumption forecast for ten years for the residential, commercial, and industrial building sectors. This data was provided in an hourly format for the years 2007 to 2017 and can be seen in Figure 20 through Figure 22. ICF converted these into annual data from 2008 to 2017 to use in the potential model. This data was used in the summary as a benchmark for the savings achieved.

ENO Res	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GWh	1,336	1,355	1,382	1,404	1,336	1,467	1,497	1,528	1,336	1,595
MW	339	344	348	350	339	369	374	388	339	397

Figure 20. ENO Residential Baseline Consumption

ENO Com	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GWh	1,960	1,969	1,986	2,005	2,028	2,050	2,071	2,094	2,122	2,153
MW	360	359	364	366	372	377	382	384	387	393

Figure 21. ENO Commercial Baseline Consumption

ENO Ind	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GWh	575	610	633	650	660	674	686	697	707	721
MW	97	103	108	112	114	114	116	118	123	125

Figure 22. ENO Industrial Baseline Consumption

2.2. Modeling

2.2.1. Measure Impact Estimation

For each measure, energy and demand savings were estimated by applying them to all applicable sectors of the ENO service territory. For example, energy and demand savings were estimated for a high-efficiency central air conditioner installed in existing and new residential construction, with a variety of HVAC systems (e.g., central air conditioner with gas furnace, central air conditioner with electric resistance heating).

The methodology used to evaluate technologies was selected based upon whether the technology was weather-sensitive or non weather-sensitive.

WEATHER SENSITIVE MEASURES

The demand and energy impacts of each weather-sensitive technology were estimated by comparing them to the established baseline. For this process, ICF used Beacon®, our proprietary energy simulation modeling tool that is capable of efficiently completing a large number of parametric simulations. The back end of Beacon® computes simulations on the hourly simulation software DOE-2.1E, a nationally-recognized standard computer program for performing energy analysis on buildings that has been widely used by the industry for more than 25 years. DOE-2.1E is accepted for determining energy efficiency by the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) and has been validated for accuracy both in controlled laboratory studies and in comparison with actual detailed building metered energy use.

To simulate the performance of buildings, DOE-2.1E requires hourly weather data. Building simulations commonly employ Typical Meteorological Year (TMY) weather data, which is a subset of collected weather data selected to represent the range of weather conditions the location is likely to experience over many years. The baseline building definitions and each individual DSM measure were entered into Beacon® and the weather-sensitive measures were modeled using New Orleans as the weather location. The results from modeling the weather files were weighted proportionate to the customer count in each territory.

NON-WEATHER SENSITIVE MEASURES

For the non-weather-sensitive measures, the savings were estimated by comparing the energy-efficient technology to a standard efficiency baseline technology (primarily using ICF engineering calculations or the experience of other utilities). In certain cases the 2005 version of the Database for Energy Efficiency Resources (DEER), which is widely regarded as the most extensive database of energy efficiency technologies available, was used. For each technology, data was compiled or ICF assumptions were used to estimate annual electricity consumption and peak demand savings relative to a standard baseline technology. The percentage of peak demand savings coincident with system peak was also estimated.

The industrial sector measures were all modeled as non-weather sensitive measures with custom (non-simulated) load shapes. For the industrial sector, 126 DSM measures were analyzed. The measures targeted a variety of equipment including motors, lighting, air conditioning, energy transformers, and other process equipment. Additionally, the DSM measures for motors, which include compressors, fans, pumps and drives, were disaggregated by size (in horsepower). Some of the DSM measures cut across all the industries (e.g., motors, lighting) while the others only apply to one (e.g., baking, near net shape casting) or a handful of industries (e.g., curing ovens).

LIFETIME IMPACT OF MEASURES

Measure life was researched for each baseline and upgrade measure to estimate the lifetime impact of measures. Savings from an installation were assumed to continue for the life of the measure.

