ENERGY EFFICIENCY POTENTIAL STUDY FOR THE STATE OF NEW MEXICO

Volume 1: Executive Summary

June 30, 2011

Global Energy Partners™
An EnerNOC Company

Global Energy Partners
An EnerNOC Company
500 Ygnacio Valley Road, Suite 450
Walnut Creek, CA 94596

P: 925.482.2000
F: 925.284.3147
E: gephq@gepllc.com

Disclaimer

This report was prepared by

Global Energy Partners
An EnerNOC Company
500 Ygnacio Valley Blvd., Suite 450
Walnut Creek, CA 94596

Project Director: Ingrid Rohmund
Project Manager: Bridget Kester

Subcontractor*:*
The Brattle Group
353 Sacramento Street, Suite 1140
San Francisco, CA 94111

Acknowledgements

This material is based upon work supported by the Department of Energy under Award Number(s) DE-EE0000108. It was managed by the State of New Mexico's Energy, Minerals and Natural Resources Department's (EMNRD) Energy, Conservation and Management Division.

For supporting this work, we thank EMNRD Secretary John Bemis and EMNRD staff Ken Hughes, Fernando Martinez, Craig O'Hare (formerly of EMNRD), Brian Johnson, Randy Sweat, Susie Marbury and Harold Trujillo.

For providing utility-specific data that were central to the analysis, we thank Erick Seelinger (PNM), Steve Bean (PNM), Dean Brunton (PNM), Sharon James (PNM), Alena Gilchrist (KEMA/PNM), Jan Nelson (SPS/Xcel), Suzanne Doyle (SPS/Xcel), Heather Hemphill (SPS/Xcel), Mandy McLean (SPS/Xcel), Jeremy Peterson (SPS/Xcel), Ruth Sakya (SPS/Xcel), Paul Royalty (El Paso Electric), Susanne Stone (El Paso Electric), Derek Pearson (El Paso Electric) Steve Casey (NM Gas Company), Dru Jones (NM Gas Company), John Fernald (NM Gas Company), Keven Groenewold (NMRECA), Richard Marquez (NMRECA), Lance Adkins (Farmers' Electric Coop), Mike Sims (Farmington Municipal Electric), Thom Moore (Farmers' Electric Coop), Christine Chavez (Los Alamos Dept. of Public Utilities), Julie Williams-Hill (Los Alamos Dept. of Public Utilities), and Deenise Becenti (Navajo Tribal Utility Authority), all of whom were highly supportive and responsive throughout the data acquisition process.

We would also like to thank the stakeholders that provided valuable comments throughout the study and participated in the various stakeholder meetings, particularly Tammy Fiebelkorn (SWEEP), Keith Freischlag (SWEEP), Tom Singer (NRDC), Jeff Primm (PRC), Leslie Padilla (PRC), Marc Martinez (PRC), Roy Stephenson (PRC), Theresa Becenti-Aquilar (PRC), Brendan Miller (NMEDD), Tom Schuster (City of Las Cruces), Erik Aaboe (Santa Fe County), Luis Duran (NM Workforce), Chris Wentz (Galvin Electric Initiative), Calvin Steckler (PSFA), Birk Jones (Yearout), Robin Harder (ENERGY STAR Homes Program), Victoria Sandoval (Graybar), James McLane (WH Pacific), Phyllis Kaplan (CASA) and Robb Thomson.

Finally, we acknowledge the members of the analysis teams from Global and Brattle:

- Global Energy Partners: Cecilia Arzbaecher, Jan Borstein, Gaynoll Cook, Anthony Duer, Vish Ganti, Debyani Ghosh, Patricia Hurtado, Kelly Marrin, Joe Prijyanonda, King Lee, Barb Ryan, Abigail Sanchez, Greg Wikler, Craig Williamson, Sharon Yoshida
- The Brattle Group: Ahmad Faruqui and Doug Mitarotonda

Sincerely,
Bridget Kester and Ingrid Rohmund
Global Energy Partners

EXECUTIVE SUMMARY

INTRODUCTION

The State of New Mexico's Energy, Minerals and Natural Resources Department's (EMNRD) Energy, Conservation and Management Division contracted with Global Energy Partners to conduct a state-wide energy efficiency (EE) and demand response (DR) market potential study to address utility-level programs in the state. The U.S. Department of Energy (DOE) awarded EMNRD funding for this project through the American Recovery and Reinvestment Act (ARRA) to enhance the State Energy Program.

The 2005 adoption of New Mexico's Efficient Use of Energy Act (EUEA) directs New Mexico to support public utility development of all cost-effective energy efficiency and load management measures. These measures include removing regulatory disincentives and allowing rate recovery of energy efficiency and load management program costs. Under rules set forth by the New Mexico Public Regulation Commission (PRC), investor-owned gas and electric public utilities (El Paso Electric (El Paso), New Mexico Gas, Public Service Company of New Mexico (PNM), and Southwest Public Service (SPS)) must obtain PRC approval of energy efficiency programs, implement those programs, and report their results and costs.

No comprehensive study of the potential for energy efficiency strategies and measures in New Mexico has ever been conducted. A 2008 report prepared by Southwest Energy Efficiency Project (SWEEP)[1] broadly addresses policy options for New Mexico's energy efficiency strategy, but does not analyze potential energy efficiency measures individually, or assess existing saturation levels for each measure. The Tri-State Energy Efficiency Potential Study conducted in 2009[2] provides some estimates for New Mexico for the rural electric co-ops that are a part of Tri-State. Other reports, including a 2005 potential study prepared for (PNM)[3] and a survey of 2006 gas utility demand-side management programs are limited in scope and are based on 2004 data. The New Mexico and federal policies encouraging energy efficiency and the recent increase in federal funding for related projects make evident the need for a detailed, comprehensive, and current potential study that assesses individual energy efficiency measures and considers regional differences within the state.

Objectives

Key objectives for the study include:

- Conduct a state-wide energy efficiency potential study to determine the potential for specific energy efficiency measures to reduce the consumption of natural gas and electricity by regions in New Mexico
- Conduct a state-wide demand response potential study to determine the potential for reduction in peak demand through demand response programs
- Identify energy-efficiency measures that meet the total resource cost (TRC) test
    - Specify measures relating to housing, building structures, and appliances
    - Address climate zones and other geographic considerations, as well as utility service areas
- Analyze various market penetration rates associated with technical, economic, and achievable potential estimates

[1] Southwest Energy Efficiency Project, *Beyond Code: A Guide to Creating Energy Efficient and Sustainable Buildings in the Southwest*, 2008. http://www.swenergy.org/programs/buildings/codes/beyondcode/SWEEP_Beyond_Code_Guide_2008.pdf
[2] Nexant, Cadmus Group, *System Wide Electric Energy Efficiency Potential Study*, 2010.
[3] Itron, *Public Service New Mexico Electric Energy Efficiency Potential Study*, 2006

- Describe and quantify the strategies for implementing those measures in a manner that produces the maximum achievable energy savings
- Run scenarios based on three levels of avoided costs
- Provide information to the public

Report Organization

This report is presented in seven volumes:

Volume 1, Executive Summary

Volume 2, Electric Energy Efficiency Analysis

Volume 3, Natural Gas Energy Efficiency Analysis

Volume 4, Demand Response Analysis

Volume 5, Summary of Potential Estimates and Study References

Volume 6, Appendices to Electric Energy Efficiency Analysis

Volume 7, Appendices to Natural Gas Energy Efficiency Analysis

KEY FINDINGS

This study informs the state of New Mexico about its customer base and the potential for energy savings and peak demand reductions from energy-efficiency (EE) measures and demand response (DR) programs. The key highlights are as follows:

- ***Electricity use in 2009***. There were nearly one million electricity users in the state in 2009. In total, they consumed 21 trillion watt-hours (TWh) of electricity. The residential sector, made up of about 850,000 customers used about 31% of the total. The commercial sector is the largest user with about eight TWh (38% of the total). Industrial sector use is almost equivalent to the residential sector. The sum system peak for the entities in the state was about 4,000 MW in 2009.
- ***Natural gas use in 2009***. In 2009, there were just over 600,000 natural gas customers who used a total of 735 MMTh. The residential sector is the largest; it consumed 340 MMTh or 46% of the total. The commercial and industrial sectors account for 30% and 24% of total natural gas use, respectively.
- ***Electric energy-efficiency savings***. The estimates of achievable potential for savings from electric energy-efficiency measures in 2012 range from 67 to 187 GWh or 0.3–0.9% of the baseline forecast—a forecast that includes the effects of appliance standards, building codes and naturally-occurring conservation but does not include the effect of EE programs beyond 2011. The cumulative achievable savings in 2025 range from 1,473 to 2,656 GWh (6.2% to 11.1% of the baseline forecast). The high end of this range represents 75% of the economic potential in 2025. In addition to annual usage savings, these measures also reduce the peak demand by 189 to 361 MW in 2025 (5–9% of the baseline peak demand forecast). The full incremental cost of achieving this range of savings, plus an additional 15% for program administration costs, results in a cost range of $60–$100 million per year for 2012 to 2025.
- ***Natural gas energy-efficiency savings***. Achievable potential savings for natural gas in 2012 range from 0.5 to 1.9 MMTh or 0.1–0.3% of the baseline forecast. By 2025, cumulative achievable savings range from 28 to 81 MMTh, or 3–9% of the baseline forecast. The high end of this range represents 74% of the economic potential in 2025. The full incremental cost plus administration costs, averaged over the 14 years of the study, are $10–$28 million per year.
- ***Demand response savings***. The range of achievable potential[4] in 2012 is 74 to 99 MW. In 2012, the majority of savings come from direct load control and from traditional curtailable

[4] The low range of achievable potential for demand response reflects the IOU's current plans regarding advanced metering infrastructure (AMI); SPS does not have any plans for AMI and El Paso Electric has advanced meters for its largest customers only. For

tariffs. By 2025, the range is 206 to 287 MW. Direct load control and curtailable tariffs are still the dominant programs, but demand buyback and dynamic pricing in the commercial and industrial sectors also make significant contributions to the total savings. The total cost of achieving the high end of the savings is about $120 million.

The results of this study can be used for policy analysis and planning as well as the development of utility and public programs to support energy efficiency and demand response. The IOUs and many of the rural electric coops and municipal utilities already offer some energy-efficiency programs. This study supports these current efforts and also suggests areas for refinement and new options to consider. Utility-sponsored programs will benefit from other initiatives that work to increase awareness of energy-efficiency as a cost-effective alternative to generation and as a means to reduce carbon emissions. Whenever possible and practical, collaboration will enhance the savings.

ENERGY EFFICIENCY ANALYSIS FOR ELECTRICITY

The analysis of energy efficiency for electricity[5] was performed using a bottom-up analysis approach, shown in Figure 1 and summarized below.

1. Held a meeting with the project team and various stakeholders in the state to refine the study objectives. This resulted in a work plan for the study.
2. Performed a market characterization to describe sector-level electricity use for the residential, commercial, and industrial (C&I) sectors for the base year (2009). This included using utility data and secondary data from sources such as the U.S. Department of Energy's Energy Information Agency (EIA).
3. Utilized primary market research and secondary sources to understand how customers in New Mexico currently use electricity. Combining this information with the market characterization, we developed energy market profiles that describe energy use by sector, segment, and end use for the study's base year, 2009.
4. Developed a baseline electricity forecast by sector, segment, and end use for 2010 through 2025.
5. Identified and analyzed energy-efficiency measures appropriate for New Mexico.
6. Estimated four levels of energy-efficiency potential, *Technical, Economic, Achievable - High, and Achievable - Low*. The estimates for achievable potential for each sector were allocated to each electricity-providing entity in the state.
7. Reviewed the current programs offered in the state and researched program best practices to recommend strategies for achieving savings.

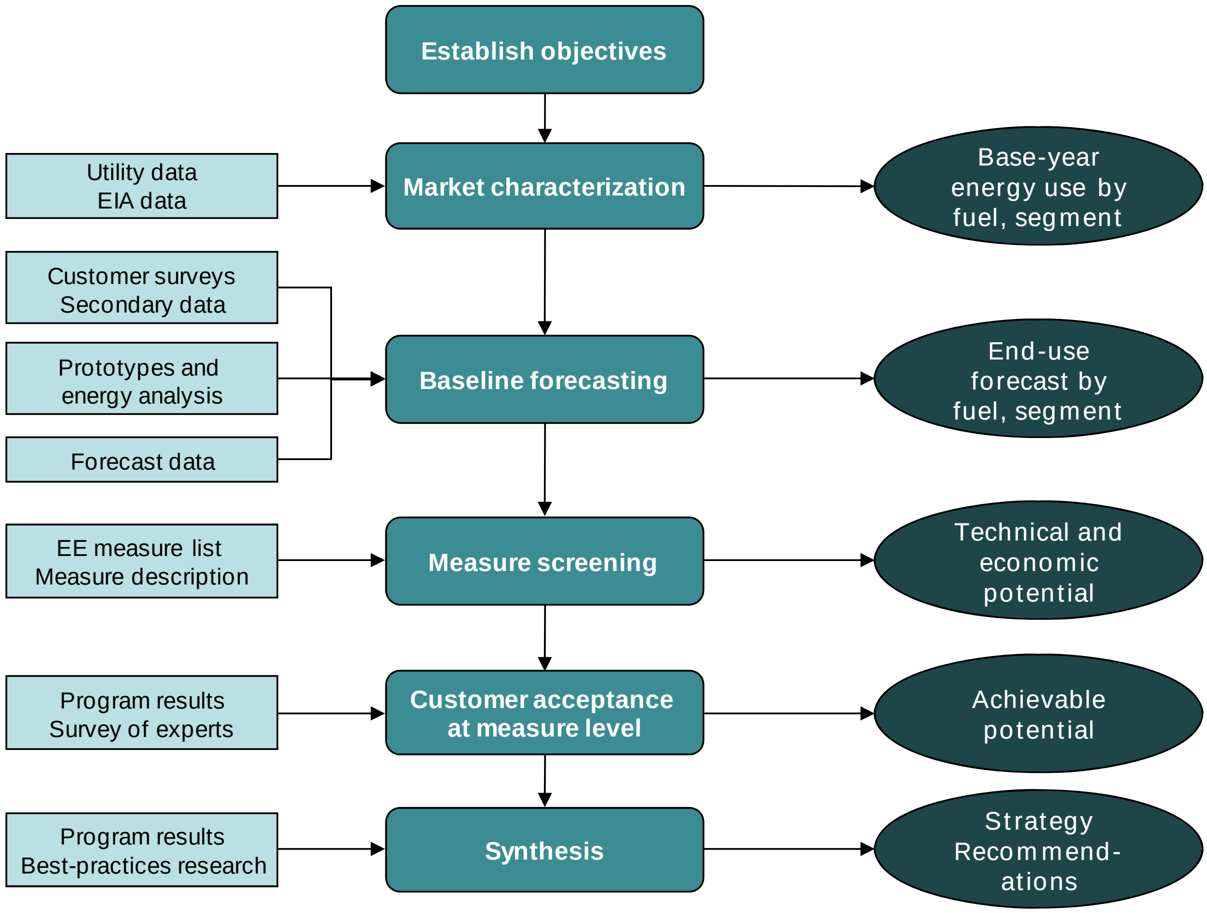
The steps are summarized below and described in further detail in Volume 2, Chapter 2.

For the residential sector, there was a good amount of primary market research available for each of the investor-owned utilities (IOUs). Therefore, the analysis was performed for each IOU individually and for the non-IOUs as a group. For the commercial and industrial sectors, the analysis was performed at the state level.

the non-IOUs, the deployment schedule from the FERC National Assessment of Demand Response was used. The high end of achievable potential assumes that the IOUs will also follow the deployment schedule from the FERC study.

[5] This approach was also used for the analysis of natural gas energy efficiency.

Figure 1 Overview of Analysis Approach



Market Characterization and Baseline Forecast

In 2009, New Mexico's nearly one million electricity customers used 20,902 GWh. The commercial sector is the largest, accounting for 38%, or almost 8,000 GWh. The remaining use is split equally between the residential and industrial sectors. The sum of the peak demand for the entities in the state was nearly 4,000 MW.

Residential Sector

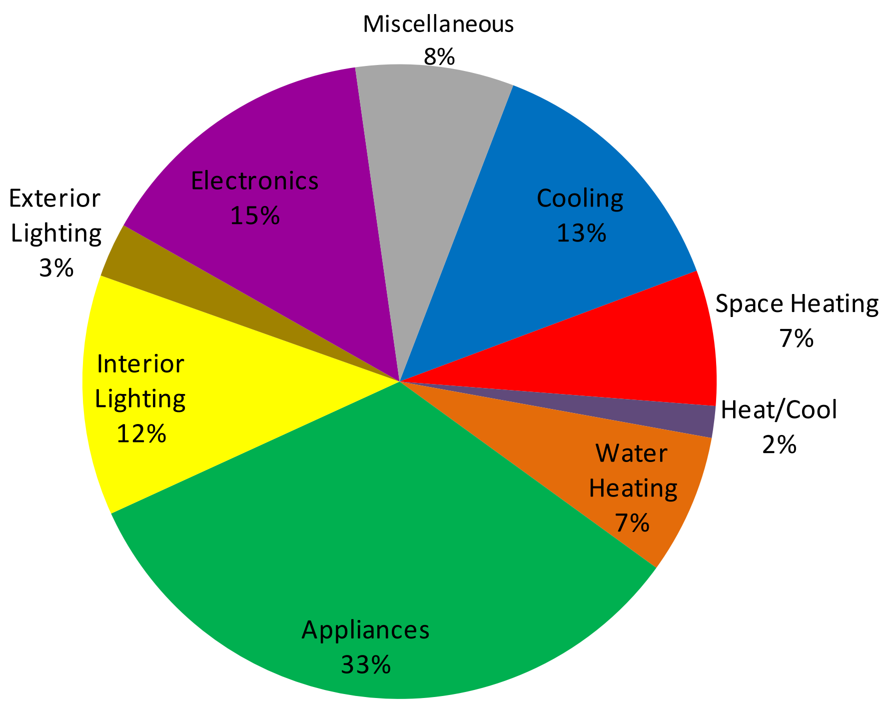
There are about 843,000 residential customers in New Mexico. The sector was segmented by housing type and income level. The largest segment is single-family homes, which account for 47% of electricity use in 2009. The second largest segment is Low Income, which includes all dwelling types but is dominated by single-family homes.

Table 1 Residential Sector Electricity Usage and Intensity by Segment Type

Segment	Intensity (kWh/Household)	Customers	GWh (2009)	% of Total Usage
Non Low Income:				
Single- Family	8,502	356,935	3,035	47%
Multi -Family	5,405	104,434	564	9%
Mobile home	7,030	82,917	583	9%
Low Income	7,675	298,591	2,292	35%
Total	**7,680**	**842,876**	**6,474**	**100%**

For each segment and entity, a snapshot of electricity use by end use and technology was developed. The state-level breakdown is shown in Figure 2. Appliances account for one-third of the usage, followed by lighting and electronics. The electronics end use, which includes personal computers, TVs, home audio, etc., also contributes significantly to household electricity usage. The miscellaneous end use includes such devices as furnace fans, pool pumps, and other "plug" loads (hair dryers, power tools, coffee makers, etc.). Additional electricity consumption is allocated among cooling, space heating, miscellaneous and water heating. Cooling is relatively low in New Mexico due to the high saturation of evaporative cooling in existing homes.

