Clark County Department of Air Quality
Ozone Advance Program
Progress Report

June 2015

Table of Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

Acronyms

AQR	Clark County Air Quality Regulation
AVERT	Avoided Emissions and Generation Tool
CARB	California Air Resources Board
CEA	Consumer Electronics Association
CEP	Clean Energy Project, Inc.
DAQ	Clark County Department of Air Quality
EE	energy efficiency
EV	electric vehicle
EPA	U.S. Environmental Protection Agency
HA	hydrographic area
IRTA	Institute for Research and Technical Assistance
NAAQS	National Ambient Air Quality Standards
PV	photovoltaic
RE	renewable energy
RTC	Regional Transportation Commission of Southern Nevada

Abbreviations

CO	carbon monoxide
CO_2	carbon dioxide
kWh	kilowatt-hour
GWh	gigawatt-hour
MW	megawatt
MWh	megawatt-hour
NOx	nitrogen oxides
ppb	parts per billion
ppm	parts per million
VOC	volatile organic compounds

1. Introduction

The Clark County Department of Air Quality (DAQ) enrolled in U.S. Environmental Protection Agency (EPA) Ozone Advance program on June 12, 2013. The program's goal is to help maintenance and attainment areas ensure continued health protection, to better position those areas to remain in attainment, and to efficiently direct available resources toward actions to address ozone and its precursors.

Current Attainment Status

Clark County was a maintenance area for the 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS), and the 1997 NAAQS was revoked on April 6, 2015, by the 2008 ozone NAAQS implementation rule. Clark County is currently in attainment/unclassifiable for the 2008 8-hour ozone standard. By law, the state of Nevada uses hydrographic areas (HAs) to define airsheds.

The Clark County ozone design value history in Figure 1-2 shows a downward trend from 2007 through 2011; however, the design values increased in 2012, 2013, and 2014.

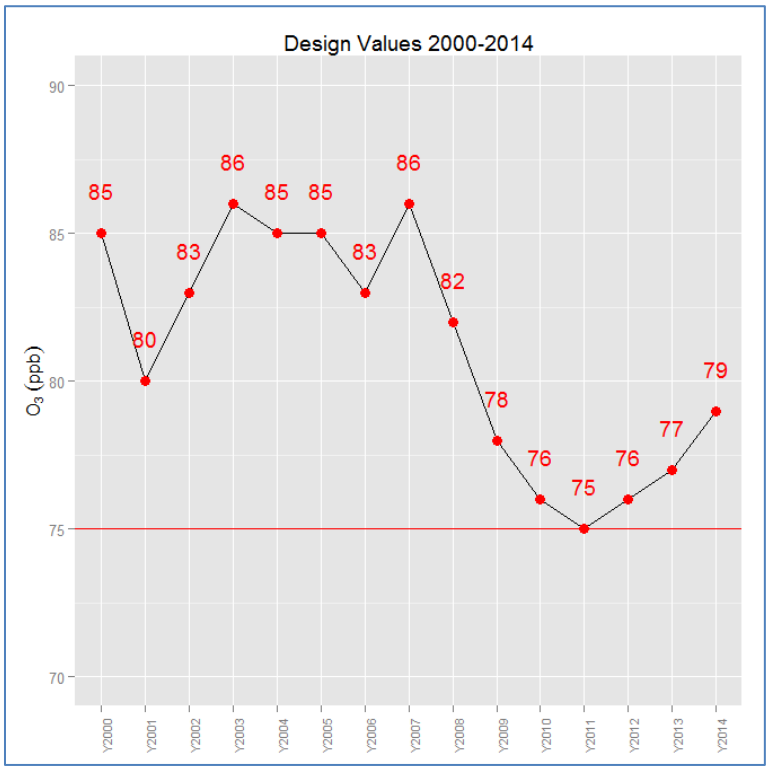

Figure 1-1. Ozone design value history.

DAQ is in the process of completing exceptional event packages for wildfires that occurred in 2013. If the Region 9 office of the EPA will concur with DAQ's findings, the design values will lower to near or under the NAAQS.

Impacts of Meteorological Conditions on Ozone Concentrations

High ozone events in Clark County generally occur during weather patterns characterized by high pressure. Regional wind fields are also influenced by the local terrain, which channels winds through passes, slopes, and valleys. Such slope-and-valley wind systems are local, thermally driven flow circulations created in complex terrain areas like the Las Vegas Valley. These systems directly affect the transport and dispersion of pollutants.

According to historical data collected at McCarran International Airport[1], the highest average wind speeds in Clark County occur in the early spring (April–May), the same months that ozone concentrations increase rapidly. Figure 1-3 shows average wind speeds during the year.

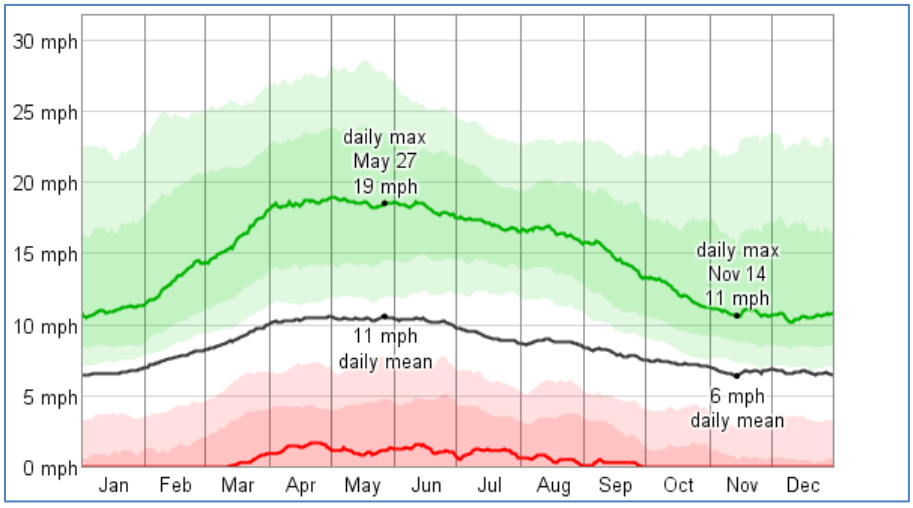

Figure 1-2. Average wind speeds at McCarran (1989-2012).

