



LESSONS LEARNED FROM SOLAR BENEFITS COLORADO

A CASE STUDY OF A COLORADO SOLAR-EV GROUP PURCHASE PROGRAM

by

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ABOUT THIS CASE STUDY

This case study is a part of the Transportation Electrification Toolkit, designed to help Connecticut municipalities develop strategies to encourage transportation electrification through the pairing of electric vehicles and residential solar photovoltaic systems and electric shared-use mobility solutions. The toolkit consists of summaries of each transportation electrification concept, a case study of the concept from outside Connecticut, and potential approaches to deploy the concept for policymakers. The toolkit also consists of a resource library and interactive data dashboards that provide quick access to relevant information on transportation electrification in Connecticut.

The toolkit is a joint effort of Atlas Public Policy, Connecticut Green Bank, and the Connecticut Department of Energy and Environmental Protection.

In 2016, Atlas Public Policy began working with the Connecticut Green Bank and the Connecticut Department of Energy and Environmental Protection on the Green Bank's strategy to accelerate alternative fuel vehicle deployment in the state. Atlas began with a market potential assessment of various alternative fuels and vehicles tailored to local conditions in Connecticut. Atlas then identified promising electric mobility concepts, including electric vehicle shared-use mobility, the pairing of electric vehicles and residential solar, and high-powered electric vehicle charging infrastructure. Atlas evaluated the suitability of these concepts as part of a strategic planning process for the Connecticut Green Bank to help the Green Bank define its role in growing the alternative fuel vehicle market in the state.

PROGRAM BACKGROUND

The [solar group purchase concept](#), pioneered in Portland, Oregon in 2009, allows homeowners or businesses to use their aggregated purchasing power to negotiate discounts from solar vendors. In addition to providing purchase discounts, these programs build awareness of solar through consumer education and outreach. The initiative started in one Portland neighborhood and grew as the City of Portland's Bureau of Planning and Sustainability [used a \\$400,000 grant from the U.S. Department of Energy](#) to bring the program to every neighborhood in the city. The model has since been adopted by other states and communities nationwide, including [Solarize CT](#), [Solarize Texas](#), and [Solarize Michigan](#).

[Research in 2015](#) conducted by Southwest Energy Efficiency Project (SWEET) through funding from the University of Colorado Boulder, Boulder County, and the City of Boulder identified the opportunity to expand the solar group purchase model by including EVs. The research concluded the joint marketing of solar and EVs can help raise awareness and demonstrate the value of these technologies to prospective buyers.

Colorado's solar-EV group purchase program, [Solar Benefits Colorado \(SBCO\)](#), ran from September to December of 2015 in the counties of Boulder, Adams, and Denver. Although any Colorado resident could take advantage of the program, outreach was targeted at these three counties. The purchase program allowed residents of these counties to purchase either or both an EV and a rooftop solar array.

Key to the SBCO program, was leadership by Boulder County government in coordination with the City of Boulder, the City and County of Denver, and Adams County. The program arranged competitive discounts from solar vendors, an auto dealer and an auto manufacturer, and took advantage of existing financial incentives at the state and federal level for both solar and EVs (see Box 1).

Box 1: Key Program Elements

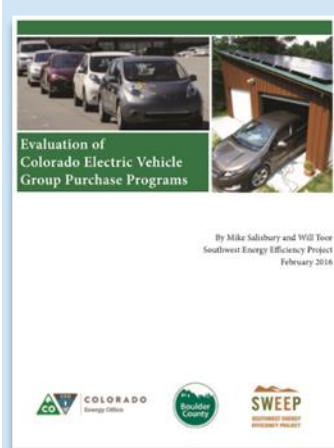
- Community leadership in setting up the program and conducting outreach to residents.
- Competitive selection of solar installers and auto dealers to get the best deals.
- Financial Incentives for EVs and solar from state and federal government and discounts from auto dealers, automakers, and solar vendors to encourage greater participation.