2.2.2. Cost Effectiveness Screening

Once the measure impacts were calculated, the analysis moved to the Energy Efficiency Potential Model. The inputs for this model include the measure impacts, measure costs and cost-effectiveness screening assumptions. The outputs are cost-effectiveness test results, annual measure penetration over the analysis span, annual energy and demand reduction per measure over the analysis span, and program and portfolio level energy and demand reduction potential.

The methodology for the cost-effectiveness screening was based on the California Public Utility Commission's 'California Standard Practice Manual: Economic Analysis of Demand-side Programs and Projects'. The primary test that was used to screen technologies was the Total Resource Cost test. From a TRC perspective, benefits are measured as the net present value of the utility's operating cost reductions as a result of reduced demand for electricity sales and capacity. Costs include the incremental cost of the efficient measures over and above the baseline measures, plus the costs associated with implementing the program[6].

Measures that pass the TRC test are later bundled into programs and evaluated for cost-effectiveness using an integrated resource planning (IRP) model (which develops avoided costs annually and is otherwise believed to be a more precise measure of cost-effectiveness). Therefore this approach is a reasonable way to prioritize measures for resource intensive

[6] Note that implementation costs do not typically include incentive payments, since although they represent a cost to the utility, they are a benefit to the participant, and from a "total resource" perspective they cancel out.

analysis in the IRP model, without the risk of passing programs which might not otherwise be cost-effective.

If a measure had a TRC greater than 1.0, it was slated to be included in the portfolio. However, this analysis covered six companies for Entergy and not all measures passed the cost-effectiveness tests for all companies uniformly. ICF operated under the assumption that Entergy would most likely offer similar measures across all companies. Therefore, to generate this final list of measures, we chose a measure for the portfolio if the measure passed the TRC test in 4 or more of the 6 companies. A sample of this analysis is shown in Figure 23. Measures with the number 1 listed under the "Include" column meet the criteria for inclusion.

		Reference Case						
Technologies	**HVAC System**	**ENO**	**EMI**	**ELL**	**EGSI-TX**	**EGSI-LA**	**EAI**	**Include**
Central AC E* 14 SEER	Gas Furnace / Central AC	1	1	1	1	1	0	**1**
Central AC E* 14 SEER	Gas Furnace / Window AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Heat pump - Elec Backup	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Electric Res / Central AC	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Electric Res / Window AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Gas Furnace w/ No AC	1	1	1	1	1	0	**1**
Central AC E* 14 SEER	Electric Furnace w/ No AC	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Gas Furnace / Central AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Gas Furnace / Window AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Heat pump - Elec Backup	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Electric Res / Central AC	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Electric Res / Window AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Gas Furnace w/ No AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Electric Furnace w/ No AC	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Gas Furnace / Central AC	1	1	1	1	1	0	**1**
Central AC E* 14 SEER	Gas Furnace / Window AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Heat pump - Elec Backup	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Electric Res / Central AC	1	1	1	1	1	1	**1**
Central AC E* 14 SEER	Electric Res / Window AC	0	0	0	0	0	0	**0**
Central AC E* 14 SEER	Gas Furnace w/ No AC	1	1	1	1	1	0	**1**
Central AC E* 14 SEER	Electric Furnace w/ No AC	1	1	1	1	1	1	**1**
Central AC E* 15 SEER	Gas Furnace / Central AC	1	1	1	1	1	0	**1**
Central AC E* 15 SEER	Gas Furnace / Window AC	0	0	0	0	0	0	**0**

Figure 23. Sample of Analysis to Include or Exclude Measures Based on TRC across Companies

Measure costs

To establish the cost of each measure relative to baseline practices, ICF used our Efficiency Metrics database. This database includes several sources of measures, including ICF's previous potential studies, and associated measure cost data. To develop this database, we followed the industry standard practice of using high quality estimates from other studies, validated and adjusted where possible to reflect ENO-specific factors. The source most often used for a majority of the standard measures is the Database for Energy Efficiency Resources (DEER) which can be found at http://www.energy.ca.gov/deer/. This database is jointly developed and maintained by the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) for purposes of utility energy efficiency planning and program design.