The northwest quadrant of the Las Vegas Valley typically experiences the highest ozone levels when Clark County experiences elevated ozone concentrations. Often stagnant flow conditions in the populated urban areas of California increase ozone concentrations, which can transport to southern Nevada and contribute to widespread exceedances throughout the Clark County network. Figure 1-4 shows the predominant airflow in Clark County; the general airflow enters from the south (following I-15) and exits to the northwest (following U.S. Highway 95).

[1] http://weatherspark.com/averages/30697/Las-Vegas-Nevada-United-States.

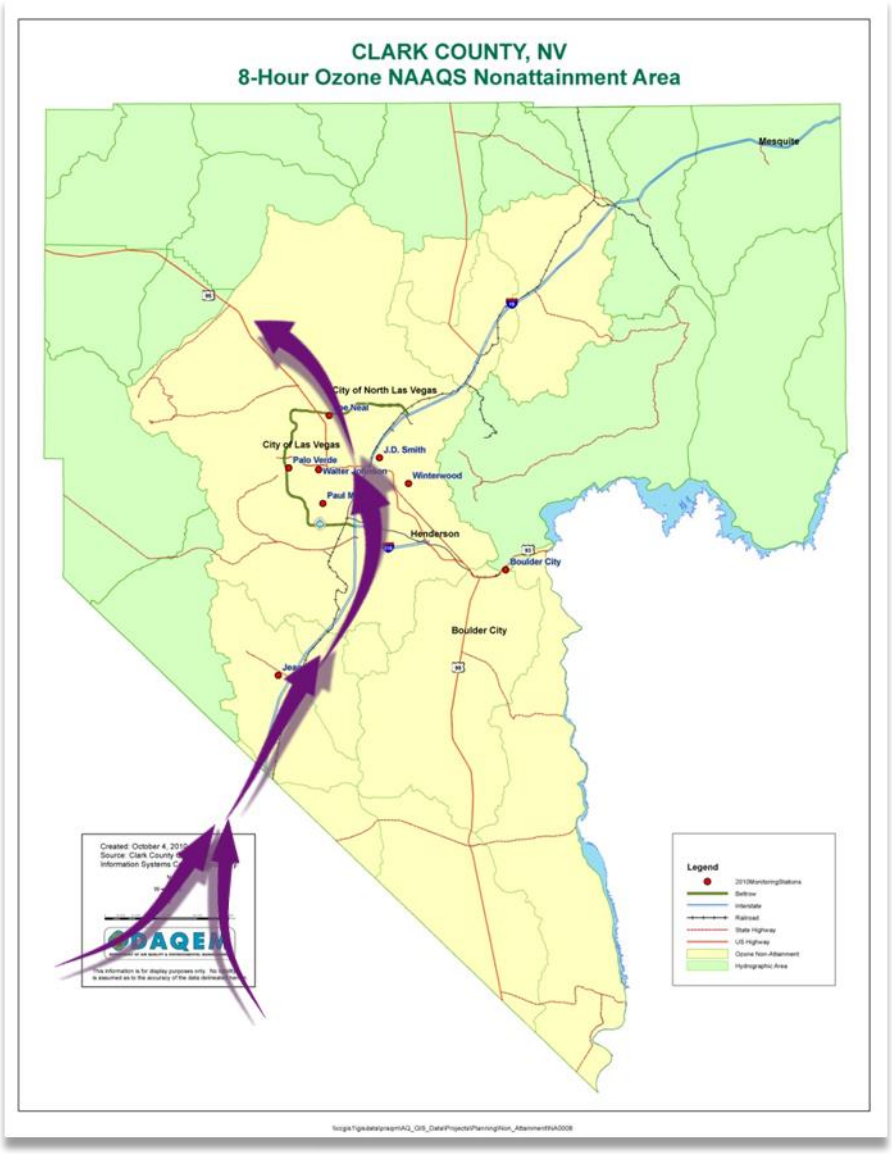

Figure 1-3. Airflow in Clark County.

Several studies directed by DAQ confirmed that there is transport from Southern California into Clark County; however, the contribution from local versus transported ozone is difficult to quantify without extensive regional modeling analyses.

2. Ozone Health Effect and Sources[2]

Overview of Ozone

Ozone (O_3) is a tri-atomic ion of oxygen. In the stratosphere or upper atmosphere, ozone occurs naturally and protects the Earth's surface from ultraviolet radiation. Ozone in the lower atmosphere is often called ground-level ozone, tropospheric ozone, or ozone pollution to distinguish it from upper-atmospheric or stratospheric ozone. Ozone occurs naturally in the lower atmosphere (troposphere) and in most locations background ozone is relatively low, well below the NAAQS. However, at higher locations in the west, background ozone can be modeled at levels approaching the NAAQS. The term "smog" is also commonly used to refer to ozone pollution.

Although ozone is a component of smog, smog is a combination of ozone and airborne particles having a brownish or dirty appearance. It is possible for ozone levels to be elevated even on clear days with no obvious "smog." In the lower atmosphere, ozone is formed when airborne chemicals, primarily nitrogen oxides (NOx) and volatile organic compounds (VOCs), combine in a chemical reaction driven by heat and sunlight. These ozone-forming chemicals are called precursors to ozone.