PROGRAM DESCRIPTION

PARTNERS AND OUTREACH

Boulder County government coordinated outreach with other local governments to expand the program outside of Boulder. The County also leveraged its work experience with the non-profit [Vote Solar](#) on solar group purchasing to select solar vendors and educate residents. Vote Solar developed an online portal to sign up residents and redirected consumers directly to selected technology vendors.

To bring technology providers on board with SBCO, the program team organized two requests for proposals, one for solar contractors and another for auto dealers. The program selected solar vendors operating in multiple electric utility service territories, thereby making the program more accessible for residents across the three counties. Two solar vendors ([Sunrun](#) and [Custom Solar](#)) and one auto dealer ([Boulder Nissan](#)) were selected. Other auto dealers expressed verbal interest in joining the program but Boulder Nissan was the only one to submit a proposal.



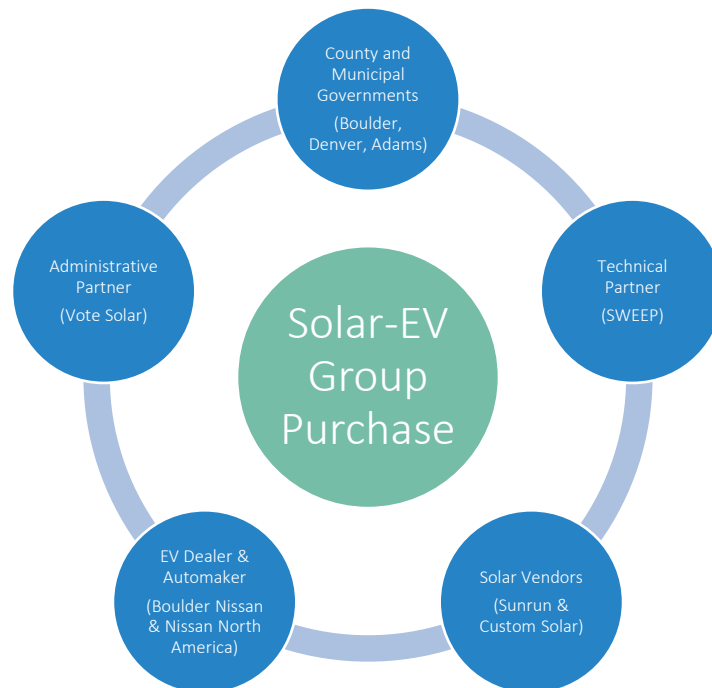
Box 2: SWEEP’s Evaluation of the Group Purchase

Portions of this case study rely on SWEEP’s evaluation and survey conducted after the Solar Benefits Colorado group purchase program ended in December 2015.

Boulder County led and organized the program’s outreach efforts and other local governments organized outreach in their communities. Vote Solar provided templates for the program’s outreach materials, which reduced the program’s administrative costs. Local government participants used emails, presentations, and newsletters to conduct both employee and community outreach. For example, the Boulder Valley School District sent out a [newsletter](#)

to all of its staff, which emphasized the community focus and the program’s simplicity. Community outreach came in the form of [press releases](#), [workshops](#), and social media engagement. A full list of outreach activities is available in a report by program’s technical partner, SWEEP called the [Evaluation of Colorado Electric Vehicle Group Purchase Programs](#) (see Box 2).

FIGURE 1: KEY PROGRAM PARTNERS



INCENTIVES AND DISCOUNTS

The SBCO program demonstrated how group purchase programs in [states with financial incentives for EVs](#) can increase EV adoption. State and federal incentives for solar and EVs provided foundational support for the SBCO program by reducing upfront costs for consumers. In [2015 and 2016](#), Colorado had a tax credit worth up to \$6,000, which could be combined with a federal tax credit worth up to an additional \$7,500. For purchasing and installing rooftop solar, residents of Colorado could receive a [30 percent federal tax credit](#), and could enroll in electric utility programs that lower the total cost of solar ownership like Xcel Energy’s [Solar*Rewards](#) or [net metering](#).

