

COLORADO CLIMATE UPDATE TO THE LEGISLATURE 2019

Annual report to the legislature regarding climate change issues, efforts to reduce greenhouse gas emissions, and prepare the state for climate change effects

Observed Climate

▲ 2.5 °F over 50 Years

Colorado has warmed 2 degrees in the last 30 years and 2.5 degrees over the last 50 years.

No Long-term Precip Trend

No long term trends in precipitation have been detected.

▲ Drought Severity

There is an increased trend in drought severity over the last 30 years.

2018 Drought

Second Driest Year

Water Year 2018 (October 2017- September 2018) was the warmest and second driest on record.

Economy Impacted

Economic impacts to agriculture, tourism and recreation are still being tallied, but are likely to be significant, especially in Southwestern Colorado.

Conditions Reflect Future

While we cannot attribute the weather of 2018 directly to climate change, we can say that 2018 is similar to what we would expect to see in the future under climate change conditions.

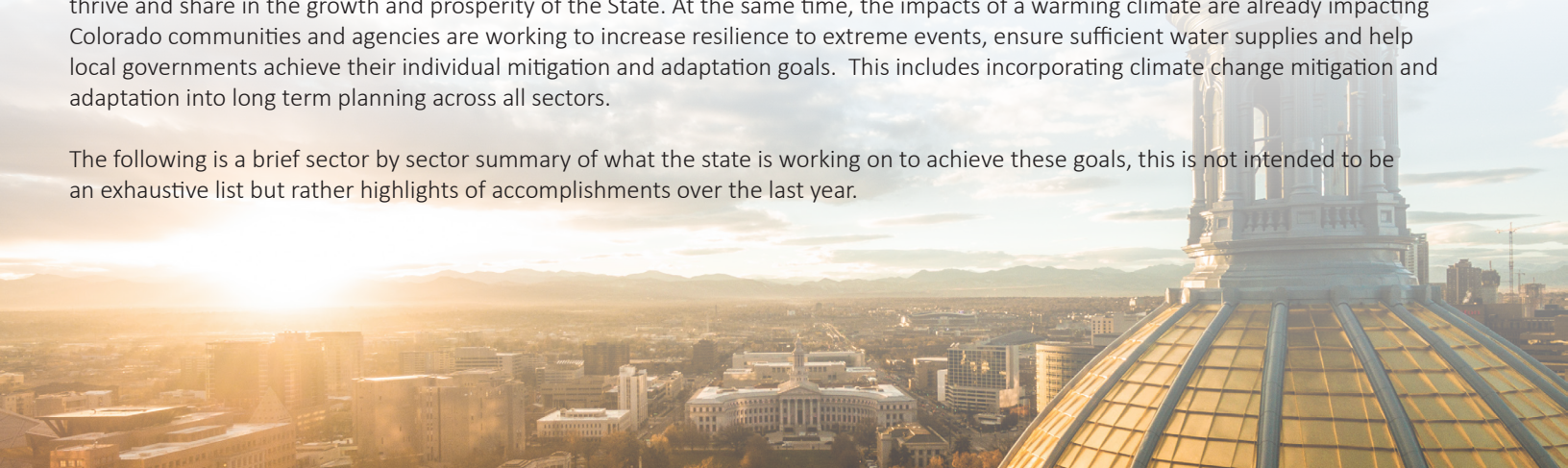
Projected Climate Change in Colorado

By 2050, models project between 2 to 5 degrees of additional warming for Colorado. In addition, a new analysis by the University of Maryland indicates that should global emissions follow the high emissions scenario, by 2080 Denver's climate would feel more like the climate of Borger, Texas today. Summer in the Texas panhandle is 9 degrees Fahrenheit warmer than the current average summer in Denver.

Overarching Goals for the State

The Administration is focused on preserving, protecting and providing for Colorado's way of life- reducing emissions and a statewide transition to clean energy are key to this vision. Consequently, the State is working to advance towards 100 percent renewable electricity by 2040 and rapidly expand electrification and emissions reductions of vehicles- addressing Colorado's two largest sources of emissions. The Administration is also prioritizing strategies to expand energy efficiency measures and extend the impact of cleaner electricity to other sectors of the economy. Just as we move forward on emission reductions and a transition to clean energy, we also need to institute policies and supportive programming that ensure communities and workers negatively affected by the transition can continue to thrive and share in the growth and prosperity of the State. At the same time, the impacts of a warming climate are already impacting Colorado communities and agencies are working to increase resilience to extreme events, ensure sufficient water supplies and help local governments achieve their individual mitigation and adaptation goals. This includes incorporating climate change mitigation and adaptation into long term planning across all sectors.