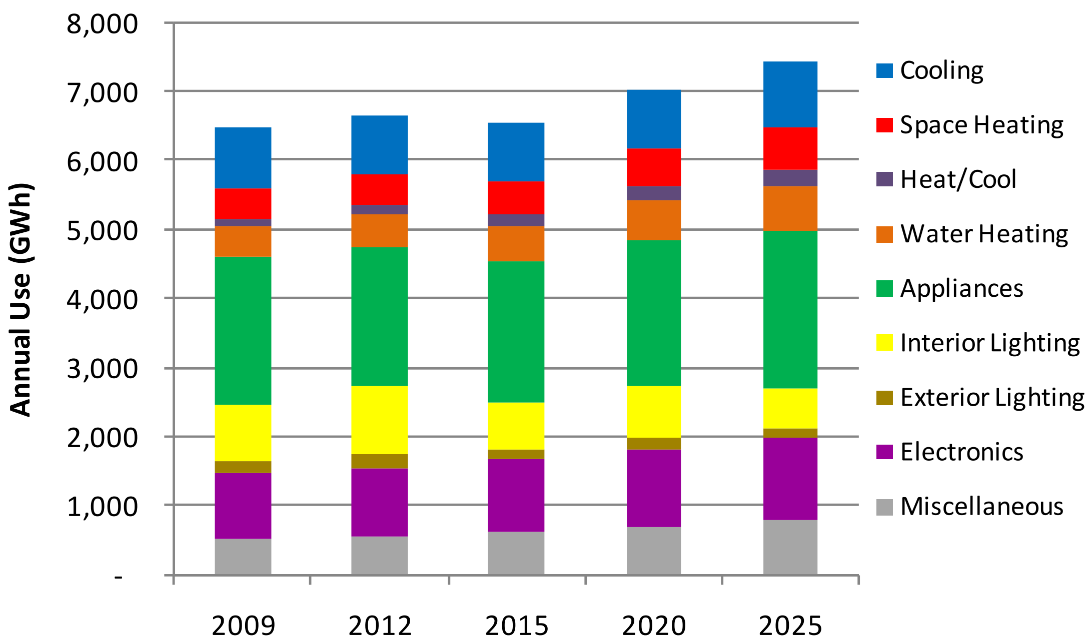
Figure 2 Residential Electricity Use by End Use, 2009



The residential baseline forecast incorporates the effects of future customer growth, trends in appliance ownership, building codes[6], federal appliance standards and customer usage response to changes in electricity prices and household income. As such, it includes naturally-occurring energy efficiency.

Figure 3 presents the baseline forecast at the end-use level for the residential sector as a whole. Overall, residential use increases moderately, from 6,474 GWh in 2009 to 7,421 GWh in 2025, a 14.6% increase. By comparison, the 2011 Annual Energy Outlook forecast for the U.S. increases by 6.9% over the same time horizon. Growth is moderated by the effects of standards, most notably the EISA lighting standard which results in a decrease in interior lighting use by 24% and exterior lighting use by 33% over the forecast period. The growth in saturation of space cooling and appliances is also offset by efficiency standards.

Figure 3 Residential Baseline Electricity Forecast by End Use



Commercial Sector

Total electricity use in the commercial sector in 2009 was 7, 898 GWh. Using data from a statewide survey of business customers as well as secondary sources, total commercial floor space is estimated at 551 million square feet, implying an average intensity of 14.3 kWh per square foot per year.

Figure 4 shows the breakdown of annual electricity usage by end use. Lighting is the largest single end use in the commercial sector, accounting for over one-third of total usage. Cooling is second, followed by commercial refrigeration, miscellaneous, and ventilation. Each of the other end uses accounts for less than 10% of total usage.

Figure 5 illustrates how the end-use composition of electricity use varies by building type. Observations include the following:

- Lighting and cooling are major end uses across all building types
- Refrigeration has the largest share in grocery stores and restaurants
- Office equipment has substantial use in large offices, small offices, health, and colleges

[6] At the time of the analysis, the 2009 New Mexico Building Code was in effect and it was included in the baseline forecast.

- Miscellaneous is highest in health since this end use includes medical equipment
- Electric space heating and water heating are small across all segments, reflecting the high fuel share for natural gas

Figure 4 Commercial Electricity Consumption by End Use, 2009

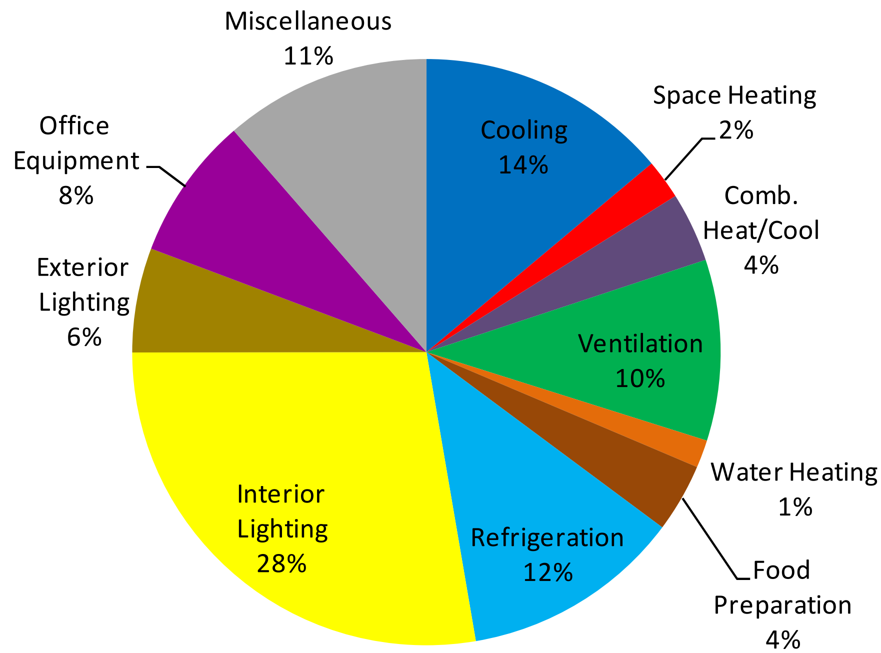
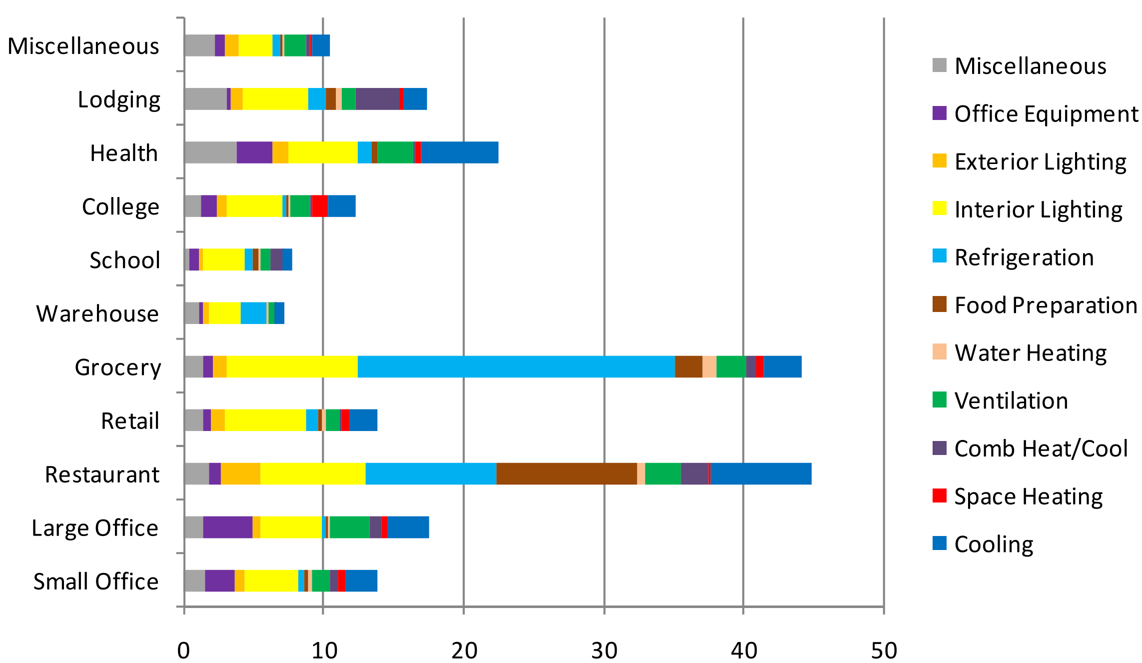
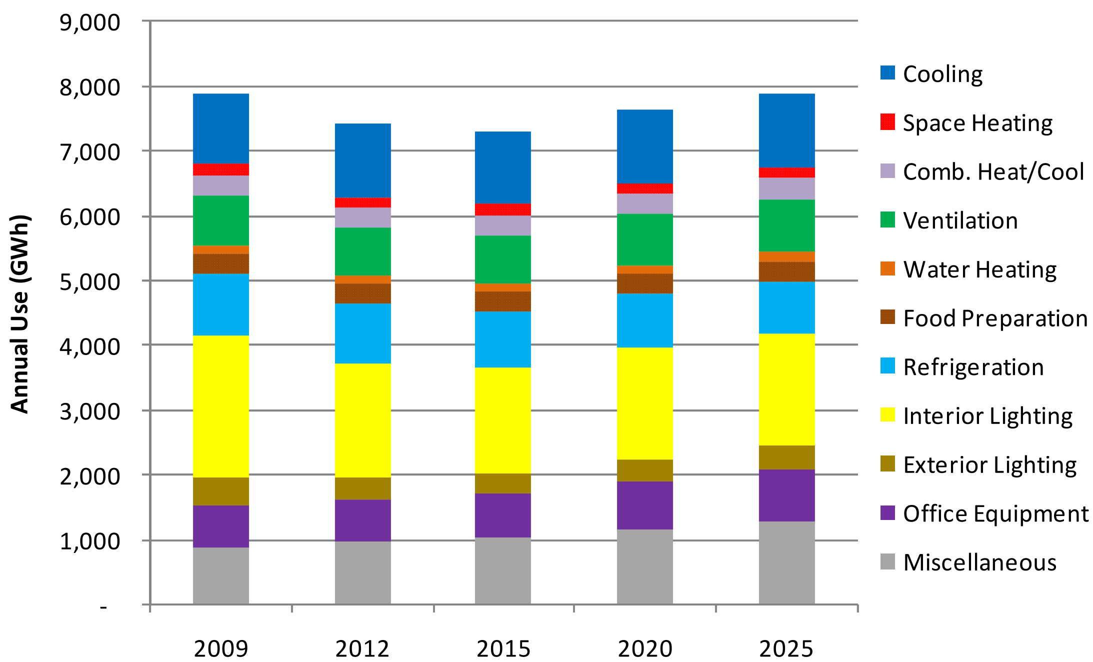


Figure 5 Commercial End Use Electricity Intensities by Building Type, 2009 (kWh/sq. ft.)



Electricity use in the commercial sector remains relatively flat during the forecast horizon. It starts at 7,898 GWh in 2009, decreases from 2010 to 2015 and increases to 7,871 GWh in 2025. Figure 6 presents the baseline forecast at the end-use level for the commercial sector as a whole. Most end uses show modest growth over the forecast period. The exceptions are interior lighting which declines due to the EISA 2007 lighting standards and refrigeration which is affected by the EPACT 2005 standards for refrigeration.

Figure 6 Commercial Baseline Electricity Forecast by End Use



Industrial Sector

With 6,530 GWh, the industrial sector accounts for almost one-third of total electricity sales. Oil and gas extraction and electronics manufacturing are the two largest industries throughout the state, accounting for 2,788 GWh (44%) and 828 (13%) of total industrial sales in 2009. The largest end use across the entire sector is machine drives, which accounts for 61% of electricity use in 2009.

Figure 7 shows the end-use shares of electricity consumption for the major industrial segments in New Mexico in 2009. Machine drives account for about 80% of total electricity use in the oil and gas segment and for about half of use in other industrial. In the electronics manufacturing segment, energy use is distributed more evenly across the end uses.

Figure 7 Industrial Electricity Use by End Use, 2009

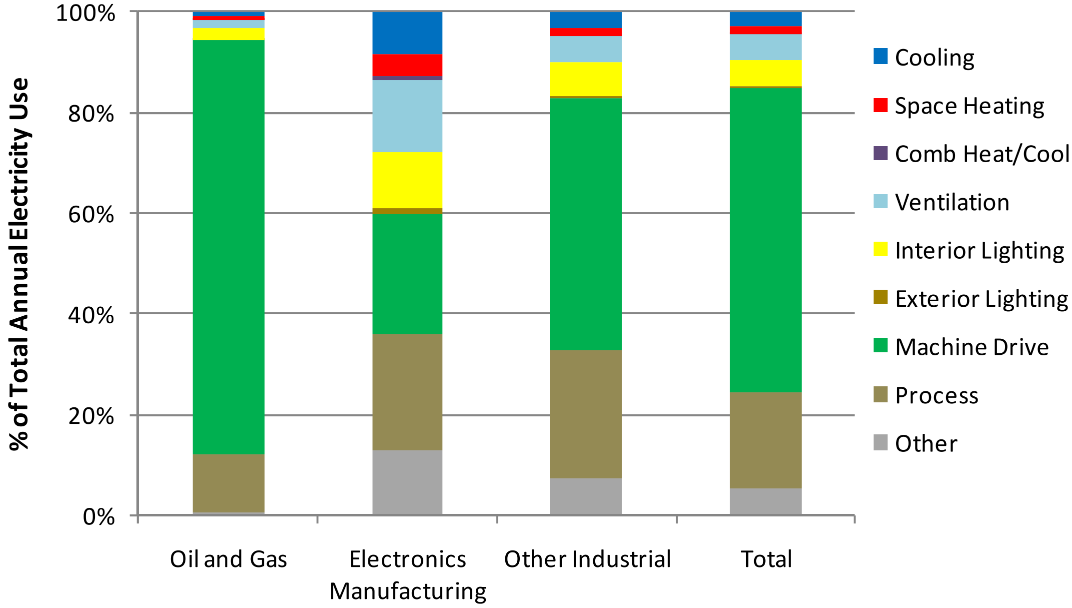
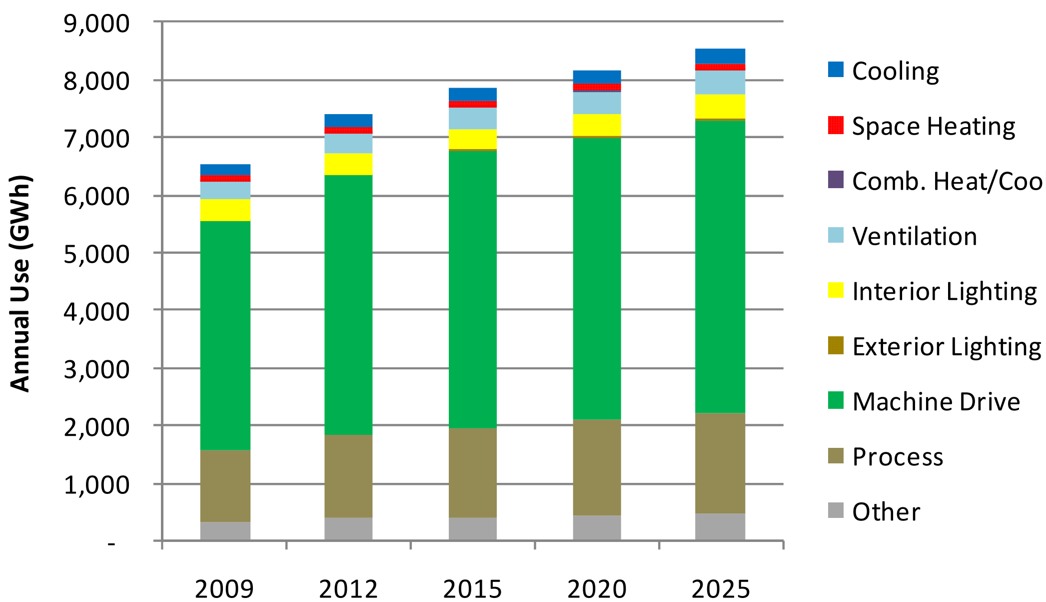


Figure 8 presents the baseline forecast at the end-use level for the industrial sector as a whole. Overall, industrial annual energy use increases steadily from 6,530 GWh in 2009 to 8,538 GWh in 2025, a 30.7% increase. The AEO 2011 forecast increases by 24% over this same time period.

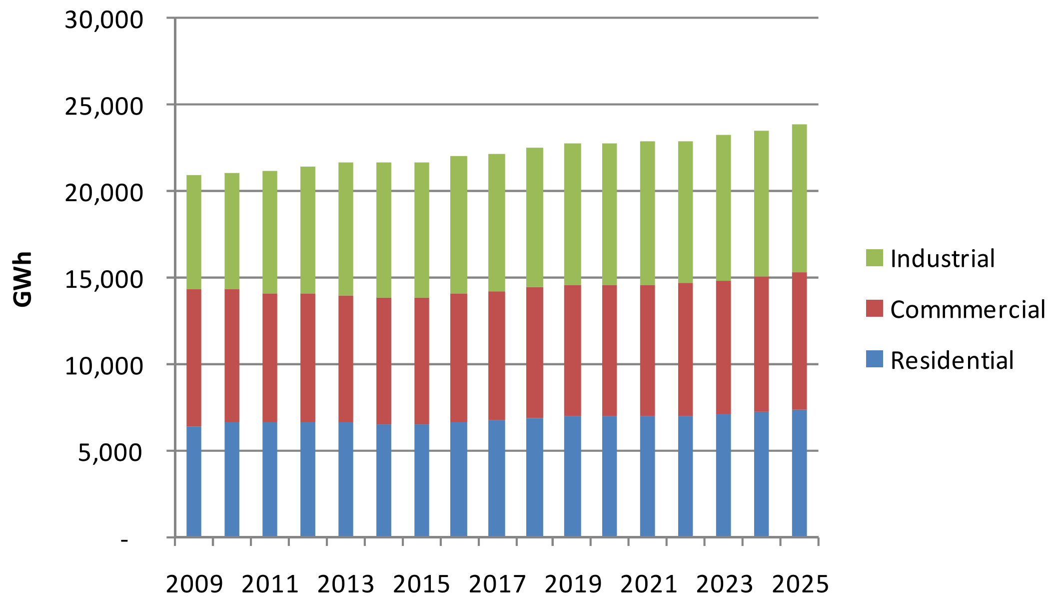
Figure 8 Electricity Industrial Baseline Forecast by End Use



Total Baseline Forecast

Across all sectors, electricity use in New Mexico is expected to increase from 20,902 GWh in 2009 to 23,829 GWh in 2025. This 14% increase over the forecast horizon represents an average annual growth rate of 0.82% per year. Figure 9 illustrates the overall baseline forecast by sector and for New Mexico as a whole. This baseline forecast is the metric against which future savings from energy efficiency programs are measured.

Figure 9 Electricity Baseline Forecast Summary



Definitions of Potential

In this study, we estimate the potential for energy efficiency savings. The savings estimates represent net savings[7] and we developed three types of potential: technical potential, economic potential, and achievable potential. Technical and economic potential are both theoretical limits to efficiency savings. Achievable potential embodies a set of assumptions about the decisions consumers make regarding the efficiency of the equipment they purchase, the maintenance activities they undertake, the controls they use for energy-consuming equipment, and the elements of building construction. For this reason, we developed a range of achievable potential. All four levels are described below.

- ***Technical potential*** is defined as the theoretical upper limit of energy efficiency potential. It assumes that customers adopt all feasible measures regardless of their cost. At the time of equipment failure, customers replace their equipment with the most efficient option available. In new construction, customers and developers also choose the most efficient equipment option. Examples of measures that make up technical potential in the residential sector include:
  - Ductless mini-split air conditioners with variable refrigerant flow
  - Ground source (or geothermal) heat pumps
  - LED lighting for general service and linear applications

  Technical potential also assumes the adoption of every available other measure, where applicable. For example, it includes installation of high-efficiency windows in all new construction opportunities and air conditioner maintenance in all existing buildings with central and room air conditioning. The retrofit measures are phased in over a number of years, which is longer for higher-cost measures.