If these preferred sources of measure costs were not available for particular technologies, other DSM program filings, vendor quotes, monitoring and evaluation reports, or professional judgment were used as necessary. ICF recommends that measure costs be validated as a component of detailed program design, and monitored on an ongoing basis as a part of program implementation.

Program costs

Costs include all costs incurred in order to purchase, install, and maintain efficiency technologies plus any non-incentive costs (e.g., marketing, monitoring and verification, administration, etc.) required of the utility to implement the energy efficiency programs.

INCENTIVE COSTS

An incentive level is chosen for each measure by buying down the customer payback to two years, bounded by a minimum of 25% and a maximum of 75% of incremental cost.

ADMINISTRATIVE COSTS

Program administration costs are modeled as a percentage of the incentive costs and are based on industry research. The administration costs assumed (expressed as a %) are shown in Figure 24.

Sector	Program	One-Time Admin Costs	Annual Admin Costs
Residential	RES HVAC Equipment	55%	0%
	RES HVAC System - AC Tuneup	55%	0%
	RES DHW Equipment	55%	0%
	RES DHW System - Setpoint, Insulation, Low Flow	100%	0%
	RES Air Sealing, Insulation, Windows	55%	0%
	RES HPES	95%	0%
	RES New Construction	50%	0%
	RES Weatherization	60%	0%
	RES Appliances - Window AC	55%	0%
	RES Refrigerator Turn-In	500%	0%
	RES Lighting	55%	0%
	RES Renewables	55%	0%
	RES TOU - No Enabling	25%	66%
	RES TOU - Enabling	25%	66%
	RES DR	0%	90%
	RES In-Home Display	25%	50%
	RES Performance Benchmarking	30%	0%
	RES New Code	55%	0%
Commercal	CNO Building Shell	55%	0%
	CNO Lighting	40%	0%
	CNO Plug Loads	55%	0%
	CNO HVAC	55%	0%
	CNO NEW	55%	0%
	CNO DHW	55%	0%
	CNO DG	0%	15%
	CNO Relamp	20%	0%
Industrial	IND Compressed Air	55%	0%
	IND Fans	40%	0%
	IND Pumps	55%	0%
	IND Drives	55%	0%
	IND Custom	55%	0%
	IND HVAC	55%	0%
	IND Lighting	15%	0%
	IND Demand Response	0%	20%
	IND CHP	10%	0%

Figure 24. Program Administration Cost Assumptions

2.2.3. Achievable Potential Estimation

Achievable potential, sometimes called market potential, estimates how much electricity savings could be realized over time through the implementation of DSM programs. Achievable potential thus depends not only on the technical characteristics and economic potential of the individual measures, but also on the response of Entergy customers to program interventions. To project achievable potential, ICF estimated the extent to which Entergy programs might increase the proportion of customers that purchase high-efficiency equipment instead of standard-efficiency equipment—a fraction we call the market share. Over time, increases in market share also increase the installed saturation of high-efficiency equipment in Entergy customers' homes and businesses. Based on those changes in saturation, we estimated the total energy savings due to hypothetical programs from installation of high-efficiency equipment.

The planning horizon for the IRP only extends 10 years. However, the analysis was completed for 25 years to capture the lifetime savings of the technologies. To forecast the market potential for each measure, the maximum annual installations that would be achievable were estimated. A technology adoption rate was then applied to dictate how quickly the market would reach this maximum annual installation rate. This is commonly referred to as a market adoption S-curve.

The measures that passed the screening (which involved consideration of the results of several of the cost-effectiveness perspectives and other strategic reasons for including specific measures if desired by the client) were then packaged into programs. For example, several residential air-conditioning measures (e.g., high SEER A/C, duct sealing, and quality installation standards) may be packaged into a single program. These bundled program scenarios are designed to balance program strengths and weaknesses to achieve cost-effective results. Measure bundling also serves to group measures into logical packages representing program types within specific market segments and/or incentive and implementation strategies.