The following is a brief sector by sector summary of what the state is working on to achieve these goals, this is not intended to be an exhaustive list but rather highlights of accomplishments over the last year.



ENERGY

According to the U.S. Energy Information Administration, electricity from renewable sources in Colorado has more than doubled since 2010 to almost 25% of the state's net generation in 2017, led by increased wind power from the state's 2,000 turbines.

At the end of 2018, installed wind capacity in Colorado was 3,706 MW according to the American Wind Energy Association. During 2017, wind energy provided 17.6% of all in-state electricity production, this is equivalent to 889,100 homes being powered by wind.

In 2016, more than 375 MW of utility-scale renewables came online in Colorado, including Xcel's Comanche Solar Project (120 MW), Tri-State's San Isabel Solar Farm (30 MW), and Black Hills' Peak View Wind Farm (60 MW).

By the end of 2018, solar provided 2.96% of the state's electricity and powered 241,244 homes according to the Solar Energy Industries Association. Solar investment in Colorado was \$3,175.21 million by December 2018, with 463 solar companies (including manufacturers and installers) operating in the state. According to the Colorado Cleantech Industry Association, the clean energy industry attracted \$20.5 million in venture capital investments in 2016 and created a \$4.6 billion economic impact for the state.

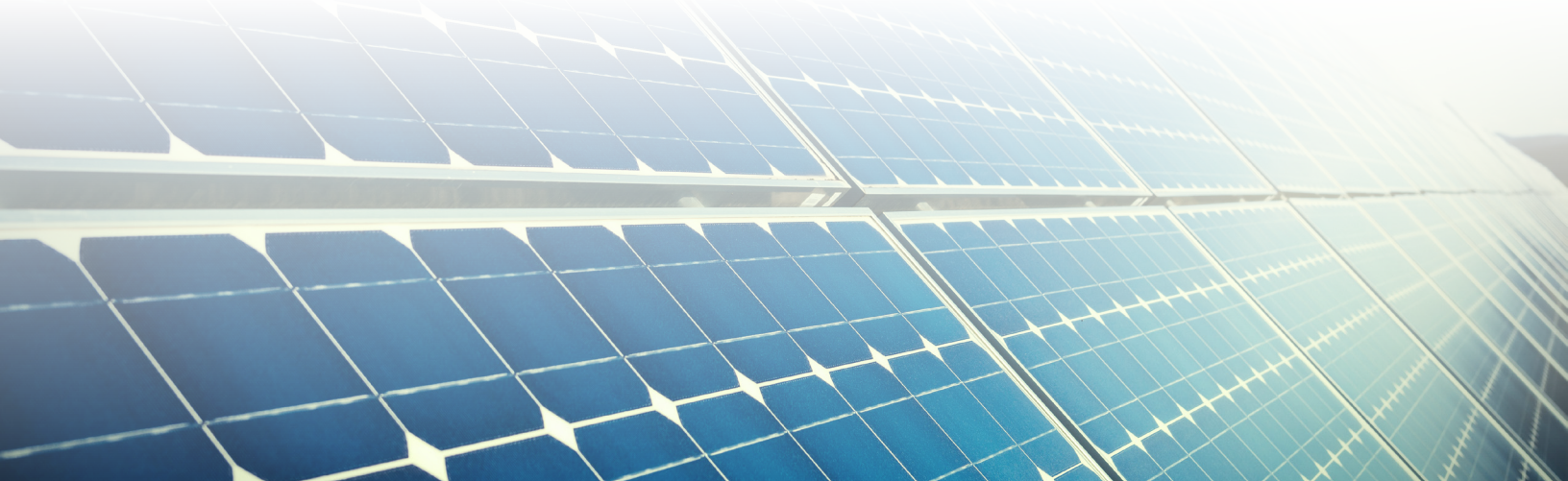
ELECTRICITY GENERATED FROM WIND NOW COSTS LESS THAN COAL AND NATURAL GAS.

SEIA reports solar prices in Colorado have fallen 47% over the last 5 years, and the projected growth is 2,380 MW over the next 5 years. Xcel recently reported that a kilowatt hour (kWh) of electricity generated from wind now costs less than coal and natural gas. When Xcel went to bid for new renewables last year, the median price for new wind was under 2 cents/kWh; for solar the median bid was under 3 cents/kWh, while the cost of operating existing coal and gas plants is over 4 cents/kWh. A recent analysis by Vibrant Clean Energy concluded that retiring all coal plants in Colorado by 2030 and replacing these with primarily wind and solar would provide \$2.5 billion in net savings to Coloradans while also reducing emissions by approximately 500 million metric tons of carbon dioxide.

