City of Albuquerque Energy Council
FY18 Annual Report: July 1, 2017 – June 30, 2018

Contents

Executive Summary

To: Mayor Timothy Keller and Albuquerque City Council

From: Athena Christodoulou, Chair, 2018-2019
Albuquerque Energy Council (AEC)

It is my pleasure to submit this Annual Report on behalf of the Albuquerque Energy Council (AEC). The AEC would like to acknowledge the City of Albuquerque for its efforts and commitment in implementing energy efficiency and renewable measures at numerous facilities in order to reduce energy use, energy costs and environmental impacts related to energy use. The work of the City staff and the Energy Council are critical to helping the City of Albuquerque meet its recent commitment to the Paris Climate Agreement.

This report documents the results of the AEC's activities for the past fiscal year. The AEC has made it a priority to understand the City's energy costs, maintenance schedules, and sustainability initiatives the city staff present. Based upon stafftheirresearch and the group's depth of knowledge and significant experience in the energy industry, the AEC recommended a number of projects. The selection of these projects focused on the energy saving potential of each project to facilitate lower energy use and costs, while also considering the positive environmental effects associated with reducing carbon emissions. The AEC was able to accomplish this via funding provided through the 3% for energy conservation and renewable energy set-aside for capital improvements (3% funds). The staff are an invaluable and knowledgeable resource.

The AEC recommended a variety of energy conservation projects in FY18, funded through the 3% CIP for Energy Conservation and are included in this report:

- Combined Sandia Swimming Pool Cool Roof and Solar Thermal Project
- Balloon Museum Lighting and Controls Upgrade
- Fire Station 22 Lighting and Controls Upgrade
- Concurrent Street Lighting Implementation Envision ABQ

3% Funds Allocated	Projects Completed	Energy Saved (est. annual)	Energy Cost Savings	Simple Payback
$1,254,662	3	1,456,521 KWh	$290,926	3 years
Street Lighting Implementation	Installed in FY18	Energy Saved	Based on PNM Banner System	On-Going Analysis
$1,326,899	15,062 Fixtures	1,192,000 Kwh	TBD	TBD

Those four projects, alone, are Green House Gas equivalent to removing 422 cars from the road for one year, or the tending of 51,083 tree seedlings grown for ten years. Energy savings also reduce the water consumption connected with the production of electricity. The 2018 total kWh saved meant a water savings of approximately 868,545 gallons of water.

To: Mayor Timothy Keller and Albuquerque City Council

From: The Energy and Sustainability Office

This has been another exciting year for energy and sustainability that brought renewed vigor to our efforts in reducing the City's overall energy usage. While the projects highlighted in this report offer a glance at the impact the Energy and Sustainability Office is having on the City's energy and sustainability landscape, there have been multiple energy measures implemented to enable the City to sustain its current energy performance. These measures include an upgrade to the Energy Manager Software we use on a daily basis to monitor utility usage across the City's assets. A pilot energy reduction program was implemented at four City facilities utilizing our existing Building Trane Controls to reduce HVAC energy by implementing occupied /unoccupied operational schedules. This pilot program is currently reducing the HVAC energy used at the four facilities by 30%. This energy reduction program is being implemented across thirty two other city buildings made up from Fire Stations, Community Centers, Police Stations, Libraries and Government Centers.

The energy office oversaw $1,254,662 in 3% Funded Projects, $1,326,899 in our LED Street Light Implementation with an additional $18,981,673 in NCREBs Solar Projects currently underway.

We have been active in several work groups including PNM/COA Commercial Solar partnership, assessing the City's opportunities to leverage renewable energy from a large scale solar plant.
As a result of the City's street light implementation program we contributed to the change of the City's Development Process Manual (DPM), inserting industry standard methodologies relating to roadway lighting standards and future maintenance requirements.

We are invested in the verification of the City's energy use and utility expense. Collaborating with Mountain Vector Energy to assess our monthly utility billing facilitates our search for other opportunities to reduce energy.

