



**TOWN OF BOONE
SUSTAINABILITY, ECONOMICS AND ENVIRONMENT COMMITTEE
MEETING AGENDA**

The Sustainability, Economics and Environment Committee will meet on **Thursday, April 12, 2018 at 5:30 p.m.** in the Planning & Inspections Department – Upstairs Conference Room located at 680 W. King Street. The following items will be on the agenda:

- 1. Call to Order**
- 2. Adoption of Agenda**
- 3. Approval of Meeting Minutes**
 - March 8, 2018
- 4. Bee City USA Update**
- 5. Discussion on Green Infrastructure Plan**
- 6. Review on NC Climate Solutions Coalition Energy Action Plan**
- 7. Discussion on Energy Action Plan**
- 8. Discussion on Bike Share**
- 9. Discussion on Campus Resiliency Plan**
- 10. Discussion on Solar Panels**
- 11. Other Matters by Commission Members or Staff**
 - Set agenda for next meeting
- 12. Adjournment**

TOWN OF BOONE
SUSTAINABILITY, ECONOMICS AND ENVIRONMENT COMMITTEE
THURSDAY, MARCH 8, 2018
5:30 P.M.

Members Present: Chairperson Quint David, John Prickett, Benjamin Scarboro, Nicholas Stover, Sam Furgiuele and Marshall Ashcraft

Staff Members Present: Christy Turner, Senior Planner and Marlene Crosby, Committee Secretary

Call to Order

Chairperson David called to order the meeting of the Boone Sustainability, Economics and Environment committee, held in the Planning and Inspections Department – Upstairs Conference Room located at 680 W. King Street at 5:36 p.m.

Chairperson David reviewed the agenda topics and asked if anyone had topics to add to the agenda. Member Furgiuele explained that he had previously made an action request to Council to expand the Sustainability, Economics and Environment committee by one more member. He said it is not that the committee is too small but it could benefit the committee to add more members with specialized expertise. Member Furgiuele said he is going to ask the Council to revisit the Council Liaison positions on all the Town committees.

Adoption of Agenda

Member Prickett made a motion, seconded by Member Ball to accept the agenda as amended with the addition of expanding the number of SEEC committee members.

Vote:

Aye – All
Nay – None

The motion passed.

Approval of Minutes

Member Ashcraft made a motion, seconded by Member Stover to accept the February 8, 2018 meeting minutes with the following amendment: in the first sentence change “Member Furgiuele” to “it was noted”.

Vote:

Aye – All
Nay – None

The motion passed.

Discussion on Bee City, USA

Ms. Christy Turner, Senior Planner began discussion with a few updates on Bee City, USA. She noted that this topic will be on this month’s Council’s agenda. She said the Town’s horticultural

person has provided her with a list of pesticides. She asked for suggestions on where to locate the side effects of the pesticides on the list.

Member Ball said the University is involved with Bee Campus, USA. He said Mr. Chris Erickson the head landscaper at the University is extremely knowledgeable and he could arrange a meeting with Mr. Erickson and the Town Staff to discuss the side effects. Chairperson David said he would like to include a honey farmer that he knows at the Farmers Market in the side effects discussion. He said the honey farmer used to run the bee keeper's society in the area.

Ms. Turner talked about the possibility of adding some host plants to the budget for Bee City, USA (permanently attached). Member Ball said depending on the species of plants the University may be able to share some of their plants with the Town.

Ms. Turner talked about the educational component associated with Bee City, USA. She said that the third week of June is when it is usually conducted by other Towns. She said if the SEEC would rather have the educational component occur while schools are in session, the SEEC could discuss it. She suggested working the educational component into the grade schools.

Discussion ensued on having the Bee City, USA information on the Town's website. Ms. Turner said it is a requirement of Bee City, USA to have this information on the Town website. It was noted that there have been previous discussions in other Town meetings to request that the Town website be expanded to contain additional topics.

Ms. Turner said that she created an action request for Council to approve the Staff's time to research topics on Bee City, USA.

It was suggested to add a list of bee plants in the water bill mailings to help involve the community in Bee City, USA.

It was the consensus of the SEEC to wait for the Council's approval on the Bee City, USA action request before taking other action on it.

Discussion of Earth Day Sustainable Community Event

Chairperson David said it is part of the charge of the SEEC to establish a yearly Sustainability Forum. He said it should be done at a minimum of once a quarter.

Chairperson David reviewed the 42-page survey (permanently attached). He said he reduced this information into a 24-page survey. He explained that the public was involved in the surveys. It was noted that this information is on the Town website.

Chairperson David reviewed the 2014 Sustainability goals as they relate to the survey entries. He explained how the responses and ranked scores were added. He said he would like to revisit some of the survey topics and involve the public again on these topics before the budget numbers are submitted to Council. He said the SEEC has not worked on all of the items on the survey but they have worked on a lot of them. He said he felt it would be good to use some of the same topics again on the next survey; to get the feedback from the new Council Members and Committee

members. He said he would like to work on a list to outline any budget items that may need to be considered. Chairperson David said for example curbside composting has been discussed and the public wants it but it has not been discussed with the new Council Members and Committee Members. Chairperson David said there is a Master Composting certification that can be obtained to help to achieve effective composting.

Discussion ensued on recycling plastic. Ms. Turner said that recycled items need to be cleaned and dried and sorted or they will be thrown into the regular garbage. Member Ball said currently there is not much of a market for rigid plastic because the energy prices are so low. He said that plastic bags have to be very clean to be accepted for recycling.

Discussion ensued on curbside cardboard pick-up. It was noted that the cardboard could be picked up every other week from the larger bins.

Mr. Turner talked about the need to try to educate the public on recycling.

Chairperson David talked about creating two lists for Earth Day. He said on one of the lists have items that the Town wants to see happen and a list of the items that are happening in the Town. He suggested that the knowledgeable Town employees could speak on what is happening in the various departments of the Town. It was suggested to have an Earth Day umbrella event sponsored by the Town and have the Town employees share information from the different departments of the Town.

It was suggested on combining an Earth Day event with the Jones House concerts. It was suggested to set up a table in front of the Downtown Boone Post Office to provide information on Sustainable topics. Chairperson David suggested inviting groups to speak on specific topics they are involved in that are related to the 2014 Sustainable Goals. It was suggested to provide certificates to the people who speak.

Chairperson David reviewed the following topics for Earth Day: compost bins, rain barrels and low flow toilets.

Discussion ensued on having a forum at the library and an Earth Day celebration at the Jones House. It was suggested to have break out sessions to gather community input on the list of Sustainable topics. It was noted that this is a good way to get the word out to the community.

Discussion ensued on the date of Earth Day. Ms. Turner said that there needs to be Council approval for Town events. Ms. Turner said the action request deadline is April 6, 2018 for the Council meeting date of April 19, 2018. Ms. Turner said that the Town Manager can approve a press release but the Council needs to approve a Town event. Chairperson David said the press release would be of the Sustainability topics that the Town is already doing. It was noted that the press release could include that the Town plans to celebrate Earth Day in the fall of 2018.

It was noted that the Town is already involved in the Cyclovia event and that Sustainability topics can be added to it.

Ms. Turner said she would create an action request to Council for the SEEC to have an Earth Day event in the fall. It was suggested that the action request include the Department Heads letting the Staff know about their involvement in the Earth Day events.

Member Ball talked about involving the University students in the Earth Day events. He said that the students are back in late September.

Member Ball talked about involving the Town in the University Earth Day event. He suggested having Mr. Brian Johnson, Urban Design Specialist speak on the Forest Management Plan and Ms. Marsha Owens speak on recycling at this event.

Discussion ensued on including Sustainability topics in the Town's Quarterly Reports. It was suggested to task Staff to research Sustainability information to add to the reports. Chairperson David said for example the SEEC does not have enough information to calculate carbon usage, they only see the amount of dollars spend by the Town on fuel usage.

It was suggested to establish a Sustainability section into the quarterly reports. It was noted that the information would be available, when needed.

Discussion ensued on tasking the departments of the Town with researching ways to help the SEEC reach their Sustainable goals. Chairperson David said the SEEC could review this information in the quarterly reports.

Chairperson David said he would work with Mr. Turner and the Town Manager to create the Earth Day press release.

Discussion of Green Infrastructure Plan and Energy Action Plan

Chairperson David said that he wanted to talk with Vice-Chairperson Ayers on his "Sustainability Energy Action Plan" compared to the "Boulder Sustainability Energy Action Plan" but Vice-Chairperson Ayers was not able to attend this meeting.

Chairperson David talked about the gray versus the green infrastructure. He said if we want the Town of Boone to be a green Town, there needs to be more focus put on the greenways and the bike paths with multiple-purpose lanes rather than vehicles.

Chairperson David reviewed the Boulder Sustainability Energy Action Plan (17-page document), (permanently attached). He talked about minimizing fossil fuel transportation. He said there are some things that the SEEC can do to encourage the usage of electric vehicles in the Town of Boone. He said for the whole community, there are policy initiatives that can be implemented to force developers to build what the Town wants.

Chairperson David said he would like for the SEEC to provide to Council for this budget year a list of budget items like electric vehicles, solar panels and lights. And to have a list of budget items that do not have high costs associated with them like the Bee City, USA topic. It was suggested to request to Council through for example a Special Use Permit or Conditional District zoning process to make it a requirement for the developer to demonstrate how they will be

maximizing sustainability. Then, the SEEC could make recommendations which possibly be approved as a Sustainability code requirement.

Chairperson David reviewed the strategies section of the Boulder Sustainability Energy Plan. He said they have some residential ideas that could be easily adopted by the Town of Boone such as a light efficiency lighting program.

Chairperson David talked about a financing program called PACE (Property Accessed Clean Energy). He said this topic was approved by the Town as part of the SEEC's 2017 long-term goals. He said this program works for example, if you want solar panels on your house you can borrow money from the Town and the repayment is accessed through your property taxes. This helps the community afford the solar panels and the Town makes interest on the money borrowed. He said that the PACE program past ten years ago in North Carolina. And there is only one community near Durham, North Carolina using the PACE program.

It was the consensus of the SEEC to continue discussion on the Boulder Sustainability Energy Plan at the next meeting and add to the budget list from the energy plan.

Member Furgiuele said that the Council endorsed Vice-Chairperson Ayers' energy action plan. He said the Council talked about allocating not quite the amount of money that Vice-Chairperson Ayer's was asking for but close to that amount. The Council approved to fund his energy action plan based on the availability of funds and consideration of the SEEC.

Review of NC Climate Solutions Coalition Energy Action Plan

It was the consensus of the SEEC to table this agenda item to the next SEEC meeting.

Other Matters by Committee Members or Staff

Member Furgiuele said that he added to the Council agenda the addition of one more member to the SEEC.

Motion and Vote:

Member Lee made a motion, seconded by Member Stover to allow Chairperson David to work with the Town Manager and Planning Staff to create a press release for 2018 Earth day events to include the Town Department heads involving their Staff in the events and for the Sustainability Economics and Environment Committee to plan their Sustainability Forum in the fall of 2018.

Vote:

Aye – All

Nay – None

The motion passed.

Set agenda items:

- Discussion of Green Infrastructure Plan
- Review of NC Climate Solutions Coalition Energy Action Plan
- Discussion of the Energy Action Plan
- Discussion of Bike Share

- Discussion of Campus Resiliency Plan
- Discussion of Solar Panels

Adjournment

Member Stover made a motion, seconded by Member Prickett to adjourn the meeting at 6:59 p.m.

Vote:

Aye – All

Nay – None

The motion passed.