The pathway to high levels of renewable electricity has been supported by a long history of policy initiatives and public-private collaboration, and is accelerating as market forces continue to favor cleaner, cheaper sources of energy. One of many compelling examples of this market transition is Xcel Energy's recently approved Colorado Energy Plan, that retires two additional coal units (Comanche 1 and 2) a decade early and transitions the utility to 55% renewable by 2026 while saving hundreds of millions of dollars for its customers. Colorado is leveraging these voluntary commitments with policies and programming that accelerate market-based investments and modernize regulatory oversight to drive innovation and create economic growth across the state. Xcel supported the proposal at the Public Utilities Commission, which approved the Colorado Energy Plan in the fall of 2018. Since then:

- Xcel has made a commitment to 80% reductions in carbon emissions below 2005 levels by 2030
- Platte River Power Authority has set a goal of being 100% carbon free by 2050
- Holy Cross Energy has set a goal of reducing its emissions by 70% by 2030
- La Plata Electric Association has adopted a goal to reduce carbon emissions 60% below 2005 levels by 2030
- Grand Valley Power has adopted a goal to reduce emissions 60% below 2005 levels by 2030

However, electricity generation remains the single largest source of greenhouse gas emissions in Colorado. In addition to voluntary measures, action by the legislature, the Public Utilities Commission, the Air Quality Control Commission and other government entities will be needed to achieve continued progress.



While renewable energy continues to decline in price, energy efficiency continues to be the lowest cost pathway to reducing carbon and other emissions. In 2018, the PUC adopted new energy efficiency targets for Black Hills and Xcel Energy. The PUC approved a 25% increase in Xcel's annual energy saving targets, from 400 MWH to 500 MWH, or about 1.6% of total electricity use by Xcel's customers.

CEO's Colorado Agricultural Energy Efficiency (AgEE) program supports irrigators, dairies, greenhouses, nurseries and cold storage facilities, and released a total of \$1.6 million in funding assistance to agricultural producers for energy efficiency and on-farm renewable energy projects since the program launched in 2015. The AgEE program brings together partners, existing resources and funding opportunities for clean energy projects to reduce cost of production, modernize infrastructure and improve operating margins. To date, the AgEE program has completed 194 audits, saved 2.4 million kWh of electricity, 115,000 therms of natural gas, and identified an additional 14.5 million kWh of potential energy savings.

In February 2018, the CEO announced the first agricultural project funded through Colorado's Commercial Property Assessed Clean Energy (C-PACE) program. Ela Family Farms, a Hotchkiss-based certified organic orchard, used C-PACE financing to install a new solar photovoltaic (PV) system at its warehouse. Along with producing renewable energy, the installment is projected to save the fourth-generation orchard more than \$113,000 in energy costs over the system's lifetime. This project demonstrated the ability to use C-PACE for small rural projects and expanded program applicability to communities in all areas of the state. In FY18, the C-PACE program closed 18 projects totaling \$16.1 million in financing with projected energy savings of over 36 million kBtu/year.

In FY18, CEO's Colorado Residential Energy Upgrade (RENU) Loan was launched, a statewide residential loan program aimed at financing energy efficiency and renewable energy projects for existing homes. Eligible projects include HVAC equipment, insulation and air sealing, windows, ENERGY STAR appliances, solar PV and solar thermal. By the end of March 2019, the RENU Loan program had authorized 94 contractors working across the state and had closed more than 200 loans for homeowners in 24 counties with a combined financed value of \$3.2 million.

During FY18, 14 MOUs for Colorado Energy Performance Contracting (EPC) program were signed between CEO and municipal and county jurisdictions including Denver International Airport, the Town of Walden, Pueblo 70 School District, Haxtun School District and the City of Trinidad. EPC secured more than \$28 million in facility improvement investment, upgraded 83.1 million square feet and guaranteed \$34.2 million in annual utility cost savings. CEO partners with Western Resource Advocates to further promote opportunities within EPC for water efficiency and water meter upgrades. As of June 2018, 206 active and completed projects have improved the energy and water efficiency performance of public school and university buildings, veterans' facilities, libraries, parks, community centers, wastewater treatment plants, prisons and other government buildings in communities across 75% of Colorado's counties. To date, EPC has saved 193.1 million kWh of electricity, 10.3 million therms of natural gas, propane, heating oil and coal, and 507,560 gal of water.