The Energy and Sustainability office is committed to contributing to the City's efforts and administrations commitment toward becoming a NetZero City and to reduce our carbon footprint.

Energy Council Overview: The 3% for Energy Conservation and Renewable Energy initiative is part of the Capital Improvement Program (CIP) 2-12-1 and supports numerous energy saving projects annually. This initiative includes the funding of energy conservation and/or renewable energy projects in existing facilities where the capital expenses of a project are regained from energy savings within the expected life of the equipment. The projects are managed by City of Albuquerque Staff and advised by the City of Albuquerque Energy Council (AEC). The AEC has provided vision and leadership aimed at influencing the way the City of Albuquerque manages and consumes energy in its facilities.

The collaborative effort between the AEC and Facilities and Energy Management Division culminated in this year's projects.

Mission Statement

The AEC provides supportive and critical feedback of proposed energy conservation efforts and renewable energy measures for the City of Albuquerque and support its goal to be net zero."

Vision Statement

We see low cost, high quality, clean energy usage in Albuquerque with educated and empowered citizens resulting in clean air and a high quality of life for all. We see our city government leading the way by example with its buildings and all its systems."

Recommendations

During FY 2018 the AEC recommended three (3) projects allowed by the 3% set aside Legislation. These projects varied from mechanical systems to lighting upgrades. As the City of Albuquerque moves towards the goal of attaining Net Zero status, it must assess, plan, and act in that direction. It will require a more concerted, comprehensive, and focused effort.

Comprehensive Building Approach

We need a complete building energy reduction approach where all the systems are considered important. Addressing all of the energy systems can provide more energy savings and increase the financial feasibility to fix some systems that would otherwise go untouched. For example, coupling the quick pay back of a lighting upgrade with heating, ventilating, and air conditioning (HVAC) upgrades could make the HVAC upfront cost financially feasible.

Increasing Awareness of Energy Conservation at the City

The AEC recommends implementing some communications initiatives to help City employees learn about the value of conserving energy and engage them in behaviors to help the City conserve even more. This could include a newsletter and/or some grassroots training. These communications efforts should be expanded into the community to increase awareness of the City's efforts to save energy and money and to encourage its citizens to save energy, thus reducing our entire City's carbon footprint. We also recommended an annual award for those departments who conserve the most energy.

Goals of the City

> Our goal is for the city to attain Net Zero, We desire to work with the mayor and other stake-holders to define net zero and establish a SMART Goal.

Project of the Year Award and Project Recognition

The AEC recommends that each fiscal year an energy conservation project be selected as Project of the Year. The project will be selected based on energy savings, innovation, and cost savings. The award will be made annually at an Albuquerque City Council meeting.

Additionally, the AEC recommends that a plaque be installed at each facility where the project took place explaining the project, the energy savings and the funding source. Our citizens should see and understand how their tax dollars are being used for energy conservation.

Selected Project Summaries

Combined Sandia Swimming Pool Roof and Solar Thermal Project

This project included a new cool roofing system, the replacement of a 1.5 MMbtu domestic hot water boiler and a solar thermal hot water system to provide the primary heating capacity for the 260,000 gallon swimming pool. This project will improve the building's comfort, while maximizing energy savings by Converting to LED, and Gas Saving by using Thermal Solar Panels.

- New Solar Thermal Energy Measures Phase II kWh Annual Savings: **812,233 kWh**
- Avoided Annual Energy Cost Phase II: **$121,835.00**
- Phase II Project Cost: **$841,229.10**
- Estimated Rebate: **$12,241.00**
- Aquatics Division Contribution: **$160,000.00**
- 3% CIP Contribution: **$681,229.10**
- Return on Investment **6.8 Years**
- Roofing life expectancy **25 years**
- Solar Thermal life expectancy **20 years**

Balloon Museum Lighting and Controls Upgrade

This lighting efficiency upgrade enables the use of new energy efficient lighting in an effective manner through the use of occupancy sensors, dimming or multi-level switching and daylight harvesting. The Museum is a high energy user with high peak demand.