- ***Economic potential*** represents the adoption of all ***cost-effective*** energy efficiency measures. In this analysis, the total resource cost (TRC) test, which compares lifetime energy and capacity benefits to the incremental cost of the measure, is applied. Economic potential assumes that customers purchase the most cost-effective option at

[7] The baseline forecast, described in Chapter 4, includes naturally occurring conservation. Therefore the potential estimates reflect net, not gross, savings.

the time of equipment failure and also adopt every other cost-effective and applicable measure.

- ***Achievable - High potential*** takes into account expected program participation resulting from ideal implementation conditions and customer preferences for energy-efficient technologies. Achievable - High establishes a maximum target for the EE savings that a utility can hope to achieve through its EE programs and involves incentives that represent a substantial portion of the incremental cost combined with high administrative and marketing costs.
- ***Achievable - Low potential*** represents a lower bound on Achievable potential. It reflects limited DSM budgets and significant barriers to customer acceptance.

Potential Savings from Electric Energy Efficiency

Table 2 presents the baseline forecasts of energy consumption and peak demand, as well as the four levels of energy-efficiency potential across sectors. The baseline forecast across all sectors increases over the 16-year time period at a moderate average annual growth rate of 0.8%. Growth in residential customers and industrial activity is partially offset by appliance and equipment standards, building codes, and a sluggish economy. Key findings related to energy-efficiency potentials are summarized below.

- ***Achievable - Low potential*** across all sectors is 67 GWh in 2012 and increases to 1,473 by 2025. This represents 0.3% of the baseline forecast in 2012 and 6.2% in 2025. By 2025, Achievable – Low offsets 62% of the growth in the baseline forecast. Peak demand savings from energy-efficiency measures are 6 MW in 2012, which represents 0.2% of the baseline forecast of peak demand. By 2025, peak demand savings reach 189 MW, 4.5% of the baseline peak demand forecast.
- ***Achievable - High potential*** is 187 GWh in 2012, which represents 0.9% of the baseline forecast. By 2025, the cumulative savings are 2,656 GWh, 11.1% of the baseline forecast, for an annual average of just under 1% per year. By 2025, Achievable – High offsets more than 100% of the growth in the baseline forecast. Peak demand savings are 18 MW in 2012, which represents 0.5% of the baseline forecast of peak demand. By 2025, peak demand savings reach 361 MW, 8.7% of the baseline peak demand forecast.
- ***Economic potential***, which reflects the savings when all cost-effective measures are taken, is 576 GWh in 2012. This represents 2.7% of the baseline energy forecast. By 2025, economic potential reaches 3,510 GWh, 14.7% of the baseline energy forecast. Peak demand savings are 51 MW in 2012, which represents 1.3% of the baseline forecast of peak demand. By 2025, peak demand savings reach 491 MW, 11.8% of the baseline peak demand forecast.
- ***Technical potential***, which reflects the adoption of all energy efficiency measures regardless of cost-effectiveness, is a theoretical upper bound on savings. In 2012, energy savings are 695 GWh, or 3.2% of the baseline energy forecast. By 2025, technical potential reaches 4,770 GWh, 20.0% of the baseline energy forecast. Peak demand savings are 70 MW in 2012, which represents 1.8% of the baseline forecast of peak demand. By 2025, peak demand savings reach 851 MW or 20.4% of the baseline peak demand forecast.

Figure 10 summarizes the energy-efficiency savings for the four levels of potential relative to the baseline forecast. Figure 11 displays the energy-efficiency forecasts[8].

[8] Annual savings are shown in Appendix I.

Table 2 Summary of Electricity Energy Efficiency Potential

	2012	2015	2020	2025
Baseline Forecast	21,450	21,697	22,820	23,829
Energy Savings (GWh)				
Achievable - Low	67	246	810	1,473
Achievable - High	187	573	1,488	2,656
Economic	576	1,171	2,170	3,510
Technical	695	1,520	2,998	4,770
Energy Savings (% of Baseline)				
Achievable - Low	0.3%	1.1%	3.5%	6.2%
Achievable - High	0.9%	2.6%	6.5%	11.1%
Economic	2.7%	5.4%	9.5%	14.7%
Technical	3.2%	7.0%	13.1%	20.0%
Peak Savings (MW)				
Achievable - Low	6	25	95	189
Achievable - High	18	61	184	361
Economic	51	123	273	491
Technical	70	190	461	851
Peak Savings (% of Baseline)				
Achievable - Low	0.2%	0.6%	2.4%	4.5%
Achievable - High	0.5%	1.6%	4.6%	8.7%
Economic	1.3%	3.2%	6.8%	11.8%
Technical	1.8%	4.9%	11.6%	20.4%

Figure 10 Summary of Electricity Potential Energy Savings

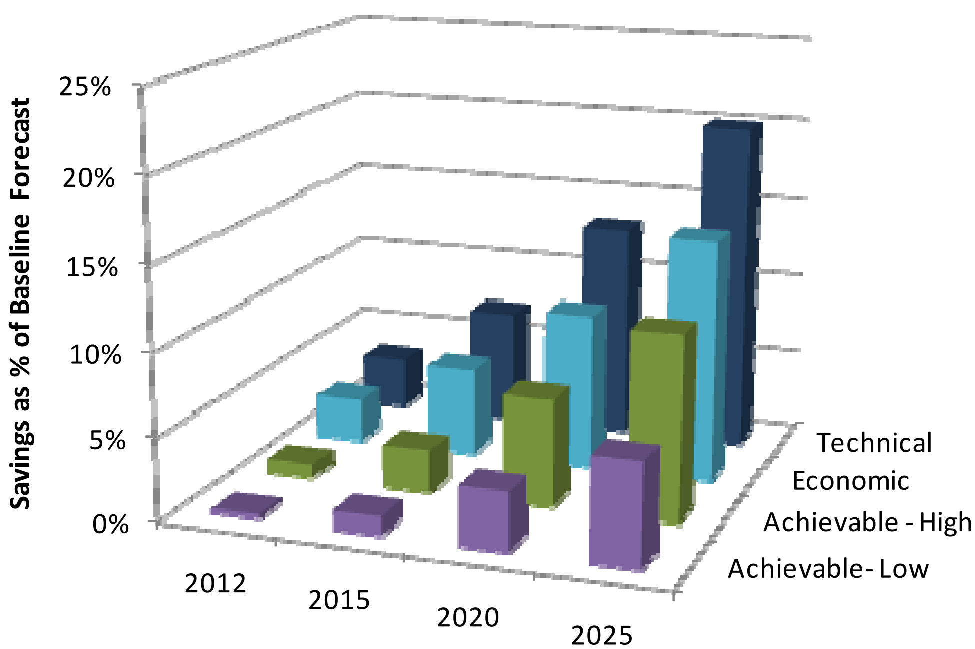


Figure 11 Electricity Energy Efficiency Potential Energy Forecasts (GWh)

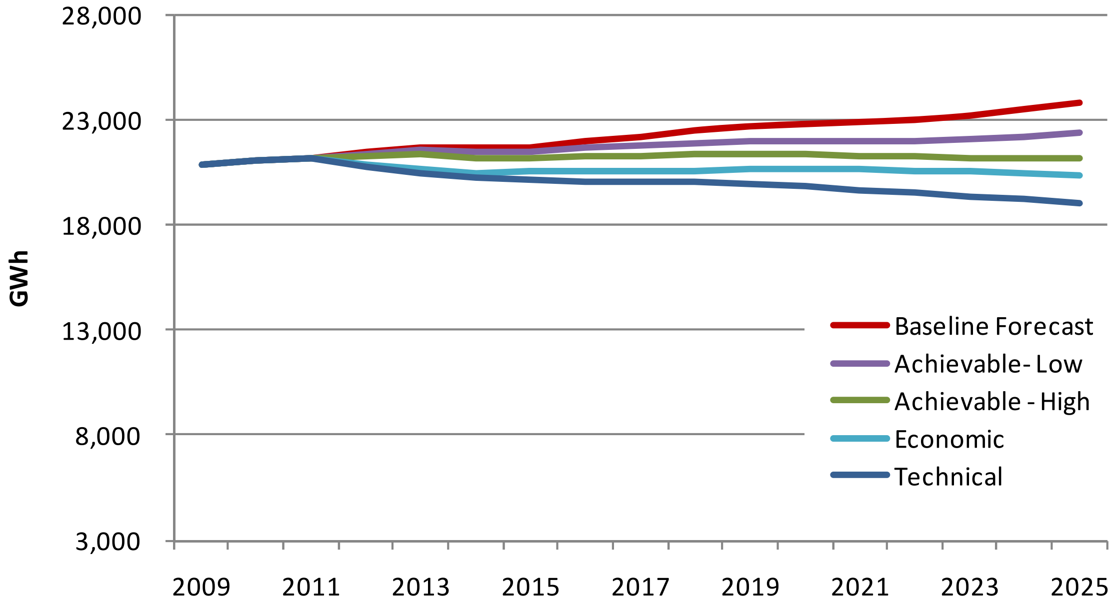


Figure 12 summarizes the range of achievable potential by sector. The residential sector accounts for the largest portion of the savings — about half of the Achievable - Low potential in 2025 — followed by the industrial sector.

Figure 12 Electricity Achievable Potential by Sector, 2025

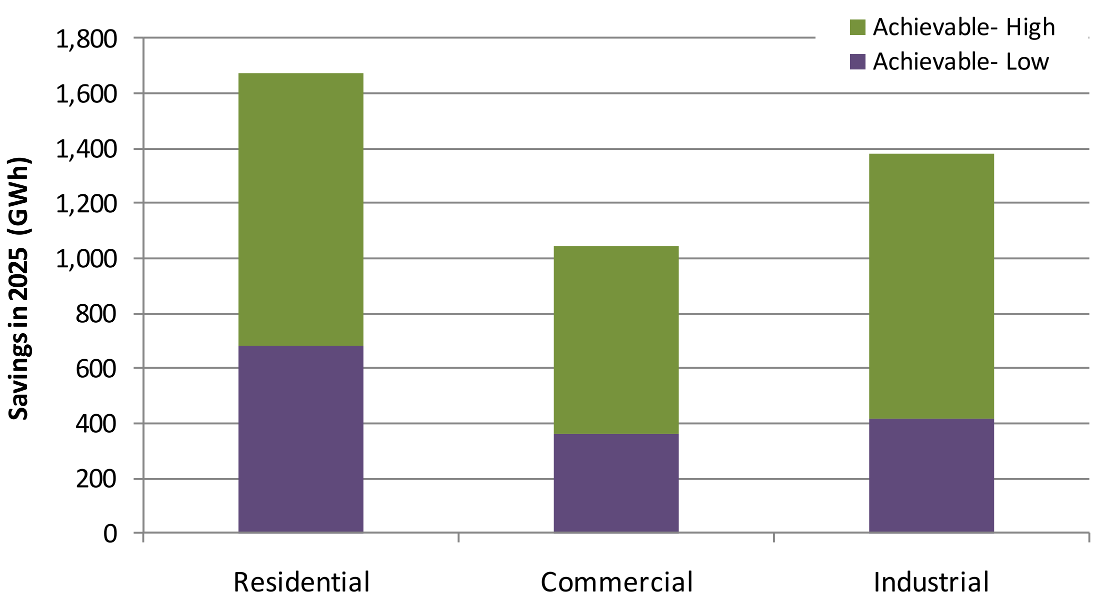


Table 3 presents the efficiency savings potential by each of the New Mexico utilities (entities). These estimates are a summation of the sector-level estimates presented and described in Volume 2.

Table 3 Electricity Efficiency Potential by Entity (MWh)

Utility	Type	2012	2015	2020	2025
IOUs					
PNM	Achievable - Low	32,698	124,688	384,903	608,747
	Achievable – High	88,694	278,959	664,103	1,009,478
	Economic	292,240	584,198	970,335	1,334,780
SPS	Achievable - Low	9,652	36,022	135,534	292,214
	Achievable – High	28,563	88,169	265,485	570,043
	Economic	78,439	175,588	385,997	753,475
El Paso	Achievable - Low	4,267	15,196	47,553	82,622
	Achievable – High	11,484	34,151	83,458	136,910
	Economic	39,778	71,455	121,707	180,057
Non IOU					
Aztec City of	Achievable - Low	175	636	1,903	2,953
	Achievable – High	467	1,441	3,344	4,764
	Economic	1,521	3,052	5,045	6,380
Central New Mexico El Coop, Inc	Achievable – Low	915	3,251	10,630	19,939
	Achievable – High	2,543	7,391	19,015	34,652
	Economic	8,700	15,499	27,685	45,590
Central Valley Electric Coop, Inc	Achievable – Low	1,324	4,461	18,544	48,073
	Achievable – High	4,390	12,230	41,350	103,376
	Economic	9,857	21,656	58,139	135,652
Columbus Electric Coop, Inc	Achievable – Low	299	1,095	3,314	5,178
	Achievable – High	808	2,553	6,082	8,787
	Economic	2,418	5,317	9,261	11,923
Continental Divide El Coop Inc	Achievable – Low	1,378	4,894	16,274	31,337
	Achievable – High	3,916	11,543	30,605	57,364
	Economic	12,087	23,484	44,711	75,812
Duncan Valley Elec Coop, Inc	Achievable – Low	16	56	186	358
	Achievable – High	44	124	323	607
	Economic	162	266	465	794
Farmers' Electric Coop, Inc	Achievable – Low	1,027	3,618	12,707	26,562
	Achievable – High	3,036	8,911	25,302	51,721
	Economic	8,484	17,485	36,707	68,382
City of Farmington	Achievable – Low	3,393	12,049	40,153	77,599
	Achievable – High	9,754	29,099	77,886	146,318
	Economic	27,827	58,044	114,176	193,744
City of Gallup	Achievable – Low	809	2,965	8,829	13,344
	Achievable – High	2,183	6,975	16,362	22,715
	Economic	6,187	14,388	25,050	30,930

Utility	Type	2012	2015	2020	2025
Jemez Mountains Elec Coop, Inc	Achievable – Low	1,471	5,308	16,187	26,398
	Achievable – High	3,940	11,849	27,926	42,438
	Economic	13,647	25,351	41,591	56,255
Kit Carson Electric Coop, Inc	Achievable – Low	1,189	4,258	13,370	23,242
	Achievable – High	3,240	9,606	23,536	38,996
	Economic	11,076	20,324	34,697	51,461
Lea County Electric Coop, Inc	Achievable – Low	1,911	6,846	23,216	45,468
	Achievable – High	5,658	17,486	48,362	91,503
	Economic	13,249	33,564	71,784	122,599
Los Alamos County	Achievable – Low	1,052	3,542	14,517	37,247
	Achievable – High	3,454	9,577	31,967	79,445
	Economic	8,057	17,113	44,877	104,058
Mora-San Miguel Elec Coop, Inc	Achievable – Low	345	1,234	3,795	6,370
	Achievable – High	913	2,642	6,179	9,726
	Economic	3,577	5,834	9,049	12,704
Navajo Tribal Utility Authority	Achievable – Low	431	1,539	4,954	9,008
	Achievable – High	1,204	3,593	9,165	16,063
	Economic	3,756	7,385	13,499	21,260
Navopache Electric Coop, Inc	Achievable – Low	52	186	570	936
	Achievable – High	137	404	944	1,438
	Economic	515	886	1,397	1,898
Northern Rio Arriba E Coop Inc	Achievable – Low	167	592	1,934	3,648
	Achievable – High	464	1,334	3,427	6,307
	Economic	1,630	2,812	4,963	8,254
Otero County Electric Coop Inc	Achievable – Low	683	2,422	8,077	15,611
	Achievable – High	1,906	5,484	14,399	27,204
	Economic	6,665	11,537	20,837	35,722
Raton Public Service Company	Achievable – Low	195	694	2,225	4,038
	Achievable – High	536	1,562	3,916	6,863
	Economic	1,872	3,304	5,716	9,010
Rio Grande Electric Coop, Inc	Achievable – Low	10	36	115	212
	Achievable – High	27	78	196	348
	Economic	101	169	285	457
Socorro Electric Coop, Inc	Achievable – Low	649	2,324	7,438	13,352
	Achievable – High	1,793	5,335	13,438	23,161
	Economic	5,869	11,130	19,802	30,676
Southwestern Electric Coop Inc	Achievable – Low	627	1,991	10,002	30,677
	Achievable – High	2,347	6,173	24,438	69,785
	Economic	4,140	9,702	33,470	91,127
Springer Electric Coop, Inc	Achievable – Low	427	1,399	6,349	17,961
	Achievable – High	1,500	4,057	14,823	39,824
	Economic	3,019	6,792	20,543	52,084

Utility	Type	2012	2015	2020	2025
Springer, Town of	Achievable – Low	22	80	243	391
	Achievable – High	59	174	403	600
	Economic	218	381	598	791
Tri-County Electric Coop, Inc	Achievable – Low	0	0	1	2
	Achievable – High	0	1	2	3
	Economic	1	2	3	3
City of Truth or Consequences	Achievable – Low	184	669	2,045	3,283
	Achievable – High	493	1,514	3,593	5,342
	Economic	1,640	3,223	5,408	7,170
Roosevelt County Elec Coop Inc	Achievable – Low	465	1,596	6,089	14,347
	Achievable – High	1,433	3,989	12,342	28,684
	Economic	4,101	7,654	17,427	37,549
Sierra Electric Coop, Inc	Achievable – Low	164	595	1,830	3,006
	Achievable – High	437	1,310	3,098	4,723
	Economic	1,579	2,843	4,613	6,279
Western Area Power Administration	Achievable – Low	585	2,173	6,311	8,783
	Achievable – High	1,601	5,425	12,720	16,330
	Economic	3,335	10,699	19,907	22,755
Grand Total	Achievable – Low	66,580	246,415	809,798	1,472,909
	Achievable – High	187,026	573,143	1,488,190	2,655,516
	Economic	575,746	1,171,136	2,169,742	3,509,632

Residential Sector Potential

The baseline forecast in the residential sector shows moderate growth despite the Energy Independence and Security Act (EISA) standard that decreases lighting use after 2012 and appliance standards that take effect in 2014. Key findings related to potential for the residential sector are shown in Table 4 and summarized below.

- ***Achievable - Low potential*** projects 36 GWh of energy savings in 2012, 0.5% of the baseline forecast. This increases to 684 GWh, 9.2% of the baseline forecast, in 2025. Peak demand savings under the Achievable - Low potential are projected to be 2 MW, 0.2% of the baseline peak demand forecast, in 2012. The savings increase to 83 MW by 2025 or 5.5% of the baseline forecast. Peak demand savings are lower than energy savings because the majority of savings come from lighting and the lighting peak is not coincident with the system peak.
- ***Achievable - High potential*** is 95 GWh in 2012, which represents 1.4% of the baseline forecast. By 2025, the cumulative energy savings are 990 GWh, 13.3% of the baseline forecast. Peak demand savings are 6 MW, which represents 0.5% of the baseline forecast of peak demand. By 2025, peak demand savings reach 127 MW, 8.5% of the baseline peak demand forecast.
- ***Economic potential*** is 398 GWh in 2012. This represents 6% of the baseline energy forecast. By 2025, economic potential reaches 1.275 GWh, 17.2% of the baseline energy forecast. Peak demand savings in 2012 are 27 MW, which represents 2.0% of the baseline forecast of peak demand. By 2025, peak demand savings reach 169 MW, 11.3% of the baseline peak demand forecast.

- ***Technical potential*** energy savings in 2012 are 489 GWh, or 7.4% of the baseline energy forecast. By 2025, technical potential reaches 1,752 GWh, 23.6% of the baseline energy forecast. Peak demand savings are 41 MW in 2012, which represents 3.1% of the baseline forecast of peak demand. By 2025, peak demand savings reach 395 MW or 26.4% of the baseline peak demand forecast. The fact that peak demand savings under technical potential are relatively higher than the other types of potential reflects the fact that several air-conditioning related measures are available but not cost-effective.