CEO's Colorado Weatherization Assistance Program (WAP) weatherized 2,000 residential units in FY18 which included installing 23,000 LED light bulbs, 100 rooftop solar PV systems and 560 high efficiency furnaces. These installed measures resulted in annual energy savings estimated at 400,000 therms of natural gas and 2.3 million kWh of electricity, and provided an estimated \$650,000 in annual energy bill savings for low-income Coloradan households. Also within the WAP, the Nest Power Project was piloted. WAP service provider Arapahoe County Weatherization tested incremental energy savings potential from the installation of Nest Learning Thermostats as part of its low-income weatherization efforts. The data collected from the pilot highlighted valuable data that will be used for future WAP programming refinement, including an achievement of 9% savings of natural gas for home heating.

CEO provided building code trainings and technical assistance at no additional cost to several jurisdictions in FY18 and FY19. Jurisdictions that adopted the 2015 or 2018 International Energy Conservation Code (IECC) in this timeframe include Colorado Springs (through the Pikes Peak Regional Building Department), Lakewood, Jefferson County, Adams County, Trinidad, Larimer County, Fort Collins and Louisville.

In 2018 the Colorado Clean Energy Fund was launched following a multi-year research effort led by the Colorado Energy Office, in partnership with the Department of Energy and the Coalition for Green Capital, to evaluate the viability of establishing a Green Bank in Colorado. That effort identified a viable pathway forward and the Colorado Clean Energy Fund was incorporated as a 501(c)(3) in the State of Colorado and formally launched as the defacto Green Bank of Colorado in early 2019. The Colorado Clean Energy Fund is positioned to work with public and private partners to scale existing clean energy finance efforts and introduce new ones across Colorado in an attempt to address un/underserved markets. It became a member of the American Green Bank Consortium and, in doing so, will leverage various resources from other Green Banks across the country, including back-office support and capital, to scale its operations quickly. The Colorado Clean Energy Fund is working diligently to establish its governance structure and launch its first product line by the summer of 2019.

PUBLIC HEALTH

In May 2019 CDPHE will submit proposed regulatory revisions to the Air Quality Control Commission (“AQCC”) that would adopt a Colorado Zero Emission Vehicle (ZEV) standard, as directed in Governor Polis’ first Executive Order. If adopted by the AQCC, these standards will require that auto manufacturers sell a certain percentage of electric or fuel cell vehicles in Colorado starting in 2022. It is expected that these requirements will drive greater availability of electric vehicles in the state and will aid in Governor Polis’ broader goals of electrifying Colorado’s new vehicle fleet.

In November of 2018 the AQCC unanimously adopted a Low Emission Vehicle (LEV) standard. Based on the technical analyses supporting the rule these standards will reduce greenhouse gas emissions from Colorado’s vehicle fleet by approximately 30 million tons of CO₂e from 2022 through 2032, and will result in a net savings to vehicle purchasers based on reductions in the amount of fuel used.

Throughout 2018 CDPHE convened stakeholder processes to evaluate strategies to reduce methane and other hydrocarbon emissions from oil and gas facilities across Colorado. The stakeholder group provided an initial report to the AQCC, and will provide recommendations for adoption of additional strategies in January 2020.

In 2014, the AQCC approved revisions to Regulation Number 7 that reduce leaks of methane and other hydrocarbons at oil and gas production facilities by requiring infrared camera inspections, or approved alternatives. Monitoring data from 2018 shows that the number of leaking oil and gas facilities has been reduced by more than 50 percent since 2014. Reductions in leaks, along with the implementation of other strategies from the 2014 oil and gas rulemaking have resulted in significant reductions in methane emissions from the Denver/Julesberg basin. Air sampling in Platteville shows a 35 percent decline in ambient methane concentrations from 2013-2018. With the recent passage of Senate Bill 19-181 Colorado is poised to take a giant step forward in reducing methane emissions from the oil and gas sector. The bill directs the AQCC to adopt regulations to minimize methane emissions from oil and gas production, midstream and transmission facilities. This regulatory effort presents the opportunity to reduce millions of tons of CO₂e annually.

TRANSPORTATION

With Colorado’s strong economy and population growth, the state has seen a steady rise in the number of vehicle miles traveled across all modes. CDOT is working to address the rising congestion- both in the air and on the road- through a variety of measures, including investments in transit (including CDOT’s own bus service, Bustang), carpooling programs, and bike and pedestrian infrastructure, as well as programs to increase the use of electric vehicles.