The lighting control system includes various reporting features like date, time of use and kWh used during an event. This interior and exterior lighting project also included design elements to enhance the visitor's experience.

- kWh Annual Savings: **612,942 kWh**
- Avoided Annual Energy/ M&O: **$171,821.80**
- Project Cost: **$525,000.00**
- Estimated Rebate: **$20,000.00**
- Cultural Division Contribution: **$0.00**
- 3% CIP Contribution: **$525,000.00**
- Return on Investment **3.17 Years**
- Equipment life expectancy **10 years**

Fire Station 22 Lighting and Controls Upgrade

This lighting efficiency upgrade encompassed interior and exterior spaces. Daylight harvesting was used in the apparatus bay to control lighting located adjacent to clear story windows. Additional parking area lights wereadded to provide additional security to vehicles. Finally, lighting control strategies in offices, meeting rooms and general operations areas were used to reduce overall energy consumption.

Existing Annual Lighting kWh: **58,832.00 kWh**

- New Estimated Annual Lighting kWh: **27,486.00 kWh**
- Avoided Annual kWh: **31,346.00 kWh**
- Avoided Annual Maintenance Cost: **$6,611.00**
- Avoided Annual Lighting Energy Cost: **$4,075.00**
- Lighting Energy use Reduction: **56 %**
- Return on Investment: **1.71 years**
- 10-year Warranty on LED Fixtures

Street Lighting Implementation Envision ABQ

This City owned street light infrastructure upgrade consists of replacing 20,966 existing High Pressure Sodium (HPS) fixtures with LED fixtures which use 65% less watts per fixture and reduces maintenance costs. The street lighting utility bill amounted to 1/3 of the City's electric monthly utility bill with two account types: 80% at a flat rate with the remaining 20% as metered accounts. Lighting levels and color temperatures were selected to provide visibility, enhance visual acuity, and keep our citizens safe. A locally owned company was contracted to install the lights.

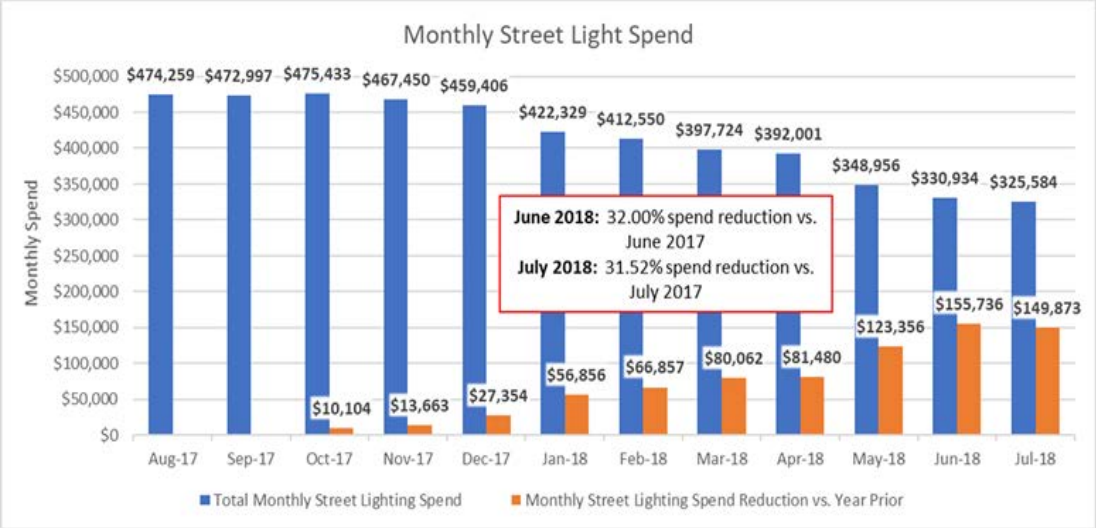
This project is ongoing and scheduled to be completed late November 2018.