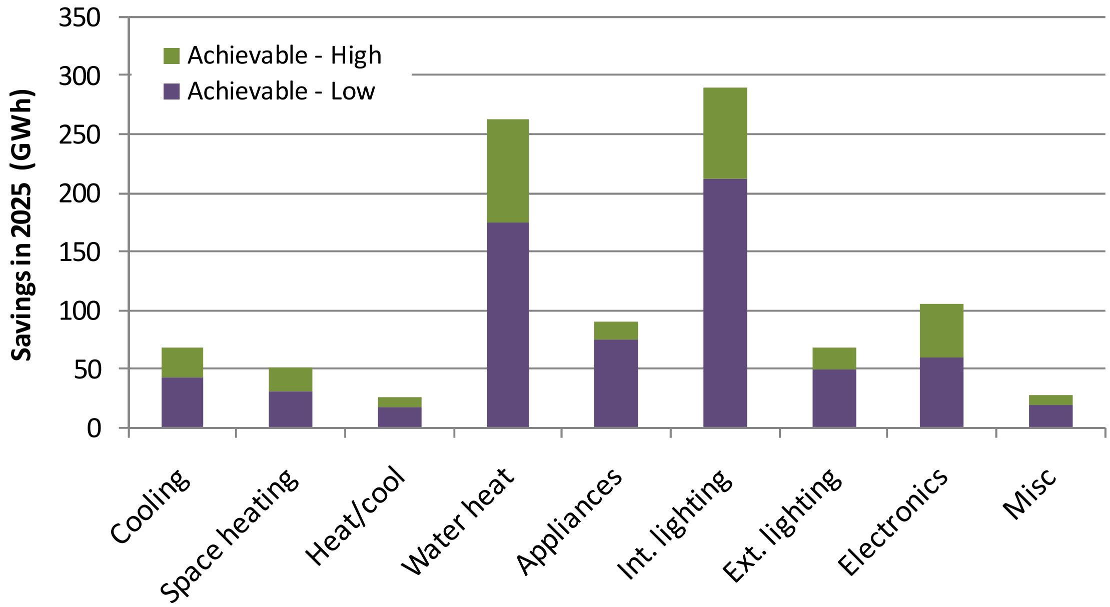
Table 4 Electricity Energy Efficiency Potential for the Residential Sector

	2012	2015	2020	2025
Baseline Forecast	6,646	6,539	7,035	7,421
Cumulative Energy Savings (GWh)				
Achievable – Low	36	137	428	684
Achievable – High	95	281	651	990
Economic	398	631	925	1,275
Technical	489	904	1,422	1,752
Energy Savings (% of Baseline)				
Achievable - Low	0.5%	2.1%	6.1%	9.2%
Achievable - High	1.4%	4.3%	9.3%	13.3%
Economic	6.0%	9.7%	13.1%	17.2%
Technical	7.4%	13.8%	20.2%	23.6%
Peak Demand Savings (MW)				
Achievable - Low	2	10	42	83
Achievable - High	6	21	65	127
Economic	27	48	92	169
Technical	41	101	225	395
Peak Demand Savings (% of Baseline)				
Achievable - Low	0.2%	0.7%	3.0%	5.5%
Achievable - High	0.5%	1.5%	4.6%	8.5%
Economic	2.0%	3.6%	6.6%	11.3%
Technical	3.1%	7.5%	16.2%	26.4%

Savings in the residential sector are dominated by interior lighting and water heating. Figure 13 presents the range of achievable potential savings by end use

- Lighting equipment replacement accounts for the highest portion of the savings as a result of the gap between advanced incandescent lamps, which are assumed to be the baseline technology after the EISA standards take effect, and CFL lamps and LED lamps. The majority of lighting savings are captured by the Achievable - Low case.
- Water heating also accounts for large savings because heat pump water heaters are cost-effective starting in 2012.
- Electronics, appliances, and cooling measures also contribute significantly to the savings, although there is considerable room for additional savings beyond the Achievable - Low case.
- Because of the relatively small share of homes with electric space heating and the limited opportunity for higher efficiency equipment, there are only minor contributions from this end use.

Figure 13 Electricity Residential Achievable Potential by End Use in 2025



Commercial Sector Potential

The baseline forecast for the commercial sector essentially remains flat, which reflects the sluggish economy, building codes, and relatively efficient energy-use patterns. Nevertheless, the opportunity for energy-efficiency savings is still significant for the commercial sector.

- ***Achievable - Low potential*** projects 23 GWh of energy savings in 2012 and 361 GWh in 2025. This corresponds to 0.3% of the baseline forecast in 2012 and 4.6% in 2025. Peak demand savings under Achievable - Low are projected to be 3 MW, 0.2% of the baseline peak demand forecast, in 2012. The savings increase to 63 MW or 4.6% of the baseline forecast by 2025.
- ***Achievable - High potential*** is 63 GWh in 2012, which represents 0.8% of the baseline forecast. By 2025, the cumulative energy savings are 681 GWh, 8.7% of the baseline forecast. In 2012, peak demand savings are 9 MW, which represents 0.7% of the baseline forecast of peak demand. By 2025, peak demand savings reach 134 MW, 9.8% of the baseline peak demand forecast.
- ***Economic potential*** is 130 GWh in 2012. This represents 1.8% of the baseline energy forecast. By 2025, economic potential reaches 950 GWh, 12.1% of the baseline energy forecast. Peak demand savings in 2012 are 19 MW, which represents 1.4% of the baseline forecast of peak demand. By 2025, peak demand savings reach 189 MW, 13.8% of the baseline peak demand forecast.
- ***Technical potential*** energy savings in 2012 are 144 GWh, or 1.9% of the baseline energy forecast. By 2025, technical potential reaches 1,425 GWh, 18.1% of the baseline energy forecast. Peak demand savings are 21 MW in 2012, which represents 1.6% of the baseline forecast of peak demand. By 2025, peak demand savings reach 264 MW or 19.3% of the baseline peak demand forecast.

Table 5 Electricity Energy Efficiency Potential for the Commercial Sector

Forecasts (GWh)	2012	2015	2020	2025
Baseline Forecast	7,410	7,285	7,623	7,871
Cumulative Energy Savings (GWh)				
Achievable – Low	23	86	253	361
Achievable – High	63	215	513	681
Economic	130	424	804	950
Technical	144	468	1,014	1,425
Energy Savings (% of Baseline)				
Achievable - Low	0.3%	1.2%	3.3%	4.6%
Achievable - High	0.8%	3.0%	6.7%	8.7%
Economic	1.8%	5.8%	10.5%	12.1%
Technical	1.9%	6.4%	13.3%	18.1%
Peak Demand Savings (MW)				
Achievable - Low	3	12	39	63
Achievable - High	9	32	87	134
Economic	19	64	136	189
Technical	21	72	170	264
Peak Demand Savings (% of Baseline)				
Achievable - Low	0.2%	1.0%	2.9%	4.6%
Achievable - High	0.7%	2.5%	6.5%	9.8%
Economic	1.4%	4.9%	10.1%	13.8%
Technical	1.6%	5.5%	12.6%	19.3%

Figure 14 focuses on the range of achievable potential for each segment. Retail has the largest savings potential in 2025 with 65 GWh — 95 GWh. The achievable savings for retail are 21% of the overall C&I Achievable - Low potential and 7.9% of the Retail segment baseline forecast. Retail and Lodging have the highest Achievable - Low potential as a percentage of the baseline forecast with 7.9%, followed by Offices (Small and Large combined) with 6.9%.

Figure 15 presents the commercial sector achievable savings by end use in 2025. Not surprisingly, lighting delivers the highest achievable savings. Cooling and exterior lighting are next highest in terms of Achievable - Low potential, followed by water heating and refrigeration.

The greatest savings in 2025 come from:

- Replacement of interior screw-in lighting systems (138 GWh)
- Replacement of exterior lighting systems with HID lamps (34 GWh)
- Installation of energy management systems (24 GWh)
- Replacement of water heating equipment (23 GWh)

Together, these four measures account for more than 60% of the Achievable - Low potential savings in the commercial sector in 2025.

Figure 14 Electricity Achievable Potential Savings in 2025 by Commercial Building Type (GWh)

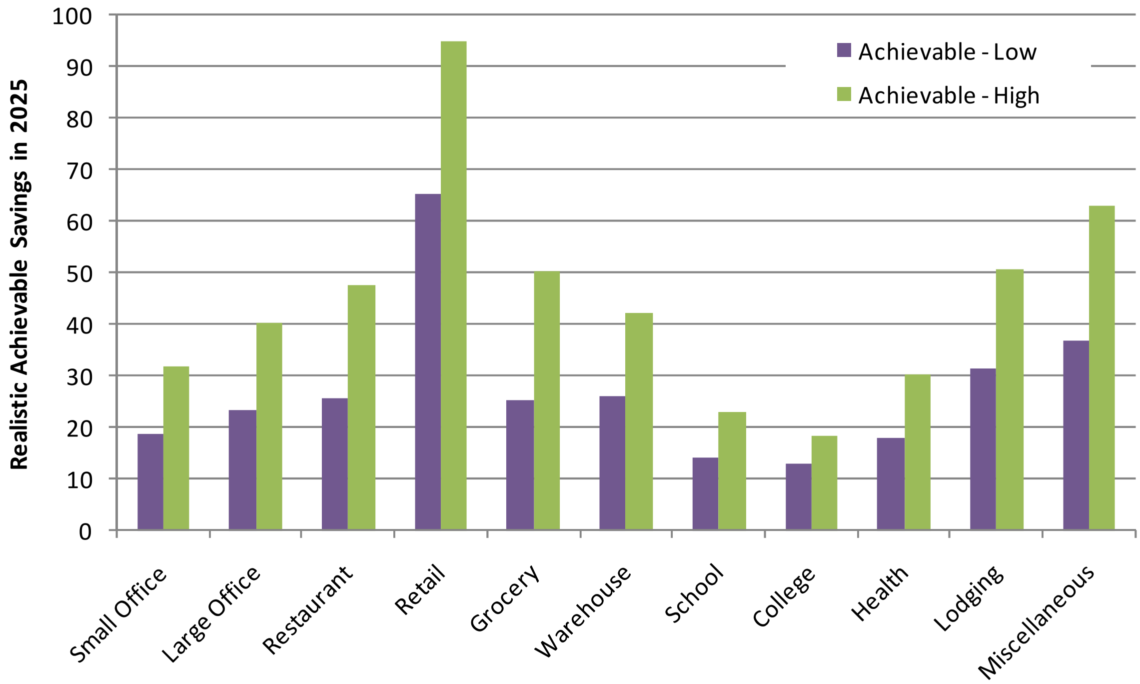
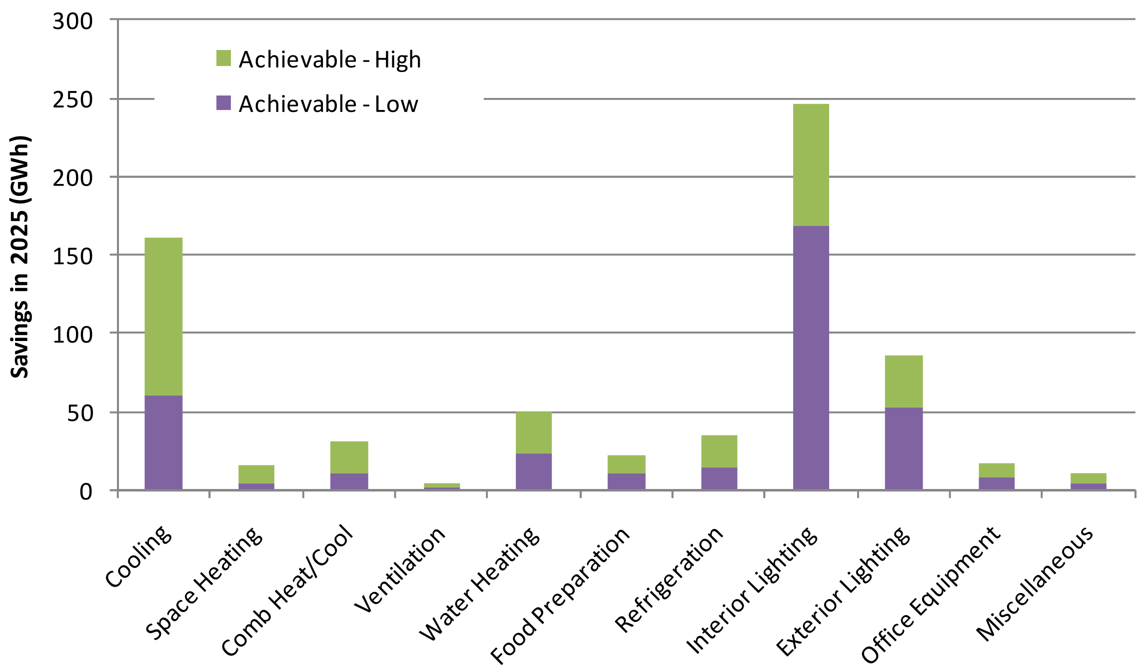


Figure 15 Electricity Commercial Achievable Potential Savings by End Use in 2025 (GWh)



Industrial Sector Potential

The industrial sector makes up about one-third of New Mexico's total electricity usage. Within the industrial sector, oil and gas extraction accounts for about 43% of the total electricity use in 2009. Electronics manufacturing is also a large industry in New Mexico, accounting for 13% of industrial electricity use. Because of the size of these industries, we analyzed these two segments separately from the rest of the industrial use.

Most of the equipment replacement opportunities are in the machine drive (motors) end use, but potential savings are diminishing due to the National Electrical Manufacturer's Association (NEMA) standards, which now make premium efficiency motors the baseline efficiency level. As a result, potential savings are only available from upgrading to still more efficient levels. Furthermore, due to the site-specific nature of many industrial sector process energy efficiency opportunities, savings potential resulting from these customized approaches should be characterized individually. To further understand these opportunities, it would be appropriate to carry out site-specific engineering assessments for each customer and we would recommend that these assessments be limited to only the very largest customers.

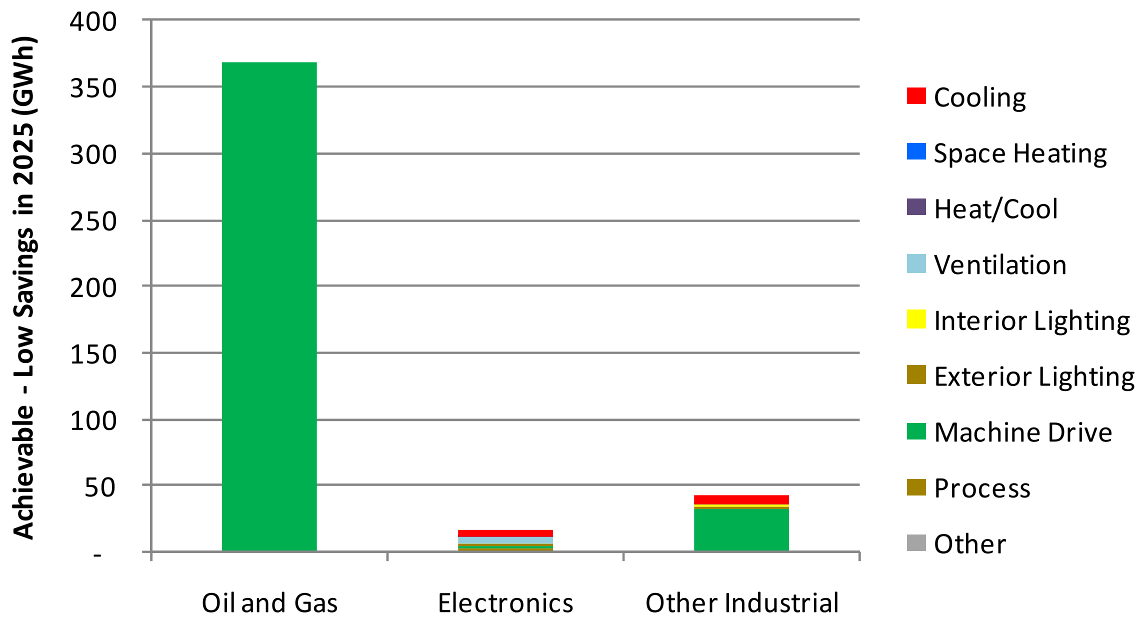
In 2012, Achievable - Low potential is 8 GWh or 0.1% of the baseline industrial forecast. This increases to 427 GWh, or 5.0% of the baseline forecast in 2025. Table 6 presents the savings for the various types of potential considered in this study.

Table 6 Electricity Energy Efficiency Potential for the Industrial Sector

Forecasts (GWh)	2012	2015	2020	2025
Baseline Forecast	7,395	7,873	8,162	8,538
Cumulative Energy Savings (GWh)				
Achievable – Low	8	24	129	427
Achievable – High	30	77	324	985
Economic	48	116	441	1,285
Technical	62	149	562	1,594
Energy Savings (% of Baseline)				
Achievable - Low	0.1%	0.3%	1.6%	5.0%
Achievable - High	0.4%	1.0%	4.0%	11.5%
Economic	0.6%	1.5%	5.4%	15.1%
Technical	0.8%	1.9%	6.9%	18.7%
Peak Demand Savings (MW)				
Achievable - Low	1	2	13	43
Achievable - High	3	8	33	101
Economic	5	12	45	134
Technical	7	17	66	192
Peak Demand Savings (% of Baseline)				
Achievable - Low	0.1%	0.2%	1.0%	3.3%
Achievable - High	0.3%	0.6%	2.6%	7.8%
Economic	0.4%	1.0%	3.6%	10.2%
Technical	0.6%	1.4%	5.3%	14.7%

Figure 16 shows the savings by segment and end use. Machine drives offer the greatest opportunity for energy savings across the range of potential, due largely to a variety of motor measures, including optimization of pumping and air compressor systems. Cooling and lighting have the next highest savings potential, but are dwarfed in comparison to machine drives.

Figure 16 Electricity Industrial Achievable – Low Potential Savings by End Use in 2025 (GWh)



Scenario Analysis

In addition to the analysis described above, which we subsequently refer to as the Reference forecast, two scenarios reflecting lower and higher avoided cost forecasts were developed. The Low case uses avoided costs that are 75% of those used for the Reference forecast and the High case uses avoided costs that are 150% of the Reference forecast case. The changes in avoided costs affect economic potential directly and the changes flow through to achievable potential.

- As avoided costs increase, the value of energy and demand savings increases, causing the benefit-cost ratio to increase. If measure B/C ratios rise to a value of 1.0 or above, then the measures are included in economic potential.
- Conversely, lower avoided costs decrease the benefits from energy efficiency savings, thus lowering the B/C ratio. Measures that passed the economic screen in the Reference case may no longer pass.

Focusing on economic potential in 2025, the scenario analysis results in the following:

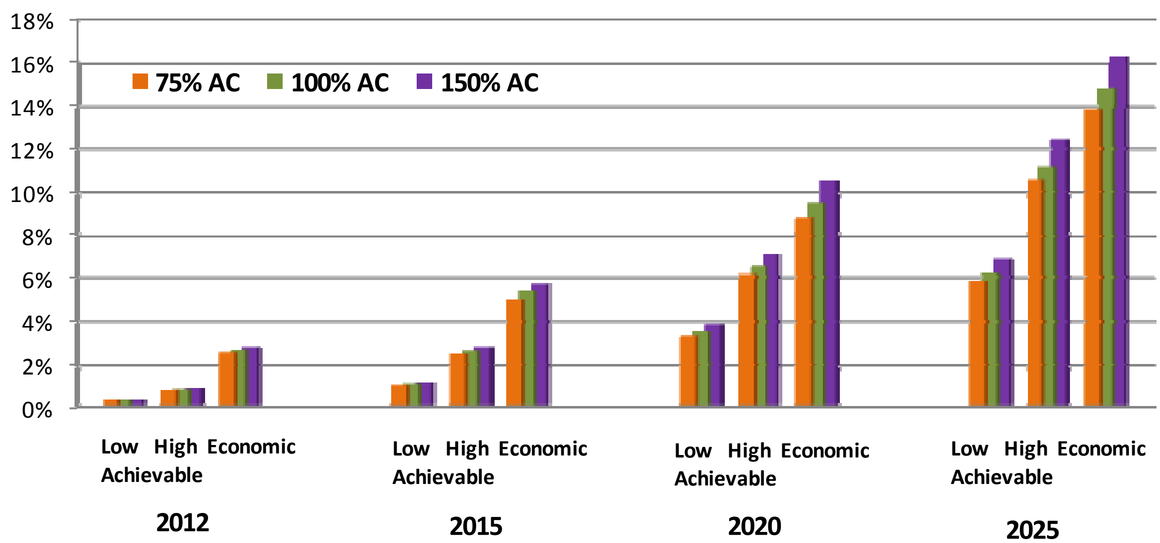
- In the Low case, economic potential is 206 GWh lower than in the Reference case, which is a 6% reduction in absolute savings. As a percentage of the baseline forecast, the Low case saves 13.9% in 2025, compared to 14.7% in the Reference case.
- In the High case, economic potential is 373 GWh higher than in the Reference case, which is an 11% increase in absolute savings. As a percentage of the baseline forecast, the High case saves 16.3% in 2025, compared to 14.7% in the Reference case.