Quint David, Chairperson

Marlene Crosby, Committee Secretary

327 responses

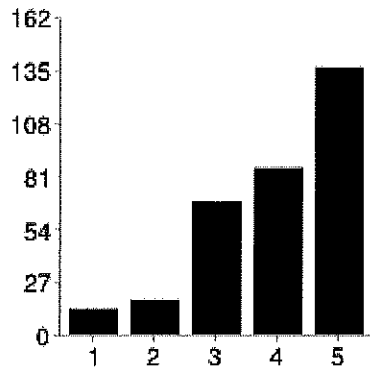
[View all responses](#)[Publish analytics](#)

Summary

Potential TRANSPORTATION Initiatives

Bike Maintenance Station

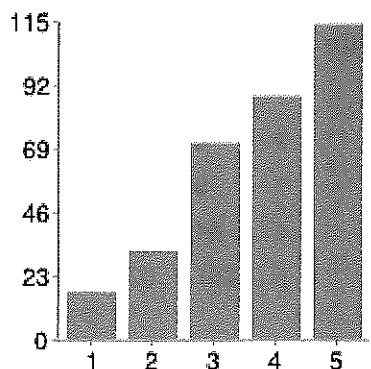
Public Bike Maintenance Station



1	13	4%
2	18	6%
3	68	21%
4	85	26%
5	136	42%

Bike Corral Shelter

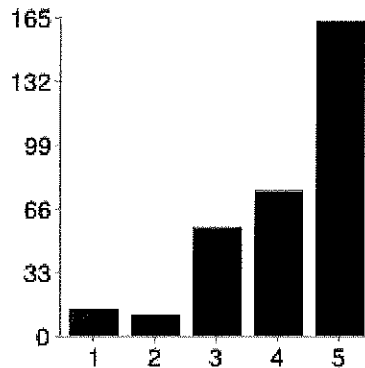
Bike Corral/Parking Shelter



1	17	5%
2	32	10%
3	71	22%
4	88	27%
5	114	35%

Boone Bike Initiative

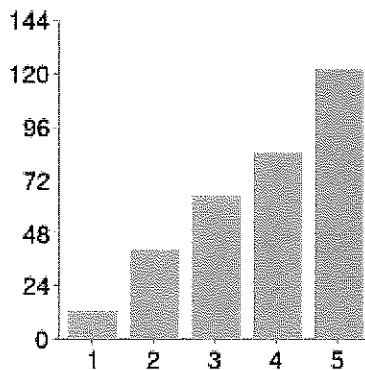
Revive the Boone Bike Initiative



1	14	4%
2	11	3%
3	56	17%
4	75	23%
5	163	50%

Electric Vehicle Charging Stations

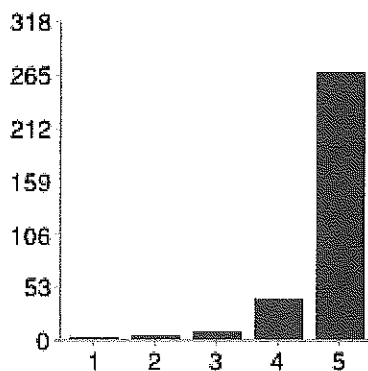
Electric Vehicle Receptacle/Charging Station



1	12	4%
2	40	12%
3	64	20%
4	84	26%
5	122	37%

Greenway Trails

A Greenway corridor from downtown Boone to the Blue Ridge Parkway.

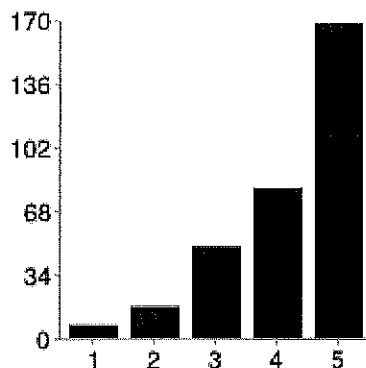


1	3	1%
2	4	1%
3	9	3%
4	41	13%
5	267	82%

Potential ENERGY Initiatives

Solar Bus Stop

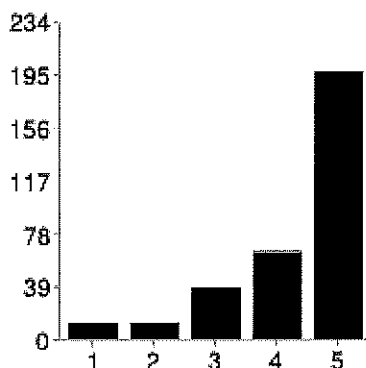
Solar bus stop and energy usage information kiosk



1	7	2%
2	17	5%
3	49	15%
4	80	24%
5	168	51%

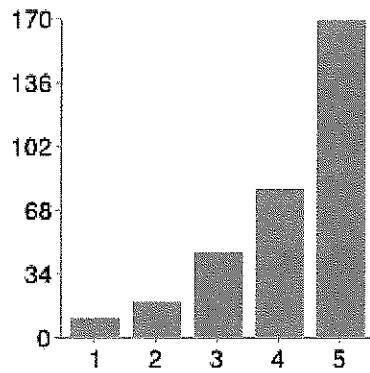
Solar Parking Shelter on Queen St

Solar Covered Parking on Queen St



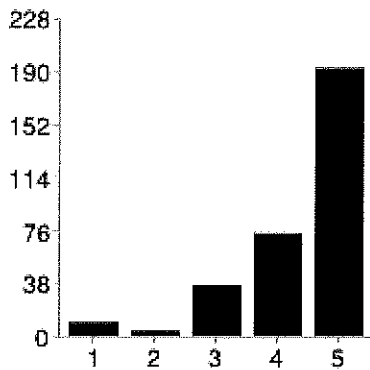
1	12	4%
2	12	4%
3	38	12%
4	64	20%
5	196	60%

Inventory of carbon pollution for Town of Boone to identify highest energy users and savings potential.



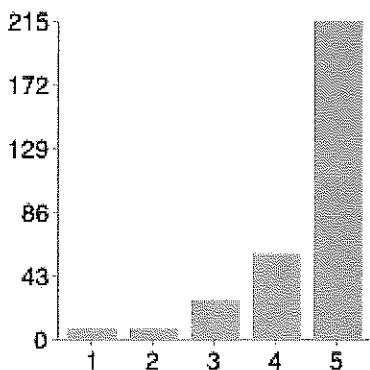
1	10	3%
2	19	6%
3	45	14%
4	79	24%
5	169	52%

On-bill energy improvement financing program.



1	10	3%
2	4	1%
3	37	11%
4	74	23%
5	192	59%

Local incentives for energy efficiency and energy production.

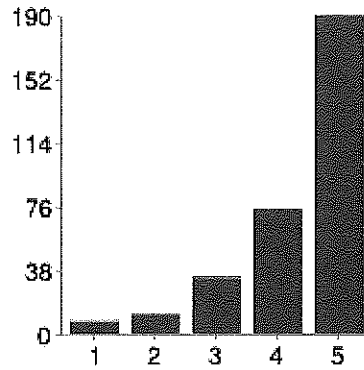


1	7	2%
2	7	2%
3	27	8%
4	58	18%
5	215	66%

Community center and/or community owned renewable energy project.

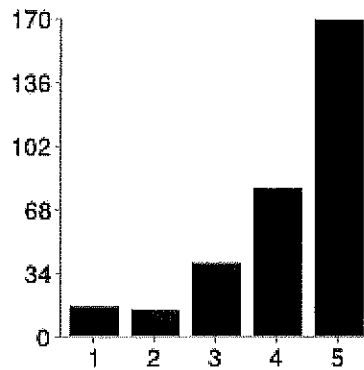
The Town of Boone is currently exploring options to promote sustainable energy use in the community.

New community owned renewable energy project (wind turbine or solar).



1	8	2%
2	12	4%
3	34	10%
4	75	23%
5	190	58%

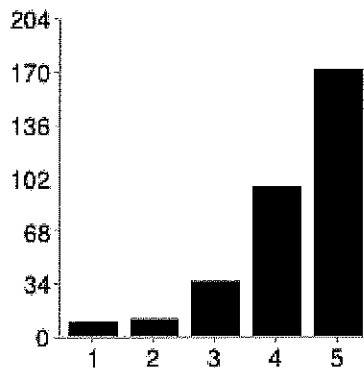
Education & outreach initiative for conservation and/or renewable energy.



1	16	5%
2	14	4%
3	39	12%
4	79	24%
5	169	52%

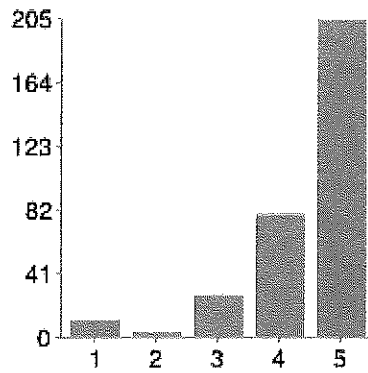
Potential WATER Initiatives

Expand of existing conservation and toilet rebate program.



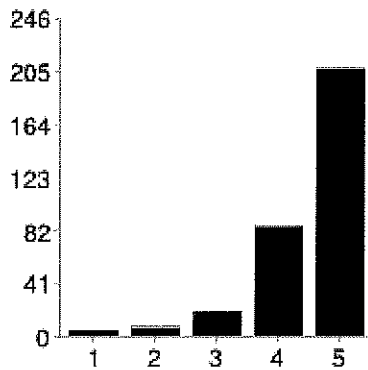
1	9	3%
2	11	3%
3	35	11%
4	96	29%
5	171	52%

Point source pollution study within town of Boone.



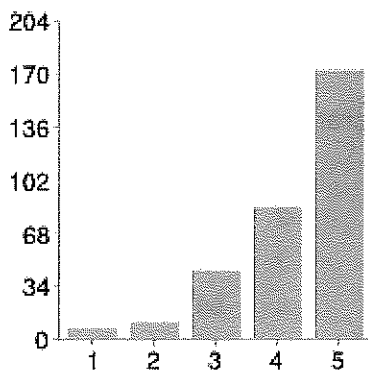
1	11	3%
2	3	1%
3	27	8%
4	79	24%
5	204	62%

Watershed restoration plan in partnership with Watauga County.



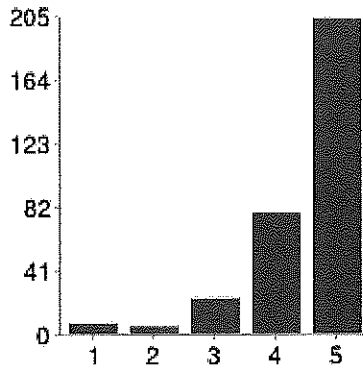
1	5	2%
2	7	2%
3	19	6%
4	85	26%
5	207	63%

Research grants for student/faculty monitoring of local streams and rivers.



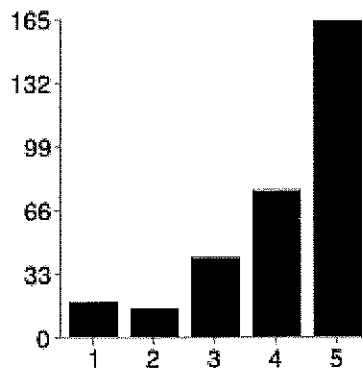
1	7	2%
2	11	3%
3	44	13%
4	85	26%
5	172	53%

Fast permitting process for rainwater/greywater system installation.



1	7	2%
2	5	2%
3	23	7%
4	78	24%
5	203	62%

Integrate low-flow fixture design requirements into Unified Development Ordinance (UDO) for new construction and renovation.

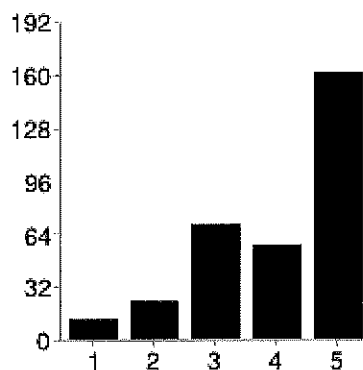


1	18	6%
2	15	5%
3	41	13%
4	76	23%
5	164	50%

Potential FOOD initiatives

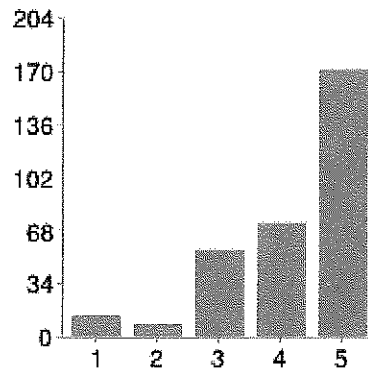
Garden tools lending library

Creation of a gardening tools lending library.