FY18 Street Lighting Upgrade Accomplishment Summary

- Total number of fixtures upgraded through June 2018: 15,062

Energy and Cost Saved

- Total monthly energy saved through June 2018: 1,192,000 Kwh
- Total monthly reduction in street lighting costs for June 2018 as compared to June 2017: ***$149,872.89 or a 31% reduction in cost.***



Key People & Partners

Community Partners

The Albuquerque Energy Council's members bring a diverse and expansive background to the Council. In addition to the work they do for the Council, most are involved in a variety of other significant groups around the community and the state. Some of those organizations include:

Albuquerque Public Schools Energy Conservation Committee

American Institute of Architects

Public Service Company of New Mexico

New Mexico Gas Company

DNV GL – Energy

New Mexico Association of Energy Engineers

New Mexico Solar Energy Association

City of Albuquerque 21st Century Transportation Task Force

City of Albuquerque Climate Change Task Force

City of Albuquerque Alternative Vehicle Managers Committee

Central New Mexico Community College

University of New Mexico

National Council of Architectural Registration Boards

New Mexico Chapter of the U.S. Green Building Council

Mountain Vector Energy

The Nature Conservancy

Environment New Mexico

Current C Energy Systems

Administration Support

The Albuquerque Energy Council (AEC) would like to enthusiastically thank the following for their support of the 3% Set-Aside for Energy Conservation and Renewable Energy Program, especially Tony and Saif, without whom these projects would never be completed.

MAYOR, CITY OF ALBUQUERQUE
Timothy M. Keller

CHIEF ADMINISTRATIVE OFFICER
Lawrence Rael

ALBUQUERQUE CITY COUNCIL
Ken Sanchez, District 1

Isaac Benton, District 2

Klarissa Pena, District 3

Brad Winter, District 4

Cynthia Borrego, District 5

Pat Davis, District 6

Diane Gibson, District 7

Trudy Jones, District 8

Don Harris, District 9

MUNICIPAL DEVELOPMENT DEPARTMENT
Patrick Montoya. Director

Gregory P. Smith, Deputy Director, Attorney

Kevin Sourisseau, Deputy Director

Kenneth Mitchell, CFM, Facilities Official

Tony Gurule, Energy and Sustainability Program Manager

Saif Ismail, Energy Specialist, FEMD

Albuquerque Energy Council Personnel

ALBUQUERQUE ENERGY COUNCIL FY18 BOARD MEMBERS

Athena Christodoulou, Chair

Colby A. Geer

Phil Sisneros

Carlos Lucero

Barbara Madaras

Amy Miller

Sandra McCardell

Sanders Moore

Michael Cecchini

ALBUQUERQUE ENERGY COUNCIL ADVISORY BOARD

Jim Desjardins

TECHNICAL REVIEW COMMITTEE

Kenneth Mitchell, CFM, Chair

Jacques B Blair

Tony Gurule

Saif Ismail

Appendix A – Financial Summary

3% for Energy Conservation and Renewable Energy Set-Aside for Capital Improvements
Project Summary