Manmade NOx and VOC precursors contribute to ozone concentrations above natural background levels. Since ozone formation is greatest on hot, sunny days with little wind, elevated ozone concentrations occur during the warm weather months, generally April through September. In agreement with EPA's guidance, Clark County operates certain ozone monitors year-round.

Ozone Health Effects

When people breathe ozone, it acts as an irritant to the lungs. Short-term, infrequent exposure to ozone can result in throat and eye irritation, difficulty drawing a deep breath, and coughing. Long-term and repeated exposure to ozone concentrations above the NAAQS can result in reduction of lung function as the cells lining the lungs are damaged.

Repeated cycles of damage and healing may result in scarring of lung tissue and permanently reduced lung function. Health studies indicate that high ambient ozone concentrations may impair lung function growth in children and result in reduced lung function in adulthood. In adults, ozone exposure may accelerate the natural decline in lung function that occurs as part of the aging process. Ozone may aggravate chronic lung diseases such as emphysema and bronchitis and reduce the immune system's ability to fight off bacterial infections in the respiratory system.

Asthmatics and others with respiratory disease are especially at risk from elevated ozone concentrations. Ozone can aggravate asthma, increasing the risk of asthma attacks that require a doctor's attention or the use of additional medication. According to the EPA, one reason for this

[2] Text borrowed from Cumberland County, North Carolina Path Forward plan

increased risk is that ozone increases susceptibility to allergens, which are the most common triggers for asthma attacks. In addition, asthmatics are more severely affected by the reduced lung function and irritation that ozone causes in the respiratory system. There is increasing evidence that ozone may trigger, not just exacerbate, asthma attacks in some individuals.

All children are at risk from ozone exposure because they often spend a large part of the summer playing outdoors, their lungs are still developing, they breathe more air per pound of body weight, and they are less likely to notice symptoms. Children and adults who frequently exercise outdoors are particularly vulnerable to ozone's negative health effects because they may be repeatedly exposed to elevated ozone concentrations while breathing at an increased respiratory rate.

Ozone Sources

Ozone-forming pollutants, or precursors, are VOCs and NOx.

Volatile Organic Compounds

VOCs are sometimes referred to as hydrocarbons. In Clark County, large portions of precursor VOCs are produced by natural (biogenic) sources, primarily trees. Man-made (anthropogenic) VOCs also contribute to ozone production, particularly in urban areas. Sources of anthropogenic VOCs include unburned gasoline fumes from gas stations and cars, industrial emissions, and consumer products such as paints, solvents, and the fragrances in personal care products.

Nitrogen Oxides

NOx is produced when fuels are burned and result from the reaction of atmospheric nitrogen at the high temperatures produced by burning fuels. Power plants, highway motor vehicles (the major contributor in urban areas) and off-road mobile source equipment, such as construction equipment, lawn care equipment, trains, and boats, are the major sources of NOx. Other NOx sources include "area" sources, which are small, widely distributed sources such as fires (forest fires, backyard burning, house fires, etc.) and natural gas hot water heaters.

Source Categories

The following lists the sources, by category, that contribute to NOx and VOC emissions:

Biogenic: Trees and other natural sources.

Mobile: Vehicles traveling on paved roads: cars, trucks, buses, motorcycles, etc.

Nonroad: Vehicles not traveling on paved roads: construction, agricultural, and lawn care equipment, motorboats, locomotives, etc.

Point: "Smokestack" sources: industry and utilities.

Area: Sources not falling into the above categories. For VOCs this includes gas stations, dry cleaners, print shops, and consumer products. For NOx this includes forest and residential fires, natural gas hot water heaters, etc.

Source Apportionment Modeling

DAQ has conducted several studies to characterize ozone transport, and the results show that interstate transport significantly impacts Clark County. Transport from Asia and stratospheric ozone intrusions also contribute to ozone concentrations. While it is difficult to quantify transport contributions from any of these sources, DAQ plans to perform source apportionment modeling in the near future, with the goal of identifying sources that affect ozone concentrations in the county. The new 2011 computer modeling platform that EPA is proposing may be able to analyze interstate transport and better characterize source contributions.

Past modeling results show that the background ozone concentration in Clark County is between 40 and 45 parts per billion (ppb). Modeling also shows that transport into Clark County from inside and outside the United States is between 20 and 40 percent, depending on the episode.

3. Program Update

The initiatives described in the Ozone Advance Path Forward submittal of June 23, 2014 are still ongoing. The sections in this chapter are either updates to existing initiatives outlined in the original submittal, or new initiatives commenced after the submittal. The sections are identified as Update or New Initiative.

Energy Efficiency

Several agencies and businesses in Clark County promote voluntary measures to control ozone precursors from mobile sources and energy usage. Government entities and private companies both offer many different opportunities for the citizens of Clark County to engage in programs that reduce emissions.

It is difficult, however, to achieve long-lasting results from voluntary programs because they involve a behavior change. Therefore, education and outreach are key components of any successful program. Recognizing this, the agencies and businesses promoting voluntary control measures have developed sets of materials to use in outreach campaigns to actively promote and improve their programs.

Renewable Energy

Many renewable energy projects were initiated over the last few years. Federal grants and the NV Renewable Portfolio Standard (RPS) are the drivers for the projects. The following paragraphs give a brief overview of the projects, at various levels, that were finished between 2011 and 2013 and the projects that are scheduled to be finished in the next couple of years.

State wide - Update

Although Nevada was one of the front-runners of renewable energy generation between 2011 and 2012 when the amount of renewable energy produced in Nevada increased by 19 percent, it was the 2013 Legislative Session that helped to encourage growth in all market sectors. In 2014, Nevada installed 339 megawatt (MW) of solar electric capacity, ranking it 3rd nationally. The 789 MW of solar energy currently installed in Nevada ranks the state 5th in the country in installed solar capacity.