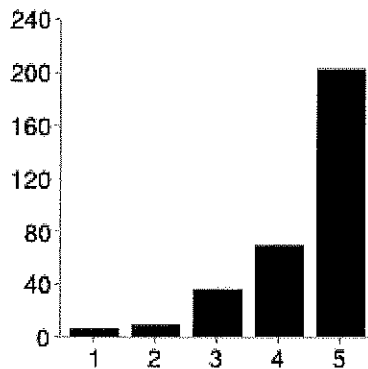
1	12	4%
2	23	7%
3	69	21%
4	57	17%
5	161	49%

Mini-grants to local food and related businesses and organizations for education initiatives on the benefits of local food, issues of food accessibility,

and nutrition.

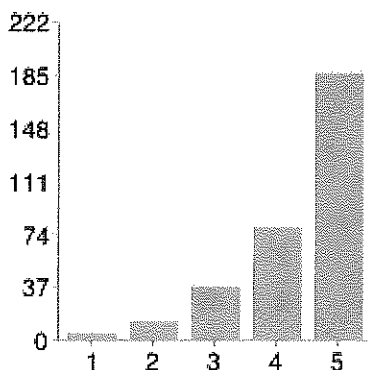
1	13	4%
2	8	2%
3	56	17%
4	73	22%
5	171	52%

A yearly festival to celebrate local foods and our farmers, with workshops for the general public and for businesses to develop skills in the culinary arts, agriculture and value-added food production.



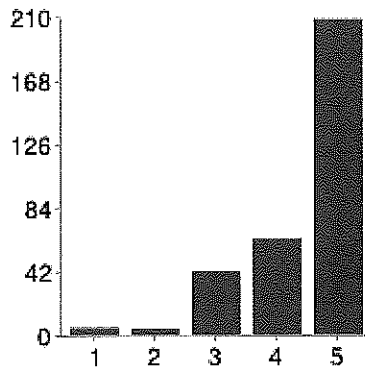
1	6	2%
2	9	3%
3	36	11%
4	69	21%
5	202	62%

Allow the expansion of farmers markets into already existing spaces and/or help create a more “indoor” feel to the current structures.



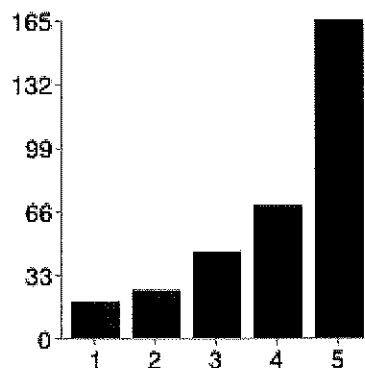
1	5	2%
2	13	4%
3	38	12%
4	79	24%
5	187	57%

Encourage private/public investment in a community center with a focus on winter farmer’s market and other local food initiatives (possible ideas include a commercial kitchen, a cannery, low-income community garden, and a food hub to highlight local entrepreneurs.



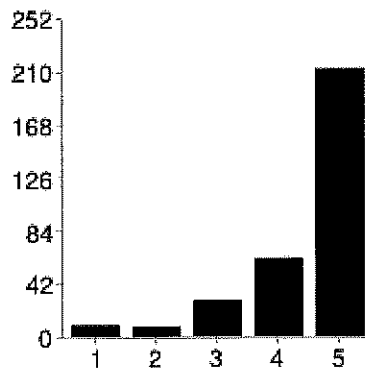
1	5	2%
2	4	1%
3	42	13%
4	64	20%
5	208	64%

Investigate the feasibility of creating a low-cost plastic bag fee to decrease landfill waste and increase the use of multi-use bags.



1	19	6%
2	25	8%
3	45	14%
4	69	21%
5	165	50%

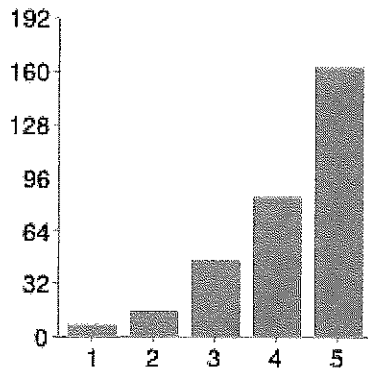
Curbside composting program for restaurants



1	9	3%
2	8	2%
3	29	9%
4	62	19%
5	212	65%

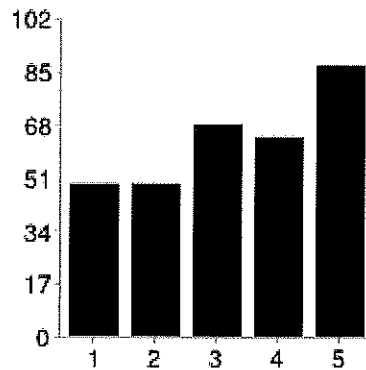
Potential Education Initiatives

Publish local sustainability oriented workshops and events on Town of Boone website. Create a page on Town of Boone website with a calendar of local events and a monthly e-newsletter to give access to programming already occurring around sustainability in identified areas.



1	7	2%
2	15	5%
3	46	14%
4	84	26%
5	162	50%

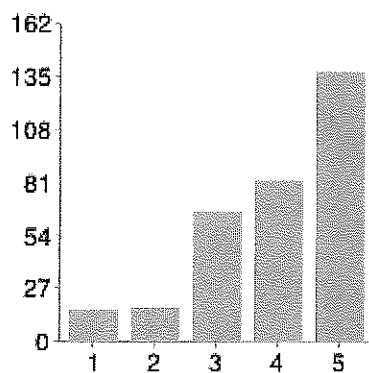
Billboard to display carbon-offsets, renewable energy, and other initiatives.



1	49	15%
2	49	15%
3	68	21%
4	64	20%
5	87	27%

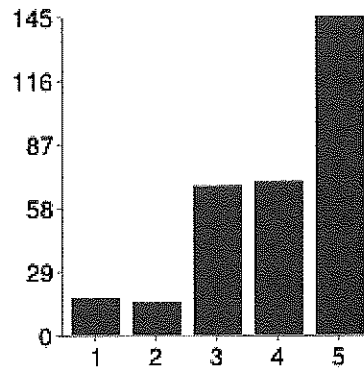
Promotion of sustainable practices on map/ walking tour.

Extend green business certification and promote businesses on map of town. Photo: Sustainable Raleigh Map



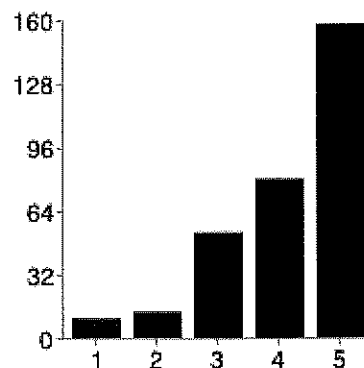
1	16	5%
2	17	5%
3	66	20%
4	82	25%
5	137	42%

Extend living wage certification and promote businesses on map of town.



1	17	5%
2	15	5%
3	68	21%
4	70	21%
5	145	44%

Sustainability internship program- intern for Town of Boone departments to help work on issues & sustainability.



1	10	3%
2	13	4%
3	53	16%
4	80	24%
5	158	48%

And Finally....

If you had to choose just ONE sustainability initiative for Boone to pursue next year, what would it be?

Opportunities for residents who live in apartment buildings and other places where composting is unrealistic to compost and dispose of it (to a community garden?)

A Greenway corridor connecting downtown Boone.

Solar Bus Stop

Any of the bike measures- especially one to incorporate a way to get students/community members second hand, street, Boone appropriate bikes and teach them how to maintain that bike.

expansion of farmers market

the greenway corridor

Curbside composting. Period.

Increase walking and bike paths

Food Education Initiative

The Greenway to the BRP project

Greenway trails

Buy Howard's Knob land from Mr. green. Expand the park that currently exists on top of Howard's Knob. make it better for our community.

water usage

Electric Vehicle Charging downtown

Local Food Festival

Loans or grants for energy retro-fits.

Farmers markets

Mini-grants to local food and related businesses and organizations for education initiatives on the benefits of local food, issues of food accessibility, and nutrition.

More sidewalks. Ever since more have been made i see a lot more people walking and running places.

Any initiative involving food distribution - food is a RIGHT not a privilege!

Expand and improve pedestrian/ bike access to town through bike lanes and Greenway expansion.

Curbside composting fir restaurants .

-

I'd like to see Boone become more bike-friendly. Whether that be through more bike lanes, bicycle awareness campaigns, bike corrals or whatever. I currently don't feel very wanted riding my bike in Boone. I would like that to change.

Expansion and promotion of renewable energy

greenway trails

bring back the boone bike initiative!!!

Bike Maintenance Station

Expand and create new bike paths linking town to parkway and hopefully Blowing Rock!

Anything that encourages increased biking/walking in town rather than driving would be great, like more extensive greenways, bike resources/education. Also, local and sustainable food initiatives are so important too!

Greenway Trail Extension

Expand the Greenway Trail!

Middle Fork Greenway

Any and all of the water initiatives.

PUT IN BIKE LANES!!!!!! You have dropped the ball on this completely!

Indoor farmer's market or expanding the greenway trail to the parkway

Local incentives for energy efficiency is simple and powerful go get it!

Expansion of services to local farmers, gardeners, and producers of food and home value-added products that employ environmentally sustainable techniques. A downtown

local food hub could encompass many of the solutions above; a tool share, cannery, food market, and information hub all in one building.

Bike Lanes!

Encourage policies to allot money for garden coordinators at local schools.

Public composting facilities/education

Low flow design requirement from the city of Boone

integrated food system sustainability projects such as those listed above. don't just choose one of these, because by focusing on the food system in general, all of these ideas come up and work together. some type of community service or financing options would be great to promote participation.

More sidewalks to make town more walker friendly. Sidewalks along Highland, for instance, would make it much less dangerous and more accessible for all the students, faculty and others who live in the many neighborhoods around it.

Composting for restaurants!!

Human Powered Transportation

Take advantage of wind and solar energy more.

Bike Lanes

Howard Street renovation.

Bike shelters and other facilities that encourage bike transportation.

solar energy

On-bill energy savings for energy co-ops, local subsidies for home & business conversion to renewable energy, strategic ways to support business-model conversions for the energy co-ops so they are incentivized to support sustainable energy instead of incentivized to maintain a traditional non-renewable energy-grid.

Greenway trails that go to and from somewhere useful.

For you to be more inclusive and to take advantage of more local sustainability professionals willingness to help. You also should not disban the sustainability taskforcem!

If I had to choose, I'd say that "On-bill energy improvement financing program" may perhaps provide the biggest bang for the buck.

Local incentives for energy efficiency and energy production. i.e. tax, permitting, or other incentives to promote renewable energy systems and efficiency improvements.

Greenway improvements/ connectivity. Look at Boulder, CO, or Portland, OR, or Flagstaff, AZ or the greenway from Williamsburg to Richmond, VA for inspiration. These cities have Greenway Trails that GO SOMEWHERE! Our Greenway does not encourage people to use less transportation because it does not link important commercial, academic, and recreation areas in our town. Currently, it is a destination for folke who wan to exercise (which is great), but it's not an alternate means of getting places around town in a safe, healthy, carbon-free way. We also really need some strict environmental

regulations and protections in the county so that we don't have to sacrifice our beautiful landscape to another development like the Cottages. What a shame that place is! So destructive! We have to begin to approach development by looking at the ways that economy, equity, and environment intersect!

New community owned renewable energy project (wind turbine or solar). That would be really awesome for our local economy and for education - for the public and also Appalachian State students.

Anything related to bicycles

focus on keeping the water sources clean or making them cleaner. WATER WATER WATER! so important

Indoor, year-round Farmers' Market.

