

August 2015

COFSAC 15-03

Advancing Food Systems Issues in Colorado



COLORADO FOOD SYSTEMS
ADVISORY COUNCIL

Preparing for Food Security in an Age of Limited Natural Resources Part III: Energy

In order to grow the state's economy and support access to healthy foods for all Coloradans, the Colorado Food Systems Advisory Council (COFSAC) recommends that the State of Colorado assess and pursue opportunities to more efficiently use our natural resources to increase opportunities for food production. The COFSAC sees opportunities to foster stronger environmental stewardship while creating new opportunities for our food producers to grow more healthy Colorado products to reach more Colorado consumers at prices sustainable for both consumer and producer.

This issue brief is one of three that explores aspects of our natural resources – water, land, and energy – and the steps necessary to balance Colorado's need for increased agricultural production to feed its growing population and the sustainable use of its natural resources to support production.

Issues Constraining Agriculture and Food Access Today

Central to the charge of the COFSAC is to improve healthy food access for all Coloradans - especially for those who currently lack sufficient access. The fact is, not only do many Coloradan's lack such access, but many also currently struggle with accessing and affording enough food to simply feed themselves consistent, healthy meals.

At the same time, there are increasing constraints being placed on Colorado's natural resources that are limiting our states' ability to grow plentiful, healthy food to feed our residents now and into the future. This issue brief explores some of the possibilities for increasing food production for human consumption that could help make fresh, healthy, Colorado products more readily available.

Colorado, along with the rest of the world, must adapt to feed more people with limited natural resources:

Colorado's population was 5,355,866 in July 2014, a 6.5% increase since 2010¹. The 2014 Census data ranks Colorado as the nation's 4th-fastest growing state. Our state's projected population according to the State Demography Office is 6 million in 2020 and 8 million in 2040².

In 2013, nearly 1 in 7 Coloradans experienced times when there was not enough money to buy food for their families or themselves³.

¹United States Census Bureau (2014). *QuickFacts Beta*. Retrieved from <http://www.census.gov/quickfacts/table/PST045214/00.08>

²Colorado State Demography Office, Department of Local Affairs. Preliminary Population Forecasts by Region, 2000-2040. Retrieved from: <http://dola.colorado.gov/demog-cms/content/census-data>

³Coleman-Jensen, A., Gregory, C., Singh, A. (2014). *Household Food Security in the United States in 2013*. Retrieved from <http://www.ers.usda.gov/publications/err-economic-research-report/err173.aspx>



While Colorado has some of the relatively lowest energy costs in the country, with significant agricultural activity occurring in 63 of Colorado's 64 counties (USDA), energy cost pressure is an issue that has broad enough potential impact to justify attention. Direct energy expenses account for more than \$400 million annually in Colorado's agriculture industry according to the 2013 Colorado Agriculture Energy Market Research (CAEMR) Report⁴. There are, however, substantial opportunities to lessen costs and implement renewable energy systems to attain more efficient agriculture production methods within Colorado.

The agriculture industry is unique in that different operations use energy in different ways. This means that each state and region needs to address energy use in ways that are most relevant for their agricultural industry. In Colorado, electricity constitutes the greatest portion of energy expenses, with diesel costs following closely behind; together they make up 67% of the total energy expenditure⁵.

A 2007 USDA Census of Agriculture (the most recent available data until 2013 data becomes public) Farm and Ranch Irrigation Survey⁶ identified a multitude of barriers ranchers face when attempting to make improvements to reduce energy use. The number one barrier was identified as cost/availability of financing, particularly in relation to the upfront capital costs of energy-saving investments. However, respondents to the survey who had already implemented energy improvements indicated that the projects in place met their expectations.

Opportunities for Colorado

The CAEMR Report estimates that in the next 10 years existing agricultural operations in Colorado have the potential to reduce electric usage by more than 90 million kilowatt hours annually and install more than 10 megawatts of on-farm renewable energy capacity. If statewide adoption of energy efficient technologies were put into action, Colorado's overall irrigation efficiency could be improved by 10%.

At least 80% of agricultural producers in Colorado said they were interested in energy efficiency projects that will lower their consumption of diesel, gasoline, and electricity.