Technical potential

Technical potential is an estimate of the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and willingness of end-users to adopt the efficiency measures. In order to produce this estimate from the buildings in ENO's service territory, the following assumptions were made:

Technical Potential = Technology Units per Sector x Relevance x Technical Applicability x Stock Turnover Rate

Technology Units per Sector: This is the number of technology units each building would contain. For example, one central air conditioning system per home was assigned. The value assigned was dependent upon whether the measure was to be applied to the existing or new sector. For measures applied to the existing sector, the value was the number of existing buildings or homes within the service territory. For measures applied to the new construction sector, the value was the annual quantity of new buildings or homes or kWh constructed within the service territory.

Relevance: Relevance is the percentage of those buildings that include the baseline technology. For example, when considering a measure related to central air conditioning systems, the percentage of total homes with central air conditioning systems was assigned. For measures that had competing technologies such as SEER 14 and SEER 15 air conditioners, a proportion of the market was assigned to each.

Technical Applicability: This is the percentage of those units for which it would be technically feasible to upgrade the baseline technology. For many measures, the applicability would be 100 percent. However, for certain measures, such as the addition of wall insulation to existing homes, variations in wall construction and accessibility would reduce the applicability below 100 percent.

Stock Turnover Rate: This is the annual percentage of units that would be eligible for replacement with the efficient measure. It was primarily assumed that existing units would be eligible for replacement at the end of their useful life and that existing units would reach end of life at an even rate that was inversely proportional to their lifetime. For example, units with an 18 year life would fail at a rate of 1/18, or 6 percent per year.

Market potential

Achievable/market potential refers to the efficiency potential possible given specific program funding levels and designs. Often, program potential studies are referred to as "achievable" in contrast to "maximum achievable." In effect, they estimate the achievable potential from a given set of programs and funding. Of primary importance is the concept of Payback Acceptance Rate. This is the maximum percentage of the marketplace that would be willing to adopt the technology, based solely upon the payback period. This methodology estimates payback acceptance rates based on consumers' stated willingness to pay for energy efficiency projects with different paybacks. The acceptance rate for a technology is calculated given the fraction of consumers who would accept that technology's calculated payback period. The benefit of this approach is its simplicity, transparency and grounding in actual consumer statements; however, it is important to note that consumers' hypothetical self-reported payback threshold generally differs considerably from their actual behavior.

Other constraints may, depending on the technology, include:

Market Applicability Rate: This is the percentage of units that do not face market barriers in implementation. This factor takes into account that in spite of economic feasibility, a measure may face intangible market barriers. A prime example of this is the resistance of consumers to the quality of light produced from CFLs.

Not Yet Adopted Rate: This is the percentage of units that have not already been upgraded to the efficient technology. Because each of the measures considered is commercially available, it is reasonable to expect that some percentage of the market has already adopted the measure and would not be affected by a DSM program.

ICF also included assumptions for free-riders and free-drivers based on Net-to-Gross (NTG) ratios from the CPUC's Energy Efficiency Policy Manual and program evaluation reports for other utilities or markets. The assumptions used are shown in Figure 25.