Zero Emission Vehicles

Governor Polis is committed to reducing vehicle miles travelled (VMT) and the associated greenhouse gas emissions. In his first executive action in January 2019, the Governor issued Executive Order B 2019 002, “Supporting a Transition to Zero Emission Vehicles,” which was designed to accelerate the electrification of cars, buses, trucks, and other vehicles. This E.O. set a goal of 940,000 electric vehicles on the road by 2030, up from 19,738 BEVs and PHEVs sold in Colorado from 2011-2018.

Several key initiatives will support this goal:

- **Charging Infrastructure:** In November 2018, CEO awarded a \$10.33 million grant to ChargePoint through its ALT Fuels Colorado program to build EV fast-charging stations along the state’s major transportation corridors. The fast-charging stations will be located in communities at 33 sites across six Colorado corridors comprised of Interstate, State and U.S. highways. CEO and Regional Air Quality Council (RAQC) also partner to administer the Charge Ahead Colorado grant program for EV charging stations. To date, RAQC has awarded 549 Level II charging stations and 113 electric vehicles within the Denver metro area, while CEO has awarded 199 Level II and DCFC charging stations in community locations outside the Denver metro area.
- **Government Fleets:** CDOT continues to right-size its fleet and utilize alternative fuel vehicles where possible. With the assistance of Charge Ahead Colorado grants, CDOT’s light fleet now has 109 hybrids, 82 CNG, and 10 electric vehicles, with 25 electric vehicle charging stations at 10 locations. Numerous other state agencies are in the process of procuring charging stations.

- **Transit Electrification:** The first call for projects to incorporate funds from the State of Colorado’s allocation of the Volkswagen Settlement was completed and in April 2019. CDOT awarded \$13.8 million to 6 transit agencies for the purchase of 24 electric transit buses (with 20 EV chargers), 3 propane transit buses, and 1 CNG transit bus. This program will continue to support strategies outlined in the Governor’s Executive Order supporting Colorado’s transition to zero-emission vehicles by awarding funds from the Settlement Trust to public transit agencies for the replacement of conventional-fuel transit buses with Battery Electric Buses or other ZEVs. The Volkswagen trust requires detailed reporting on the resulting air quality benefits in reduced GHG emissions will be tracked by the Colorado Department of Public Health and Environment.

- **REV West MOU:** In collaboration with eight other states (Arizona, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming) Colorado announced a plan to align with neighboring states on the infrastructure needs, regulations, and programs, including voluntary minimum standards for alternative fuel recharging stations. This effort is important to provide interstate connectivity in ZEVs; however, it relies on active engagement and support from leadership in the REV West states.

Transit and Multimodal Options

Providing reliable transit options is critical to reducing VMT across Colorado. Each year, Colorado transit agencies provide over 127 million transit trips statewide, including 15.2 million rural transit trips. Included among these are services by 100 demand-response, human services, and senior transit service providers in addition to the 40 fixed-route transit agencies across the state. Bustang is an interregional and intercity express bus service that operates an estimated 85,000 miles per month; ridership for the overall Bustang system averages 19,906 passengers per month. This includes Bustang Outrider service to rural regions and operates an estimated 1,636 miles per day, seven days a week.

Emerging Technologies

CDOT continues to study new technologies that may reduce emissions in the transportation sector. Initiatives include ramp metering to reduce congestion, tire pressure monitoring, and methods to improve truck parking along busy corridors.

Risk and Resilience

The principles of risk and resilience remain key in addressing and preparing for climate-related transportation challenges. CDOT is responding to this challenge by incorporating resiliency criteria into our project selection and planning process and infrastructure maintenance investment decisions. For example, the I-70 Risk and Resiliency Pilot project took a probabilistic look at risks to CDOT and the travelling public from failure of our transportation infrastructure related to potential natural disasters and man-made threats such as floods, rockfall, avalanches, terrorist attacks, etc. The risk data was then used to assess the benefit-cost of proactively investing in mitigations to reduce the impact of such events when they occur.



AGRICULTURE

The Colorado Climate Plan originally offered limited recommendations for the path forward to address climate resiliency in agriculture. During the past year the state has worked to define and support activities that would provide measurable climate outcomes for agricultural preparedness and carbon sequestration opportunities.

Staff attend the US Climate Alliance Natural and Working Lands Learning Lab to help states create and implement working lands programs to reduce & sequester atmospheric carbon. The Colorado team identified more opportunities for long term carbon sequestration through the agricultural sector than through forest management means. This resulted in setting priorities for CDA to focus program efforts on a wide array of climate preparedness activities to help agricultural producers to develop on-farm and regional strategies for extreme weather events and adapting to a drier climate.