To address one of agriculture's highest energy costs, fuels, the focus needs to be on four key areas: 1) Modifying farm practices to conserve fuel use, 2) Installing GPS auto-drive technology to reduce "overlapping", 3) Purchasing fuel-efficient machinery, and 4) Purchasing or converting to alternative-energy-fueled machinery⁷.

CSU Extension has identified several agricultural energy management opportunities, which include, from highest to lower opportunity:

1. energy efficient irrigation;
2. energy efficient dairies;
3. energy efficient greenhouses;
4. solar photovoltaic for various agricultural operations;
5. solar thermal for dairies and greenhouses; and, small hydropower for irrigators.

To spur adoption of these recommendations, Colorado farmers and ranchers are looking for assistance in the form of equipment rebates, technical assistance, cost benefit analysis and energy audits. Providing this support along with tailoring programs to fit the needs of different farming techniques, and incentivizing energy sustainability through various govern-

Lowering the costs needed to put into production of food will create an environment that allows for more abundant harvests, and in turn, lower cost of fresh foods throughout Colorado.

⁴Naranjo, R., Ruen Blanchard, S., Frank, T., Shields, G. (2013). *Colorado Agricultural Energy Market Research Phase II: Market Research Report Colorado Energy Office*. Retrieved from <http://www.colorado.gov/cs/Satellite/GovEnergyOffice/CBON/1251597774824>

⁵Ibid.

⁶United States Department of Agriculture (2009). *8663 Census of Agriculture: United States Summary and State Data 7(17)*. Retrieved from <http://www.agcensus.usda.gov/Publications/2007/index.php>

⁷Naranjo, R., Ruen Blanchard, S., Frank, T., Shields, G. (2013). *Colorado Agricultural Energy Market Research Phase II: Market Research Report Colorado Energy Office*. Retrieved from <http://www.colorado.gov/cs/Satellite/GovEnergyOffice/CBON/1251597774824>

⁸Ibid.



Aiding the agriculture sector to be able to afford energy efficient programs would benefit both farmers and consumers. Programs in place that could help achieve this include the USDA's Rural Energy for America Program (REAP) grants, which can cover 25% of purchase and installation of equipment to reduce energy bills for small businesses including farmers and ranchers.

Hoophouses provide an example of the type of project that could be funded to reduce energy costs while increasing food production of Coloradans. Hoophouses – typically seasonal structures that allow for vegetable production in the winter months – have much lower energy costs than greenhouses or other season extension infrastructure. The allowance of hoophouses as accessory uses through more local policy action and other state investments to support their growth could mean lower energy costs and more year-round pro-

From the Field

Using Our Hydro Power

The Colorado Department of Agriculture's Advancing Colorado's Renewable Energy Program (ACRE)⁹ identified opportunities within Colorado for low-head, small hydro development. The Department also just received a \$1.8 million USDA grant to support implementation of small hydro projects.

Colorado has more than 250 irrigation companies along with streams and rivers that lie close to farms and ranches and could take advantage of hydropower.

The opportunities for small hydropower development coupled with the 2013 passage of the Hydropower Regulatory Efficiency Act, which states that water conduit projects less than 5 MW in size would be exempt from costly Federal Energy Regulatory Commission (ferc.gov), provides a promising future for Colorado's agriculture sector.

How It Can Work: Examples From the Field

Solar and Wind Assessments for Pivots (SWAP)

Colorado State University's Rural Energy Center is offering **FREE** solar and wind energy assessments for Colorado agricultural producers with center pivot sprinklers. The assessments will provide producers with estimated system sizes, costs, savings, and other information needed to decide whether investing in a renewable energy system is a sound investment.

For example, solar or wind systems could be installed on the corners of fields where electrically-driven center pivot sprinklers are used to irrigate crops. The renewable energy systems to be evaluated would be tied into the grid and used to offset the costs of pumping water for irrigation. CSU is accepting applications on an ongoing basis up to a limit of 30.

<http://rec.colostate.edu/swap/index.html>

The Colorado Dairy and Irrigation Efficiency Program

The Colorado Energy Office's statewide program will engage the services of an experienced third party contractor to provide **FREE** energy audits and technical support services to producers. The contractor will assist producers in selecting and implementing cost effective improvements that reduce energy use, environmental impacts, and producer operating costs. CEO will leverage the contractor's role in this program to monitor individual producer and overall progress and track and report on improvements, energy and cost savings, and GHG reductions.