Sector	Program	NTG
Residential	RES HVAC Equipment	0.80
	RES HVAC System - AC Tuneup	0.80
	RES DHW Equipment	0.80
	RES DHW System - Setpoint, Insulation, Low Flow	0.80
	RES Air Sealing, Insulation, Windows	0.80
	RES HPES	0.80
	RES New Construction	0.90
	RES Weatherization	0.80
	RES Appliances - Window AC	0.80
	RES Refrigerator Turn-In	0.80
	RES Lighting	0.80
	RES Renewables	0.80
	RES TOU - No Enabling	0.95
	RES TOU - Enabling	0.95
	RES DR	0.95
	RES In-Home Display	0.95
	RES Performance Benchmarking	0.55
	RES New Code	0.80
Commercial	CNO Building Shell	0.80
	CNO Lighting	0.80
	CNO Plug Loads	0.80
	CNO HVAC	0.80
	CNO NEW	0.80
	CNO DHW	0.80
	CNO DG	0.95
	CNO Relamp	0.65
Industrial	IND Compressed Air	0.80
	IND Fans	0.80
	IND Pumps	0.80
	IND Drives	0.80
	IND Custom	0.80
	IND HVAC	0.80
	IND Lighting	0.80
	IND Demand Response	0.95
	IND CHP	1.00

Figure 25. Net to Gross Ratios Modeled for ENO

2.2.4. Scenario Generation

Three scenarios, reference case, high case, and low case, were generated for Entergy based on three sets of Avoided Costs shown previously in Figure 16 and Figure 17.

To model the impact of these three scenarios, it was assumed that with high avoided costs, the retail rates would be driven higher as well, and this would impact market acceptance; people would be more likely to participate in energy efficiency programs. For the High Case and Low Case, the applicability of the sector units was modified to reflect this as shown below:

- ENO Market Applicability (High Scenario) –110% times Reference Case
- ENO Market Applicability (Low Scenario) – 85% times Reference Case

The acceptable payback period was also adjusted. The following were used as acceptable payback periods:

- Reference case – 2 years
- High Case – 1 year
- Low Case – 3 years

3. Results

3.1.1. Findings

The results of this analysis are presented in the tables and graphics below.

Entergy New Orleans - 10 Year DSM Potential 2008-2017

		Energy			Demand			10-Year Cumulative Program Cost (Thousands)
		Cumulative MWh Saved by 2017	% of Total Energy Forecast	% of Sales Growth	Cumulative MW Saved by 2017	% of Total Demand Forecast	% of Demand Growth	
Total	Low	57,829	1.29%	9.66%	40	4.36%	48.59%	$18,061
	Reference	114,565	2.56%	19.14%	73	7.94%	61.02%	$37,044
	High	171,499	3.84%	28.65%	102	11.16%	85.77%	$71,115
Residential	Low	27,840	1.75%	10.73%	30	7.45%	51.13%	$14,338
	Reference	63,917	4.01%	24.63%	56	14.00%	96.07%	$30,559
	High	97,919	6.14%	37.73%	78	19.71%	135.29%	$57,889
Commercial	Low	20,265	0.94%	10.49%	9	2.19%	25.86%	$3,123
	Reference	34,322	1.59%	17.77%	14	3.61%	42.66%	$5,215
	High	45,983	2.14%	23.80%	19	4.84%	57.28%	$7,071
Industrial	Low	9,724	1.35%	6.66%	2	1.41%	6.27%	$600
	Reference	16,327	2.27%	11.19%	3	2.34%	10.44%	$1,270
	High	27,598	3.83%	18.91%	5	3.89%	17.34%	$6,155