Staff continue to leverage federal resources such as the Northern Plains Climate Hub to “depoliticize” and improve communications surrounding climate variability and preparedness. Steadily increasing temperatures and forecasted weather variability are compelling rationale for engaging in adaptive farming practices that protect soil health and improve resiliency. Staff are working to proactively equip producers with the tools and resources necessary to respond.

PRESERVING AND ENHANCING COLORADO’S AGRICULTURAL ECONOMY UNDER A CHANGING CLIMATE REQUIRES INCREASED COLLABORATION.

CDA is exploring the benefits of creating a soil health program to complement federal programs and localized efforts. Increasing adoption of cover crop practices and similar inputs that maintain year round root growth will help agriculture adapt to drying conditions and also mitigate for its GHG emissions. Some of the benefits are: a) more efficient water use; b) co-benefits of sequestering carbon c) intact soil biome, and d) economic benefits. The framework for the program includes:

- **Tracking active acres** –manage a confidential GIS inventory of active fields where soil health methods are practiced throughout the state.
- **Soil testing** – Establish and assist (technically, procedurally, and financially) landowners with soil testing protocols and; establish base line conditions for new participants.
- **Monitoring success/failure** and geographic limitations to different soil health practices throughout the state.
- **Providing State incentives** through technical and financial assistance.
- **Assisting in organizing local demonstration projects** to help farmers and ranchers learn from one another.
- **The state is also exploring numerous emerging opportunities** with partners to implement agricultural best management practices including: supporting a newly emerging Environmental Services Market Platform for carbon sequestration, Carbon market oversight through conservation districts, New ag market options (peas, lentils, quinoa, millet, etc.), Water Quality Pollutant Trading partnerships with local municipalities.
- **Verification** – As new ecosystem services markets emerge, CDA may train and oversee a verification program with willing conservation districts to confirm ecosystem service impacts and ensure practices are implemented according to program guidelines.
- **Education and outreach**- Collaborate with CSU Extension and NRCS to organize and facilitate demonstration tours, field days, etc. Link regional soil health activity groups to share experiences and innovations.
- **On-farm economic impacts** - Collect and catalog financial impacts of soil health measures.

Preserving and enhancing Colorado’s Agricultural economy under a changing climate requires increased collaboration among producers, agencies and institutions. Colorado is committed to these efforts and is actively working with producers and partners, like CSU and NRCS, on modernizing agricultural infrastructure, expanding crop breeding programs, and reducing barriers and misperceptions about climate preparedness to enable broader adoption of practices that preserve and enhance Colorado’s agricultural economy.

Agricultural energy assistance programs from CEO and CDA provide urgent assistance directly to agricultural producers not available elsewhere. These services focus on energy-intensive agricultural operations identified in a CEO market study in 2013. On-farm energy efficiency audits and renewable energy feasibility studies are provided at little to no cost to producers through CEO's AgEE program and CDA's Advancing Colorado's Renewable Energy and Energy Efficiency (ACRE3) program, resolving the greatest barrier to providing assistance. Technical services and funding from these programs support the implementation of recommendations from the energy efficiency audits and feasibility studies to reduce or offset on-farm energy costs. CDA's ACRE3 energy grants program, launched in 2007, provides about \$500,000 directly to about 30 producers per year to modernize on-farm energy infrastructure, and has completed more than 120 projects to date. The funding and technical services also assist the producers with selecting, financing, and installing cost-effective equipment that meets the equipment performance requirements of the programs.

In addition to modernizing on-farm energy infrastructure, the AgEE Program and the ACRE3 program also prioritize other natural resource conservation goals, such as irrigation water-use efficiency planning, incentives and assistance to convert from flood irrigation to more efficient center pivots, and other practices that conserve soil and water quality and quantity and directly improve on-farm climate preparedness and resiliency.

The AgEE Program and the ACRE3 program have also leveraged available state funding with federal funding through the NRCS Regional Conservation Partnership Program (RCPP). Both programs signed agreements with NRCS, leveraging \$2 million in combined state funding to \$5 million in total funding for the RCPP AgEE Program (CEO) and the RCPP Pressurized Irrigation Small Hydropower Project (CDA). These partnerships have provided valuable opportunities to coordinate funding and strategies between state and federal agencies and other state and local agencies to address agricultural climate preparedness with maximum impact. These partnerships also allow each agency to provide necessary services that no single agency could provide by itself to make the AgEE and ACRE3 programs successful.