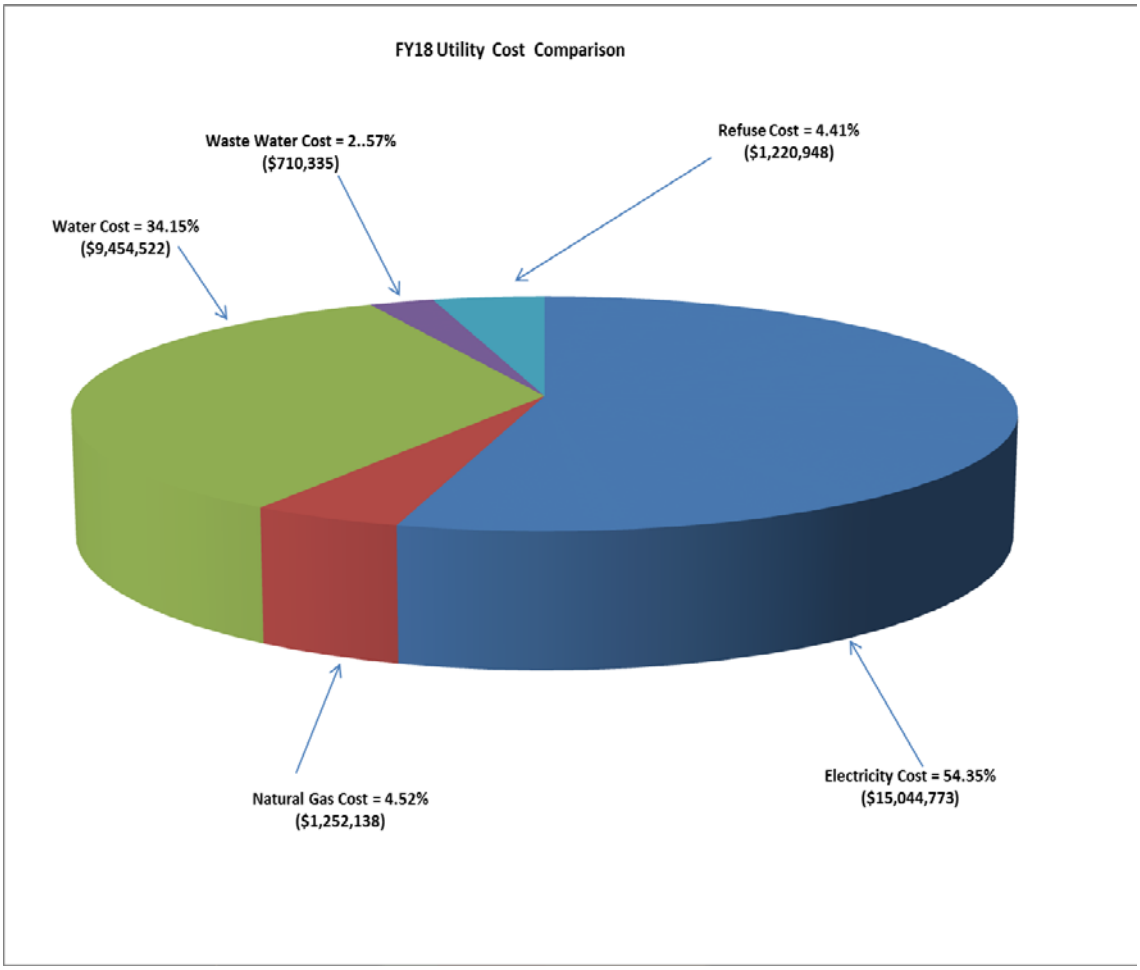
Completed Fiscal Year (FY18)	CIP 3% Contribution	Dept. Contribution	Est. PNM Rebate	Annual Avoided Energy Cost	Years Pay Back	Annual Kwh Savings	Annual MMbtu Savings
Sandia Swimming Pool Roof and Solar Thermal Project	$681,229	$160,000	$12,241	$121,835	6.8	712,194	1,347.19
Balloon Museum Lighting and Controls Upgrade	$525,000	$0.00	$20,000	$142,700	3.17	612,942	0
Fire Station 22	$48,433	$0.00	$2,000	$10,686	4.5	31,346	0
Street Lighting Implementation	$1,326,899					1,192,000	
Sub-total	**$2,581,561**	**$160,000**	**$34,241**	**$275,221**	**4.82***	**2,548,482**	**1,347.19**

***The average return on investment for the three (3) projects listed is 4.82 years.**

Appendix B – Utility Billing Summary

The City of Albuquerque's total annual utility bill is broken down by utility expense, included is electricity, natural gas, water, waste water and refuse costs. The total utility expense for FY-18 amounts to $27,682,716 with electricity 54.35% and water 34.15% being the largest utility expense. Conservation efforts in electric, natural gas and water use go a long way towards reducing the City's annual utility expense.