Further expanding the greenway! I attended the ribbon cutting this week for the next section at Mystery Hill; once fully connected to Blowing Rock and Boone this will become a huge asset to this community, even more so than it is now. I also believe this hits the heart of what 'mountain' life is all about; enjoying the beautiful outdoors.

Create a more walk-able town through the expansion of the Greenway, better crosswalks, and better education regarding pedestrian traffic.

Local food and nutrition

Year round indoor farmers market open on limited days in winter and spring and daily farmers market in summer and fall

Community gardens

More solar and wind energy

Greenway to brp

Community owned renewable energy project

Greenways

Greenway from downtown to blueridge!

Probably the bike initiative. But I would most support any planning and design initiatives aimed at shifting transportation focus from cars to bicycles and pedestrians.

LOCAL FOOD

Expansion of Greenway Trails

Conservation

Local food production

Extension of Greenway.

the Watershed restoration plan idea, including something to address stormwater runoff, which is a major source of degradation of our waters and causes economic damages to homes, businesses, infrastructure in low lying areas

Residential energy efficiency loan program.

To halt/slow expansion and growth thereby effecting beautification, transportation,

energy, waste, water and food.

Greenway trail connector to downtown Boone

Sustainability internship or long-term position for town of Boone

Compost! They can give it away to people who need it and hospitality house's gardens and Farm Cafe's garden.

Electric car charging stations! I cannot believe there is only the one at Makatos!

Solar water heaters

I would really focus on the local food and farming. People in Boone love this part of the sustainable movement, and I feel like it would be a good starting point to further changes. I also think the compost area is a great idea.

I like the idea of the community space for a winter and perhaps even summer farmers market to make access to local food easier.

On-bill financing

energy efficiency projects and education!

Greenway.

Expand Greenway Trail

Improve and increase walking and biking paths and lanes.

New community owned renewable energy project (wind turbine or solar).

Extending the Greenway

On-bill energy improvement financing program.

Boone Bike Initiative

Indoor, daily farmer's market, with classes to teach people about growing their food.

Better Farmer's Market! Longer hours, better location, better parking. But above all anything that could make it more profitable for the farmers! Incentives for restaurants that shop there on Saturdays. Better shelter, therefore people will come out no matter the weather. Our farmers need to make money and they can't do it only selling wholesale! Market value is the only way to make it worth it.

That is truly a difficult decision - I think our water quality/use should be a top priority because it is something that can be assessed and improved with very little effort (at least for starters). Aside from that, I say we utilize the multitude of resources and man/woman-power provided by the university and create opportunities to install and implement solar energy in every way possible (learning opportunities, etc.)

Greenway..

End single-use plastic bags in Town of Boone

Plastic Bag fee

Community center and community owned renewable energy shelter.

Focus in projects that give locals something we can use right now and daily like the greenway expansion. Do not waste money on studies, research, etc. We are smart

people we do not need studies to tell us what we need. Lets have something to show for the money we spend, something we can use. I am not knocking the studies but think we should focus on real and usable projects in the short term.

Encourage private/public investment in a community center with a focus on winter farmer's market and other local food initiatives (possible ideas include a commercial kitchen, a cannery, low-income community garden, and a food hub to highlight local entrepreneurs.

I believe all of these are wonderful ideas, some of them I am beyond excited about such as the Greenway Trail to the Parkway, I believe many community members will be very excited about this idea. I believe this creates a sense of ease to our everyday hectic lives and individuals can go off on a wonderful long bike ride to escape into our beautiful landscape.

Reclaiming food from restaurants/ASU cafeterias, etc., to feed the hungry (via Hospitality House, Oasis, etc.)

Watershed protection and restoration

Extending and connecting the Greenway to town!!!!

Gardening Tools Lending Library

Electric car charging station.

Green way corridor from Boone to Parkway

So many choices! Curbside composting for restaurants.

Extend the farmers market

More Greenway / Bike commute paths

Initiate or increase collaboration with the Watauga County Economic Development Commission to encourage E.D. initiatives which prioritize the commission's goals as promoting economic development activities which foster environmentally friendly, socially conscious, economically rewarding (for both employer and employee), and culturally appropriate businesses. An added emphasis must be placed on locally based business and entrepreneurship which have a proven, vested interest in the Boone, Watauga, and High Country area and should be preferred in order to sustain the long-term economic vitality of the community.

Extend sidewalks wherever the AppalCart runs - I see people walking in the ditch in the dark and rain along 421 and worry for everyone's safety!

Safe sidewalks and bike paths within downtown city limits at least. A community center would be amazing.

Solar Covered Parking

Year round farmers market like Asheville.

I don't think this could be accomplished in one year, but the thing I would most love to see would be the extension of the greenway to the downtown area (and the blue ridge parkway). It's already hard enough to bike in Boone with all of the hills, but dealing with

traffic makes it even worse. As far as easier to set up initiatives, I really like the public bike maintenance station and the tool-library (could be extended to non-garden tools as well) for their usefulness and immediate potential for impact.

Charging stations

Support a community center!

Food

Winter indoor site for Farmers Market.

Maybe the one that says: Encourage private/public investment in a community center with a focus on winter farmer's market and other local food initiatives (possible ideas include a commercial kitchen, a cannery, low-income community garden, and a food hub to highlight local entrepreneurs.

this one ! Encourage private/public investment in a community center with a focus on winter farmer's market and other local food initiatives (possible ideas include a commercial kitchen, a cannery, low-income community garden, and a food hub to highlight local entrepreneurs.

Greenway expansion!

Community center / community owned renewable energy project

Education & outreach initiative for conservation and/or renewable energy!

So many wonderful and important ideas—how to choose just one? I'd suggest instead looking at several low-investment ones as well as one BIG one. How about car charging station along with sustainability workshops, sustainable map, wage map, and encouraging year-round farmers' market etc.

Get rid of the mixed-use requirement in the UDO to allow more dense student housing close to campus.

potential energy initiatives

greenway bike trail through Boone to BRP

Decrease energy use and CO2 emissions in automobile use. Encourage alternative transportation.

Incentives for residential retrofits, including loans and tax breaks.

Initiatives that involve research/studying/education/conservation of our water resources.

Promotion and incentives for businesses that obtain NC Green Travel recognition.

Additional promotion on the TDA website and workshops for businesses on how to obtain the recognition from the state.

More walkable town! Sidewalks are grossly insufficient in many areas of this town.

Curbside Composting

greenway trails and support local farmers

Alternative energy incentives and promotions plus assistance for low-income families... weatherization, solar, etc.

Local incentives for energy efficiency and energy production

Public green community center with solar or wind, and a weekly winter farmers market space!

Water conservation

Curbside composting for restaurants or lending library for garden tools. Also, the watershed pollution identification and restoration initiative would be fabulous.

Stop the selling water bottles throughout the town and possibly the university.

I really like the idea

Increase recycling/composting

Anything to do with creating more bike lanes!

Greenway Trails

MORE SIDEWALKS!!! I almost get hit by cars speeding everywhere and it is SCARY!!!

Bike lanes. This problem is serious and needs to be addressed aggressively.

Public Utilities/Works Infrastructure. Parking in Boone is a nightmare, Sewer upgrades, storm water.

Greenway and sidewalks throughout the town.

Anything Solar or Hyrdo projects. Keep building more Greenway miles.

Either curbside composting for restaurants or a winter farmer's market (which should be allowed to occupy existing structures, for simplicity and comfort's sake).

Expansion/creation of curbside recycling and composting.

Rainwater recycling would be incredibly efficient and really a blessing to this area. With the amount of rain we get, it's silly to not be using it in our homes. Some sort of program to support this would be idea.

Local incentives for energy efficiency and energy production.

Potential FOOD initiatives OR Waste

Expand farmers market during winter and allow more parking areas.

Extend the greenway so that we can go almost anywhere in town by bicycle/feet safely.

Queen Street Solar Parking Shelter

investment in walking areas including sidewalks, bike paths, greenway, etc.

Winter farmers market, commercial kitchen community center.

Combine these: Encourage private/public investment in a community center with a focus on winter farmer's market and other local food initiatives (possible ideas include a commercial kitchen, a cannery, low-income community garden, and a food hub to highlight local entrepreneurs. New community owned renewable energy project (wind turbine or solar). Part education center, part tourist attraction, part energy source. Space could be used for events or to house a food hub or other sustainability initiatives.

PHOTO: The Green Britian Community Center hosts events for 200, along with a full scale wind turbine containing an observation deck at the top. Since 2004, over 150,000

people have made the 20-story climb to the observation deck.

Curb side composting

Mini grants to local food and related businesses.

Greenway Corridor from downtown to Blueridge Parkway.

Solar array above queen street parking

Reduce the excessive amounts of waste bags used.

Work on extending the Greenway to get more people outdoors.

Motivation for shops & companies to aggressively reduce energy use. Use education and competition to get local businesses to be energy star rated.

Expansion of the greenway.

Creek restoration

Farmers make a inclosed area for market.

Bike Maintenance Station

Working on food Education and more support for the Farmers Market.

GREENWAYS

fee for plastic bag

So many great ideas here! In the next year, I'd love to see plastic bags be taxed or removed from town.

Town wide restaurant composting pickup

Too hard! But I would say either the plastic bag initiative, or one of the water reduction encouragement measures (low-flow requirements on new construction + better incentives for retrofitting existing buildings, especially hotels and restaurants).

Electric vehicle charging stations!! And, because i think this is equally important, I would LOVE to see curbside composting for EVERYONE!!!

Solar

greenway trail - boone to blowing rock! Would love to have this for running and biking sustainable power. Wind and solar.

Greenway expansion

To become a bike friendly community, offering more bike paths to ride for children and adults.

"Community center and/or community owned renewable energy project." This project is large but I think a community center devoted to sustainability and community events is a much-needed community resource that is lacking in Boone. A place for people to gather, learn, grow, and share. A highly visible (by residents, tourists, and students) commitment to long-term sustainable development and practices in Boone. Plus, such a community center could be home to many of the other projects listed on this survey (education, festivals, gardens, tool lending library, Boone Bike Initiative).

I think that the transportation initiatives would be very beneficial in a few ways: 1) it will

decrease the carbon footprint of the town and individuals, 2) decrease air and noise pollution, and 3) it will alleviate traffic problems, promoting more sustainable transportation choices because of increased safety (and general kindness). Several of the options seem like low-cost, high-benefit initiatives and the town could knock several out very quickly. Additionally, once people become conscious of the cost of transportation to the environment and how to improve quality of life, more initiatives could gain more support due to automatic/free education and outreach. Everyone travels, transportation is a good start.

Initiatives to educate the community on bike laws, put bike racks downtown and expand the reach of bike lanes in the community

A community center with all of the above listed possibilities would be nice.

More pedestrian friendly cross walks, more bike friendly. Both would encourage more in-town residents to consider walking. I honestly do not feel safe crossing Blowing Rock Rd in front of campus, or River's St. I would also like to see the Farmer's Market, Boone Jaycee Park, Horn in the West, Daniel Boone Native Gardens, Strawberry Hill Arboretum get an entire makeover.

water conservation

Bike Maintenance Station in downtown area

Anything that can improve the town's usage of alternative energies and/or educational programs to incentivize and encourage using less energy. So the town can use less and be greener about when it does.

Bike lanes, bike paths, more greenway and bike safety around town along with pedestrian walking paths and shortcuts marked and mapped to help folks get out and explore neighborhoods.

alternate energy programs

A close and walking distance farmer's market. I'd be much more willing to buy farmer's market food if I could get to it easily.

Please tell us your thoughts, ideas, suggestions etc in the space below.

Traffic flow/transportation

Community centers offer an opportunity for all ages to recreate & educate. Together we can move forward w/ our goals of sustainability!

All of these ideas are so exciting. We can do them all. I would be/am so proud to live in such a place...

I love the efforts by the county to shred plant waste for mulch. I'd like to see it divided into leaf waste (for garden compost), small wood waste (for mulch), and large hardwood waste (for use as firewood).