During the SBCO program in 2015, Boulder Nissan provided a \$3,349 discount and Nissan North America provided an addition \$5,000 discount on three variations of the 2015 Nissan LEAF. The net price of the standard 2015 LEAF model was 38 percent below the suggested retail price (see Figure 2). The program did not include used vehicles, because of the variability in pricing and quality. Additionally, the dealership provided zero percent financing over three years and Nissan’s [No Charge to Charge Program](#) provided buyers with two years of free public charging. Nissan also donated charging stations to the County of Boulder. SBCO also organized discounts for vehicle leasing (two or three years), but this option was neither as financially attractive, nor as popular as the purchase option. Both solar vendors offered fixed installation costs and discounts, as shown in Table 1. Sunrun, the solar vendor in Xcel Energy’s territory (Colorado’s largest electric utility) provided a much larger discount than Custom Solar. Sunrun was likely able to guarantee a larger discount because it had access to a larger utility customer base through Xcel Energy.

FIGURE 2: EV DISCOUNTS AND INCENTIVES OFFERED FOR STANDARD NISSAN LEAF



The combination of discounts and incentives greatly reduced the net price of the Nissan LEAF. The group discount was available for three models of the Nissan LEAF. The diagram above shows the net price for the base LEAF model.

Source: [Evaluation of Colorado Electric Vehicle Group Purchase Programs, SWEEP \(February 2016\)](#)

TABLE 1: SOLAR DISCOUNTS OFFERED

	Sunrun	Custom Solar
Utility Territory	Xcel Energy	Lyons, Longmont, and Platte River Power Authority
Installation Cost (\$/Watt)	\$3.50	\$3.50
Group Discount	\$750	\$250

Two solar contractors were selected as vendors for the program. Each offered a fixed installation cost, but group discounts varied based on electric utility service area.

Source: [Evaluation of Colorado Electric Vehicle Group Purchase Programs, SWEEP \(February 2016\)](#)

PROGRAM RESULTS

The purchase program was originally meant to be conclude on September 30th for EVs and on November 6th for solar purchases. Due to high demand the program was extended through the end of December. The online sign up system for the program managed by Vote Solar was more effective at gauging solar sales than EV sales. In its study, SWEEP suggested that as news spread about the vehicle discount more customers went directly to the dealer rather than signing up online through Vote Solar’s website.

A survey was emailed to program participants that signed up online for the EV purchase portion of the program. Feedback was solicited from both those who made a purchase and those who started the purchase process, but did not end up making a purchase. A raffle for a \$100 discount towards a charging station or electric bike was conducted for those who completed the survey. Exactly half of the 248 people who bought a LEAF responded to the survey.

LEAF sales in 2015 from Boulder Nissan increased by over 300 percent during the program from 2014 levels, accounting for 3.5 percent of total LEAF sales nationwide in 2015. The program resulted in 248 LEAFs sold in 13 different counties in Colorado. Both Boulder and Adams County have higher populations than Boulder County, but Boulder (173 vehicles sold) registered over 70 percent of total sales. The next highest sales by county was Denver (21 vehicles sold) with nearly nine percent of sales. According to SWEEP’s [study](#), only 19 participants purchased both an EV and a rooftop solar system. Boulder again ranked the highest in total solar sales with 59 percent of 147 total installations. Adams (9 percent) and Denver County (26 percent) accounted for a greater portion of solar sales than they did for EV sales.