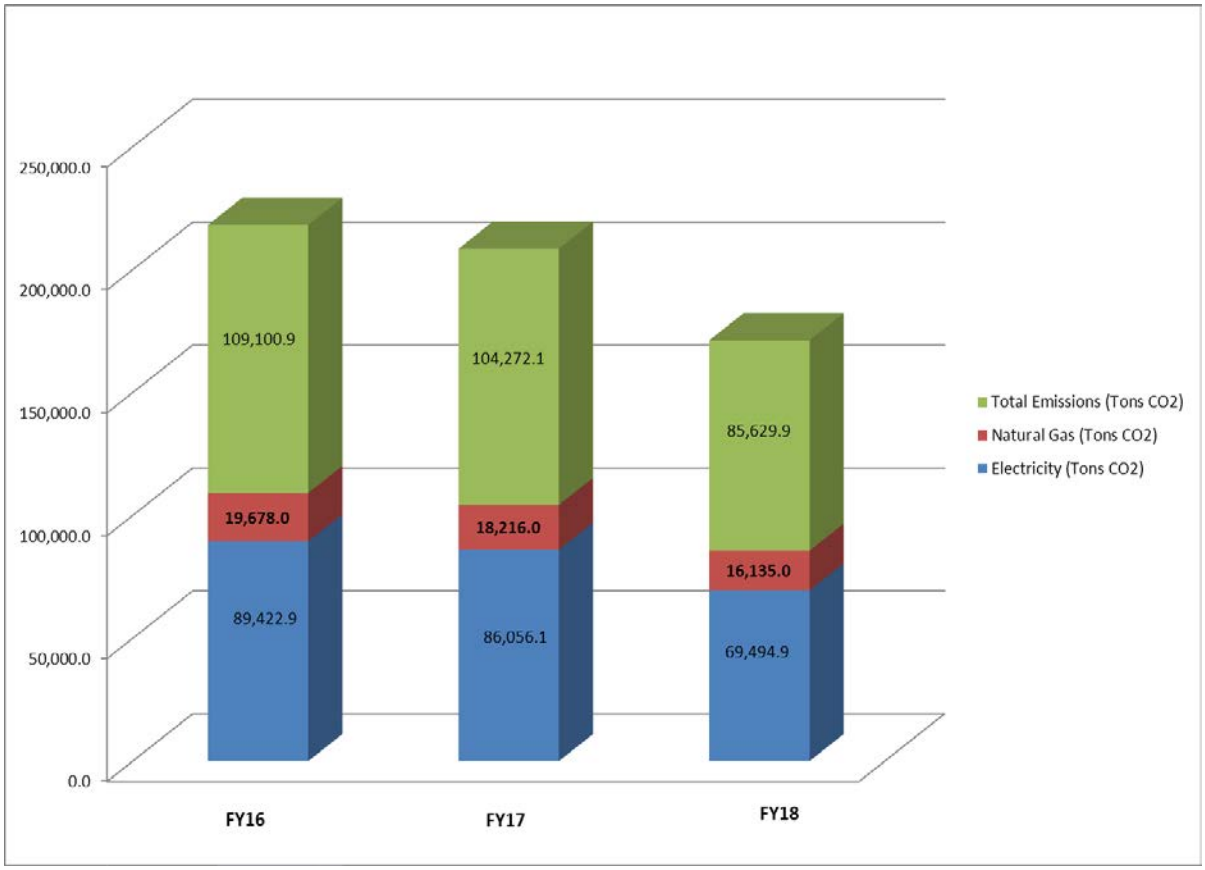
FY2018: July 1, 2017 through June 30, 2018 Utilities Expense



Appendix C – Historical CO2 Emissions Comparison

The City of Albuquerque through its conservation efforts continues to reduce carbon emissions as reflected in the graph. Electricity and natural gas emissions historically have dropped below the previous year for a combined total CO2 reduction as reflected on a year to year comparison.