We should start from the ground, or underground, up. Let's fix the sewer pipes in Boone. We could improve the power lines or put them under ground when addressing the

crumbling sewer pipes. Let's get some more lights on Kings Street (it's dangerously dark!). Let's give the people back that other lane on Howard Street and take imminent domain on the stretches where folks would not let us put a sidewalk before. No one uses that "sidewalk" properly anyway. It's totally stupid! We also need to build all our parking lots up...at least 2 stories, if not three. We could use some of this money to take back our parking meters. If Boone owned and operated the meters we would have enough money in a year to build up the decks and so on and so forth. And finally, let's enforce downtown Boone landowners to either improve their properties so that they can be rented, or condemn them. The town looks half abandoned!! It's embarrassing. Thanks for asking.

EDUCATION TOB website should be an up-to-date source of information on Town related information. It should also provide links to other non-government initiatives or events within the town that is accurate and representative of all efforts within the community. Its identity should be clear as a site for the government role of the TOB. If it is to serve as a public relations site for the town and the area it should do so by having links to ongoing postings of other organizations rather than trying to represent them directly. Our website was improved upon but has a long way to go in representing the latest and greatest ways to provide information to community residents.

Please, please make Boone easier for bikers. This town is small and it wouldn't be hard to make it bike friendly (like Carrboro). Anything to encourage people to drive less. Think of how much less congested 105/321 intersection would be if we had less cars constantly going around! Or even if App made it more appealing for students to bike!

Bolivia just passed the "Law of Mother Earth" which gives rights to our planet as a living system. It would be a step in the right direction if communities could draft their own laws that reflect what Bolivia has done. I believe this is something we should do in Boone. Perhaps one day the state and country could also back these laws. Here is a link to the article. <https://www.minds.com/blog/view/370619333145006080/bolivia-passes-law-of-mother-earth-which-gives-rights-to-our-planet-as-a-living-system>

This survey detailed some great initiatives with many potential projects which can certainly help improve the sustainability of Boone. But the 'highly approve'/'highly disapprove' options did not exactly allow the survey-taker to express exact sentiments for the individual project. For example, while I certainly approve of bicycle maintenance stations, I do not believe that placing these as a high priority on the town's list will do a great deal to enhance the sustainability of the community. While they will certainly improve quality of life and provide a service to certain residents it does not necessarily address the basics of sustainability. Also, I believe a greater emphasis must be placed on the local built environment and promoting infill growth and walkability of existing neighborhoods. While I completely understand that property owners' rights to develop their property is an extremely strong right that they have to exercise, codification and policy can help to promote new urbanism type growth which doesn't promote urban sprawl. Also, coordination with the Watauga County Planning Officials can help to

mitigate this impractical pattern of development. The suggestions focusing around water resources are a great starting point and contain a nice foundation for promoting sustainability.

Transportation issues including the legality of human powered transportation and promotion of sustainable transportation options including the infrastructure for bike lanes, sidewalks, appalcarts, and other methods of alternative transportation

Would like to see a bigger effort to educate folks on the fact that we CAN recycle all forms of plastic in this county at the Watauga service center (including hard plastics aka 3-7). Many folks, even more sustainably-minded ones, do not know this, and I think it's vital to keeping our rivers and oceans clean. Also, start recycling process for plastic BAGS, like Lowes Hardware offers (and encourage to recycle not just plastic grocery bags, but plastic bag wrap on food products and other packaging).

Make sure this survey goes beyond the "sustainably minded" Boonies! We need understand the opinions of those who might be adverse to sustainability to keep the movement moving forward.

We should build a new recreational facility that is energy efficient as possible, unlike the current pool complex that runs multiple heaters all winter long in an attempt to keep an uninsulated, metal building of mostly sliding glass doors swelteringly hot.

Also look into financing and green investments for the town. Many towns and cities have chosen to divest their monies out of coal/fossil fuels, etc. (ie Seattle <http://mayormcinn.seattle.gov/next-steps-on-fossil-fuel-divestment/>) There is an on-campus club Fossil Free App State working on a campaign to get the university to either divest or create positive sustainable investments, and we would love to work with you! Contact: Olivia Sanders and other officers at fossilfreeappstate@gmail.com

Not a big fan of the plastic bag initiative alone. If there were bring-your-own-bag bags being given out for free then it might be more feasible. As it is, people would just get mad that they have to pay for their plastic bags, whatever the cost.

Not anything to crowd already crowded public spaces such as solar panels over King Street parking. What is the cost vs. benefit of this? How many years of solar energy in this cloudy region will it take to offset the resources spent to construct solar panel parking awning and other similar structures? Electric Vehicle chargers - seems like would be waste considering low number of rechargeable cars, and don't think this installation would increase chance of a user to purchase a car. I like the community based ideas - a real change/movement will sprout from connection within the community - cooperation and idea spread. greenway trails - how many habitats will this fragment?

-

More community gardens.

Great job!

More greenways!!!!!!!!!!

I believe the 11th tenet should be beautification. Through all of our new construction and

retro- and upfits, we need to keep a keen eye on making our town beautiful. Our overhead powerlines are hideous. They block so many gorgeous views of our mountain viewshed. Daylighting Boone Creek. All. The. Way. Through. Town. Wind turbine on Howard's Knob, which I realize is the county's land but still a feasible project that appears to be attributed to the TOB. Create a low-rise ordinance to prevent gargantuan buildings from altering the viewshed, or at least allow TOB to be able to nix a project due to its viewshed impact, including App State. Separate biking paths from roadways. People have too many other things to pay attention to these days. We need to up the safety game! Have the TOB make a commitment to go carbon neutral by X date. Cover buildings in PV. Make Howard Street a walkable pathway with green and communal space from Appalachian Street to Water Street. Make business owners that have dilapidated buildings pay a fine for unimproved spaces, and earmark that money for TOB beautification projects ONLY. I'm not a fan of giving money to research project b/c too often the research doesn't get built upon nor does it see the light of day (get shared). This is a comment about one of the prior initiatives in the survey. Create a "craft" center that is co-owned by the TOB and all businesses that choose to be located within it's walls. This craft center would be a LEED certified building with LOTS of natural light and provide a view to nature. It would house the farmers market and other local craft vendors and be open all year long. Connect sidewalks ALL THROUGH town. Thank you for allowing us the opportunity to provide feedback about the place we call home! All statements are rooted in love of humanity and our shared environment. Thank you!

PUT IN BIKE LANES!

There was no mention of tailgating.

Grants for renewable energy and efficiency improvements to be made on local downtown Boone business buildings. Rooftop community gardens. Indoor community greenhouse facility.

1) Recycling (curb side). Larger bins. Boone now picks up all types of recycling (they recently added aluminum, plastics #3-6). The blue bins are too small. We now need larger recycle bins and smaller trash bins. 2) I believe you got one of the transportation initiative wrong. Before we build bike maintenance stations and bike shelters we need bike lanes on the road or a bike corridor/greenway that serves/weaves the whole town not just a section. Boone is not very "biker friendly" at this time. 3) Recreation is major reason folks visit our area and is a sustainability concept. Can we include more recreating areas in Boone to serve locals and visitors? I.E. Hiking trails in Town to Howards Knob, etc, a Frisbee golf course, a tubing trail on the New river, a network of trails (bike and hiking) to link all sides of town (interconnection). Maybe partner with other groups to work on this???

Advertise where to get money from aluminum cans, other recyclables.

The most important thing to me is to improve the water infrastructure so that there isn't a need for another intake on the New River. Ending leaks in the supply of existing water

systems, implementing effective water conservation efforts for all connected to the water system and strongly encouraging less water use by subscribers to the system to make the best use of the current water supply. No water for non-residents unless the ETJ is brought back where controls can be placed on growth.

I believe these initiatives will also provide economic advantage to the community(jobs, etc...)

I think rain water collection is going to be the way forward to help solve Boone's water issues.

The bike initiatives look great. They all need to be paired with making both bike and pedestrian use in/around Boone re roads, paths more safe and enjoyable, and to find ways of further reducing autos (possibly like ASU limiting cars to older students; expanding/incentivizing Appalcart and PART bus use). Tuition/fees break for ASU students who leave cars behind? Proactive strategies desperately needed for outreach and sustainable community conversations to help address/bridge political, socioeconomic, generational, "town-gown," and "native-non-native" divides in the community. A facilitated "our common future" series? Figure out ways to include unemployed and homeless populations in dreaming up and implementing initiatives. Investigate/propose cooperative businesses.

I really like the idea of having the farmer's market available all year. A large part of our individual footprint originates in our diets and I'd love to see the local food movement continue to gain momentum.

The town could really make a name for itself as a green travel destination, which would help our local economy! We need to have regulations in place that protect the natural beauty of our community. I didn't see any initiatives for purchasing green space for the sake of having green space in our community, for example. Again, Boulder, CO has done this with an open space tax. Residents and tourists pay it because they love the natural beauty of their community and they understand that their tourism economy DEPENDS on protecting that beauty! That's why we have tourists and the students at App who fuel out local economy in so many ways, and it is so frustrating that local developers don't seem to understand that if they make Boone ugly, we will not be a big tourist destination, and we will miss the opportunity to brand our town as a sustainable tourist destination and as a healthy, caring community that attracts students and faculty to the university! It's for our children that we need to take this seriously, for the land and the people.

The bike ideas are good but I think the first step is providing a more bike-friendly environment through bike lanes and paths and some driver education.

Bike Lanes!

Town of Boone can save electricity by not having so many streetlights.

Some of the things mentioned here are already underway. It would be great to see the Town of Boone supporting these already existing initiatives. Thanks for putting this

survey together! Great work!

Local food and helping our farms is very important. Finding places for farmers markets that are affordable for local farmers and stay dedicated to our farmers is crucial. Greenways are a great way to get people into our environment. I hope that we continue on a sustainable path. We need to catch up!

One thought, concerning the billboard: I think a really cool place for such a thing would be above the Footsloggers raft shop. They have a very visible rooftop space that, at the moment, acts simply as a stage for a brick wall and ventilation/exhaust systems. I think it would give a cool urban appeal if we had a billboard in that location, which also happens to be very central.

The bike corral and maintenance station is a nice idea, but we really need to address the lack of bike lanes before going there. Also, surely there are communities who capture and filter rainwater for drinking. Has this been explored?

Appalcart is great. Boone is a horrible place to ride bicycles. The recent addition of sidewalks has been fantastic.

We are a green business that has been trying to do business in the town of Boone for two years! We have tried to get help from council members and the current mayor when he was a council member. We rent goats for weed control, but due to the livestock ordinance have been denied the clearance to rent to customers within the town limits. The goats are only there for a short time and make no noise nor do they cause any pollution. We would like to speak to someone about a way to make this possible in 2015. We are a sustainable business and feel that maybe the focus and funds of this initiative should be focused on ways to increase tourism and help businesses survive.

Wide spread, creative use of public, commercial and ASU spaces (greenway, parks, street medians, open spaces, lawns at public & commercial buildings, etc) for planting & growing edibles openly available for anyone. Use public dollars to create initiatives in public space; ASU dollars for ASU spaces; some kind of grant mechanism for private commercial property owners to do the same. "Bee Safe" Campaign particularly toward lawn care companies & their residential & commercial customers to shift mindsets around what a beautiful lawn should look like. Include real dangers of weed eradication and shifting notion to reality that a beautiful lawn is one full of "weeds" clovers, and other natural habitats for pollinators and other critters.

Stop painting stripes on roads for bikes. I'm a cyclist, and they are dangerous. We need to construct bike paths that are physically separated from the road.

I installed (direct) solar water heaters, and they work more than expected. Working on solar air heaters (all low tech, but easy to build and install by oneself)

Let's buy the land above Boone and make a great green space overlooking town. Land is for sale now! Allow bouldering, play and fun at the park already there- that not a lot of folks visit. Now is our chance. We missed the opportunity 15 years ago let's fix that problem now.

Don't get so carried away with spending money on energy efficiency that you spend more money than you get back. Additionally, try to make an effort to reach out to the county for sustainability options. There is a lot of untapped knowledge from farmers that have had to live simply for generations. You would be surprised... Simple is better!