The Nevada Office of Energy is the gatekeeper of many of the federal funds and grants available to agencies and entities in the state, distributing and tracking the funds it receives for projects in Nevada. The office has a directive, per the Nevada Revised Statutes, to prepare a state energy plan that reduces the amount of energy purchased for state-owned buildings and facilities. Thanks to the efforts of the office, the energy consumption in state-owned buildings has declined by 10.2 percent. (See Figure 3-1).

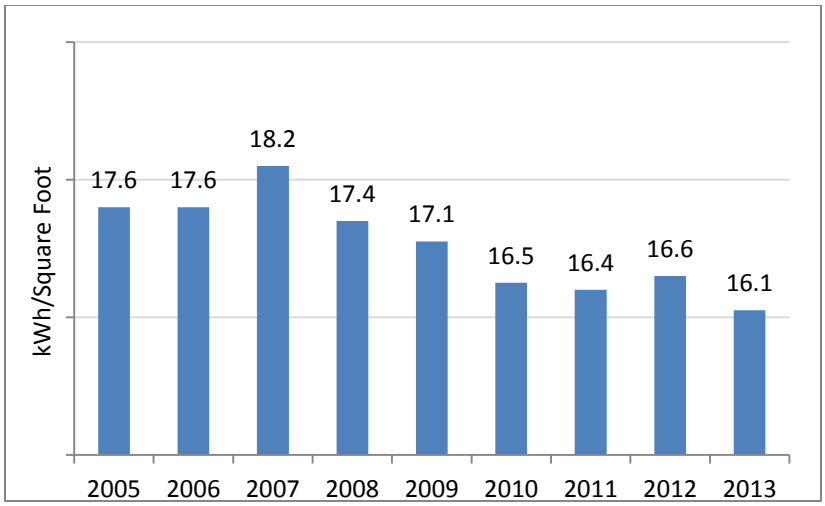

Figure 3-1. Energy reductions in state-owned buildings.

Figures 3-2 and 3-3 show the 2013 capacity installed and the 2013 generated. The nameplate capacity is the maximum rated electric output a generator can produce under specific conditions, while generation is the amount of electricity a generator produces over a specific period of time. There were 917 MW installed, and there were 3,730 megawatt-hour (MWh) (in thousands) generated.

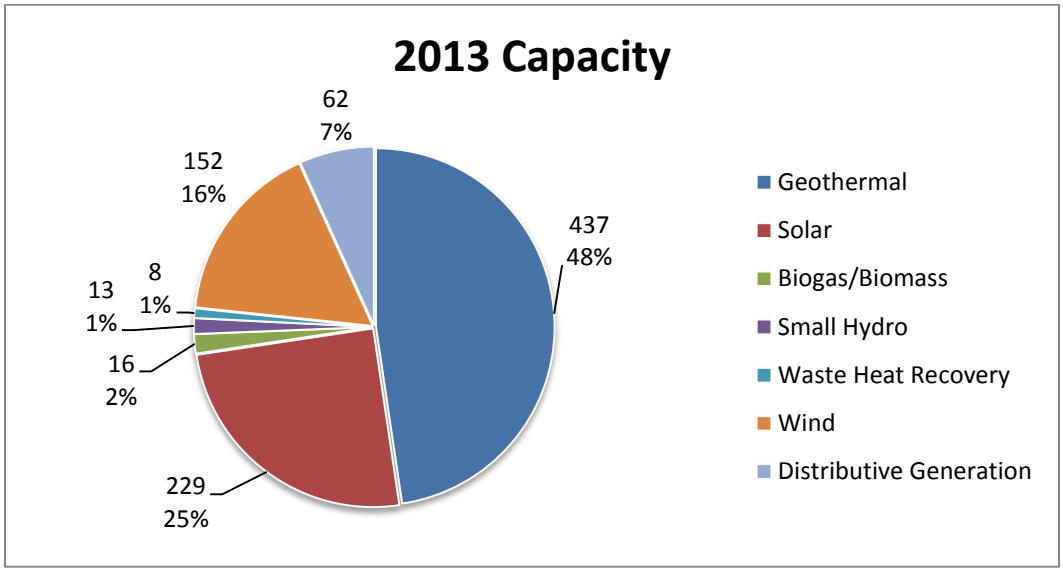

Figure 3-2. Renewable capacity.

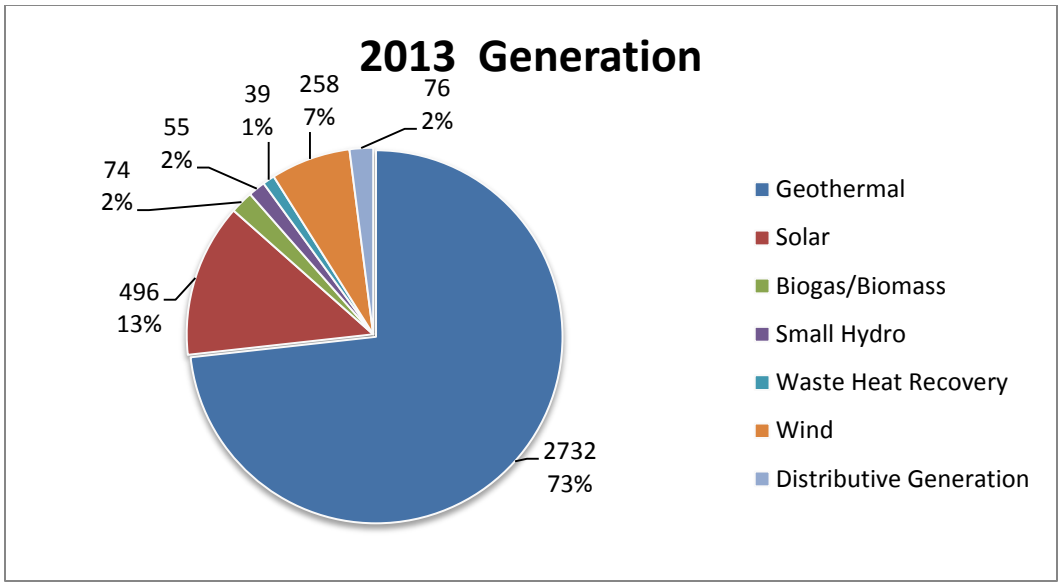

Figure 3-3. Renewable generation.