The state is collaborating with other agricultural entities in the Arkansas Valley to explore partnerships to further the co-management of point and non-point sources. This effort would pay farmers to change practices to reduce non-point source pollution in the river; and partner with municipalities that are looking to farmers to help offset their pollution.

The Noble Foundation has nearly finalized a robust market platform to support agricultural carbon sequestration in the US. A pilot is currently underway in the Southern Plains region and a nationwide market opportunity will emerge in the next couple years. CDA's goal in leveraging these efforts is to enable willing agricultural producers to participate and receive financial carbon incentives for conservation activities.

A pilot program to provide early warning for manure piles and promote adjusted manure management based on weather patterns at dairies and feedlots on the plains is currently in the early stages. This voluntary program will reduce nitrogen deposition onto alpine ecosystems during upslope weather events.

NATURAL RESOURCES

The Colorado Parks and Wildlife Aquatic Research Section continues to compile the largest spatial and temporal collection of water temperature data in the State. These data are being used to monitor changes in water temperature over time at specific locations, as well as looking at how water temperatures across the landscape are influencing fisheries community composition.

Monitoring, evaluation and technical design review was completed at thirteen different fish passage structures associated with diversions or whitewater park features. As a result, innovative fish passage structures were installed in some areas that allow fish movement to avoid areas with low water or high temperatures and to complete their lifecycles. This will allow for adaptation of these populations in the future in the face of climate change.

Distribution and population viability studies on native cutthroat trout in Colorado have been initiated to inform future predictions of persistence of these fish populations in an uncertain future. One study combined the influence of many diverse threats facing Rio Grande Cutthroat Trout in a warming climate to predict the probability that each population will persist to 2040 and 2080. Additional work on seasonal and temperature related movement and thermal tolerances of various strains of cutthroat trout, as well as temperature effects on spawning timing of Flannelmouth Sucker, Bluehead Sucker, and Roundtail Chub have been conducted. These studies will help managers understand and plan adaptation strategies in changing conditions.

For terrestrial species, alpine habitats are of interest due to the potential impacts of climate change on species which are dependent on these unique habitats. Population distribution, abundance, and demographics of white-tailed ptarmigan and American Pika have recently been assessed and investigations of brown-capped rosy-finch are currently underway. These species appear to currently be secure and no detrimental effects of climate change have been detected. A long-term strategy to monitor populations of these species into the future is being developed.

Other terrestrial habitat may also be affected by climate-induced changes in temperature and precipitation. The State is taking steps to ensure stable populations and maintain distributions of several priority species. For example, sylvatic plague vaccine is being used to control disease in populations of black-tailed, white-tailed, and Gunnison's prairie dogs and translocations are being used to improve distribution and abundance of lesser prairie-chickens and greater sage-grouse. These types of projects contribute to short-term management goals while also maintaining resilience and adaptability which may help to address future climate change concerns.

In December 2017, Reclamation Commissioner Brenda Burman called on the seven Colorado River Basin States and water entitlement holders in the Lower Colorado Basin to develop Drought Contingency Plans (DCPs) to respond to ongoing historic drought conditions in the Basin and reduce the likelihood of Colorado River reservoirs – particularly Lake Powell and Lake Mead – further declining to critical elevations. All seven Colorado River Basin States worked diligently throughout 2018 on a set of draft DCP agreements that would implement Drought Contingency Plans in the Upper and Lower Basins. The agreements include an Upper Colorado River Basin Drought Contingency Plan and a Lower Colorado River Basin Drought Contingency Plan.

- **The Upper Basin DCP** is designed to: a) protect critical elevations at Lake Powell and help assure continued compliance with the 1922 Colorado River Compact, and b) authorize storage of conserved water in the Upper Basin that could help establish the foundation for a Demand Management Program that may be developed in the future.
- **The Lower Basin DCP** is designed to: a) require Arizona, California and Nevada to contribute additional water to Lake Mead storage at predetermined elevations, and b) create additional flexibility to incentivize additional voluntary conservation of water to be stored in Lake Mead.

Colorado's Water Plan sets forth strategies to meet our future needs through balanced policies and actions that all Coloradans and their elected officials can support. The plan attests to our citizens' ability to organize around shared goals to preserve our water values of a productive economy, vibrant and sustainable cities, productive agriculture, a strong environment, and a robust recreation industry.

Colorado's Water Plan alone does not relieve us of the inherent uncertainty of water scarcity, uncertain supplies, and natural hazards that may be affected by a warming climate. As a living document, Colorado's Water Plan establishes update goals including an Analysis and Technical Update phase that will release its findings in July 2019. That effort incorporates scenario planning into the analysis in order to examine how climate change may impact water supplies.