I would like to see the Town quit spending so much of our tax money on the Town Attorney, and fighting with the County, ASU, and Developers. The money saved could be spent on the above items or improving Howard Street. I think the Town needs to spend less time on drafting new regulations to limit development they don't want. The time would be better spent developing initiatives for the type of development they want. Outreach seems the most important to me to create a foundation for all of the other projects to be built off of. The more people involved, the more likely the projects will succeed!

Community gardens, monthly clean-ups and volunteer days, tons of King at business owners also live downtown — ask them!!

I hope one day we might get a YMCA.

everything on this survey is a fantastic idea, ecologically, but also economically. Personally, i believe any of these ideas could become a very successful business with the right business plan.

Adequate Downtown parking! Instead of building a solar sheltered parking area on Queen St. which does nothing to elevate the lack of parking, maybe the focus should be on adding a solar sheltered parking DECK which would provide the Downtown area with more parking spaces. Just a thought.

We need to become an earth friendly community. We should offer more pesticide free food and a more chemical free environment.

safe ways for non-motorized transportation,

This isn't on the list and I know I am jumping in maybe too late to make a new suggestions, but....I think it would be great if we had park and ride parking lots in strategic areas of the county outside of downtown, that the appalcart would pick people up from. So that you could drive only a few minutes from home to a semi-central location out in the county and get picked up by the bus and take the bus around town (or to a central location in town where you can jump on a different bus).

Watauga County needs to do everything it can to be self sufficient.

Most of the items in your survey could/should be done by private businesses, groups and individuals. Quit forcing the taxpayers to pay for your hippy fantasies.

As a runner, I really like the idea of extending the Greenway and I like the idea of community gardens. Everything else that I was asked to rate above should not be paid for with tax dollars. Private investments should be how these ideas germinate, and if they don't, it's because the interest isn't there.

Local incentives for energy efficiency and energy production. OR Community Center

While I love many of the projects, if teaching about energy/energy-use to college freshman has taught me anything, it is that they are thoroughly uninformed, even misinformed at times, about their impacts on the environment through their use of energy. Education is ESSENTIAL to moving forward. We can have all the pretty RE projects you could think of, but until people understand WHY they are important, and HOW they will help foster a cleaner, greener, more sustainable community, I don't feel that their effect will be that great. Other than leading many to complain about the "waste of money" on some solar panels, or bike stations, etc.

No mention of native plant initiatives. This is critical to keeping habitats, preventing erosion and to saving energy costs (fewer lawns and more native plantings = less mowing). Thanks for doing the survey. Cool ideas!

Improvements to bus routes - expanded bus routes would be great. Ban on bottled water? Enhancing beekeeping infrastructure to support new beekeepers? Banning certain pesticides or pesticide forms from use in the area? Building up a farm land trust so that people can afford to farm land that's here without paying developer's land prices. Queen street solar canopy sounds like a great idea, same with the bus stops. Great stuff, best of luck y'all!!

A park for kids near King Street.

Would love to see existing stream beds restored and integrated into the beauty and active lifestyle of the town rather than diverted into storm drains. For example, incorporating open streams and green-space with a Greenway Trail rather than underground storm system (like from Boone Mall, past McDonalds all the way to campus on 321).

More opportunities to access the farmers market, including a small winter market.

Don't just choose projects or systems that will get good press for the Town of Boone, or visually look good for tourists. Choose projects that you think would be the best for the town of Boone, its residents, and the environment. Focus more funding on the Farmer's Market (i.e. staying open later, better parking, better location, and above all making it more profitable for the farmers!). Bike lanes and biker safety are very important! Making biking longer distances (i.e. on 421 or 321) safer, so people aren't afraid that they'll be hit by cars (it happens all the time!) Just don't green-wash everything, throw PV panels up in high-traffic places, get an electric car station just to say you have one. How many people in this town actually have electric cars anyways? More farm to school initiatives with elementary, middle, and high schools. Involve the ASU students.

As you can see by my answers, I believe that the majority of these initiatives should be pursued. Anything that helps our community become better stewards of our resources is worth consideration and action.

Food and agricultural land issues are most important to me.

Watauga county and Boone is doing well with beginning to incorporate wind and solar power energy. Keep it up!!! I would really like to see more of it in town and give locals

discounts and incentives for using these.

Storm water runoff is a huge issue that needs to be addressed. Flood events in the past few years have been dangerous and resulted in excessive erosion largely due to the overly culverted and constrained Boone Creek.

I think it is awesome that we are finally making changes towards the sustainability movement!

Bike parking (simple metal frames)

Increased recycling education

Soup kitchens and pantries

The greenway trail and year round farmers market would be the most visible and practical of the initiatives in my opinion. The greenway could decrease parking congestion downtown

I'm always amazed at the amount of litter along our roadways and waterways. Much of it could be recycled. Maybe an anti litter campaign. Also more recycle barrels in parks and green ways.

I have nothing against bicycle travel, but people riding need to obey the same traffic laws as others. There needs to be more policing of this problem that bicyclists do not obey traffic laws.

Since the sustainability movement relies on education to spread, whichever ones Boone decides to go with should be highly advertised and should actually make a difference. Seeing small changes here and there really get to people.

An important aspect of this is to make it inclusive - too much in Watauga County I see the "tree-huggers vs. locals" dynamic. Education in the schools, community outreach, and non-partisan communication that addresses how these initiatives benefit every citizen in the community are important to gain long-term support.

More education for the entire public...young and old, so all can understand fully how we as a community can save the beauty of our beautiful mountain town , county and region ..

Conservation initiatives for energy, water, food need to be promoted widely. Town of Boone needs to get over its inactivity. We have been waiting for example for Howard Street improvements for 20 years. We need something people can see in the way of imagination and creativity. Too many run down lots/buildings along Blowing Rock Road and Howard St. tell people the town is stagnant.

Making our town more walking and bike friendly will also improve the health and sustainability of our residents. See previous answer about neighborhood walking paths and shortcuts.

Earlier I said that I support electric vehicle charging stations, but that is only the case if renewable energy is expanded. EVs only switch from using oil to coal, and that is not enough.

Teaching the old guys new permaculture stuff, like Gorilla's gardening.

Re: publicizing education initiatives, relying on town's website is insufficient--need to make it easier for people to see. In addition to e-newsletter, have a dedicated facebook page and be sure to publicize on Todd's calendar, newspapers, etc.

Please find another spot for recycling besides the Daniel Boone Native Garden parking lot. It is very difficult to access on Saturday mornings, when I typically take out my garbage due to my work schedule.

We need more green space that is readily accessible from downtown and more green space to connect the whole town together. A greenway from downtown to the existing one would be great. Also, the current greenway seems to have a lot of space that is heavily managed, i.e. just a big swath of grass... Can there not just be trees there

I work for WAMY Community Action, Inc. and we gets calls almost every day from folks who need their homes weatherized, but do not qualify for our grant program. We do offer energy audits to anyone based on a sliding scale, but many cannot afford to get the work done.

Boone isn't a bike friendly town. If we are going to invest in bike promotion we should increase bike lanes, bike safety and walkability first.

If we can choose the source of the electricity, such as coal, nuclear, solar, wind, etc. (since the cost is different from each other, say, if someone choose 30% as coal, 40% as solar, 30% as wind, the person pay accordingly and visibly supports renewable energy movement, or someone who cannot afford to high cost energy can choose low cost combination.) , and show the statistics, we will see the affordability of town. Encouragement such as tax reduction often lead unfair movement of tax money.

I think the festival would be a good start to make people aware of the issues and what Boone can do to counter these issues. This would also be a great opportunity to emphasize local farmers and community members who are trying to make changes and make Boone sustainable.

Many good ideas shared here.

I learned a little about what's ailing the world through the Sustainable Development program here at App. I don't claim to have all the answers but I'm led to believe that the root of all solutions is based in the agricultural system. By addressing the means by which an individual and a town's food is procured, you address all of the Tenets of Sustainability included above. The amount of resources it takes to provide food for a community has increased drastically over the last century and that is the major difference between self-reliant communities of the past and those we have now. I don't mean we need to revert to turn of the century style agriculture, just that since then, the amount of water, energy (primarily from fossil fuels), pollutants, and transport time needed to complete the agricultural cycle has increased. The sustainability crisis arises from this increase. By reducing the inputs needed and the physical distance between the production of food and the people who will eat it, we can reverse this trend, revive

the better parts of community life from the past, while maintaining the advances in technology and civil rights our generation prides itself on. I suggest and will work for any systematic readjustment of Boone's food network that favors small-scale, organic methods of agriculture. The town provided composts bins, which is excellent- what about recycled rain barrels? More partnership with the ag center to incentivize teachings on sustainable farming techniques. More opportunities like the farmers market to make a living from sustainable agriculture. Provisions for urban and rooftop agriculture in the zoning ordinances. Partner projects between appropriate tech retrofit businesses and gardeners for whole house/yard renovations. Thank you for providing this survey, I look forward to seeing what's going on and would love to help how I can. I'm glad the town is looking at these issues seriously and I encourage you to look at these problems as a connected whole instead of individual obstacles to achieve.

More pedestrian friendly cross walks, more bike friendly. Both would encourage more in-town residents to consider walking. I honestly do not feel safe crossing Blowing Rock Rd in front of campus, or River's St. I would also like to see the Farmer's Market, Boone Jaycee Park, Horn in the West, Daniel Boone Native Gardens, Strawberry Hill Arboretum get an entire makeover.

Make the Appalcart bus fleet 100% hybrid buses.

Reduce / stop wasteful spending on "research" and "initiatives" ... Either do or don't do. Encourage more public support of these "initiatives" - there's no reason for everyone to pay for projects used by few... Solar parking roof??? Solar bus stops?? Those who bike are already equipped and relatively few (outside of college kids) - they can buy cell phones and laptops, let them fix their own bikes. Stop trying to make Boone fit into some metro-fantasy.

I think that it is important for the town to quit dressing the part of a sustainable community and start acting on it. The university takes up much of the town's priorities, and it is not fair for Boone to label itself as a progressive community when the priorities do not reflect that.

Elkland Art Center is seeking to develop a local food/sustainability puppet show. Let's work together!

And finally finally, the demographics

Name

Anon

Yvonne

Molly Law

Jeanne Supin

Dan Stevenson
Catherine Wilson
Abbey Dahl
Greg Young
Matt
Amber Johnson
Christina Bailey
Charlie Mize
sara
Jasyn klmaborowski
Becky
John Kidda
Amy Stenzel
Kathryn van Werkhoven
Deborah Ientz
Mellow Mushroom
Amy Adams
Anna
K. Miller
Annika
anonymous - TOB full-time working resident
Celina Szymanski
Jason Burch
Lynnwood Brown
Watauga Native
Maria Norris
Heather Bray
Allison Rollans
Christmas Baby
McLovin
Jen Westerman
Michelle
Boone Resident and Taxpayer
Molly russell
Ellen Arnold
Hallie

