



# CSU EXTENSION ENERGY NEWSLETTER

**Issue 65** **September 2016**

Welcome to the 65th issue of the CSU Extension Energy newsletter. This newsletter is distributed as a way to give the public, our partners, and Extension staff updates on CSU Extension energy work and its context in Colorado. Our overall mission is: 1. to empower Coloradans to make more informed energy decisions; and 2. to promote a broad, unbiased understanding of energy issues.

Please forward this newsletter to anyone you think might be interested. Also feel free to send us your organization’s energy-related news and events for listing in future newsletters. And don’t forget to Like us on [Facebook](#) to get updates on select energy news from Colorado and around the world.

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### **ANNOUNCING ‘YOUR ENERGY’ WEBSITE**

Colorado State University Extension is excited to announce the upcoming release of a new, dynamic, consumer-oriented website for unbiased energy information. The ‘Your Energy’ website will go live on September 28 via an announcement at the [CSU Energy Transition Symposium](#) (formerly the CSU Natural Gas Symposium) in Fort Collins.

Your Energy will feature all of the great content on the current CSU Extension energy website but in a more accessible and engaging way. For example, while energy fact sheets will still be available (perfect for handouts at local events!), information contained in those fact sheets will be broken down by topic and FAQs such as ‘how do I reduce heating costs’ and ‘is an electric vehicle right for me’. Our energy calculators have been revamped and will be accessible from multiple locations on the website. Our online DIY energy audits will also be more accessible, and our energy programs will continue to be hosted on the Extension energy site so as to keep Your Energy purely for consumer energy information.

One significant new feature will be the inclusion of an energy blog built into the Your Energy website. Blog posts will feature energy tips, commentaries on the latest energy news, and focus stories on clean energy work across Colorado. Rather than having to go to a different website to find the blog, our Facebook page will provide links to new blog posts and the blog can be accessed right on the Your Energy website itself.

Our Facebook page will also change its name and content to be consistent with Your Energy and to highlight our briefs as well as energy news. We will be redoubling our efforts to engage others working on energy issues in Colorado through Facebook. Our goal is to become the recognized go-to resource for consumer energy information in the state. Stay tuned for the unveiling of our site, FB page, logo, and all to come!

### **KING SOOPERS AND ACE TO HOST CSU ENERGY SIGNAGE**

With the extreme growth of LEDs in the market, consumers now have more lighting choices and a plethora of energy information that can make buying a light bulb daunting. To help consumers navigate this decision and to raise awareness of factual differences between lighting technologies, CSU Extension will be partnering with a King Soopers and an Ace Hardware in Arapahoe County. CSU Extension will be posting a sign in the lighting section of both stores that breaks the light bulb purchasing decision down into three easy steps and that highlights differences in cost, replacement intervals, performance, and the presence or absence of mercury between halogen incandescents, compact fluorescents, and LED bulbs.

We hope this signage pilot grows into other stores and other products that affect energy use, such as insulation, showerheads, and more.

**1. Choose your technology**

	Halogen	CFL	LED
5 year cost	\$25.90	\$8.43	\$5.42
Lifetime	0.7 years	6.8 years	17.1 years
Mercury free?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dimmable?	all	some	many





## **SWAP PROJECT RESULTS IN UPCOMING SOLAR INSTALLATION**

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The CSU Rural Energy Center's Solar and Wind Assessments for Pivots (SWAP) project had a number of interesting findings from our work. In general, we found that installing solar or wind in the corners of fields with center pivot sprinklers is not currently cost-effective in eastern Colorado as a result of low energy prices, the timing of irrigation energy use, net metering policies for irrigation, and the uncertain tax liability of many farmers. That said, a farmer in Holyoke, Colorado has signed a contract with Golden Solar to install a 15 kW solar array adjacent to one of his irrigated fields. Energy generated by this array will offset about 20% of electricity used for irrigation pumping for one pivot.

The installation is expected for early October and should take about 1 week to complete. The project will be net metered through Highline Electric Association, which has been a primary partner of CSU's on the SWAP project from the beginning. The farmer is in the process of applying for a REAP grant to offset 25% of the cost of the project, and he is also expected to take advantage of a 30% federal tax credit. After the grant and tax credit, we project a 13-year payback period and a 5.2% return-on-investment on the installation.