Historical 3-Year CO2 Emissions Comparison



Appendix D – AEC Members Bio's

Athena Christodoulou

An energy consultant for the Department of Energy (DOE), Athena Christodoulou understands all aspects of energy, especially solar, including the technology, policy, and business. A retired Navy commander, she earned a B.S. in civil engineering, M.S. in environmental engineering, and a Professional Science Master in nanoscience and business management. She is also the president of the NM Solar Energy Association and co-founder of Udorami. She is currently developing solar projects from 25 kW to 10 MW in the Solar in Your Community Challenge (DOE), managing the 2018 Solar Fiesta for October 20, and absolutely determined to be personally fossil fuel free by 2023.

Phil Sisneros

Phil is the Corporate Executive Officer for New Mexico Tint Co. Phil has over 16 years in Solar Control Window Film applications. Very knowledgeable with applied building analysis to include energy savings through the use of solar window films there by reducing energy consumption, Phil sits on the Members Action Committee for International Window Film Association for the State of New Mexico. Phil is responsible for implementation of Solar Window Film at City of Albuquerque Facilities as well as in the Business Community.

Colby Geer

Colby is the General Manager of Yearout Energy Services Company. A graduate of Colorado Christian University with his Bachelors in Business Management, Colby came to work at Yearout Mechanical, Inc. in 2008 after graduation. During his time at Yearout, Colby has worked to develop the energy services division for Yearout and turned it into Yearout Energy Services Company.

Yearout Energy Services Company, LLC is focused on the efficient use of energy in public, private, commercial, and industrial facilities. Yearout Energy provides solutions that include design, engineering, installation, and maintenance to reduce operational expenses within existing facilities. Yearout Energy guarantees the utility and operational savings and actively works with the building owner to ensure that those savings are realized.

He is best known in the industry for his ability to innovate and develop emerging energy construction markets. Colby is dedicated to being an active participant in industry associations and organizations.

Boards & Associations (Industry)

Chair of AGC's Construction Leadership Council 2012-2014
ASA of NM – Nominations Committee & Membership Committee
USGBC of NM
NAIOP
Leadership NM, Class of 2017

Colby a native of Colorado and moved to New Mexico in 2008. He enjoys baseball, traveling, skiing, fishing, golf and off-roading. He is currently spending lots of time with his wife, Ashley, and their two children, Casen and Rowen.

Carlos R. Lucero, P.E.

Carlos Lucero currently serves as Government Affairs Manager at Public Service Company of New Mexico (PNM) as a liaison to professional, business and civic groups, community organizations and state and local elected and appointed officials to troubleshoot and educate various issues affecting service territory operations and utility industry and energy developments.

Carlos holds both a Bachelor and Master of Science degrees in Electrical Engineering from New Mexico State University and a registered Professional Engineer in the State of New Mexico.

Also, Carlos has over fifteen years of electric utility and energy industry experience and has successively worked in the areas of system engineering, transmission planning, business customer support, business energy efficiency, and government affairs.

Barbara Madaras

A resident of Albuquerque for the last 32 years, Barbara retired from a 25-year career with AT&T Large Business Marketing in 2002 to become a full time Real Estate Agent with Coldwell Banker Legacy. Entering her twelfth year as a Realtor, Barbara expands her real estate practice by educating Realtors with her Continuing Education Class, "Real Estate: GREEN 101". Over the years, Barbara has given back to the Albuquerque Community in the role President of her local Neighborhood Association, in the role of first female President of the Board of Directors of the Albuquerque Boys and Girls Clubs and presently as an Ombudsman for the Greater Albuquerque Association of Realtors. Barbara is married to Rick Wright, an Albuquerque native and Sports Writer for the Albuquerque Journal. Her "family" consists of a rescued Sheltie named "Ginger". Barbara spends her spare time traveling and cooking.