Russell Bomer
County resident
Wendy Lemus
Jacob Crigler
Jane Doe
Jeff Savage
Brian Crutchfield
Bonnie Walker
Theo Saslow
Kara Dodson
David Brewer
Teresa Buckwalter
T. Houston
Kayleigh Crews
Rory McIlmoil
Tim
Todd
Jennifer Mackey
Malinda Wallace
Michelle Johnson
james decker
Mary Mary mary
John
Cameron Garrison
Kevin J. Gamble
oak grove area
Jenny
Lauren Crabtree
tommy
Troy Huff
Rob Danford
Craig Weaver
S Fall
Lee Ball
Espinosa
Carrie Morgan

carol

jon wine

John Bryant O'Neal III

Ben Todys

Pierre de St. Croix

Jaroszewski

patrick richardson

Sean Dunlap

no name

TG

maggie russell

Kristy Hackler

Christina May

Anonymous

Devon Tuttle

scott davidson

Anonymous

Bill Moore

Ray Edwards

Dr. Susan Slingland

Renee Shulman

Conni Pelley

David

Scott Warren

Pam Williamson

Faye Kelley

Lexie Danner

Ken Murray

Myhalyk

Ester

Eri Ohashi

Lauren

Beth Jacquot

Lindsay Miller

Jamie Goodman

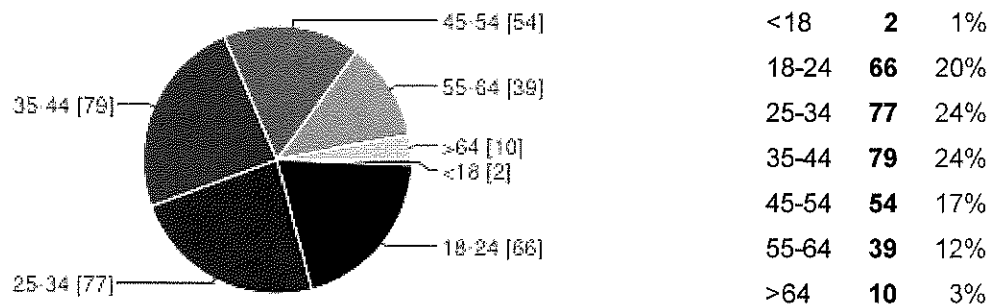
Renee Boughman

Melissa
Janet Pepin
Roy Blumenfeld
Student Appropriate Technology
Ben Loomis
Heather Szaro
Laurie Kirkpatrick
Meg Pferdekamper
Alix Sotomayor
art
Meredith Anders
Saylors
Katie Dickerson
Linda Toth
M. Burton
Olivia Sanders
Robin Hale
Josh Kelley
grace plummer
Karen German
Lindsey
Brittany Means
Ms
Tori Cox
anonymous
LHenson
Velva Bost
Marilyn Laxton
Georgie Donovan
terry Henry
Brooke Hardin
Jessica
Beth Damell
Karen brown
Kathie Billing
Maya Hutchins

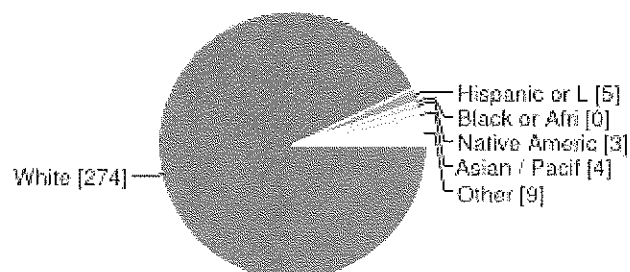
Alaina Doyle
Crystal Simmons :)
Bill Ireland
Beverly womack
Brent Simmons
Melissa Soto
ANONYMOUS
Cassie Pennington
Brenda Brittain
Karin Perk
Gabe Talavera
Michael Goopta
Courtney Baines Smith
Thomas
Alan Needle
anon
Joel Camper
Cathy Kratt
Jen Jones
Jordan Duke
Leila Jackson
Corrie Malone
m,.l
Amy
Judy Wagner
Mark Johnson
Morgan Harris
Colin Bradley
Katlyn Zulinke
Sadikshya
Tucker Deal
kaki comer
jack
planning student
Nicole Hiegl
Sarah McBryde

meagan Brown
 Jennifer Van Gilder
 Samantha
 Ben Hill
 laura duncan
 Susan Tate
 kim marland
 sarah marlowe
 Cathy Cole
 Nicole Kinnamon
 adam
 Jennifer
 Allie
 F Davis
 Jonathan Kelley
 Nevin Ebaugh
 Kate Cahow

Age



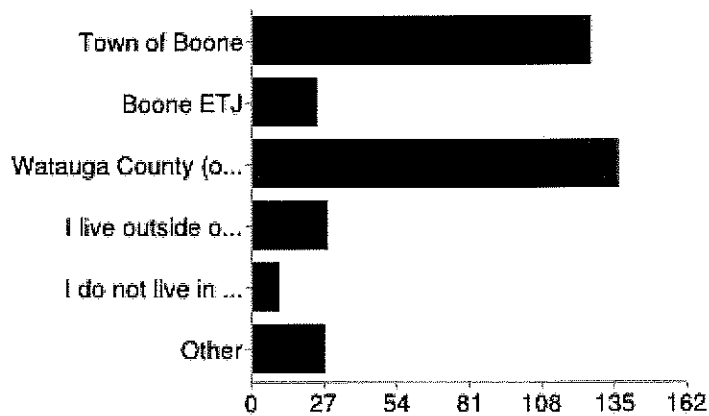
Ethnicity origin (or Race): Please specify your ethnicity.



White **274** 84%

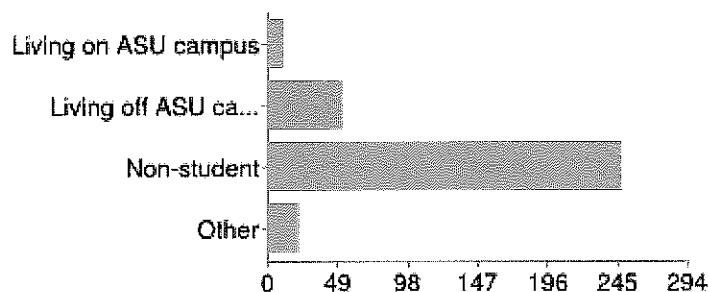
Hispanic or Latino	5	2%
Black or African American	0	0%
Native American or American Indian	3	1%
Asian / Pacific Islander	4	1%
Other	9	3%

I live in.....



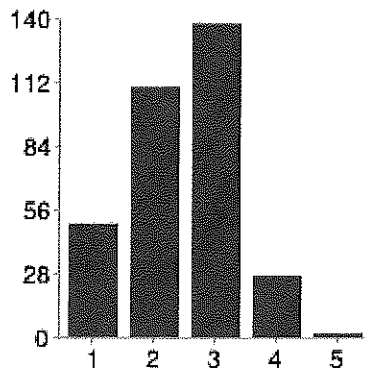
Town of Boone	126	39%
Boone ETJ	24	7%
Watauga County (outside the Boone etj)	136	42%
I live outside of Boone, but I own property or a business within the Town of Boone	28	9%
I do not live in Boone, but I am visitor.	10	3%
Other	27	8%

Are you a student...



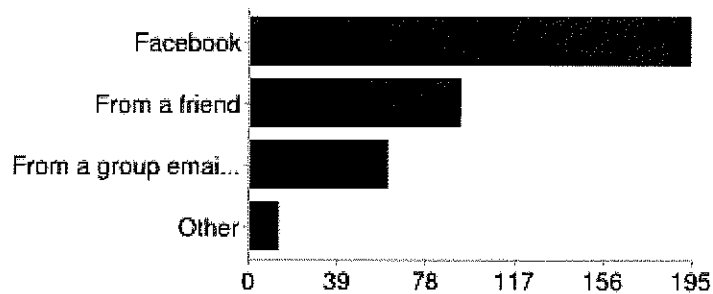
Living on ASU campus	10	3%
Living off ASU campus	52	16%
Non-student	247	76%
Other	21	6%

How would you rate current Boone sustainability initiatives?



1	50	15%
2	110	34%
3	138	42%
4	27	8%
5	2	1%

How did you hear about this survey?



Facebook	194	59%
From a friend	93	28%
From a group email list	61	19%
Other	13	4%

Would you like us to include you in our email list about future Town of Boone sustainability initiatives?

marilynaxton@gmail.com

stephlangston10@gmail.com

karamdodson@gmail.com

justmindyw@gmail.com

tori.cox@gmail.com

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wclemus@gmail.com

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perkka@appstate.edu
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graceplummer@hotmail.com

acrollans@gmail.com

tkbuckwalter@gmail.com

Nope. I prefer my representatives to get out there and speak. Thanks.

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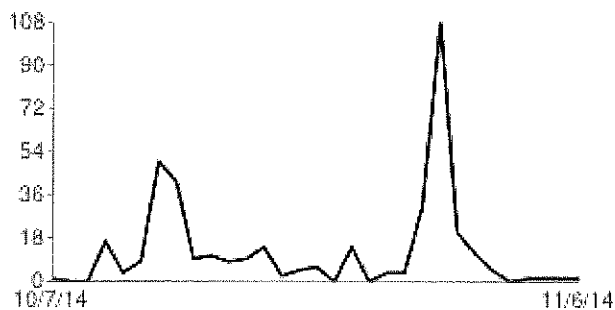
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pierredestcroix@gmail.com
brookelhardin@gmail.com
connipelley@gmail.com
kiddaj@gmail.com
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Mmaddenb@yahoo.com
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Number of daily responses



SUSTAINABLE ENERGY PLAN

BOULDER COUNTY
CONSORTIUM OF CITIES



Energy Strategy Task Force



SUSTAINABLE ENERGY PLAN

Energy Strategy Task Force Members

Elected Official or Designee from Cities, Towns and Boulder County
Will Toor, Boulder County
Mark Ruzzin, City of Boulder (former)
Kevin Stanbridge, City and County of Broomfield
Amy Gage, Town of Jamestown
Frank Phillips, City of Lafayette
Doug Brown, City of Longmont (former)
Dave Clabots, City of Louisville
Laura Farris, Town of Nederland
Lisa Skumatz, Town of Superior

Environmental Representatives

Tom Plant and Amy Ellsworth Center for Resource Conservation (former)
Eric Stonebraker, Indian Peaks Group of the Sierra Club
Dave Newport, University of Colorado Environmental Center, Boulder
Mo Tabrizi, University of Colorado Facilities Mgmt, Energy Conservation

Representatives from Business Community

Tom Dean, CU Leeds School of Business, Boulder
John Hackman, Five Winds International, Superior
Chris Lonergan, Xilinx, Longmont
Jim Pribyl, Level 3 Communications, Broomfield

Representatives from Community-at-Large

Hunter Lovins, Natural Capitalism Solutions, El Dorado Springs/Longmont
Kristin Shewfelt, Colorado E-Star, Lafayette

Technical Committee

Pam Milmo, Boulder County
Sarah Van Pelt, City of Boulder
Gary Klaphake, City of Lafayette
Bill Ewer, Longmont Power & Communication, City of Longmont
Matt Magley, Town of Superior
John Canfield, Trident Energy Services, Longmont
Ann Livingston, Boulder County



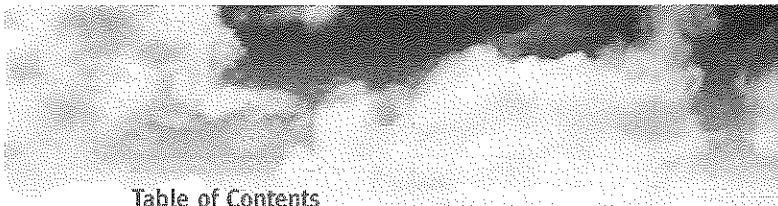


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Executive Summary

Scientific evidence now incontrovertibly demonstrates that carbon dioxide and other greenhouse gases (GHG) released into the atmosphere are currently impacting the Earth's climate and will continue to have profound and devastating effects. To address the local impacts and embrace the opportunities presented by this critical issue, the Boulder County Consortium of Cities convened the Energy Strategy Task Force. One of the chief aims of the Task Force is to provide "a framework for local and regional action on energy sustainability."

The Sustainable Energy Plan (SEP) seeks to provide such a framework. The SEP identifies a host of strategies to reduce greenhouse gas emissions and make our communities "ClimateSmart." These strategies are designed to reduce the major sources of greenhouse gas emissions. Accordingly, the strategies are organized by the main ways we use energy: In our homes, businesses, industries, government operations, and transportation. In addition to making our homes, businesses, industries, and governments ClimateSmart, the Plan is designed to make our power supply ClimateSmart, too.

Highlighted in the SEP are 20 key recommended actions that will lead to meaningful progress toward a sustainable energy future. These actions will not only reduce our county's impact on global climate change, they also result in significant cost savings through increased energy efficiency. In fact, most of the actions identified pay for themselves in five years or less. Cost, cost savings, and GHG reduction impacts have been quantified for 30 of the 35 recommended actions. The remaining five strategies focus on planning, educational, and revenue generating efforts that could not be quantified.