Copper Mountain 2 in Boulder City was completed in 2012 by developer First Solar. This photovoltaic (PV) project has the capacity to generate 92 MW of electricity. Another utility scale project, Copper Mountain 3, with a capacity of 250 MW, is currently under construction in Boulder City and is scheduled to come online in 2015. At 110 MW, Crescent Dunes Solar Energy Project in Nye County is among the largest solar installations in Nevada and was completed in 2014 by SolarReserve. Table 3-1 shows some of the Clark County projects that were completed by the end of 2014, or will be completed by the end of 2015[3].

Table 3-1. 2013 - 2014 RE Projects

PROJECT	SIZE	TYPE	COUNTY
City of Las Vegas East Yard	100 kW	Photovoltaic	Clark
City of Las Vegas West Yard	200 kW	Photovoltaic	Clark
City of Las Vegas Durango Hills	200 kW	Photovoltaic	Clark

City of Las Vegas received three loans from the State Energy Office totaling $1.2 million to help fund construction of three solar parking shade structures. The projects are expected to produce 1.2 million kilowatt-hour (kWh) of power annually and reduce greenhouse gas emissions by an estimated 23.8 million pounds of carbon dioxide (CO_2) during the first 20 years of operation.

Spring Valley is a 152 MW project located in White Pine County, Nevada. Spring Valley is situated on approximately 7,680 acres on federal land administered by the Bureau of Land Management, which granted the project a right-of-way. The project consists of 66 2.3 MW Siemens turbines that commenced commercial operation in August 2012. One hundred percent of the project's output, including electricity generation and environmental attributes, is sold to

[3] 2014 Status of Energy Report for the State of Nevada

NV Energy under a long-term power purchase agreement. Spring Valley connects to the NV Energy transmission system and was Nevada's first commercial wind power project.

Moapa River Indian Reservation, Moapa - First Solar, a leading provider of comprehensive PV energy solutions, is constructing a 250 MW alternating current (AC) solar project located on approximately 2,000 acres on the Moapa River Indian Reservation in Clark County, Nevada. Moapa Southern Paiute Solar, LLC (a subsidiary of First Solar Electric, LLC) is the project owner and will construct the project using First Solar's advanced PV thin film solar modules. When fully operational, the project will generate enough clean solar energy to serve the needs of about 100,000 homes per year, displacing approximately 178,000 metric tons of CO_2 annually—the equivalent of taking about 34,000 cars off the road.. Construction has begun and is expected to be complete by June 2016.

Clark County Department of Air Quality (DAQ)

Congestion Mitigation Projects – New Initiative

DAQ's used CMAQ grants to apply for congestion mitigation projects. Three proposals were submitted and an Electric Vehicle (VE) purchase project was selected. The Electric Vehicle project has three phases. Phase 1 occurs in FY15 during which DAQ will acquire 8 EVs and 8 charging stations for inclusion in the county fleet. In the second phase, during FY16, DAQ will purchase 13 additional EVs and charging stations. In the third phase, during FY17, eight more EVs will be added to the fleet. The electric vehicles will be Chevy Volts. Table 3-2 shows the total vehicle emission reductions by 2017 over the lifetime of the vehicles, and Table 3-3 shows the total emissions reduction comparison with a mid-size gasoline car, in this case a Chevy Impala.

Table 3-2. Electric Vehicle Emission Reductions

Pollutant	**Emission Reductions** (kg/day/vehicle)	**Emission Reductions** (kg/day/all vehicles)	**Total Emission Reductions over Vehicle Life(s)** (kg/all vehicles)
Volatile Organic Compounds (VOCs)	0.02	0.52	2,175
Carbon Monoxide (CO)	0.14	4.12	17,151
Nitrogen Oxides (NOx)	0.02	0.51	2,103

Table 3-3. Emission Reduction Comparison

Pollutant	**Percent Reduction**
Volatile Organic Compounds (VOCs)	70%
Nitrogen Oxides (NOx)	60%
Average:	66%

DAQ Public Education and Outreach Program - Update

The goal of DAQ's Public Education and Outreach Program is to enhance its interaction with the community and industry in efforts to create citizen awareness and an interest in air quality, transform behaviors and habits, and encourage voluntary air pollution-reducing actions.

Figure 3-4. DAQ outreach booth.

To this end, DAQ has developed and distributed to the public several brochures on air quality with an emphasis on ozone. Additionally, the public can sign up for EPA's EnviroFlash alerts through DAQ's Web site. Every year, Clark County issues a season-long ozone advisory that informs the public of ozone's health effects and suggests ways to reduce ozone pollution. DAQ also provides daily air quality reports and forecasts on its Web site, along with real-time monitoring data.

DAQ engages with external organizational committees that focus on public outreach and communication. In the last year, DAQ has redesigned brochures on specific air quality topics and issues, identified outreach opportunities, reviewed outreach material other agencies, and ordered tchotchke for outreach events. To reach a broader audience in the community, DAQ is making an effort to target events that differ from a traditional environmental purpose. Additionally, the public outreach budget was increased to accommodate all the activities above.