Figure 26. ENO 10-Year DSM Potential Results

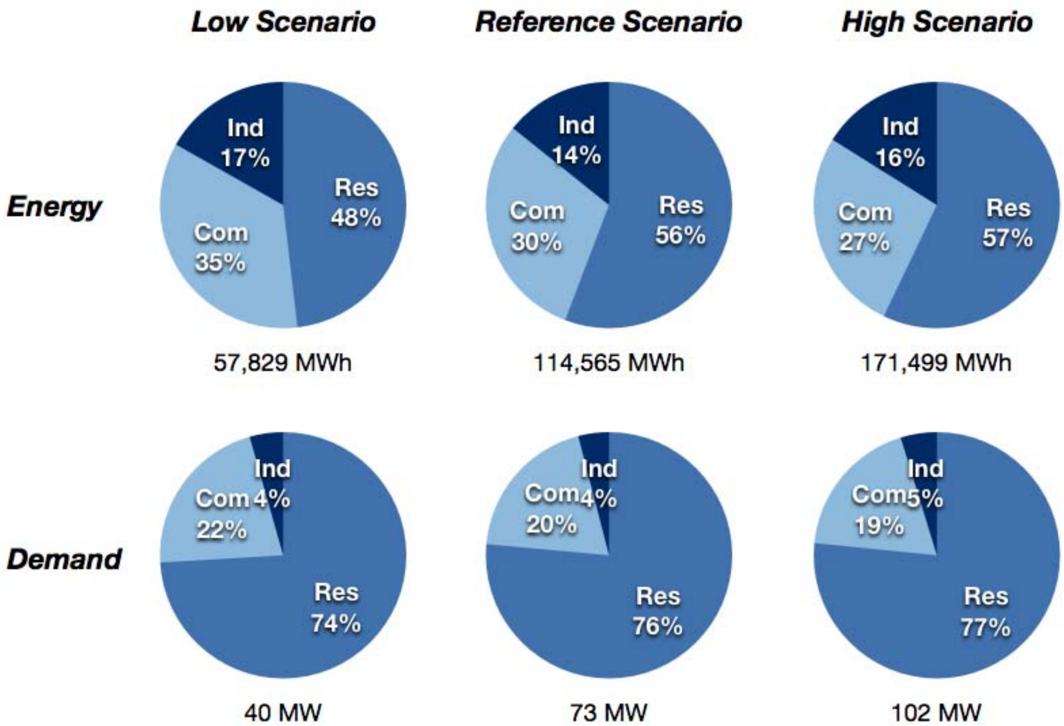

Figure 27. ENO 10-Year DSM Potential Results

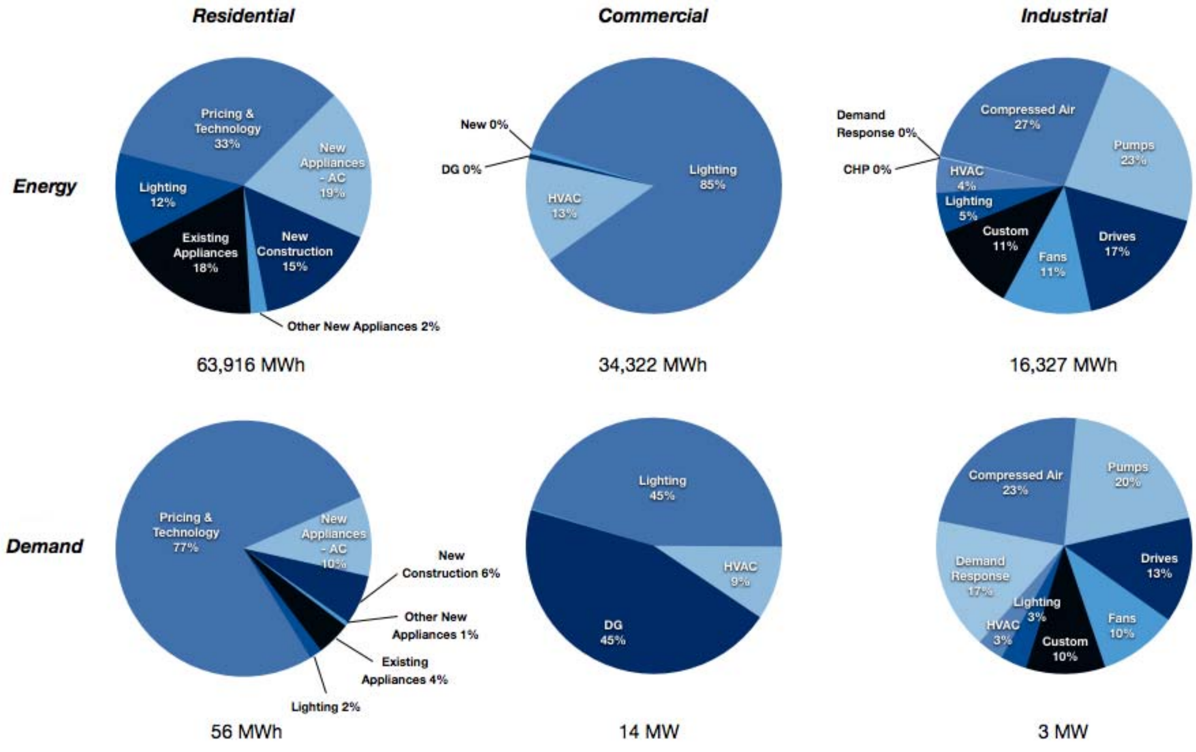

Figure 28. ENO Reference Scenario

	Program	Energy MWh Potential	Percentage Contribution to Savings	TRC	PCT	RIM	UCT	10 Year Cumulative Program Cost (Thousands)
Residential	RES In-Home Display	10,133	16%	4.1	0.0	0.7	4.0	$2,194
	RES DHW System - Setpoint, Insulation, Low Flow	9,931	16%	6.9	18.2	0.6	17.3	$270
	RES New Construction	9,813	15%	1.2	1.9	0.8	6.3	$2,042
	RES Appliances - Window AC	7,571	12%	1.6	3.2	0.7	3.1	$1,728
	RES Lighting	7,440	12%	2.6	12.0	0.6	4.0	$248
	RES TOU - Enabling	6,785	11%	2.2	0.0	0.7	1.3	$4,983
	RES HVAC Equipment	4,626	7%	1.0	2.3	0.6	1.3	$4,741
	RES TOU - No Enabling	3,393	5%	1.4	0.0	0.3	0.7	$2,152
	RES HVAC System - AC Tuneup	1,793	3%	2.2	3.2	0.9	5.6	$245