Beyond implementing the planning goals that are outlined in Colorado’s Water Plan, project implementation is always happening concurrently. To-date the state has awarded roughly \$17M through the Water Plan Grant fund, the grant program is ongoing and will continue to drive toward achieving the goals of the water plan.

The ongoing historic drought in the Colorado River Basin requires effective water resources management that relies on using science to inform operational and planning activities and presents an opportunity to better understand and advance climate and hydrology research. Consequently, the state is partnering with other basin states, water user groups, the federal government and research institutions to synthesize progress in climate and hydrology forecasting and research in the Colorado River Basin. The resulting report will establish a common scientific foundation on which to base future management and research efforts.

2018 WAS A HISTORIC WILDFIRE YEAR IN THE WEST AND WILDFIRES ARE PROJECTED TO INCREASE IN INTENSITY AND FREQUENCY.

2018 was a historic wildfire year in the west, and as Colorado continues to warm wildfires are projected to increase in intensity and frequency. Both forest health and watershed health initiatives are being implemented at the state level to address this issue.



LOCAL COLLABORATION AND PARTNERSHIPS

Several collaborative efforts and cooperative partnerships were initiated and implemented as follows:

- ***The State of Colorado and Compact of Colorado Communities are jointly working*** to shape the Colorado Communities Cooperative, an initiative that would facilitate the ongoing collaboration of stakeholders supporting the action items stemming from the Colorado Communities Symposium, as well as emerging initiatives. The goal is to establish a set of shared understandings among participants, and then leverage expertise to launch of working groups for implementation of action items.
- ***The Colorado Resiliency Office (CRO) launched the Colorado Resilient Communities workshop series*** to support local actions to confront community vulnerabilities to shocks and stressors. In addition, the Colorado Resilience Story Map was created to illuminate the challenges facing Colorado including long-term climate issues. The CRO is also partnering to develop a peer network to share climate and disaster resilience best practices and foster peer learning and support.
- ***Additional tools were added to the Planning for Hazards: Land Use Solutions for Colorado website*** (www.planningforhazards.com) and efforts were spearheaded to spur local implementation efforts. As an outcome of a DOLA technical assistance pilot program, in the spring of 2019 Manitou Springs and Milliken will be adopting enhanced land use codes and other actions to reduce their risks to hazards in 2019.
- ***A Mitigating Hazards Through Land Use Solutions workshop was developed and piloted in 2018.*** Two workshops brought together teams from six cities and four counties to identify and implement actions to reduce fire and flood risks. State agencies partnered with FEMA to develop this workshop which is now available through FEMA to communities nationally.
- ***The Alliance for Land and Water Planning was launched*** to coordinate efforts between government, non-profit, and university partners to promote water conservation in land use planning and development. Through a public/private funding partnership, a full-time land and water planner position housed in DOLA was created and is helping accelerate these efforts to achieve Colorado Water Plan goals.
- ***The Long-Term Recovery Working Group has been coordinating state and federal resources*** to support recovery efforts of communities impacted by the 2018 fires and providing technical assistance to prepare for post-fire flood risks.
- ***The State of Colorado secured funding*** in early 2019 to conduct a study to quantify Colorado's current and future vulnerability of flood, drought, and wildfire. The project's goal is to create a clear understanding of the range of potential economic, social and environmental costs associated with current and future risk from natural hazards and climate change, as well as the benefits of proactive action. This project will kick off in 2019 and result in information to help State agencies, local governments, and businesses evaluate and prioritize investments to reduce risk and enhance adaptability.
- ***In 2018, the Colorado legislature passed HB 18-1394***, which codified the Colorado Resiliency Office and calls for the integration of resiliency criteria into State competitive grant programs. The multi-agency Colorado Resiliency Working Group is developing a toolkit for state agencies to use to build resilience into operations and investments as part of the Colorado Resiliency Institutionalization Project.
- ***Floods, droughts and wildfires have the potential to impact state infrastructure*** and resources significantly. As such multiple agencies are collaborating to address these concerns as they relate to emergency management, transportation planning and infrastructure and resource allocation, this will continue throughout 2019.
- ***Climate change impacts were integrated into the State's All Hazard Mitigation Plan*** that was submitted to and approved by FEMA in late 2018, it will continue to be addressed as the state pursues enhanced status.
- ***The State's Greening Government Leadership Council continues to lead by example*** in reducing energy consumption, increasing the use of renewable energy, decreasing the environmental impact of state vehicles, and reducing greenhouse gas emissions across state agencies. Additional information on these internal efforts can be found [here](#).

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