The changes in savings flow through to achievable potential as shown in Table 7 and Figure 17.

Table 7 Electricity Scenario Analysis Results – Energy Savings (GWh)

Year	Type of Potential	Low 75% of Reference Avoided Costs	Reference	High 150% of Reference Avoided Costs
2012	Achievable - Low	64	67	69
	Achievable - High	180	187	197
	Economic	549	576	600
2015	Achievable - Low	233	246	260
	Achievable - High	540	573	610
	Economic	1,077	1,171	1,243
2020	Achievable - Low	765	810	883
	Achievable - High	1,403	1,488	1,634
	Economic	2,009	2,170	2,393
2025	Achievable - Low	1,392	1,473	1,632
	Achievable - High	2,512	2,656	2,951
	Economic	3,304	3,510	3,883

Figure 17 Scenario Analysis Results – Energy Savings as a Percentage of the Baseline Forecast



ENERGY EFFICIENCY ANALYSIS FOR NATURAL GAS

Natural gas providers consist of investor-owned utilities (IOUs), municipalities, rural electric coops, and the Navajo Tribal Utility Authority. The IOUs, most notably New Mexico Gas Company, account for 71% of total customers and 66% of total natural gas use in the state. For natural gas, the analysis approach is the same as for the electricity analysis described above and is not repeated here.

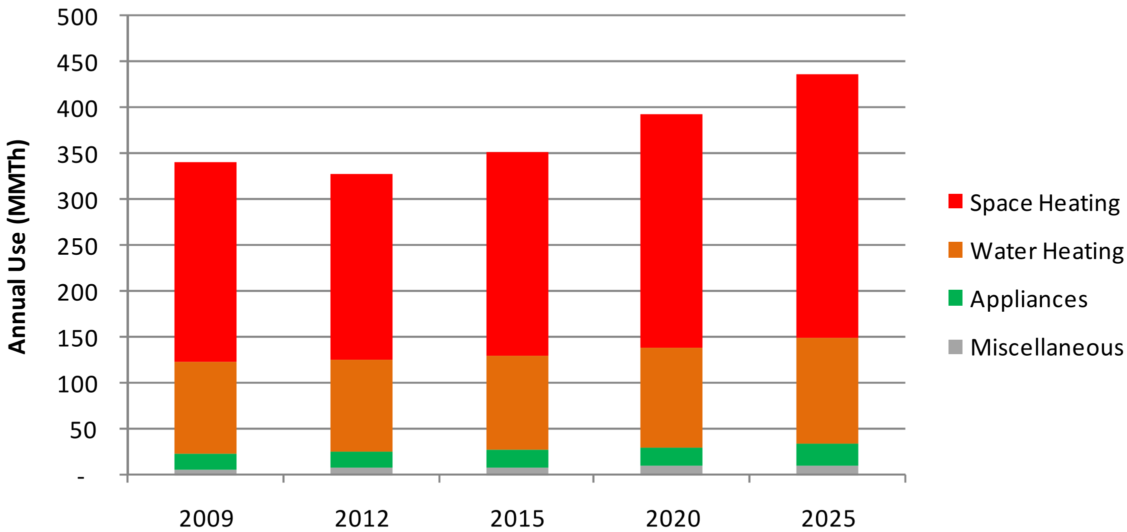
Market Characterization and Baseline Forecast

In 2009, there were slightly more than 600,000 natural gas uses in New Mexico. Total natural gas use for the residential, commercial, and industrial sectors in New Mexico in 2009 was 735 MMTh. The largest sector is residential, accounting for 46% or 340 MMTh. The remaining use is split almost equally between the commercial and industrial sectors.

Residential Sector

Figure 18 presents the baseline forecast at the end-use level for the residential sector as a whole. Overall, residential use increases steadily, from 340 MMTh in 2009 to 437 MMTh in 2025, a 28.5% increase. By comparison, the 2011 Annual Energy Outlook natural gas forecast for the U.S. increases by only 2% over the same time horizon. The primary reason for the reduction in the baseline forecast beginning in 2012 is the turnover in natural gas furnaces.

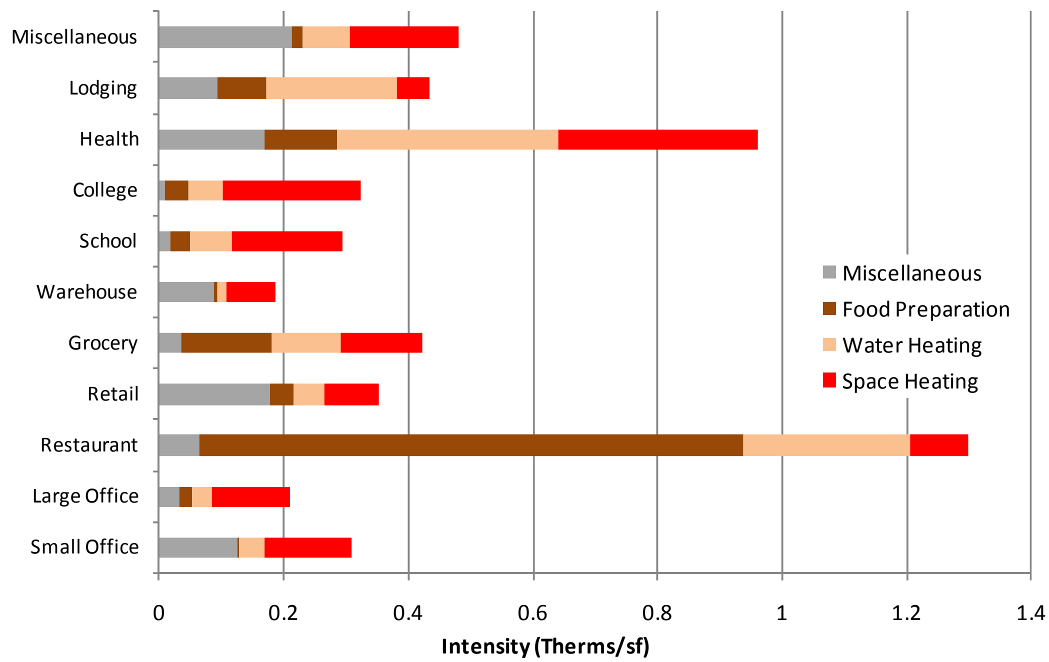
Figure 18 Residential Natural Gas Baseline Forecast by End Use



Commercial Sector

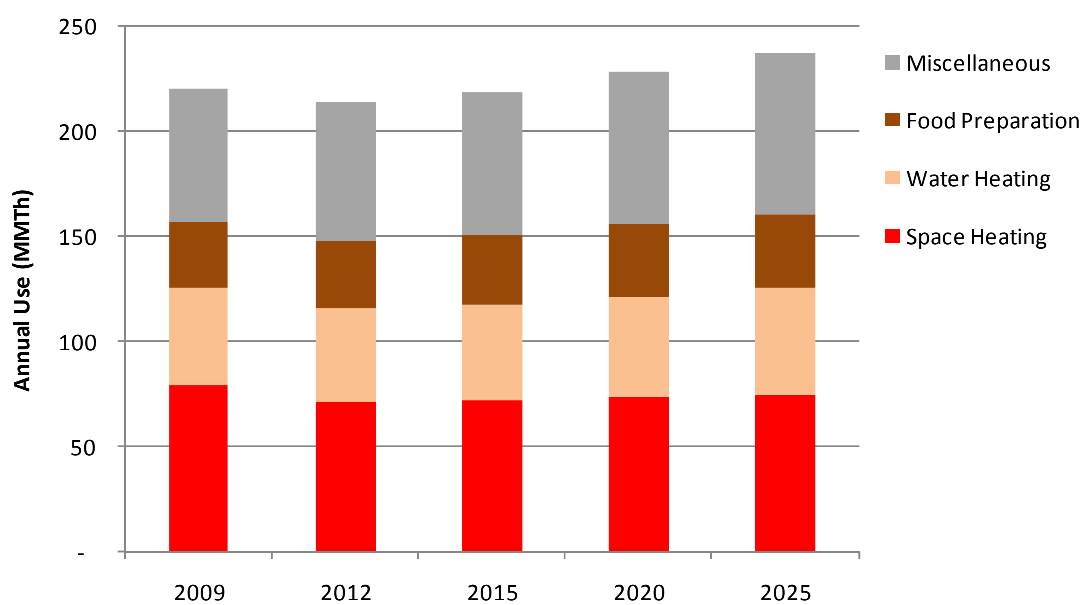
Natural gas use in 2009 in the commercial sector was 220 MMTh. Primary end uses are space heating, water heating, food preparation, and miscellaneous uses. Figure 19 illustrates how the end-use intensity of natural gas use (in therms per square foot of floor space) varies by building type. Space heating and water heating are major end uses across all building types while food preparation has the highest intensity in restaurants.

Figure 19 Commercial Natural Gas End Use Intensities by Building Type, 2009 (therms/sq. ft.)



Natural gas use in the commercial sector remains relatively flat during the forecast horizon. It starts at 220 MMTh in 2009, decreases from 2010 to 2015, and increases to 238 MMTh in 2025. Figure 20 presents the baseline forecast at the end-use level for the commercial sector as a whole. Most end uses show modest growth over the forecast period.

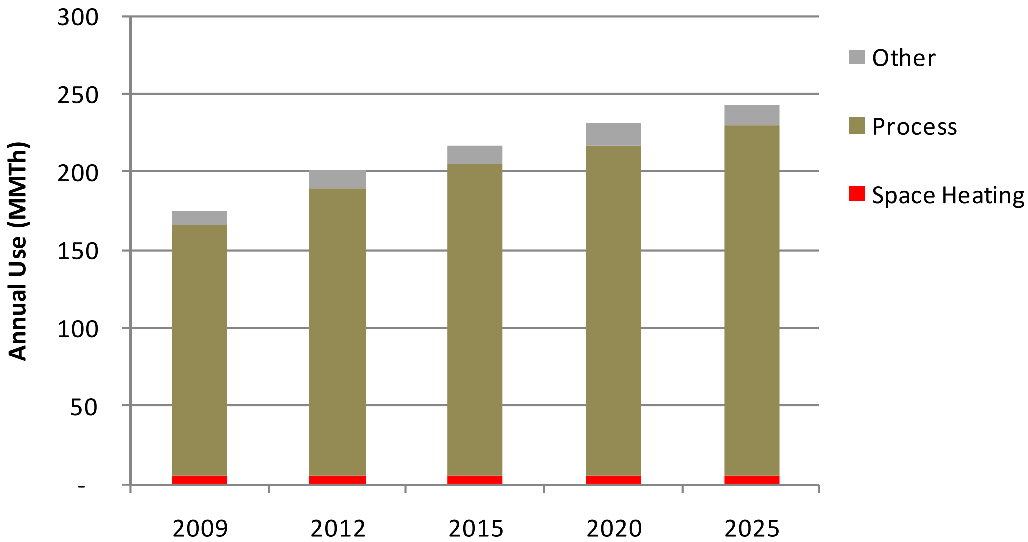
Figure 20 Commercial Natural Gas Baseline Forecast by End Use



Industrial Sector

Natural gas use in the industrial sector in 2009 was 175 MMTh. It is dominated by process use, primarily driven by boilers. Growth in the industrial sector is strongest of the three sectors. Figure 21 presents the baseline forecast at the end-use level for the industrial sector as a whole. Overall, industrial annual energy use increases steadily from 175 MMTh in 2009 to 243 MMTh in 2025, a 38.8% increase. The 2011 Annual Energy Outlook for the U.S. forecast increases by 42% over this same time period.

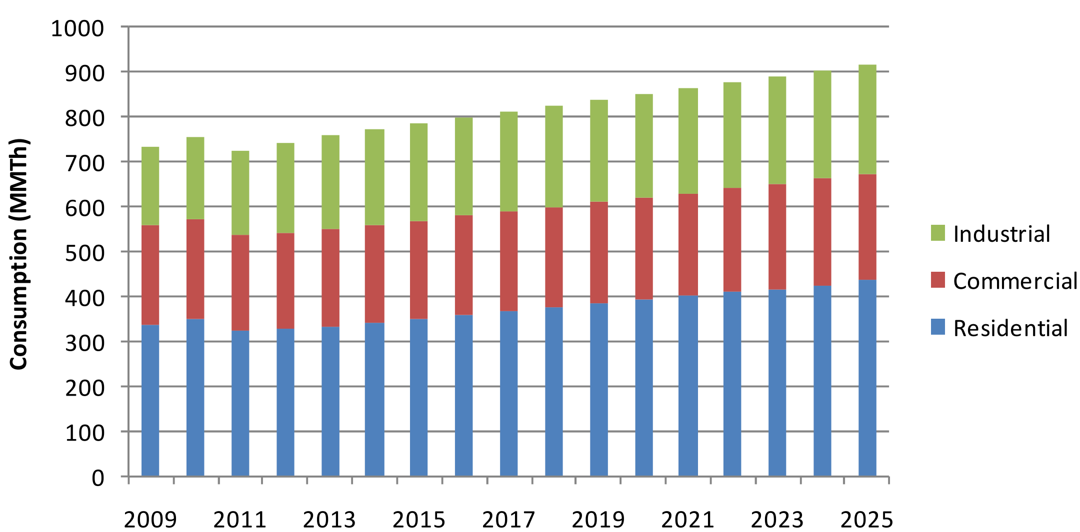
Figure 21 Industrial Baseline Natural Gas Forecast by End Use



Baseline Forecast Summary

Across all three sectors, natural gas use increases from 735 MMTh to 917 MMTh, a 25% increase (1.4% average annual growth rate). Figure 22 shows the forecast by sector. This baseline forecast incorporates the expected effects of appliance/equipment standards and building codes, consumer response to changes in natural gas prices, and naturally occurring conservation. It does not include the effects of any future energy-efficiency programs. The baseline forecast is the metric against which future savings from energy-efficiency programs are measured.

Figure 22 Natural Gas Baseline Forecast Summary



Potential Savings from Natural Gas Energy Efficiency

Table 8 presents the baseline forecasts of energy consumption, as well as the four levels of energy-efficiency potential across sectors. The baseline forecast across all sectors increases over the 16-year time period with an average annual growth rate of 1.4%. The effect of strong growth in residential customers and industrial activity is offset somewhat by appliance and equipment standards, building codes, and a sluggish economy. Key findings related to potentials are summarized below.

- ***Achievable - Low potential*** across all sectors is 0.5 MMTh in 2012 and increases to 27.7 MMTh by 2025. This represents 0.1% of the baseline forecast in 2012 and 3% in 2025. By 2025, Achievable – Low offsets 16% of the growth in the baseline forecast.
- ***Achievable - High potential*** is 1.9 MMTh in 2012, which represents 0.3% of the baseline forecast. By 2025, the cumulative savings are 80.5 MMTh, 8.8% of the baseline forecast, for an annual average of just under 0.7% per year. By 2025, Achievable – High offsets 46% of the growth in the baseline forecast.
- ***Economic potential***, which reflects the savings when all cost-effective measures are taken, is 4.3 MMTh in 2012. This represents 0.6% of the baseline energy forecast. By 2025, economic potential reaches 108.5 MMTh, 11.7% of the baseline energy forecast.
- ***Technical potential*** which reflects the adoption of all energy efficiency measures regardless of cost is a theoretical upper bound on savings. In 2012, energy savings are 7.6 MMTh, or 1.0% of the baseline energy forecast. By 2025, technical potential reaches 179.2 MMTh, 19.5% of the baseline energy forecast.

Figure 23 summarizes the energy-efficiency savings for the four levels of potential relative to the baseline forecast. Figure 24 displays the energy-efficiency forecasts.

Table 8 Summary of Natural Gas Energy Efficiency Potential

Forecasts (MMTh)	**2012**	**2015**	**2020**	**2025**
Baseline Forecast	742	787	852	917
Cumulative Savings (MMTh)				
Achievable Low	0.5	2.4	11.1	27.7
Achievable High	1.9	8.3	34.0	80.5
Economic	4.3	17.0	52.7	108.5
Technical	7.6	31.3	91.4	179.2
Savings (% of Baseline)				
Achievable Low	0.1%	0.3%	1.3%	3.0%
Achievable High	0.3%	1.1%	4.0%	8.8%
Economic	0.6%	2.2%	6.2%	11.7%
Technical	1.0%	4.0%	10.7%	19.5%

Figure 23 Summary of Natural Gas Potential Energy Savings

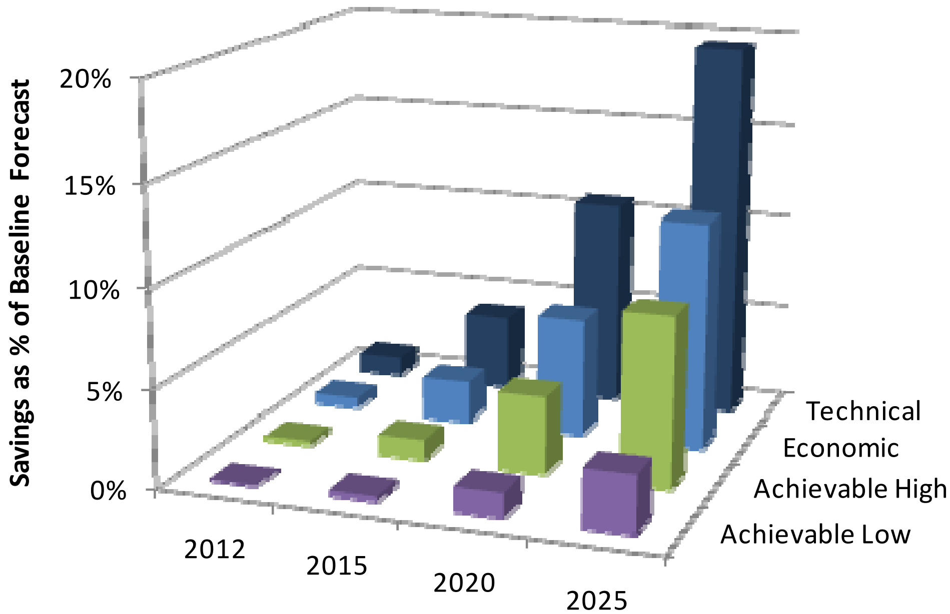


Figure 24 Natural Gas Energy Efficiency Potential Energy Forecasts (MMTh)

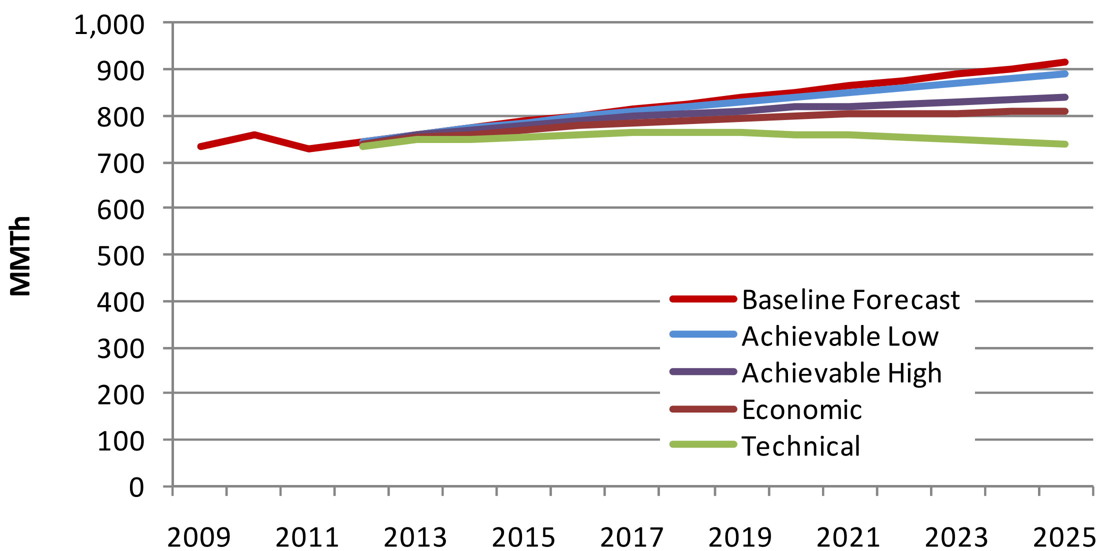


Figure 25 summarizes the range of achievable potential by sector. The residential sector accounts for the largest portion of the savings — about 71% of the Achievable - Low potential in 2025 and 77% of the Achievable - High potential in 2025.