The project objectives include reduced energy use for producers (reduction in Kwh, therms, and gallons of propane), increased environmental benefits (GHG reduction and air quality improvements), and producer cost savings.

⁹Colorado Department of Agriculture (2015). *ACRE3- Agricultural Hydro*. Retrieved from <https://www.colorado.gov/pacific/agconservation/agriculturalhydro>



Recommendations

Colorado has many opportunities to conserve natural resources while supporting its agricultural economy and the production and sale of more, healthy Colorado products into underserved markets. Opportunities include state regulatory action, enhanced academic research, and statewide partnerships that align goals of environmental stewardship, agriculture, and food security.

Across all recommendations, efforts should be encouraged that identify and manage food safety implications, reclaim resources for production that are underemployed (rather than competing for resources that are already fully utilized in other sectors), research yield and cost implications for farmers and ranchers, and, facilitate the policy changes that may be necessary to lower the barriers to adoption of new models. Opportunities for the state to explore further include:

Additional Research and Outreach Programming:

- Continue to encourage and support innovative ideas, research and education to help mitigate water, land use and energy issues at the local and state level. A number of departments and Centers within Colorado's Higher Education institutions have initiatives to explore such innovations, and need state level base support to leverage and compete for the increasing pool of federal dollars committed to this area of research.
- Research the need for and cost-benefit analysis of refrigerated storage for local food.
- Create a tool to calculate and compare local food producer life-cycle environmental footprints.

State Policy:

- Evaluate the potential impacts of adopting a state tax incentive program for on-farm agricultural efficiency and renewable energy programs. More than 12 states already provide tax incentives to businesses, including agriculture, for such projects. See the March 2013 Colorado Agricultural Energy Market Research Phase II: Market Research Report for more information.
- Integrate greenhouse audits/renewable energy analyses into the Colorado Energy Office program that is currently targeted to dairy and irrigation enterprises (examples cited above).

Leveraging Resources:

- Work with state and local partners to take advantage of unprecedented investment in sustaining our natural resources while feeding a growing population: As of 2015, USDA was funding 37 water and wastewater projects and 25 renewable energy projects totaling more than \$112 million in loans and grants for rural communities through the Water and Environmental Program (WEP) and the Rural Energy for America Program.

⁷GOCO invests a portion of Colorado Lottery proceeds to help preserve and enhance the state's parks, trails, wildlife, rivers and open spaces. GOCO's independent board awards competitive grants to local governments and land trusts, and makes investments through Colorado Parks and Wildlife. Created by voters in 1992, GOCO has committed more than \$825 million in lottery proceeds to more than 4,500 projects in all 64 counties without any tax dollar support.

⁸AB-551 Local Government: Urban Agriculture Incentive Zones (2013). Retrieved from http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB551



The COFSAC would like to thank the following partners and stakeholders for reviewing this brief and providing invaluable feedback:

- ❖ Cary Weiner, Energy Specialist, Colorado State University Extension
- ❖ Gene Backhaus, State Resource Conservationist, USDA Natural Resources Conservation Service

The COFSAC charge is to advance recommendations that strengthen healthy food access for all Coloradans through Colorado agriculture and local food systems and economies.

For more information see www.cofoodsystemcouncil.org.

COFSAC Members

Shawnee Adelson, Colorado Farmers' Market Association

Jane Brand, Colorado Department of Education

Cate Blackford, Hunger Free Colorado

Mary Lou Chapman, Rocky Mountain Food Industry Association

Karen Falbo, Natural Grocers by Vitamin Cottage

Trudy Kareus, USDA Rural Development

Pat Kendall, Colorado State University

Jill Litt, Colorado School of Public Health

Levetta Love, Colorado Department of Human Services, Director, Office of Economic Security

Barbara Marty, Producer

Dawn Thilmany McFadden, Colorado State University (Chair)

Tracy Miller, Colorado Department of Public Health and Environment

Chris Wiseman, Colorado Department of Agriculture, Deputy Commissioner

Linda Yoder, Producer