	RES Performance Benchmarking	1,080	2%	1.6	0.0	0.4	1.5	$306
	RES Refrigerator Turn-In	854	1%	2.5	1126.5	0.3	2.1	$121
	RES DHW Equipment	497	1%	2.3	5.5	0.6	6.7	$51
	RES DR	0	0%	1.9	0.0	1.1	1.1	$11,477
	Total	**63,917**						**$30,559**
Commercial	COM Lighting	29,322	85%	2.9	6.8	0.6	5.8	$3,496
	COM HVAC	4,550	13%	3.7	7.2	0.8	6.0	$802
	COM NEW	231	1%	5.1	10.0	0.7	15.1	$15
	COM DG	219	1%	7.6	3.0	2.9	6.1	$902
	Total	**34,322**						**$5,215**
Industrial	IND Compressed Air	4,452	27%	4.5	8.7	0.7	13.2	$173
	IND Pumps	3,828	23%	3.3	6.4	0.7	9.6	$207
	IND Drives	2,804	17%	2.6	5.0	0.7	7.2	$213
	IND Fans	1,838	11%	2.0	3.9	0.7	5.3	$180
	IND Custom	1,819	11%	2.3	5.0	0.7	4.4	$266
	IND Lighting	832	5%	3.4	6.2	0.7	7.1	$75
	IND HVAC	722	4%	2.1	4.0	0.7	5.7	$81
	IND Demand Response	32	0%	6.0	4.2	1.9	3.1	$76
	IND CHP	0	0%	0.0	0.0	0.0	0.0	$0
	Total	**16,327**						**$1,270**