Figure 25 Natural Gas Achievable Potential by Sector, 2025

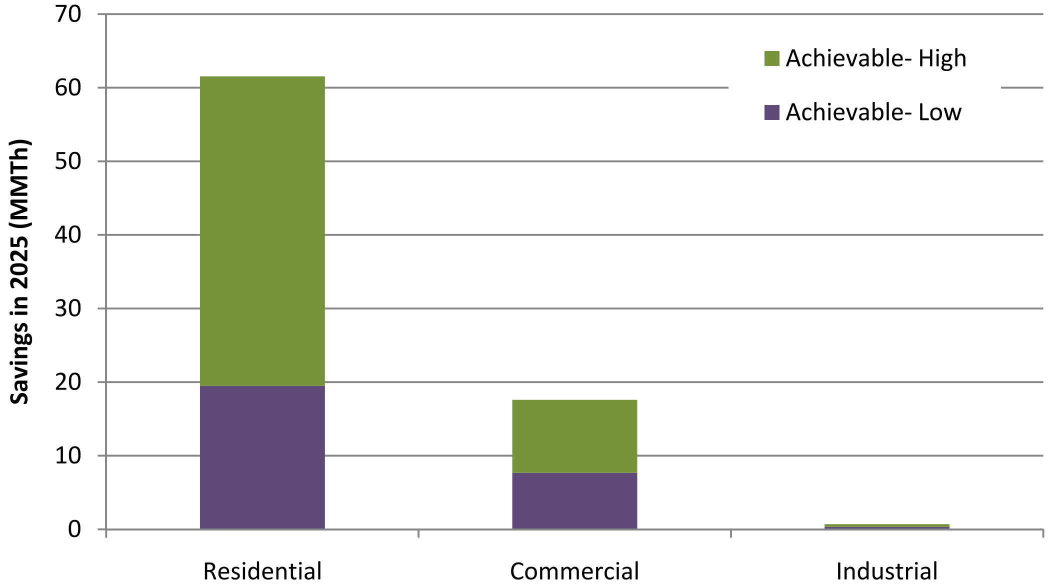


Table 9 presents the efficiency savings potential by each of the New Mexico utilities (entities). These estimates are a summation of the sector-level estimates presented and described in Volume 3.

Table 9 Natural Gas Efficiency Potential by Entity (MMTh)

Utility	Type	2012	2015	2020	2025
IOUs					
New Mexico Gas Company	Achievable - Low	0.427	2.038	9.426	23.726
	Achievable - High	1.618	7.070	29.055	69.073
	Economic	3.630	14.386	44.848	92.740
Non IOU					
City of Las Vegas Nat Gas Dept	Achievable - Low	0.007	0.035	0.136	0.313
	Achievable - High	0.025	0.112	0.389	0.855
	Economic	0.058	0.235	0.652	1.243
City of Los Alamos	Achievable - Low	0.007	0.033	0.172	0.453
	Achievable - High	0.028	0.122	0.553	1.361
	Economic	0.062	0.244	0.819	1.757
City of Socorro	Achievable - Low	0.003	0.014	0.057	0.137
	Achievable - High	0.010	0.046	0.171	0.386
	Economic	0.024	0.095	0.275	0.541
DCP Midstream	Achievable - Low	0.000	0.001	0.009	0.032
	Achievable - High	0.002	0.005	0.023	0.076
	Economic	0.003	0.008	0.033	0.108
Deming Gas System	Achievable - Low	0.005	0.025	0.092	0.206
	Achievable - High	0.019	0.079	0.265	0.565
	Economic	0.042	0.166	0.447	0.833
Eastern New Mexico Natural Gas	Achievable - Low	0.001	0.003	0.014	0.035

Utility	Type	2012	2015	2020	2025
	Achievable - High	0.002	0.011	0.043	0.101
	Economic	0.006	0.022	0.068	0.137
El Paso Natural Gas	Achievable - Low	0.000	0.001	0.004	0.014
	Achievable - High	0.001	0.002	0.010	0.033
	Economic	0.001	0.004	0.015	0.047
EMW Gas Association	Achievable - Low	0.004	0.019	0.097	0.253
	Achievable - High	0.015	0.068	0.304	0.748
	Economic	0.034	0.137	0.455	0.973
Las Cruces Municipal Gas	Achievable - Low	0.017	0.079	0.325	0.777
	Achievable - High	0.062	0.262	0.977	2.219
	Economic	0.137	0.537	1.564	3.096
Natural Gas Pipeline Company of America	Achievable - Low	0.000	0.000	0.002	0.008
	Achievable - High	0.000	0.001	0.006	0.019
	Economic	0.001	0.002	0.009	0.028
Navajo Tribal Utility Authority	Achievable - Low	0.005	0.021	0.074	0.163
	Achievable - High	0.015	0.064	0.203	0.426
	Economic	0.034	0.136	0.355	0.655
Raton Natural Gas	Achievable - Low	0.003	0.017	0.089	0.231
	Achievable - High	0.014	0.063	0.278	0.680
	Economic	0.031	0.127	0.418	0.889
Rio Grande Natural Gas	Achievable - Low	0.010	0.046	0.193	0.464
	Achievable - High	0.036	0.154	0.587	1.340
	Economic	0.080	0.315	0.930	1.848
Town of Mountainair	Achievable - Low	0.000	0.001	0.011	0.030
	Achievable - High	0.001	0.006	0.035	0.093
	Economic	0.003	0.013	0.049	0.114
Village of Corona	Achievable - Low	0.000	0.001	0.002	0.006
	Achievable - High	0.000	0.002	0.007	0.016
	Economic	0.001	0.004	0.011	0.022
Village of Hatch	Achievable - Low	0.001	0.004	0.015	0.033
	Achievable - High	0.003	0.013	0.043	0.091
	Economic	0.007	0.027	0.072	0.135
Wagon Mound Gas System	Achievable - Low	0.000	0.000	0.003	0.009
	Achievable - High	0.000	0.002	0.011	0.028
	Economic	0.001	0.004	0.014	0.034
Zia Natural Gas	Achievable - Low	0.017	0.078	0.337	0.818
	Achievable - High	0.062	0.266	1.036	2.385
	Economic	0.139	0.542	1.626	3.259
Total	**Achievable - Low**	**0.51**	**2.42**	**11.06**	**27.71**
	Achievable - High	**1.91**	**8.35**	**34.00**	**80.50**
	Economic	**4.29**	**17.00**	**52.66**	**108.46**

Residential Sector Potential

Key findings related to potential for the residential sector are shown in Table 4 and summarized below.

- ***Achievable - Low potential*** projects 0.2 MMTh of energy savings in 2012, 0.1% of the baseline forecast. This increases to 19.5 MMTh, 4.5% of the baseline forecast, in 2025.
- ***Achievable - High potential*** is 0.9 MMTh in 2012, which represents 0.3% of the baseline forecast. By 2025, the cumulative energy savings are 61.5 MMTh, 14.1% of the baseline forecast.
- ***Economic potential***, which reflects the savings when all cost-effective measures are taken, is 2.0 MMTh in 2012. This represents 0.6% of the baseline energy forecast. By 2025, economic potential reaches 74.3 MMTh, 17.0% of the baseline energy forecast.
- ***Technical potential*** which reflects the adoption of all energy efficiency measures regardless of cost is a theoretical upper bound on savings. In 2012, energy savings are 4.8 MMTh, or 1.5% of the baseline energy forecast. By 2025, technical potential reaches 132.1 MMTh, 30.3% of the baseline energy forecast.

Table 10 shows the forecasts under the four types of potential along with the baseline forecast.

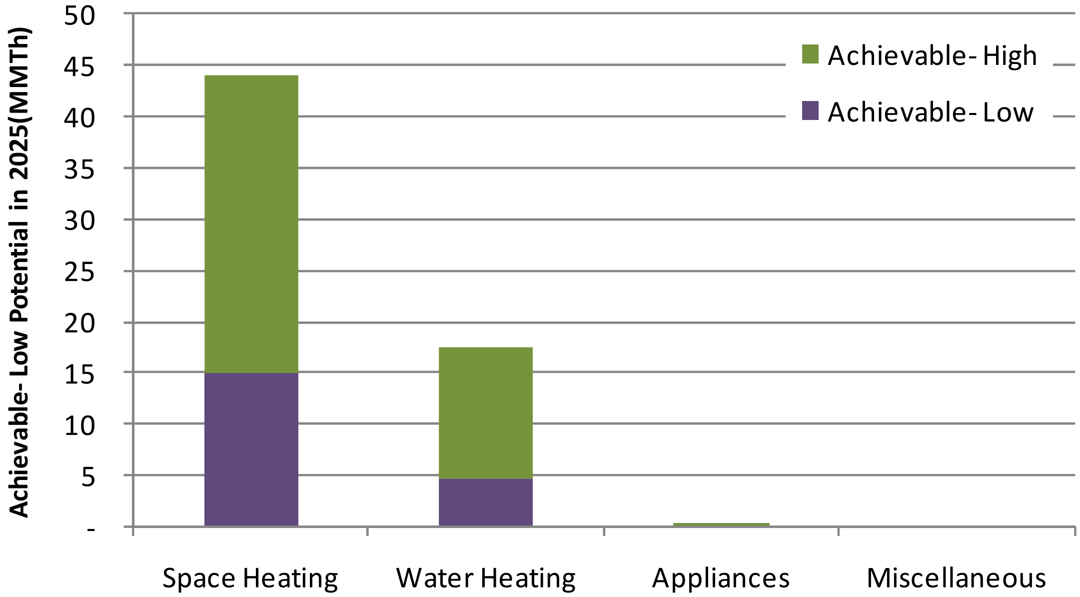
Table 10 Natural Gas Energy Efficiency Potential for the Residential Sector

	2012	2015	2020	2025
Baseline Forecast (MMTh)	328	352	393	437
Cumulative Energy Savings (MMTh)				
Achievable - Low	0.2	0.9	6.8	19.5
Achievable - High	0.9	4.2	23.4	61.5
Economic	2.0	7.9	31.9	74.3
Technical	4.8	20.5	64.4	132.1
Energy Savings (% of Baseline)				
Achievable - Low	0.1%	0.3%	1.7%	4.5%
Achievable - High	0.3%	1.2%	6.0%	14.1%
Economic	0.6%	2.3%	8.1%	17.0%
Technical	1.5%	5.8%	16.4%	30.3%

Figure 26 focuses on the range of achievable potential between Achievable - High and Achievable - Low.

- Space heating accounts for the largest savings since higher levels of efficiency for furnaces, compared to the standard, are cost-effective throughout the forecast period. Additional building shell measures contribute to the savings.
- Water heating also contributes significantly to the savings with cost-effective high efficiency water heaters.

Figure 26 Residential Natural Gas Achievable Potential by End Use in 2025



Commercial Sector Potential

The baseline forecast for the commercial sector essentially remains flat, which reflects the sluggish economy, building codes, and relatively efficient energy-use patterns. Nevertheless, the opportunity for energy-efficiency savings is still significant for the commercial sector.

- ***Achievable - Low potential*** projects 0.3 MMTh of energy savings in 2012 and 7.7 MMTh in 2025. This corresponds to 0.1% of the baseline forecast in 2012 and 3.2% in 2025.
- ***Achievable - High potential*** is 1.0 MMTh in 2012, which represents 0.4% of the baseline forecast. By 2025, the cumulative energy savings are 17.6 MMTh, 7.4% of the baseline forecast.
- ***Economic potential***, which reflects the savings when all cost-effective measures are taken, is 2.2 MMTh in 2012. This represents 1.0% of the baseline energy forecast. By 2025, economic potential reaches 32.2 MMTh, 13.5% of the baseline energy forecast.
- ***Technical potential*** which reflects the adoption of all energy efficiency measures regardless of cost is a theoretical upper bound on savings. In 2012, energy savings are 2.7 MMTh, or 1.2% of the baseline energy forecast. By 2025, technical potential reaches 43.1 MMTh, 18.1% of the baseline energy forecast.

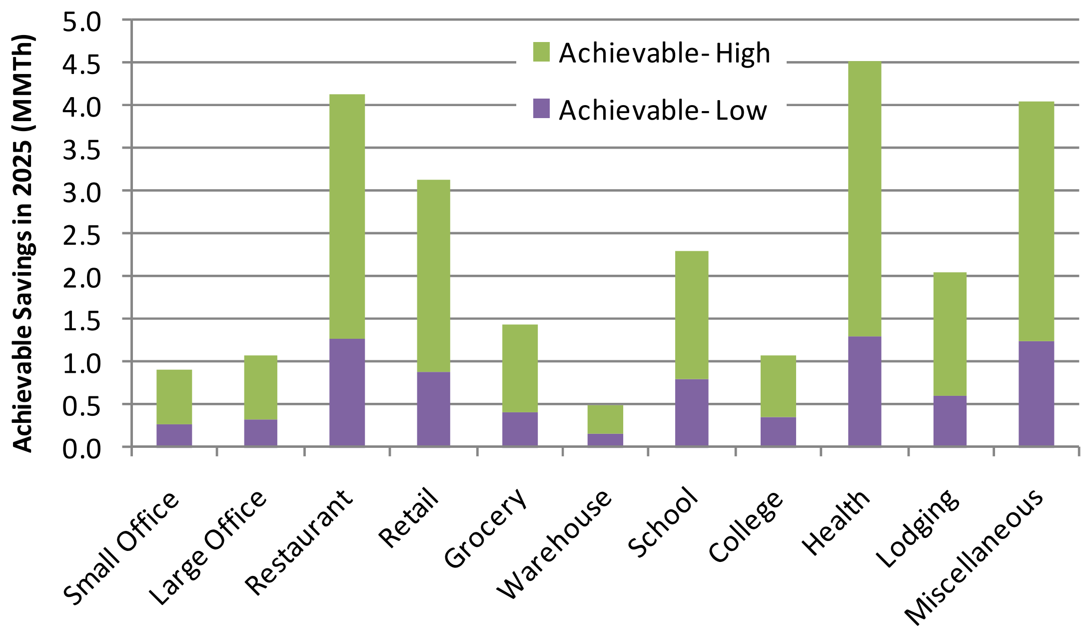
Table 11 presents the savings associated with each level of potential.

Table 11 Natural Gas Energy Efficiency Potential for the Commercial Sector

Forecasts (MMTh)	2012	2015	2020	2025
Baseline Forecast	214	219	228	238
Savings (MMTh)				
Achievable - Low	0.3	1.5	4.1	7.7
Achievable - High	1.0	4.1	10.2	17.6
Economic	2.2	8.9	20.2	32.2
Technical	2.7	10.5	25.8	43.1
Savings (% of Baseline)				
Achievable - Low	0.1%	0.7%	1.8%	3.2%
Achievable - High	0.4%	1.9%	4.5%	7.4%
Economic	1.0%	4.1%	8.8%	13.5%
Technical	1.2%	4.8%	11.3%	18.1%

Figure 27 focuses on the range of achievable potential for each segment. The Health segment has the largest potential, followed by restaurants, miscellaneous, and retail.

Figure 27 Natural Gas Achievable Potential Savings in 2025 by Commercial Building Type (MMTh)



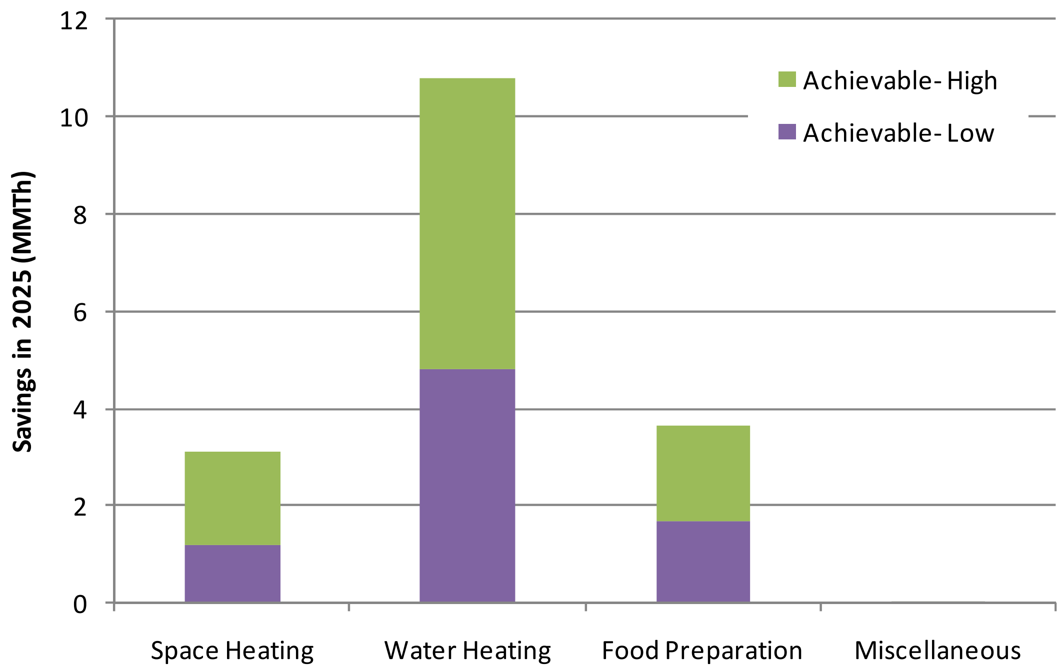
In the commercial sector, the end uses with the highest technical and economic potential are:

- Water heating, due to increasingly efficient water heaters, has the highest technical potential at 21.6 MMTh in 2025. Indirect fired water heaters are cost-effective starting in 2012 and are slowly adopted under the achievable case. The range for achievable potential from water heating is 4.8 MMTh to 10.8 MMTh in 2025.
- Space heating has the second-highest technical potential savings with 14.6 MMTh in 2025. This assumes that all businesses adopt the highest level of efficiency for furnaces (EF .91) and boilers (EF .96). Under the achievable cases, more customers will adopt less efficient technologies that are the minimum standard.

- Food preparation is third with technical potential savings of 6.7 MMTh in 2025, However, it has the second-highest level of achievable savings. With more efficient cooking appliances, Achievable - Low in 2025 reaches 1.7 MMTh and Achievable - High reaches 3.6 MMTh.

Figure 28 presents the commercial sector achievable savings by end use in 2025. Not surprisingly, water heating delivers the highest achievable savings. Food preparation is next highest, closely followed by water heating.