FIGURE 3: EV SALES BY COUNTY

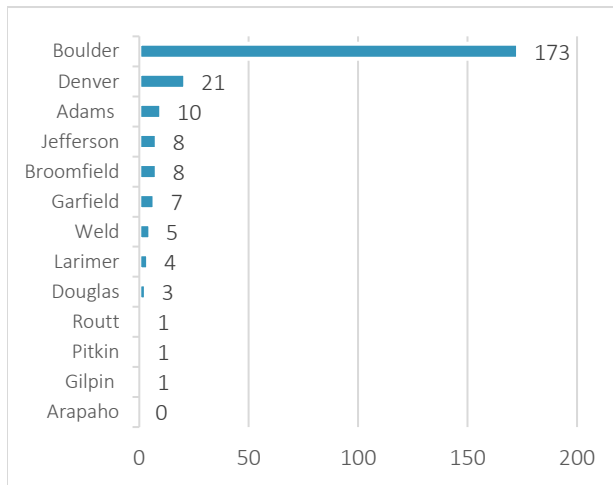
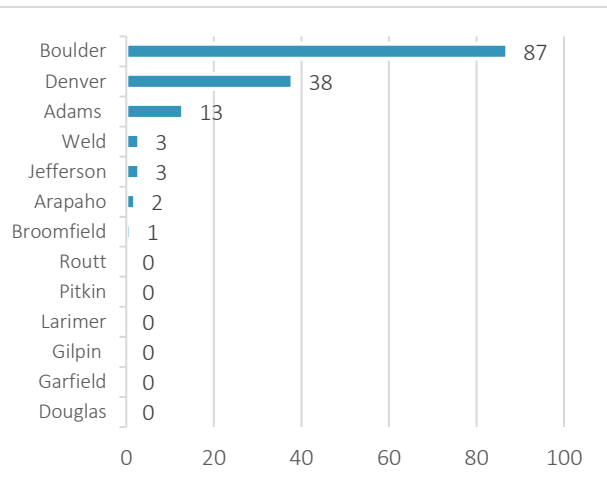


FIGURE 4: SOLAR INSTALLATIONS BY COUNTY



EV and Solar sales by county through the SBCO program. According to SWEET, county level data for EV sales was available for only 244 out of the 248 LEAFs sold through the program.

Source: [Evaluation of Colorado Electric Vehicle Group Purchase Programs, SWEET \(February 2016\)](#)

LESSONS LEARNED FROM SOLAR BENEFITS COLORADO

Without a coordinated sales effort between solar vendors and auto dealers there is limited joint adoption of EVs and solar. Only about eight percent of people that purchased a LEAF through the program also installed solar, providing evidence that the program does not effectively promote the joint benefits of EVs and solar. SWEET’s [evaluation of the program](#) recognized the importance of engaged vendors for EVs and solar. It is unclear how a more collaborative approach among these vendors could have increased joint adoption of solar and EVs. From the evaluation, it appears that the solar vendors and the dealership were not working hand-in-hand to simultaneously sell both products. Vote Solar was instrumental in selecting vendors and capturing initial interest in the program from residents, but the evaluation suggests that Vote Solar played a reduced role in the sales process as the project gained traction with potential car buyers. Initially the sales leads were funneled through Vote Solar’s online sign up, but as the EV portion of the program gained attention, more customers started going straight to the dealer. As a result, Boulder Nissan quickly became the face of the purchase program.

A local, engaged auto dealer is crucial to promoting and selling EVs. The SBCO program helped familiarize more of their salespeople with EVs. An engaged local auto dealership is needed for the EV portion of a group purchase program to be successful. According to a [report by the Sierra Club](#), auto dealerships often lack the resources (time, training, and personnel) necessary to sell an EV. EV sales require an educated salesperson that can walk a customer through the benefits and differences of EV ownership compared to a conventional vehicle. The group purchase program made the EV sales process easier in some cases, because customers visited the dealership knowing about the program and potentially ready to buy an EV.

Consumers responded positively to Boulder Nissan's engagement with nearly 80 percent rating their experience purchasing a LEAF as "excellent."

Boulder County, where Boulder Nissan is located, was by far the leader in Nissan LEAF sales throughout the course of the program. It is possible that if the purchase program had dealer partners in other counties then success might have been more widespread outside of Boulder. Solar sales were more evenly distributed than EV sales (see Figure 3 and Figure 4), in part because solar vendors were accessible to residents of more counties. Sunrun made house calls to provide price quotes regardless of the county, whereas purchasing a vehicle required a trip to Boulder Nissan.