Thus far, DAQ participated in the outreach activities listed below:

- October 2014 - Las Vegas Green Up at Las Vegas Wash
- November 2014 - Clark County Health and Wellness Fair
- February 2015 - Black History Month Celebration at the Springs Preserve
- March 2015 - March 18 Senior Expo and Health Fair
- March 2015 - Springs Preserve Annual Plant Sale and Green Expo
- April 2015 - Ask the Expert Day at Clark County Government Center
- April 2015 - Green Fest -Earth day celebration at Downtown Summerlin
- May 2015 - Science and Technology Expo
- May 2015 - Better Breeders Club
- May 2015 – Jazz in the Park

- June 2015 - Jazz in the Park

Some visitors are aware of the department's presence and function in the community. They are inquisitive and ask very specific questions about air quality and seem to have an understanding how air quality affects their health. At the other end of the spectrum, many visitors are not aware that Clark County has a Department of Air quality and want to know more about the department's activities and function.

The goal of outreach is to communicate the department's purpose to the community through public, private, and business events in a professional, informative, and friendly manner. DAQ believes it is essential to educate the public to allow them to make informed decisions about their health and welfare. For example, DAQ informs them of EnviroFlash and lets them know they can sign up for air quality forecasts. DAQ also lets them know that near-real time monitoring data is available on the department's Web site. DAQ's management believes that its Public Education and Outreach program has been successful thus far.

Pollution Prevention Grant Program – New Initiative

DAQ will participate in the "Multi-State Collaboration to Demonstrate Safer Low-VOC, Low Toxicity Alternatives in Auto Repair and Industrial Cleaning Applications in EPA Region IX" project. The project will focus on demonstrating safer alternative cleaners used by auto repair and industrial facilities for repair and maintenance cleaning, brake cleaning, batch loaded cold cleaning, and vapor degreasing. Demonstrations will be conducted in California, Arizona, and Nevada (the three state collaborators) to illustrate how facilities can convert to water-based cleaning processes. Outreach materials will be prepared for the four cleaning applications and they will be widely disseminated[4]. California Air Resources Board (CARB) is partnering with Institute for Research and Technical Assistance (IRTA) and with agencies in Arizona and Nevada on the proposed project. Specifically, the project will involve:

- Collecting and analyzing information on repair and maintenance cleaning, brake cleaning, batch loaded cold cleaning and vapor degreasing in the project participant jurisdictions;
- Estimating emissions of VOCs and toxics in these four applications;
- Investigating the current status of the four applications in Southern California;
- Selecting demonstration sites in the project participant jurisdictions;
- Equipping, arranging, and conducting demonstrations;
- Updating costs and conducting cost analysis of water-based cleaning and solvent cleaning in the four applications;
- Developing stand-alone case studies for each application;
- Assisting some facilities in conversions; and
- Preparing final report and outreach materials and arranging and holding a webinar

[4] Fiscal Year 2015 Pollution Prevention Grant Program EPA-HQ-OPPT-2015-002.

The ultimate goal is to convince affected facility owners to switch to water-based products, thus reducing the total VOC emissions from these facilities.

DAQ support for Club Ride program – New Initiative

DAQ will support the Regional Transportation Commission of Southern Nevada's (RTC's) Club Ride program by providing $200,000 for an advertising campaign promoting the program. The goal is to significantly increase the participation in the program with television ads, pamphlets, and other outreach materials. The projected start of the campaign is mid-2015.

Clean Energy Project

Clean Energy Project, Inc. (CEP) is a nonprofit, nonpartisan organization dedicated to powering the clean energy economy through education and engagement with policy leaders, community leaders, and citizens on the economic benefits of fully developing a clean energy economy.

Welcome to Fabulous Las Vegas[5] - New Initiative

CEP and Green Chips[6] worked with the Clark County Commission to develop a solar project to power the "Welcome to Fabulous Las Vegas" sign with Nevada's own solar energy. The installation allows The Strip's most iconic landmark's legendary neon and incandescent lights to run solely on harnessed solar energy. Converting this iconic sign's power source to solar provides an example to the Las Vegas community that clean, renewable energy can help power businesses, homes, or even signs throughout Nevada.

Three free-standing, sculptural solar trees were installed just south of the Welcome to Fabulous Las Vegas sign and were designed to provide the equivalent renewable energy generation to offset 100% of the annual electrical consumption of the sign while providing much needed shade for tourists waiting to take pictures. The solar trees are simple and attractive and make a visual reference to the PV shade structures at the entrance to the new LEED/Green Certified Las Vegas City Hall. The solar trees were sited to not detract from the experience of the sign or the eclectic beauty of the historic Las Vegas Strip. The Green Chips Community Portal site includes information about the solar sign project and other noteworthy sustainable facilities in Las Vegas, and it informs visitors and residents about the significant commitment to environmental sustainability that has been made in southern Nevada.

The high-profile nature of the sign makes it a superb symbol and educational opportunity for visitors and locals to become more informed about the significant progress made in creating sustainable communities in Nevada as evidenced by its 900-plus miles of urban trails and that boast more LEED certified green building space per capita than any other state in the country.

[5] http://cleanenergyprojectnv.org/
[6] http://greenchips.org/

In April 2014[7], CEP has released the "Buy Green List," Nevada's first sustainability-driven consumer guide in observance of Earth Day and Earth Week. "Empowering consumers by informing them about local companies, which not only support the clean energy economy, but also benefit from clean business practices, is essential to increasing demand for the clean energy economy," said Lydia Ball, executive director CEP. "With this early success, we are confident even more Nevada businesses will become Buy Green List participants as the program continues to grow and expand."

In late March, CEP held an introductory seminar outlining the "Buy Green List" program to interested companies and organizations. In less than three weeks more than 50 Nevada-based companies and organizations from various industries committed to become more sustainable. "First Friday strives to lead in festivals becoming more environmentally conscious," said Charles Ressler with First Friday. "We want to show that from office to outdoor, festival production companies can reduce their impact and educate their attendees, thus inspiring other companies and festivals to do the same."