Figure 28 Natural Gas Commercial Achievable Potential Savings by End Use in 2025 (MMTh)



The greatest savings in 2025 come from:

- Replacement of water heaters with more efficient water heaters than the standard (4.67 MMTh)
- Replacement of food preparation equipment with more efficient fryers (0.58 MMTh) and more efficient steamers (0.46 MMTh)
- Replacement of furnaces with more efficient units (0.42 MMTh)

The replacement of water heaters accounts for more than 60% of the Achievable - Low potential savings in the commercial sector in 2025.

Industrial Sector Potential

The industrial sector makes up about one-quarter of New Mexico's total natural gas usage. Within the industrial sector, oil and gas extraction accounts for about 63% of the total natural gas use in 2009. Because of the size of this industry, we analyzed the oil and gas segment separately from the rest of the industrial use.

Most of the equipment replacement opportunities are in the process end use. Due to the site-specific nature of many industrial sector process energy efficiency opportunities, potential resulting from these customized approaches needs to be characterized individually. To further understand these site-specific opportunities, it would be appropriate to carry out site-specific engineering assessments for each customer and we would recommend that these assessments be limited to only the very largest customers.

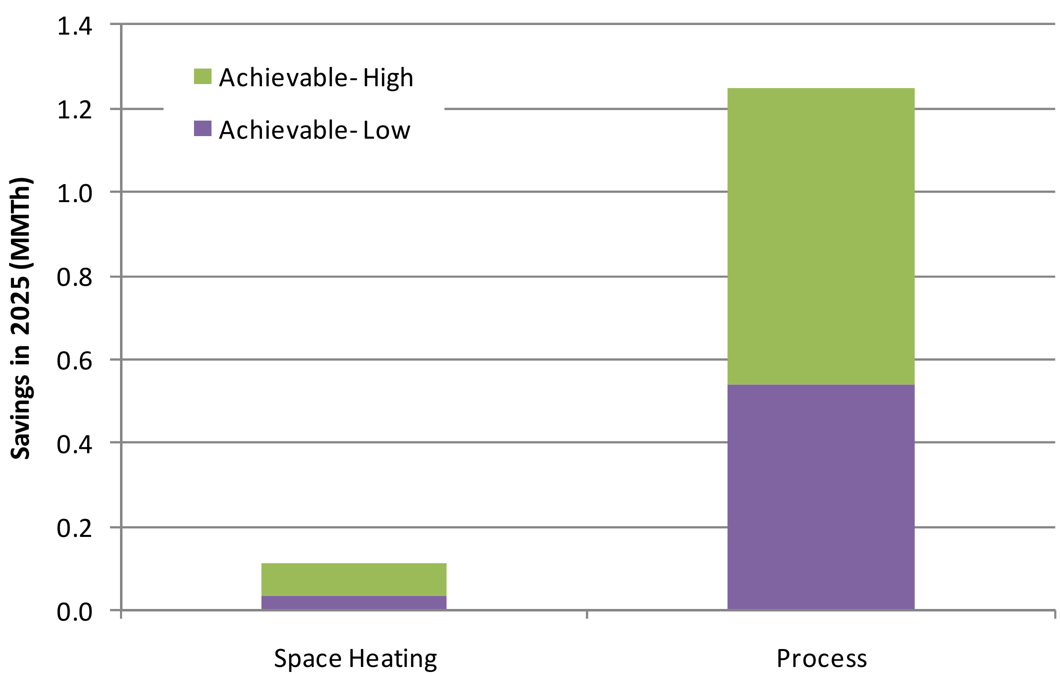
In 2012, Achievable - Low potential is zero, but increases to 0.6 MMTh, or 0.2% of the baseline forecast in 2025. Table 6 presents the savings for the various types of potential considered in this study.

Table 12 Natural Gas Energy Efficiency Potential for the Industrial Sector

Forecasts (MMTh)	2012	2015	2020	2025
Baseline Forecast	200	217	231	243
Cumulative Savings (MMTh)				
Achievable - Low	0.0	0.0	0.2	0.6
Achievable - High	0.0	0.1	0.4	1.4
Economic	0.0	0.1	0.6	1.9
Technical	0.1	0.3	1.2	4.0
Savings (% of Baseline)				
Achievable - Low	0.0%	0.0%	0.1%	0.2%
Achievable - High	0.0%	0.0%	0.2%	0.6%
Economic	0.0%	0.1%	0.3%	0.8%
Technical	0.1%	0.1%	0.5%	1.7%

Figure 29 illustrates the levels of industrial energy efficiency potential. As mentioned above, process applications offer the greatest opportunity for energy savings across the range of potential.

Figure 29 Natural Gas Industrial Achievable Potential Savings by End Use, Selected Years (MMTh)



Scenario Analysis

In addition to the Reference forecast, two scenarios reflecting lower and higher avoided cost forecasts were developed. The Low case uses avoided costs that are 75% of those used for the Reference forecast and the High case uses avoided costs that are 150% of the Reference forecast case. The changes in avoided costs affect economic potential directly and the changes flow through to achievable potential.

- As avoided costs increase, the value of savings from energy-efficiency increases, causing the benefit-cost ratio to increase. If higher avoided costs result in measure B/C ratios increasing to a value of 1.0 or above, then the measures are included in economic potential.
- Conversely, lower avoided costs decrease the benefits from energy efficiency savings, thus lowering the B/C ratio. Measures that passed the economic screen in the reference case (100% of avoided costs), may no longer pass.

Focusing on economic potential in 2025, the scenario analysis results in the following:

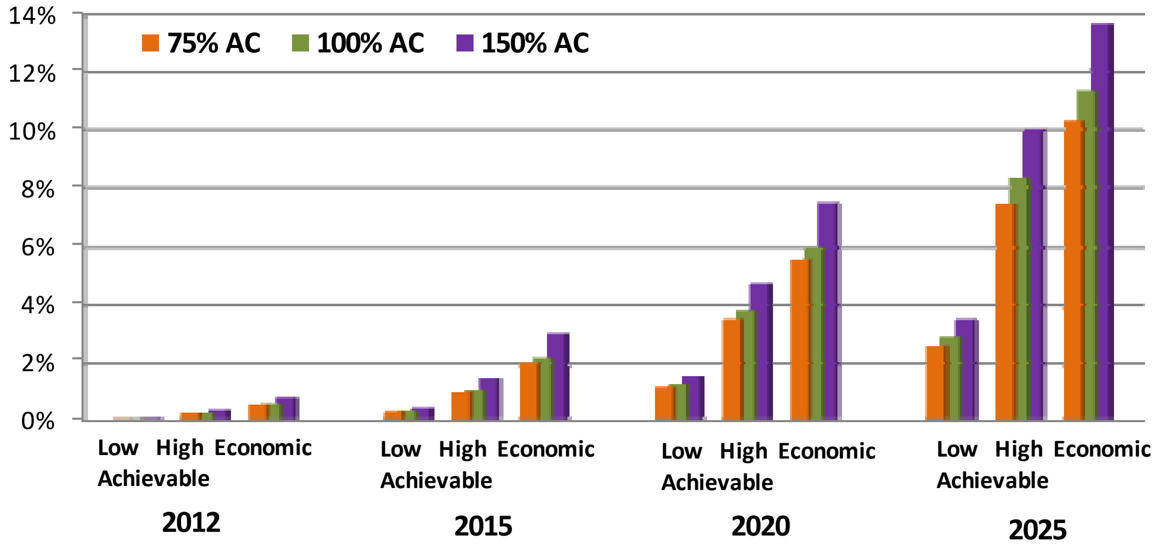
- In the Low case, economic potential is almost 10 MMTh lower than the Reference case, which is a 10% reduction in absolute savings. As a percentage of the baseline forecast, the Low case saves 10.3% in 2025, compared to 11.4% in the Reference case.
- In the High case, economic potential is almost 20 MMTh higher than in the Reference case, which is a 21% increase in absolute savings. As a percentage of the baseline forecast, the High case saves 13.7% in 2025, compared to 11.4% in the Reference case.

The changes in savings flow through to achievable potential as shown in Table 13 and Figure 30.

Table 13 Natural Gas Scenario Analysis Results – Energy Savings (MMTh)

Year	Type of Potential	Low 75% of Reference Avoided Costs	Reference	High 150% of Reference Avoided Costs
2012	Achievable - Low	0.46	0.48	0.64
	Achievable - High	1.70	1.77	2.49
	Economic	3.80	3.98	5.63
2015	Achievable - Low	2.16	2.27	3.08
	Achievable - High	7.25	7.71	10.90
	Economic	14.90	15.80	22.16
2020	Achievable - Low	9.19	10.01	12.27
	Achievable - High	27.91	30.43	37.60
	Economic	44.32	47.84	59.41
2025	Achievable - Low	21.90	24.65	29.96
	Achievable - High	63.47	70.96	85.73
	Economic	87.80	96.99	116.70

Figure 30 Natural Gas Scenario Analysis Results – Energy Savings as a Percentage of the Baseline Forecast



DEMAND RESPONSE

In addition to estimating the annual energy and peak demand savings that are possible through energy-efficiency measures, this study assessed the potential to reduce peak demand through demand response.

Analysis Approach

The analysis approach for estimating demand response potential is, by necessity, different from the approach used for energy efficiency. Energy efficiency can occur outside of utility programs; it is naturally occurring, technology driven, and can be enhanced and enabled by utility programs. Demand response, however, does not exist without a utility program. A program-by-program analysis is therefore at the core of the demand response potential study. The basic steps used to perform this demand response potential assessment are summarized as follows and described in Volume 4:

- Characterize the market
- Identify relevant demand response options
- Outline demand response program participation hierarchy
- Develop program parameter
- Estimate potential and assess cost-effectiveness

The study chose a set of demand-response options that reflect the mainstream of current and projected program types. The relevant demand response options by sector and segment for this study, shown in Table 14, reflect the "traditional" demand response programs — direct load control and curtailable tariffs — as well as the next generation of demand response through dynamic pricing. For each identified program, the study developed program parameters including participation rates, number of participants equipped with enabling technology, unit load reduction impacts, attrition rates, and demand response event participation rates. Cost data, including program development costs, customer marketing and recruitment costs, technology costs, customer incentives, O&M costs, and program administrative costs were also developed for the analysis.

Table 14 Demand Response Options

Demand Response Options	Eligible Customer Segment	Load Reduction Enablement Options	Targeted End-uses
Residential Direct Load Control	Single Family residential customers with CAC and Water Heating	PCT Load Control Switch	CAC Water Heating
Small C&I Direct Load Control	Small/Medium C&I Customers with CAC and Water Heating	PCT Load Control Switch	CAC Water Heating
Irrigation Direct Load Control	Irrigation Customers	Load Control Switch	Motors
C&I Curtailable	Medium and Large C&I Customers	Manual	Customer Specific
C&I Demand Bidding	Medium and Large C&I Customers	Manual/Auto-DR	Customer Specific
Residential Dynamic Pricing	Residential Customers	PCT	All
C&I Dynamic Pricing	All C&I Customers	PCT, Auto-DR	All

Notes: CAC = Central Air Conditioning; PCT = Programmable Communicating Thermostat

Definitions of Demand Response Potential

This demand response analysis addresses three levels of potential.

- ***Achievable potential*** takes into account expected participation rates as well as cost-effectiveness of the program. For this study, we estimate a range of achievable potential:
- ***Achievable – High*** and ***Achievable – Low***. The level of participation is a key factor for determining the range of potential savings.
- ***Economic potential*** assumes 100% participation of customer segments across DR options for programs that pass the cost-effectiveness screen performed for achievable potential.

Unlike the energy-efficiency analysis, we do not consider technical potential for demand response.

Key Findings for Demand Response

- In 2012, achievable potential reduces peak demand by 1.9-2.5%. This starting point takes into account the achievements in 2010 from the IOUs with demand response programs already in place.
- By 2025, the achievable potential reduces peak demand by 4.2-5.8%.
- The lower end of the achievable potential range is 70–75% of the higher end estimates. Over a period of 2012–2025, the achievable potential is expected to grow almost threefold, reflecting a relatively steep ramp-up of programs in the early years and a slowing down as programs reach their maturity.
- Economic potential changes over the forecast horizon in response to the mix of programs. In the early years, dynamic pricing starts to come on line and it has lower unit savings than the other options it displaces. In the longer term, the participation rates for non pricing programs are higher relative to dynamic pricing and economic potential increases.

Table 15 and Figure 31 present the overall summary of demand response potential. The primary observations are:

- In 2012, achievable potential reduces peak demand by 1.9-2.5%. This starting point takes into account the achievements in 2010 from the IOUs with demand response programs already in place.
- By 2025, the achievable potential reduces peak demand by 4.2-5.8%.
- The lower end of the achievable potential range is 70–75% of the higher end estimates. Over a period of 2012–2025, the achievable potential is expected to grow almost threefold, reflecting a relatively steep ramp-up of programs in the early years and a slowing down as programs reach their maturity.
- Economic potential changes over the forecast horizon in response to the mix of programs. In the early years, dynamic pricing starts to come on line and it has lower unit savings than the other options it displaces. In the longer term, the participation rates for non pricing programs are higher relative to dynamic pricing and economic potential increases.

Table 15 Summary of Demand Response Savings for New Mexico

	2012	2015	2020	2025
Peak Demand Savings from DR (MW)				
Achievable - Low	74	141	190	206
Achievable - High	99	192	265	287
Economic	1,095	1,075	1,130	1,228
Approximate Peak Demand Forecast (MW)[9]	3,991	4,211	4,562	4,952
Savings (% of Baseline Forecast)				
Achievable - Low	1.9%	3.3%	4.2%	4.2%
Achievable - High	2.5%	4.6%	5.8%	5.8%
Economic	27.4%	25.5%	24.8%	24.8%

[9] The baseline peak demand forecast is a sum of the peaks from the IOUs and the non-IOU group. This is an approximation of the state-level peak because the individual system peaks occur at different hours. Nevertheless, we thought it would be a useful reference point.

Figure 31 Summary of Demand Response Potential for New Mexico

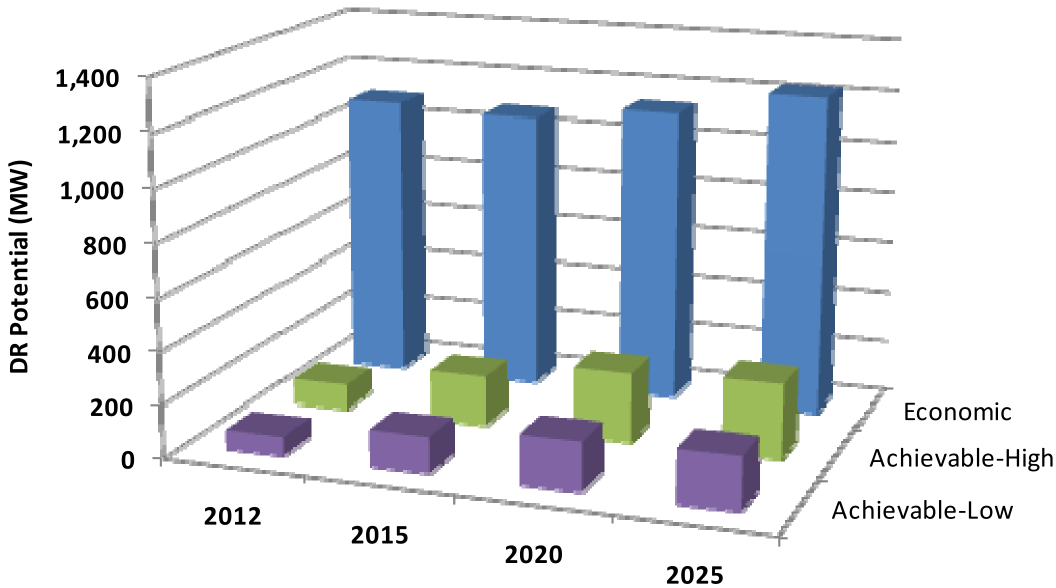


Table 16 presents the load reduction values by program type for selected years. Figure 32 shows the range of achievable potential for each program type in 2025. Key observations from the analysis are:

- ***Residential DLC*** has the largest contribution to the overall potential from all DR programs, with a 40% share in the total achievable potential in 2025. In 2012, the achievable potential from this program ranges from 31 MW to 42 MW and reflects current participation in programs. In 2025, the achievable potential ranges from 87 MW to 116 MW. This program has the largest increase of all the non pricing programs.
- ***C&I Curtailable*** has the second largest contribution, with a 28% share in the overall achievable potential in 2025. In 2012, the achievable potential from this program ranges from 29 MW to 39 MW. In 2025, the achievable potential ranges from 57 MW to 79 MW.
- ***C&I Dynamic Pricing*** is third with a 12% share of the total in 2025. Its potential is estimated to grow substantially from 4 MW to 7 MW in 2015 to 20 MW to 34 MW in 2025. In 2025, the achievable potential from pricing roughly represents 10-15% of its economic potential in that year. The pricing program is expected to ramp up very rapidly between 2015 and 2020, growing almost four and a half times within that time period due to expected rapid deployment of AMI within that timeframe.
- ***C&I DLC*** savings are similar to C&I pricing. It is expected to grow from 11 MW to 15 MW in 2012 to 24 MW to 32 MW in 2025. The potential from this program is expected to grow by more than 30% in the last ten years between 2015 and 2025.
- ***C&I Demand Bidding*** has nearly a 7% share of the overall load reduction potential in 2025, with achievable potential ranging from 14 MW to 20 MW. Its potential is expected to grow by almost 40% in the last ten years between 2015 and 2025.
- ***Residential Dynamic Pricing*** potential is expected to be 2% or less of the overall potential in 2025, at a level ranging from 3 MW to 5 MW in that year.
- ***Irrigation DLC*** has the lowest level of potential at less than 0.5% of the overall peak load reduction potential in 2025, with an estimated achievable potential close to 1 MW in that year.

Except for pricing, the low end of the achievable potential for all programs is estimated to be between 70% and 75% of the high-end estimates. For C&I pricing, the achievable potential ranges from 20 MW to 33 MW. Therefore at the low end, the achievable potential is 60% of the high-end estimates. For residential pricing, the range is 3 MW to 5 MW, with the low end of the achievable potential again representing 60% of the higher end.