Amy Miller

Amy Miller is a lifelong New Mexican, with more than 15 years of public affairs, issue management, communications, governmental affairs, strategy development and implementation experience with political and business leaders and advocacy organizations.

She is currently the President of AMM Consulting, a public affairs firm specializing in energy and environmental issues. She previously served as the External Affairs Director for The Nature Conservancy's New Mexico Chapter where she worked on the development and implementation of strategies for energy, climate change, and urban programs to achieve the Conservancy's goals through interaction with elected officials, agencies and the corporate sector.

Amy previously worked at PNM for 14 years, most recently serving as the Director of Community and Local Government Engagement, where she worked on regulatory and environmental policy issues as well as on community engagement strategies and programs. Prior to her time at PNM, she served as the Director of Public Relations for Rick Johnson & Company and the Communications Manager for Plains Electric Generation and Transmission Cooperative.

Amy is a graduate of Leadership New Mexico, Leadership Albuquerque and the University of Idaho Utility Executive Course. She serves on the UNM Alumni Association board and the Albuquerque Bernalillo Utility Authority Technical Customer Advisory Committee. She has also served on boards for The Nature Conservancy, NAIOP and the UNM School of Public Administration.

She has extensive public speaking experience at various organizations, including the Albuquerque and Santa Fe Green Chambers of Commerce, Leadership Sandoval County, the National Association of Industrial and Office Properties, the Southwest Energy Efficiency Project annual conference, the Santa Fe Homebuilders Association, the Western Energy Institute annual conference and at University of New Mexico undergraduate and graduate Business and Society courses.

Sanders Moore

Sanders is the State Director for Environment New Mexico, where she works to protect air, water, and open spaces in the state. Since joining Environment New Mexico in 2010, she has led campaigns to increase renewable energy in Albuquerque and across the state, securing a unanimous commitment from the Albuquerque City Council to get 25 percent of the City's electricity from solar energy by 2025. She also led the grassroots part of the Save the Organ Mountains-Desert Peaks campaign, which was designated a National Monument in 2014 by President Barack Obama. She has been published in newspapers across the state, including the Albuquerque Journal, Santa Fe New Mexican, and Las Cruces Sun News.

Previously, she worked for the Mothers & Others for Clean Air program at the Georgia Conservancy to improve air quality in the metro-Atlanta area through education and advocacy.

She received her Master’s degree in Environmental Law & Policy from Vermont Law School and her B.A. in Government from Wesleyan University.

ECOterra
ENERGY CONSULTING
MAKING BUILDINGS BETTER

Michael Cecchini

Michael is an energy consultant for various public and private customers. With over Twenty years of energy, solar and advanced thermal energy storage knowledge ECOterra provides consulting, engineering and implementation services, reducing Energy usage and costs in a variety of buildings across the US. Michael attended the University of New Mexico's Anderson School of Business and is a Certified Energy Manager (CEM) accredited thru the National Association of Energy Engineers and past President of the NM Association of Energy Engineers.

Sandra McCardell

Sandra has been involved with energy efficiency issues since she founded Current-C Energy Systems, Inc. in 1996. With a background in business and nonprofit management, she believes that energy efficiency and alternative energy project should relate to organizations' goals and objectives, and that energy projects succeed or fail because of the people involved. Springer Publishing will soon be publishing her book on Energy Effectiveness, an outgrowth of Current-C's consulting practice over the past several decades. Sandra also serves as the Coordinating Director for The Cooperative Catalyst of NM, which fosters cooperative organizations.