Figure 29. ENO 10-Year Programs Ranked by Energy Potential

	Program	Demand MW Potential	Percentage Contribution to Savings	TRC	PCT	RIM	UCT	10 Year Cumulative Program Cost (Thousands)
Residential	RES DR	27.1	49%	1.9	0.0	1.1	1.1	$11,477
	RES TOU - Enabling	8.8	16%	2.2	0.0	0.7	1.3	$4,983
	RES In-Home Display	5.4	10%	4.1	0.0	0.7	4.0	$2,194
	RES New Construction	3.5	6%	1.2	1.9	0.8	6.3	$2,042
	RES Appliances - Window AC	2.9	5%	1.6	3.2	0.7	3.1	$1,728
	RES HVAC Equipment	2.7	5%	1.0	2.3	0.6	1.3	$4,741
	RES TOU - No Enabling	1.4	2%	1.4	0.0	0.3	0.7	$2,152
	RES DHW System - Setpoint, Insulation, Low Flow	1.3	2%	6.9	18.2	0.6	17.3	$270
	RES HVAC System - AC Tuneup	1.1	2%	2.2	3.2	0.9	5.6	$245
	RES Lighting	0.9	2%	2.6	12.0	0.6	4.0	$248
	RES Refrigerator Turn-In	0.2	0%	2.5	1126.5	0.3	2.1	$121
	RES Performance Benchmarking	0.2	0%	1.6	0.0	0.4	1.5	$306
	RES DHW Equipment	0.1	0%	2.3	5.5	0.6	6.7	$51
	Total	**55.5**						**$30,559**
Commercial	COM Lighting	6.4	45%	2.9	6.8	0.6	5.8	$3,496
	COM DG	6.4	45%	7.6	3.0	2.9	6.1	$902
	COM HVAC	1.3	9%	3.7	7.2	0.8	6.0	$802
	COM NEW	0.0	0%	5.1	10.0	0.7	15.1	$15
	Total	**14.2**						**$5,215**
Industrial	IND Compressed Air	0.7	23%	4.5	8.7	0.7	13.2	$173
	IND Pumps	0.6	20%	3.3	6.4	0.7	9.6	$207
	IND Demand Response	0.5	16%	6.0	4.2	1.9	3.1	$76
	IND Drives	0.4	14%	2.6	5.0	0.7	7.2	$213
	IND Fans	0.3	10%	2.0	3.9	0.7	5.3	$180
	IND Custom	0.3	9%	2.3	5.0	0.7	4.4	$266
	IND Lighting	0.1	4%	3.4	6.2	0.7	7.1	$75
	IND HVAC	0.1	4%	2.1	4.0	0.7	5.7	$81
	IND CHP	0.0	0%	0.0	0.0	0.0	0.0	$0
	Total	**2.9**						**$1,270**

Figure 30. ENO 10-Year Programs Ranked by Demand Potential

Across the three sectors, 24 different programs were found to have cost-effective market potential in ENO's service territory, including:

Energy Potential	**Demand Potential**
Residential	
• **In-Home Display** • **DHW System – Set Point, Insulation, Low Flow** • **New Construction** • **Appliances – Window AC** • **Lighting** • **TOU – Enabling** • **HVAC Equipment** • **Performance Benchmarking** • **Refrigerator Turn-In** • **DHW Equipment** • **Demand Response**	• **Demand Response** • **TOU-Enabling** • **In-Home Display** • **New Construction** • **Appliances – Window AC** • **HVAC Equipment** • **TOU – No Enabling** • **DHW System – Set Point, Insulation, Low Flow** • **HVAC System – AC Tune-up** • **Lighting** • **Refrigerator Turn-In** • **Performance Benchmarking** • **DHW Equipment**
Commercial	
• **Lighting** • **HVAC** • **NEW** • **DG**	• **Lighting** • **DG** • **HVAC** • **NEW**
Industrial	
• **Compressed Air** • **Pumps** • **Drives** • **Fans** • **Custom** • **Lighting** • **HVAC** • **Demand Response** • **CHP**	• **Compressed air** • **Pumps** • **Demand response** • **Drives** • **Fans** • **Custom** • **Lighting** • **HVAC** • **CHP**

Figure 31. List of cost-effective programs in the Entergy territory