Increasing the array of EV models and drive trains offered through the program can help attract more consumers. Eleven people that purchased solar through the program purchased an EV outside of the program. This would suggest that the program might have attracted more interest if it had offered more models than the Nissan LEAF. From the 57 survey respondents that participated in the solar portion of the purchase program but did not purchase a LEAF, over 90 percent said they would consider buying an EV in the future. This group also highlighted that vehicle range was still a critical barrier to adoption. The purchase program could have captured this interest by including plug-in hybrid electric vehicle and other all-electric models that offer different utility and/or more range.

Consumer outreach raises interest and helps to generate EV sales. Program feedback suggests that most purchases were initiated by program outreach through the media, their employers, and advertisements. Over 40 percent of people who bought a LEAF through the program were not even considering buying a new car, showing outreach helped develop new vehicle sales. Those surveyed that bought the LEAF indicated that the program could be improved in the future with better and more widespread outreach. A large share of the program's media coverage (external) and employee-focused (internal) outreach was conducted in Boulder. Several large employers in Boulder, including University of Colorado Boulder, conducted outreach to employees.

To help overcome adoption barriers, outreach should directly address a consumer's motivations for purchasing an EV, including charging availability to reduce range anxiety, available financial incentives, operational savings, and the environmental benefits associated with EV ownership. For those that did not make an EV purchase, but bought solar, monetary incentives, such as tax credits, weighed heavily in the purchasing decision.

Incentives and discounts are key to reducing financial barriers to purchase. Even with the financial discounts offered, high prices for EVs were identified as one of the leading barriers limiting program success. [Press releases](#) for the program focused on how the combination of incentives and discounts made the LEAF and rooftop solar installations affordable. Feedback suggests that larger discounts would have increased participation in the EV group discount. Other programs in Colorado have had similar success in using outreach to highlight the financial discounts for EVs. The [Drive Electric Northern Colorado Program](#) also offered a discount than the SBCO program on the base 2016 LEAF model (\$10,000) for fleets that purchased two or more vehicles. The Drive Electric Northern Colorado has also organized an [offer through the end of 2016](#) for a discount (\$5,210) on the LEAF and bonus cash from Nissan (\$4,000) if the consumer finances the vehicle through Nissan Finance. The Northern Colorado program generated interest through employer-based outreach and ride-and-drive events. When it was first offered, the program sold out of LEAFs and had to source from surrounding Nissan dealers.

SUSTAINED LOCAL LEADERSHIP ACHIEVES POSITIVE RESULTS

The Solar Benefits Colorado program helped develop the EV market and generated interest and awareness of EVs, particularly in Boulder County. The noticeable increase in EV adoption through the program encouraged municipalities in Boulder County to [invest in public charging](#).

In Boulder, the program has led to sustained action and leadership from the local government. The City and County of Boulder [built off](#) of the SBCO program's success in Boulder and launched two parallel initiatives, one for solar and one for EVs. The City and County of Boulder continue to organize EV discounts through [Benefits Boulder County](#). The program is billed as seasonal and until the end of 2016 there are discounts on Nissan LEAFs through a new auto dealer partner, [Valley Nissan](#). Boulder County also implemented [Solar Benefits Boulder County](#), which ran from February to May of 2016 in partnership with [Namaste Solar](#). During its run, the program provided a \$250 rebate and had 232 participants.

Additionally, an EV [purchase program in Aurora](#) outside of Denver was launched in September 2016 and ran for 60 days. Before the program, the city of Aurora had already introduced EVs into its fleet and plans to add more in 2017. The program was developed between the Denver Metro Clean Cities Coalition and the city of Aurora to help the city capture local interest in EVs and reduce petroleum consumption. Nissan LEAFs were available at a \$10,500 discount for residents living in the metro area of Aurora. As of October, sales of the LEAF through the program were nearly double the sales from January through August of 2016.



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