Table 16 Summary of MW Savings by Program for New Mexico

DR Programs	Type	2012	2015	2020	2025
Residential DLC	Achievable – Low	31.2	61.3	78.8	86.7
	Achievable – High	41.7	81.8	105	115.6
	Economic	351.6	368.5	395.2	435.9
C&I DLC	Achievable – Low	11.1	18.1	22.0	23.8
	Achievable – High	14.6	24.1	29.2	31.6
	Economic	285.2	227.5	179.6	193.8
Irrigation DLC	Achievable – Low	0.1	0.3	0.6	0.8
	Achievable – High	0.1	0.4	0.9	1
	Economic	4.2	4.4	4.7	5.2
C&I Curtailable Rate	Achievable – Low	29.1	45.3	53.4	56.9
	Achievable – High	39.0	62.8	74.6	79.6
	Economic	268.7	199.8	172.6	183.7
C&I Demand Buyback	Achievable – Low	2.6	10.4	13.5	14.3
	Achievable – High	3.5	14.3	18.7	19.8
	Economic	185.7	157.4	121.9	131.5
Residential Dynamic Pricing	Achievable – Low	0.0	0.7	2.8	3.0
	Achievable – High	0.0	1.2	4.8	5.4
	Economic	0.0	4.4	13.7	15.1
C&I Dynamic Pricing	Achievable – Low	0.0	4.3	19.0	20.0
	Achievable – High	0.0	7.1	31.6	33.7
	Economic	0.0	113.1	242.8	262.6
All Programs	Achievable – Low	**74.1**	**140.5**	**190.1**	**205.6**
	Achievable – High	**98.9**	**191.6**	**264.7**	**286.7**
	Economic	**1,095.4**	**1,075.1**	**1,130.4**	**1,227.8**

Figure 32 Summary of Achievable Potential in 2025

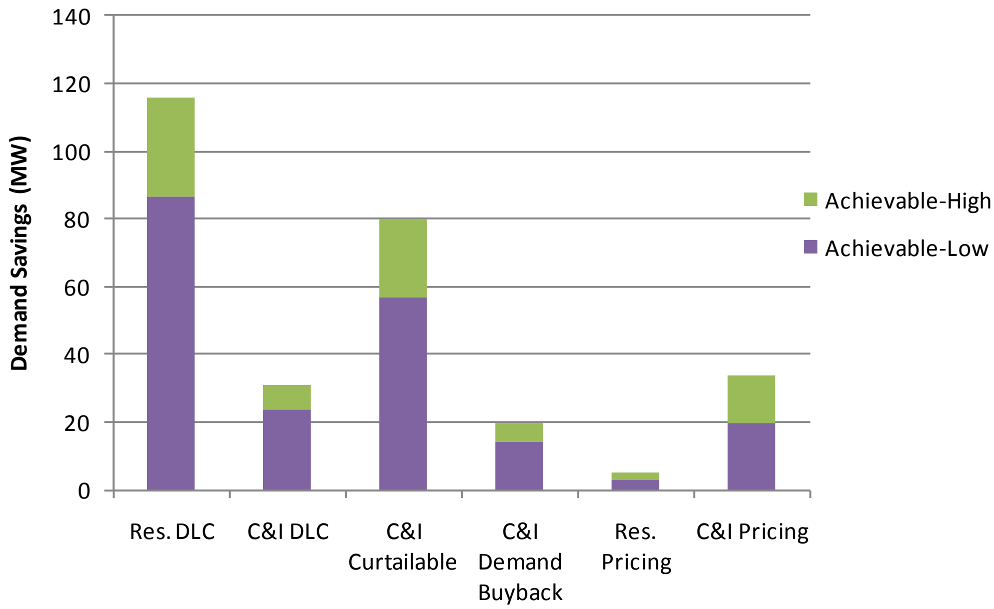


Table 17 presents a summary of the cost-effectiveness results for all programs by entity based on the TRC test. The analysis was performed by entity for the Achievable – High level of potential. The overall portfolio of DR programs is cost-effective. Note that for PNM and the non-IOUs, all programs are cost-effective with B/C ratios greater than 1. For El Paso, the two programs that fail the cost-effectiveness screening are the C&I Demand Bidding and the Residential Pricing programs. The programs that are not cost-effective have relatively low levels of potential associated with them.

Table 17 Results of Cost-Effectiveness Screening (B/C ratios)

DR Options	PNM	SPS	EPE	Non-IOUs
Residential DLC	3.6	1.7	1.1	1.2
C&I DLC	3.5	1.0	1.2	1.8
Irrigation DLC[10]	3.3	NA	NA	NA
C&I Curtailable	2.5	1.2	1.3	3.9
C&I Demand Bidding	8.4	1.2	0.9	2.9
Res. Pricing	2.7	1.2	0.8	1.0
C&I Pricing	7.0	4.1	1.1	2.5
Overall Portfolio	**3.3**	**1.7**	**1.1**	**2.0**

[10] Irrigation DLC potential analysis was considered only for PNM. No specific information related to irrigation customers was available for any of the other entities.

Scenario Analysis for Demand Response

The analysis presented above is referred to the Reference case. In addition to the Reference case, two scenarios reflecting lower and higher avoided cost forecasts were developed. The Low case uses avoided costs that are 75% of those used for the Reference case and the High case uses avoided costs that are 150% of the Reference case. The changes in avoided costs affect the potential as follows.

- As avoided costs increase, the value of savings from demand response increase, causing the benefit-cost ratio to increase. If higher avoided costs result in measure B/C ratios increasing to a value of 1.0 or above, then the program is included in the analysis.
- Conversely, lower avoided costs decrease the benefits from energy efficiency savings, thus lowering the B/C ratio. Measures that passed the economic screen in the Reference case may no longer pass.

Table 18 presents the aggregate level DR potential for the state of New Mexico under all three scenarios of avoided capacity costs. In 2025, the aggregate potential under the High case is only 0.5% higher compared to the Reference case. The Low case is 15% lower than the Reference case.

Table 18 Summary of Scenario Analysis

DR Potential (MW)	2012	2015	2020	2025
Reference scenario	74	141	190	206
Low avoided costs scenario	67	122	163	175
High avoided costs scenario	74	142	191	207

STRATEGY RECOMMENDATIONS FOR ENERGY EFFICIENCY

An important aspect of the project was to develop recommendations on how to best realize the achievable energy savings identified through the potential analysis. In this section, we suggest high-level, strategic approaches to the overall DSM portfolio of programs for New Mexico, including electricity and natural gas. We also address demand response.

High-Level Program Strategies

Four key recommendations apply across all programs and entities. Following these high-level strategies are recommendations for each customer sector.

Expand/Refocus Existing DSM Programs

Several DSM programs are already in the field in New Mexico. The rural electric coops in the state have been implementing programs through Tri-State since 1985 and the IOUs have implemented programs recently. Many of these programs focus on the technologies and measures identified in this study and can provide the basis for new or refocused initiatives.

In 2010, the SPS DSM portfolio achieved over 70% of savings from lighting. For PNM, most 2010 savings were also from lighting.[11] A refrigerator recycling program run by PNM and an Energy Savings kit for low-income customers also provided significant savings. Lighting and energy management systems accounted for over half the El Paso Electric savings in 2010. All the electric IOUs offered a self-direct program to industrial customers although none had any participants in 2010. Central NM Electric Co-op offers a Residential EE Rebate Program, which includes rebates for energy-efficient water heaters as well as a higher rebate if the heater is controlled by a timer or equipped with a low-wattage element and an additional amount if covered by a lifetime warranty.

[11] The Commercial comprehensive program results, though not broken out by measures, are likely mainly from lighting; this is a common finding in other similar energy efficiency programs across North America.

New Mexico Gas Company offered programs to both residential and business customers until April 2011. These programs provided rebates for efficient water heaters (residential and business), low-flow showerheads and insulation for residential customers, and other equipment in the business market. The utility also offered a Commercial Solutions Program (custom projects) to its business customers.

These existing programs can serve as the foundation for renewed efforts. New or increased marketing may be required to reach customers who have not yet participated.

Collaborate to Achieve the Maximum Reach

To meet state goals for energy efficiency savings, New Mexico needs to implement an aggressive portfolio of programs. The entities involved, specifically utilities, municipalities, rural coops and Tri-State, all have a vested interest in ensuring the success of DSM programs. Working together and with other stakeholders such as state government, universities, trade associations, and equipment retailers can achieve cost-effective savings. Tri-State provides a good example of effective use of a collaborative approach.

One of the most important aspects of effective DSM programs is raising customer awareness and knowledge. Collaboration on marketing and outreach programs can make the best use of limited funds and reach more customers cost-effectively.

Deliver joint gas/electric DSM programs where possible. A recent trend is for electricity and gas programs to market jointly to customers when it is appropriate, such as for custom energy efficiency projects with large commercial and industrial customers.

Use a Variety of Delivery Approaches

Experience with DSM in other jurisdictions has shown that flexibility with regard to delivery approaches is effective in achieving savings.

- ***Outsource wherever appropriate***. There are many experienced implementers who have the knowledge and infrastructure to provide turn-key solutions for programs such as refrigerator recycling and rebate programs. Some implementers also specialize in hard-to-reach areas. Other programs, such as large commercial and industrial custom projects, may be better run through the utility, which has an established customer relationship.
- ***Include upstream options***. Other jurisdictions have found that providing incentives to manufacturers and/or distributors that enables them to discount energy-efficient equipment is an effective approach. One utility has implemented an online CFL store, partnering with a manufacturer that offers deeply discounted efficient lighting equipment.
- ***Work through existing channels***. Where a channel already exists for achieving savings, leverage the channel further, possibly by supporting with utility rebates. For example, low-income weatherization programs implemented by the Community Action Agency of Southern New Mexico can include specific measures funded by the utility.
- ***Work through trade allies***. Trade allies such as contractors, engineering consultants, and industry associations know the markets and have significant influence on customer decisions. Many programs would not have been successful without the support of trade allies.

Implement a Broad-Based Education Program

A key recommendation from the *New Mexico Energy Efficiency Strategy: Policy Options* [12] — and from this study — is to implement a broad public awareness program.

Residential Options

As discussed above and shown in Figure 13, the highest achievable electricity savings in the residential sector are from efficient lighting measures, electric water heating equipment and

[12] Geller, H. et al. New Mexico Energy Efficiency Strategy: Policy Options, Prepared for the New Mexico Energy, Minerals and Natural Resources Department, November 2008.

associated measures (tank wrap, showerheads, and thermostat setback), appliances (primarily recycling refrigerators/freezers), and increasing the efficiency of electronic equipment. Figure 26 shows that water heating equipment devices also contribute to natural gas savings, as do efficient furnaces. Some weatherization measures (duct repair/seal and insulate wall cavity) contribute to achievable potential for both electricity and gas savings.

The following are program areas that the electric utilities, gas utilities, municipalities, and rural cooperatives could pursue, jointly where possible.

- ***Efficient Lighting Products*** can be distributed through giveaways such as energy savings kits, by providing rebates to customers — often through retailers — or by partnering with upstream actors such as manufacturers and distributors to provide discounts on the products. In 2010, SPS provided upstream incentives to retailers for the sale of CFLs as well as a mail-order option that allows for distribution to areas that may lack a participating retailer or for customers seeking a specialty bulb type. Both SPS and PNM provided instant discounts on CFLs bought at participating retail outlets and partnered with other agencies to distribute CFL bulbs through existing weatherization programs, at schools, and at various community events.
- ***Heat Pump Water Heater*** programs provide rebates for efficient water heating equipment. These typically rely on contractors to implement the program.
- ***Refrigerator/Freezer Recycling*** programs remove and recycle old, inefficient refrigerators and freezers. This is a well developed program area with effective third-party implementers available. In 2010, PNM offered free pickup and recycling at an Albuquerque recycling center established for this program.
- ***Energy Savings Kits*** programs distribute kits with low-flow showerheads, faucet aerators, and CFLs to customers, including low-income customers. The NM IOUs provided similar kits in 2010 for schools or low -income customers. These kits were delivered by mail or through participating agencies.
- ***Direct Install*** programs include energy savings kit measures, tank wrap, and/or selected weatherization measures that are directly installed in customers' homes by third-party implementers. Other jurisdictions have found customers are unlikely to install measures such as tank wrap on their own. For the low-income segment, this can be done through CAP agencies. For other gas and electric customers, it may be cost-effective to bundle residential audits and direct installation of measures.
- ***Efficient Electronics*** programs promote ENERGY STAR televisions and specific electronic devices such as DVDs and audio equipment. Along with customer education about the energy use by various appliances, a program aimed at these technologies could aim to influence manufacturing and/or provide upstream rebates as well as customer rebates.

Programs for natural gas are more limited and should include:

- ***Rebates for High-Efficiency Furnaces*** with AFUE > 94%. Efficient furnaces can be promoted through contactors as well as through general education. Consider including programmable thermostats with furnaces.
- ***Energy Savings Kits*** for natural gas use the same approach as electricity kits. This is a good opportunity for collaboration among gas and electric utilities.

Commercial Sector Options

As shown in Figure 14 and Figure 27, the potential for savings exists in many market segments with the retail, restaurant, health and lodging segments offering the most potential for electricity and natural gas savings. This suggests that a targeted approach by segment could be very effective as each segment is different. Utility websites can offer recommendations by business type to facilitate an understanding by their business customers about what they can do to reduce energy costs.

As shown in Figure 15 and Figure 28, lighting and cooling measures (chiller equipment replacement, chiller VSD, RTUs, heat pumps, and RTU equipment maintenance) offer the most potential for savings in the electricity market. Energy management systems are also expected to provide significant savings. Savings from efficient water heating equipment are achievable for both electricity and gas customers. As displayed in Figure 28, most of the gas savings are from water heating and food preparation.

The following are program areas to pursue to achieve commercial savings.

- ***Efficient Lighting Program*** — As noted earlier, the current electricity IOU programs have achieved significant savings from efficient lighting options, particularly screw-in options. All of the IOUs offer lighting options including the SPS Small Business Lighting Efficiency program, which includes a free energy audit. The key focus should be on replacing interior screw-in systems with more efficient options and replacing exterior lighting systems with HID lamps. Similarly, there are savings to be had in linear fluorescent systems, particularly if the existing systems are still using T12 lamps.
- ***Efficient Cooling Program*** — Another key opportunity in this market is from efficient cooling options, specifically chiller equipment replacement, chiller VSD, efficient rooftop units and heat pumps, and rooftop unit equipment maintenance. Although some of these technologies are addressed in current IOU programs, for example SPS includes rooftop units in its Business - Cooling Efficiency Program, a program focused on efficient cooling technologies and measures could better target resources to achieve cost-effective savings.
- ***Rebates for Efficient Water Heaters*** — Efficient water heating options for both gas and electric customers provide significant savings opportunities. Programs could target the market through equipment contractors and other trade allies, and use both upstream and customer incentives.
- ***Promotion of Energy Management Systems*** — El Paso has a lighting and Energy Management Program that could be used as a template to address the use of EMS along with lighting. Most EMS systems are capital intensive, but there are other innovative and lower-cost options that the utilities could use in a pilot program.
- ***Efficient Gas Technologies for Food Service Facilities*** — NM Gas had a program until April 2011 that addressed efficient gas options for food service technologies such as ENERGY STAR fryers and ENERGY STAR dishwashers. This program could be used to model a new targeted program.

Industrial Options

Motors provide the greatest opportunity for savings in the industrial sector. Two possible program areas can achieve savings in the industrial market.

- ***Promote High-Efficiency Motors*** — As of December 2010, new EISA requirements for motors manufactured or imported into the U.S. have raised the minimum efficiency levels for 1–200 hp motors covered by EPAct 1992 to NEMA Premium levels. A program to achieve savings would need to focus on motors not covered by the requirements and/or promote motors that are still more efficient than NEMA Premium.
- ***Focus on Oil and Gas Extraction Segment***. This segment is large and has the largest potential for electricity savings. Most of the savings come from motor-related measures that are custom to this segment. Those utilities with a significant presence of oil and gas extraction companies should consider developing internal expertise to serve these customers. Alternatively, they might consider outsourcing to companies who specialize in achieving savings in this industry segment.
- ***Custom Projects (Combine with Commercial)*** — Many utilities and agencies implementing programs in the commercial and industrial markets have achieved extremely significant savings from custom projects, particularly with their largest customers. With the exception of Oil and Gas Extraction and Electronics Manufacturing, this study did not go into detail in the remaining industries. However, we know from experience that working with the largest customers can yield significant savings and promote good customer relations.

STRATEGY RECOMMENDATIONS FOR DEMAND RESPONSE

In this section, we provide recommendations for strategies to achieve the demand response savings. The recommendations focus on the four programs that provide the largest potential, are easy to implement, and have a proven track record — Residential Direct Load Control. C&I Curtailable Program, C&I Pricing, and C&I Demand Bidding.

Residential Direct Load Control

Residential DLC is a low hanging fruit with significant market potential. Growth can be accomplished by both expansion of existing utility programs (PNM and SPS already have successful direct load control programs) as well as new program offers by entities that do not have currently have DLC programs in place. The target market for Residential DLC programs is single-family homes with central air conditioning. The DLC program could be administered by the utilities themselves or by outside contractors. Marketing for the DLC program can be multi-pronged including strategies such as bill inserts, mass media advertising and providing information via the utility website, direct mailings, telemarketing, and trade shows. Efforts can also target geographical areas such as high-usage neighborhoods and the hottest microclimates.

C&I Curtailable Program

The C&I Curtailable program is among the most common forms of demand response and it is intended primarily for large C&I customers. While relatively small in number, these customers have large loads and can therefore provide substantial amounts of load reduction. With a curtailable program, customers commit to a certain level of demand reduction and there are typically penalties for not meeting the commitment. Industrial customers often have specific energy-intensive processes than can be shut off or rescheduled during a curtailment event. As with DLC, programs can be administered by utilities or outside contractors. The marketing strategy for the Curtailable program should be centered on communications from customer service representatives (or representatives from outside contractors), educational training sessions, and websites designed to increase awareness of the potential benefits of enrolling in the program.

C&I Demand Bidding

C&I Demand Bidding is typically designed as a voluntary program where customers nominate a certain amount of load whenever notified of a DR event. This program is targeted to all C&I customers. Small- and medium-sized commercial establishments such as offices, service, retail, and food sales are perceived to be the best candidates for this type of program. Flexibility in program participation along with voluntary participation clauses without any penalties make this type of program attractive to these customer segments. Smaller customers can automate their response through the use of a PCT or energy management control system (EMCS) while medium and large C&I customers can use an Auto-DR platform to enable response to DR events. Like DLC and Curtailable, this program can be administered by utilities or outside contractors. A third party may be especially suitable for aggregating smaller loads and delivering a large amount of load reduction by entering into direct contracts with customers.

The marketing strategy for the Demand Bidding program should be centered around bill inserts, communications from customer service representatives (or representatives from outside contractors), educational training sessions, and websites designed to increase awareness of customers to the potential benefits of enrolling in the program. Specifically, benefits that have been found to be successful in marketing other programs and pilots include bill savings, environmental benefits, and the feeling that the customer is doing something good to help the utility and its community.

C&I Dynamic Pricing

Dynamic pricing for the commercial and industrial sector is an emerging demand-response program. Dynamic pricing is assessed to be highly cost-effective due to relatively low program development and administrative costs as compared to that for other programs. Smart Grid developments with Advanced Metering Infrastructure (AMI deployment) facilitate dynamic pricing. Because it is tariff-based, dynamic pricing is administered by utilities.

The most common form of dynamic pricing offer is Critical Peak Pricing (CPP). Under CPP, during times of extreme system peak, the electricity price is set much higher than a normal peak price, perhaps at six to ten times the on-peak price to encourage participants to reduce usage. Customers are offered discounted rates during off-peak periods on all weekdays during summer months (non-critical hours). A rate design exercise is necessary to determine the appropriate level of the critical peak price, based on existing tariff structure and marginal costs. Facilities with enabling technologies such as PCTs or EMCSs are well suited to automating response to DR events.

This program is typically offered to all C&I customers. Customers will be eligible to participate after their AMI meters (or interval meters) are installed. The marketing strategy for the CPP program should be centered on bill inserts, communications from customer service representatives, educational training sessions, and websites designed to increase awareness of customers to the potential benefits of enrolling in the rate.

Because this is an emerging program, it is well suited for a pilot to understand customer behavior and response to different levels of electricity prices. Market research conducted during the pilot may provide useful insights for design of a successful program. Specifically, benefits that have been found to be successful in marketing for CPP pilots include bill savings, environmental benefits, and the feeling that the customer is doing something good to help the utility and its community. These, as well as other marketing approaches, might be tested through focus groups.

REPORT ORGANIZATION

This report is presented in seven volumes:

Volume 1, Executive Summary

Volume 2, Electric Energy Efficiency Analysis

Volume 3, Natural Gas Energy Efficiency Analysis

Volume 4, Demand Response Analysis

Volume 5, Summary of Potential Estimates and Study References

Volume 6, Appendices to Electric Energy Efficiency Analysis

Volume 7, Appendices to Natural Gas Energy Efficiency Analysis

ABOUT GLOBAL

Global Energy Partners is a premier provider of energy and environmental engineering and technical services to utilities, energy companies, research organizations, government/regulatory agencies and private industry.

Global's offerings range from strategic planning to turn-key program design and implementation and technology applications.

Global is a wholly-owned subsidiary of EnerNOC, Inc committed to helping its clients achieve strategic business objectives with a staff of world-class experts, state of the art tools, and proven methodologies.

Global Energy Partners
An EnerNOC Company
500 Ygnacio Valley Road, Suite 450
Walnut Creek, CA 94596

P: 925.482.2000
F: 925.284.3147
E: gephq@gepllc.com