The "Buy Green List" program is intended to grow with the goal of having a majority of Nevada-based businesses pledge to become more energy conscious. To be listed, companies must:

- Sign a pledge supporting clean energy practices in Nevada including increased clean energy generation, increased energy saving practices, and improved energy efficiency;
- Sign up for NV Energy's MyAccount program to easily track energy usage;
- Sign up for NV Energy's paperless billing service; and
- Agree to implement a number of energy saving practices within their company and educating employees how to be more energy smart.

The following link provides information about the program, about the "Green Buy List," and how to apply: http://www.cleanenergyprojectnv.org/buy-green-list.

Clark County Automotive Fleet - Update

According to Automotive Fleet magazine, Clark County's automotive fleet was rated No. 6 in the nation for having the highest percentage of hybrids in its fleet. No other public sector fleet in Nevada was found to be in the top 25.

The finding is significant since Clark County's fleet is already the third largest in the state (behind the state of Nevada and the Clark County School District).

The County has 2,775 vehicles, 539 of which are hybrid (using a combination of gasoline and electricity). The hybrid portion accounts for 19 percent of the county fleet. DAQ believes this is a strong indication of commitment to conserve energy and reduce air pollution.

[7] http://cleanenergyprojectnv.org/

Regional Transportation Commission - New Initiative

The RTC is the transit authority and transportation/planning agency for southern Nevada. One of its major goals is to implement and update Clark County's transportation systems to improve air quality. In April 2015 EPA honored the Club Ride Commuter Services with its 2015 Clean Air Excellence Award for its commuter program designed to improve air quality and encourage commute alternatives such as riding transit, carpooling, vanpooling, walking, bicycling, working compressed work weeks, and telecommuting. The 2015 Clean Air Excellence Award recognizes innovative state, local, tribal, and private sector programs that protect health and the environment, educate the public, serve their communities, and boost the economy.

"With over one million clean commute trips reported this year, Club Ride has saved Nevadans $1.6 million in commuting costs," said Jared Blumenfeld Regional Administrator for EPA's Pacific Southwest Office. "Southern Nevadans breathe cleaner air thanks to this award-winning program."

"We have been working diligently with community partners to create a cleaner, more sustainable Southern Nevada," said RTC's general manager Tina Quigley. "We are proud to receive this great accolade and to share it with our partners as we continue to improve the quality of life for the millions of residents and visitors to Southern Nevada."

Club Ride partners with nearly 300 employers and more than 24,000 registered commuters in Clark County to meet these goals. Club Ride's efforts improve air quality and the overall quality of life. Club Ride's additional 2014 highlights include: 59 tons of CO emissions reduced; 2,324 tons of greenhouse gases reduced; 5.9 million miles removed from the road; and 10,287 new commuters welcomed to the program.

Club Ride recognizes the unique 24-hour workforce in Clark County and has tailored its program to meet the needs of each employer. Outreach coordinators conduct over 650 worksite and community events every year, including health fairs, orientations, and special events such as Bike Week and Earth Day.

A network of live freeway traffic cams alerts commuters to possible traffic gridlocks so they can avoid traffic congestion. RTC also set up a Bike Center in downtown Las Vegas that provides free parking for 75 bikes and free workshops on bike repair. Additionally, RTC has an extensive electric bike program for government employees in the downtown area.

NV Energy – Unit Shutdown – New Initiative

In June 2013, Nevada's governor signed a law accelerating the retirement of Reid Gardner Generating Station. Three of the plant's four units were closed in December 2014, and the remaining unit will close in 2017.

NV Energy has announced that it is seeking proposals to acquire a new generating resource with approximately 54 MW of planning capacity resources for southern Nevada customers as part of its 2015 Emissions Reduction Capacity Replacement Plan Request for Proposals for a new

generating facility of no less than 54 MW and no more than 68 MW, and with a commercial operation date no earlier than May 2018.

Highway projects - Update

Project Neon has six phases and is scheduled for completion in 2019. NDOT started Phase 1 on the project and is scheduled to be finished in 2016. The project is designed to alleviate congestion by providing alternatives to motorists who travel daily on I-15. The project includes High-Occupancy Vehicle lanes between U.S. 95 and I-15, along with better connections to surface streets into the downtown area. This project will reduce emissions from NOx, an ozone precursor.

Boulder City Bypass project involves road improvements to U.S. Highway 93, a major regional commercial corridor and the single route through Boulder City. As a major urban arterial, Highway 93 carries 32,000 east-west traffic vehicles per day. Construction of the project Phase 1 started in early 2015 and includes the Railroad Pass interchange with a project length of 2.5 miles. The second phase of the project is 12.5 miles long and will bypass Boulder City. Construction is anticipated to start in May 2015.

4. Emission Reductions

DAQ used EPA's AVoided Emissions and geneRation Tool (AVERT) to calculate the emission reductions since 2012 due significantly to renewable energy and energy efficiency programs. The table below is an update of the completed projects and their MW capacities.

Table 4-1. RE Projects

Type	Project	MW
Solar	Boulder City Copper Mountain 2	92
	Boulder City Copper Mountain 3	250
	Crescent Dunes	110
	Moapa	250
	Spectrum	30
	NV Energy Solar Electric Program	5
	Solar Total	**737**
Wind	Spring Valley	152
	Wind Total	**152**

Table 4-2 shows the corresponding input file for the AVERT model.

Table 4-2. Inputs for AVERT Model

Enter EE impacts based on the % reduction of regional fossil load		
Reduce generation by a percent in some or all hours		
Apply reduction to top X% hours:	0%	% of top hours
Reduction % in top X% of hours:	0.0%	% reduction
And/or enter EE impacts distributed evenly throughout the year		
Reduce generation by annual gigawatt-hour (GWh):	0	GWh
OR		
Reduce each hour by constant MW:	0.0	MW
And/or enter annual capacity of RE resources		
Wind Capacity:	152	MW
Utility Solar PV Capacity:	737	MW
Rooftop Solar PV Capacity:	0	MW

According to the model, the updated renewable energy generation displaced 379,600 MWh. This equals a reduction of 50,400 pounds (25.2 tons per year) of NOx. During the ozone season, renewables displaced a total of 35,400 pounds (17.7 tons) of NOx in Clark County (Table 4-3). Figures 4-1, 4-2, and 4-3 show the SO_2, NOx, and CO_2 monthly emission reductions.