**Near the site of the upcoming solar installation (corn in distance)**

## **CSU ENERGY TRANSITION SYMPOSIUM**

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Join us for the 6<sup>th</sup> annual 21<sup>st</sup> Century Energy Transition Symposium on Sept 28-29 on the Colorado State University campus. Formerly known as the Natural Gas Symposium, this year CSU has broadened the event into all energy-related topics. With over 43 different speakers during the two day symposium, CSU has built a reputation of hosting a balanced symposia that invites speakers and participants from all sides of the issues. s always, the symposium is free of charge to attend in person or on the live stream. Speakers come from industry, environmental organizations, academia, students, government, elected officials, community members and business leaders. Over 800 people attend last year's symposia plus 3,000 on the live stream. Everyone is welcomed to attend and everyone must register.

**Date:** Sept 28-29, 2016

**Location:** Colorado State University  
Lory Student Center, third floor ballroom  
Fort Collins, Colorado

**Agenda:** [Click here](#)

**Cost:** Free but everyone must register

**Register (in person):** [Click here](#) to attend on campus

**Register (live streaming):** [Click here](#) to watch sessions live streamed  
(Many groups and teachers/professors live stream sessions into their classroom)

**Event details (parking, hotels, etc):** [Click here](#) for more information

**If you want to be a sponsor:** [click here](#)

**If you want to be an exhibitor:** [click here](#)

**Website:** [www.energytransition.colostate.edu](http://www.energytransition.colostate.edu)

Questions: Maury Dobbie (Symposium Chair)

[Maury.Dobbie@colostate.edu](mailto:Maury.Dobbie@colostate.edu)

970-491-3788



## **GARFIELD COUNTY AIR QUALITY RESULTS PRESENTED**

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*From Colorado State University "Source" by Anne Ju Manning*

Data from an extensive multi-year Colorado State University study of air emissions from natural gas operations in Garfield County, Colorado have been presented publicly by a CSU research team. Study leader Jeffrey Collett, professor and head of CSU's Department of Atmospheric Science, presented the study results during a session of the Garfield County Board of Commissioners June 14. The presentation was streamed live and is [archived on the Garfield County government website](#).

The study, *Characterizing Air Emissions from Natural Gas Drilling and Well Completion Operations in Garfield County, Colorado*, was commissioned in 2012 by Garfield County. It was aimed at characterizing the extent of air emissions from natural gas extraction activities. The western Colorado county contains the Piceance Basin and has some of the highest oil and gas activity in the state. Collett and other researchers, including co-principal investigator Jay Ham, CSU professor in the Department of Soil and Crop Sciences, obtained air samples for scientific data surrounding well pad activities. Air Resource Specialists, a company that offers air quality monitoring and modeling, also contributed to the project.

Garfield County contributed \$1 million toward the study, which was organized through an intergovernmental agreement between CSU and the county. Approximately \$700,000 in additional

support came from industry gifts to CSU from Encana Corp., WPX Energy, Ursa Resources Group, Bill Barrett Corp., Caerus Oil and Gas and Laramie Energy. A technical advisory committee comprised of air quality and emission experts from government, industry, and the National Center for Atmospheric Research periodically consulted with the research team during the study, and reviewed the findings.

### **Data collection**

The CSU researchers collected and characterized emissions from three activities during new well development: drilling, hydraulic fracturing (“fracking”) and flowback – all processes typical of unconventional natural gas extraction. They quantified air emission rates and dispersion of air toxics, ozone precursors and greenhouse gases during each of these processes.

“What we have done is document the types of chemicals, and the amounts of those chemicals, that are emitted when new wells are prepared,” Collett said. “The focus was on volatile organic compounds (VOCs) that are of concern as air toxics and as precursors to ozone formation, and on methane, a potent greenhouse gas. We wanted to look at drilling, fracking and flowback, because emissions from these activities have received little prior study, especially for VOCs. The study focused on directly quantifying emissions, so that findings could be used to generate maps of concentrations for times and places of interest, under a variety of weather conditions, to examine issues like potential health or air quality impacts.”

Notably, the team observed higher rates of emission of many volatile organic compounds and methane during flowback operations than during drilling or hydraulic fracturing. Flowback is last in the chain of well completion events, and refers to water and fracking fluids flowing up from the ground after injection of water and chemicals into the well, the process known as hydraulic fracturing.

Methane, a potent greenhouse gas that has been targeted for emission reductions by the state of Colorado and the federal government, was the most abundant compound in measured emissions, with median emissions of 2.0, 2.8, and 40 grams per second (g/s) for drilling, hydraulic fracturing, and flowback activities, respectively. Other emitted VOCs of interest and their overall median emission rates included ethane (median emission rate of 0.31 g/s), propane (0.15 g/s) and other short-chain hydrocarbons that are important constituents of natural gas. They also looked at air toxics such as benzene (0.04 g/s) and toluene (0.27 g/s). Wide ranges of emissions were observed both across activity types and within a given activity.

Collett’s team was charged with quantifying emissions, but not related health risks, which were not within the scope of the project. The Colorado Department of Public Health and Environment (CDPHE) plans to use the data to conduct a human health risk assessment.

“This evaluation will improve our understanding of the potential for health risks directly attributable to air emissions from oil and gas,” said Mike Van Dyke, CDPHE branch chief of Environmental Epidemiology, Occupational Health and Toxicology.

### **Methods of collection**

The CSU field team, led by research scientist Arsineh Hecobian, and assisted by CSU graduate students, postdoctoral researchers and scientific staff, conducted a total of 21 separate

experiments from 2013-15 at various natural gas operations sites in Garfield County. Access to drilling and other operation sites, thanks to industry cooperation, was critical to gathering accurate information and was key to the study's success, Collett said. Emission measurements were conducted at well drilling and completion sites operated by Encana Corporation, WPX Energy, and Ursa Resources Group.

The team was somewhat limited by a slowdown in new well drilling over the course of the study, but they were able to complete 21 of 24 planned experiments.

They used what's called a tracer ratio method to identify and calculate rates of emissions of compounds of interest including methane, ethane, propane, benzene and toluene. Most experiments included measurement of emissions of a suite of 48 VOCs, plus methane.

Using acetylene as the tracer gas, the researchers designed experiments with a mobile plume tracker for real-time measurements of methane, and canisters that collected air samples for three-minute periods. They released the tracer, then located it downwind of the well pad in order to capture snapshots of typical emissions. Several sets of canisters were set up at each experiment station and later analyzed in a CSU laboratory using gas chromatography. The researchers also performed real-time sampling of methane emissions at each site, using a cavity ring-down analyzer. Continuous measurements of meteorological conditions were made during each experiment to support efforts to model dispersion of emitted pollutants downwind of the well pads.

Data collected in the study is available [here](#). More information on the study, including the June 14 presentation, is available [here](#).

Collett and his team are conducting a similar study of air pollutant emissions from oil and gas activity along the northern Front Range, commissioned by the state of Colorado. That study focuses on methane and VOC emissions from hydraulic fracturing, flowback, and production of oil and gas.



**Research associate Kira Shonkwiler and former CSU student Landan MacDonald (M.S. '14) set up the meteorological station upwind of a well pad.**

## RESOURCE SPOTLIGHT: HOME ENERGY VIDEOS

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With summer heading toward a close, you may find yourself again wondering if your home is as energy efficient as it could be. How can you test your home for air leaks? How can you assess your insulation levels? CSU Extension offers two videos to help answer these questions. So watch, learn, and then...DO!!!

- [Testing for Air Leaks](#)
- [Assessing your Insulation Levels](#)

## DID YOU KNOW?

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Rather than making electric vehicle purchasers claim credits on their tax returns, Colorado residents can now take advantage of \$5,000 instant rebates on electric vehicles.

## UPCOMING EVENTS

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- **September 13, 12-1pm**  
Lunch 'N' Learn webinar: Solar Options for the Home (Cary Weiner of CSU Extension)  
[Register here.](#)
- **September 28, 6-7pm**  
Renewable Energy Options for the Home (Cary Weiner of CSU Extension) – Grimm Brothers Brewery in Loveland.  
[Register here.](#)
- **September 28-29**  
CSU Energy Transition Symposium – Lory Student Center in Fort Collins.  
[Register here.](#)

## CSU EXTENSION ENERGY RESOURCES

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- Like the [CSU Extension Energy Facebook page](#) for energy news updates from Colorado and around the world
- Borrow a [Home Energy Audit Loan \(HEAL\) program kit](#) from your local Extension office
- Conduct a [DIY home energy audit](#), solar assessment, or wind assessment
- Download a [fact sheet](#) or online decision tool
- View recorded webinars and [videos](#)
- Borrow a [School Energy Activity Loan \(SEAL\) program kit](#)
- Teach from our [Clean Energy Curriculum for Colorado Middle and High Schools](#)
- Ask an [energy expert](#)
- Track energy legislation in Colorado and nationwide using the CSU Center for the New Energy Economy's [Advanced Energy Legislation Tracker](#)