Table 4-3. Model Outputs

Peak Gross Generation, Post-EERE (MW)	Annual Gross Generation, Post-EERE (MWh)	Annual Displaced Generation (MWh)	Annual Displaced NOx (lb)	Annual Displaced CO_2 (tons)	Ozone Season Displaced NOx (lb)	Ozone Season, 10 Peak Days Displaced NOx (lb)
4,215	18,567,800	-379,600	-50,400	-172,700	-35,400	-200

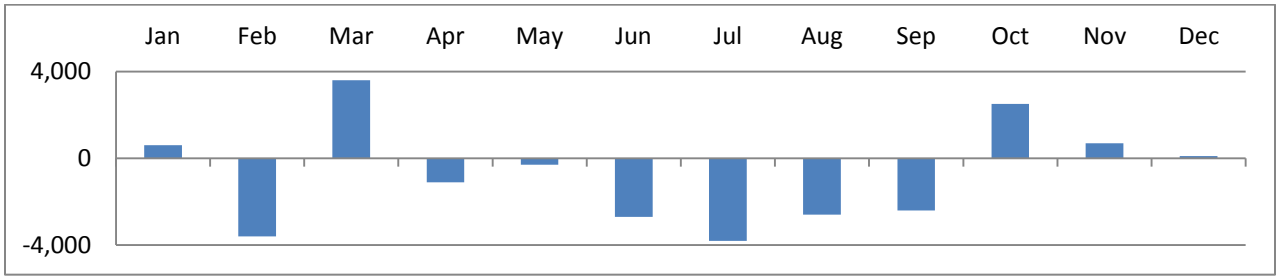

Figure 4-1. Monthly SO_2 reductions.

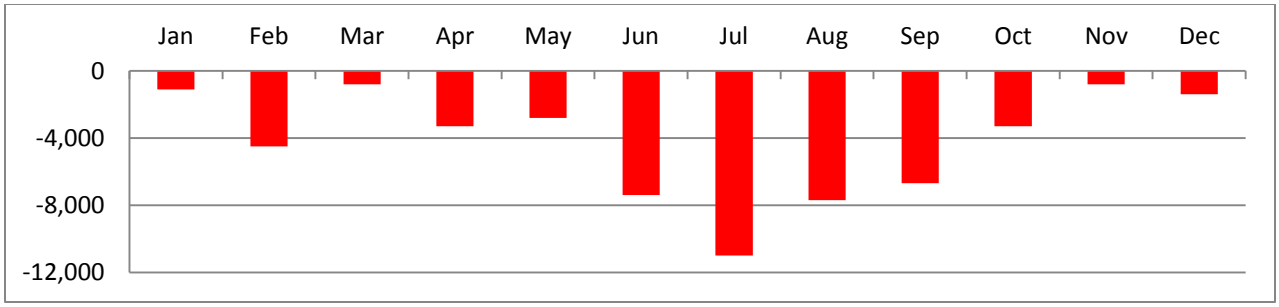

Figure 4-2. Monthly NOx reductions.

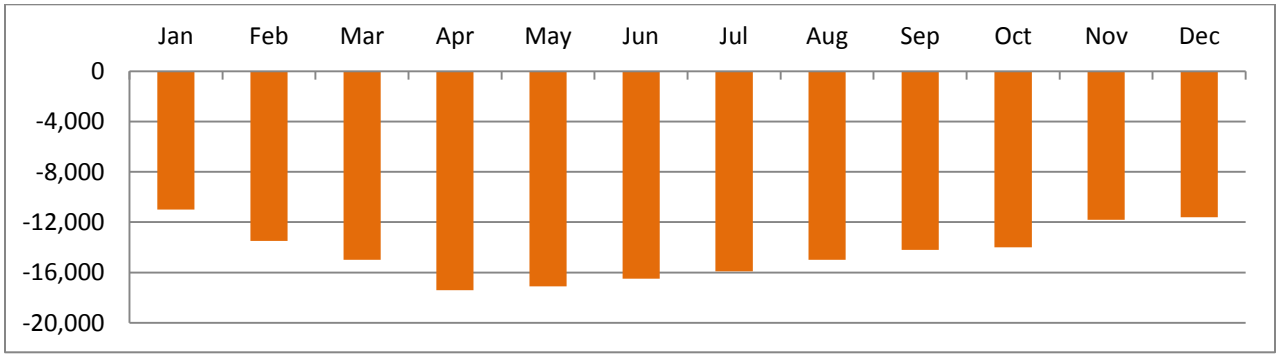

Figure 4-3. Monthly CO_2 reductions.

5. Conclusion

Several factors out of DAQ's control have a significant impact on ozone concentrations in Clark County. However, Clark County as a community is trying hard to reduce VOC and NOx precursors through mandatory and voluntary control measures, including the installation and use of renewable energy (RE) and energy efficiency (EE) measures.

Many organizations in Clark County, both government and private, are making great strides to reduce precursor emissions through various programs, and DAQ will continue to research and evaluate control measures.

Private companies and departments at all levels of government provide Clark County residents with a variety of programs to reduce emissions. Future federal regulations for mobile sources, in conjunction with scheduled highway improvement projects, will further reduce NOx emissions in the county, as will the replacement of the Reid Gardner coal-fired boilers and further RPS requirements.

Although the measures do not seem to have an immediate result, the change will be noticeable in the near future, and will certainly help Clark County to try to maintain the ozone NAAQS.