Out of the 35 actions identified, these 20 actions are recommended for "first tier" adoption. These strategies were selected based on their emissions reductions potential, their cost effectiveness, their persistence, and an effort to ensure equitable contributions across the main GHG contributing sectors and address any social equity concerns. The key strategies include voluntary and support actions as well as statewide and local regulatory programs. Combined, and accounting for overlap between strategies, these key strategies, if implemented, will lead to result in the county successfully reaching the following goals:

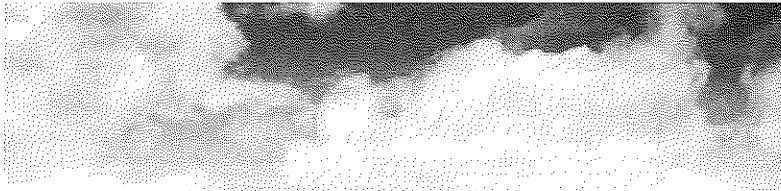
- Emissions reductions in 2012 of more than 1.3 million metric tons of carbon dioxide equivalent and 3.0 million metric tons in 2020
- Emissions reductions 11% below 1990 levels by 2020
- Annual cost savings in 2020 of more than \$445 million dollars

Putting the impact of these strategies into perspective, the Kyoto target calls for developed countries to reduce their GHG emissions 7% below 1990 levels by the year 2012. The SEP strategies will bring the county nearly halfway (45%) toward achieving the Kyoto Protocol target. In addition, with only one exception (vehicle-to-grid), all of these strategies pay for themselves in five years or less.

In the longer term, these strategies will reduce emissions even more significantly. As indicated above, by 2020, the SEP strategies will enable the county to reduce GHG emissions 11% below 1990 levels. Putting this in terms of Governor Ritter's Climate Action goal (which uses a 2005 baseline) the SEP will result in a reduction of emissions 40% below 2005 levels in the year 2020. This is a reduction nearly twice that called for by the Governor.

The SEP is also intended to be a "living document." Participating communities will continue to seek new and innovative strategies to achieve the overall goal of the plan. In addition, these communities have adopted resolutions directing staff to develop programs, projects, and policies that reflect the strategies set forth in the SEP; work in a collaborative manner with other public and private entities to implement these strategies; and seek appropriate funding, within budget constraints, to effectively, efficiently and quickly address GHG emissions in the county in order to achieve the reduction goals set forth in the SEP.





Key Strategies

(Numbers in parenthesis indicate the location of the description of the strategy in the body of the report.)

ClimateSmart at Home	1. Continue to offer high efficiency lighting discounts (1.1) 2. Continue to conduct neighborhood energy awareness sweeps (1.2) 3. Continue to offer discounted residential energy audits (1.3) 4. Develop residential green building codes and ordinances for new and existing buildings (1.4)
ClimateSmart at Work Commercial and Industrial	5. Support energy efficiency projects in small and medium-size businesses through energy assessments and project management assistance (2.1) 6. Develop green building codes and ordinances for new and existing commercial and government buildings (2.2 and 2.1.4) 7. Promote industrial combined heat and power technologies (2.3) 8. Encourage statewide participation in the formation of regional "cap and trade" programs through the Western States Climate Initiative (2.4)
ClimateSmart at Work Local Government	9. Implement controls and policies to limit idling of municipal and county vehicles (2.1.1) 10. Install light emitting diode (LED) traffic signals (2.1.3)
ClimateSmart On the Road	11. Promote sustainable biofuels (3.1) 12. Promote vehicle-to-grid power connection (3.3) 13. Implement a Clean Car Incentive program (3.4) 14. Adopt a statewide Clean Car Standard (3.5)
ClimateSmart Power	15. Develop a sustainable energy financing district (4.4) 16. Maximize the use of rebate incentives (4.1.1) 17. Increase utility demand and power supply incentives, including an aggressive renewable portfolio standard (4.1.2)
Revenue Streams	18. Create energy budgets and rate structures (5.1) 19. Create a revolving loan fund (5.2) 20. Offer "climate offsets credits" and use to build community renewable energy (5.3)

I. Introduction

Global Problem, Local Impacts, Local Solutions

Scientific evidence now incontrovertibly demonstrates that carbon dioxide and other greenhouse gases (GHG) released into the atmosphere are currently impacting the Earth's climate and will continue to have profound and potentially devastating effects. Such effects include:

- Increased risk of extreme weather events
- Increased flood severity
- Increased risk and intensity of catastrophic wildfire
- Increased risk of forest die-offs due to insect invasions
- Changing precipitation patterns and crop productivity patterns
- Increased risk of drought
- Loss of alpine meadows and tundra
- Migration of infectious diseases

In February 2005, the Kyoto Protocol, which is an international agreement, was adopted and; the agreement set binding targets for developed countries to reduce greenhouse gas emissions 7 percent below 1990 levels. While the United States has not ratified this protocol, 160 local governments nationwide have already passed resolutions pledging to reduce greenhouse gas emissions from their government operations and throughout their communities. In November 2004, more than 70% of Boulder County voters approved the passage of Amendment 37, thus requiring that the state's largest public utilities supply 10% of their power from renewable resources by 2010 and raise energy costs by up to 1% to accomplish this goal.

Local government actions taken to reduce greenhouse gas emissions through increased energy efficiency, reduced vehicle miles traveled (VMT), and waste reduction can provide multiple local benefits. These include decreasing air pollution, creating jobs, extending landfill life, and reducing energy expenditures for the county, its businesses, and its citizens. The Sustainable Energy Plan (SEP) identifies 35 such actions. These actions are described in the report along with recommended priorities and the potential cost, cost savings, and environmental impacts benefits. The Plan creates a pathway that local governments across Boulder County can take toward a sustainable future.

The Energy Strategy Task Force

Based upon the challenges and opportunities posed by global climate change, the Boulder County Consortium of Cities (comprised of municipal and county elected leaders from each of the communities in Boulder County and Broomfield) took up this issue. They formed the Energy Strategy Task Force in June 2006 to create a collaborative approach to addressing this challenge.

The purpose of the Boulder County Consortium of Cities' Energy Strategy Task Force is to provide a countywide clearinghouse for information and education on energy issues and a framework for local and regional action on energy sustainability. The goal of the Task Force is to create collaborative approaches among Boulder County, the municipalities in the county, Broomfield City and County of Broomfield, local businesses, non-profit organizations, and residents to address critical energy concerns and strategies. These include reducing the emission of greenhouse gases that are producing global warming, promoting the use of renewable energy production, and reducing the energy costs incurred by residents and businesses.¹

With technical support provided by Boulder County Public Health, the Task Force developed the Sustainable Energy Plan to identify emission reduction opportunities and strategies and guide our collaborative efforts into the future. The plan focuses on the dominant sources of emissions identified in a countywide greenhouse gas inventory conducted in 2005 and described in detail below. These sources include residential buildings, commercial buildings, transportation, and industrial operations.

Simultaneously, the Task Force evaluated and launched several "early actions" designed to test different approaches and begin the implementation process while the overall plan was being designed. These early actions include:

- **"ClimateSmart" Campaign:** ClimateSmart is a countywide effort, funded by the City of Boulder and Boulder County, to help individuals, families, and businesses increase their energy efficiency and reduce their carbon footprint.
- **Residential Energy Audit Program (REAP):** A REAP home energy analysis helps homeowners understand their energy usage and provides personalized recommendations for lowering energy bills.
- **Neighborhood Energy Sweeps:** Volunteers and CU students have delivered "ClimateSmart" kits to more than 1,000 homes. These kits contain eight compact fluorescent lamp (CFLs) lightbulbs, water quality promotions, and energy education materials.

¹See <http://www.bouldercountry.org/bccc/consortium/Energy/> for a full list of Task Force members, agendas, minutes, and mission statement.

The Energy Strategy Task Force (cont.)

- **Partners for A Clean Environment (PACE) EnergySmart Project:** The PACE EnergySmart Project provides direct support to small- and medium-sized businesses to identify and implement cost-effective energy projects.
- **High Efficiency Lighting Program:** Through this program, with matching funds provided by the county, municipalities are finding creative ways to discount the cost of CFLs and other energy efficient lighting to encourage residents and businesses to give them a try.

The results of the work provide insight into the magnitude of the challenge facing Boulder County with respect to the county's goal of achieving emissions by 2012 that are 7% below the 1990 level. Meeting this goal will be a daunting enterprise requiring substantial community mobilization, county and municipal government commitment, and resources. Figure 1 presents the results of Boulder County's GHG inventory. In 2012, the BAU trajectory is approximately 5,830,000 metric tons of carbon dioxide equivalent (mCO₂e), which is about 65% or 2,680,000 mCO₂e above the Kyoto goal.

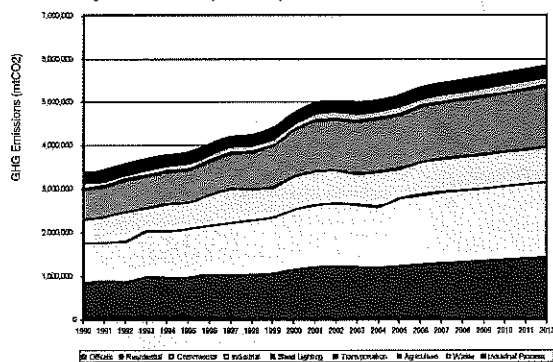
II. Countywide Greenhouse Gas Inventory

The first step in creating a Sustainable Energy Plan was to develop a clear picture of historical and current sources and magnitudes of Boulder County's greenhouse gas emissions. In 2005, the county created a GHG inventory to provide this information and to guide this planning process. The inventory includes:

- An inventory of historical GHG emissions for the period of 1990 through 2005.
- A projected "business-as-usual" (BAU) emissions trend line out to 2012 based on the historical emissions data.
- An analysis of sector- and source-specific emissions.

The results of the work provide insight into the magnitude of the challenge facing Boulder County with respect to the county's goal of achieving emissions by 2012 that are 7% below the 1990 level. Meeting this goal will be a daunting enterprise requiring substantial community mobilization, county and municipal government commitment, and resources. Figure 1 presents the results of Boulder County's GHG inventory. In 2012, the BAU trajectory is approximately 5,830,000 metric tons of carbon dioxide equivalent (mCO₂e), which is about 65% or 2,680,000 mCO₂e above the Kyoto goal.

Figure 1. Current and Projected Countywide Greenhouse Gas Emissions



²Greenhouse gas emissions are presented in metric tons of carbon dioxide "equivalent" to account for the difference in the global warming potential of the different gases.

Countywide Greenhouse Gas Inventory (cont.)

In 2005, the dominant sectors of emissions were commercial, residential, transportation, and industrial. As shown in Figure 2, together these four sectors account for 80% of the county's GHG emissions. The dominant sources of these emissions are from electricity and natural gas consumption, along with vehicles' fuel consumption in the transportation sector. A breakdown of emissions by municipality is provided in Figure 3.

Figure 2. Greenhouse Gas Emissions by Sector (2005)

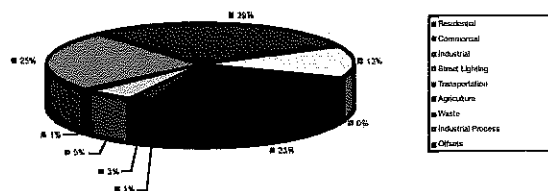
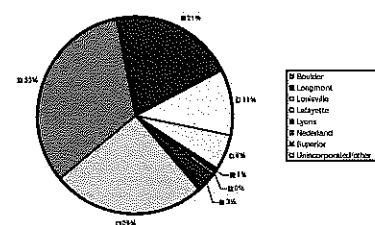


Figure 3. Greenhouse Gas Emissions by Municipality (2005)



III. RECOMMENDED EMISSION REDUCTION STRATEGIES

The Sustainable Energy Plan (SEP) identifies a host of strategies to reduce greenhouse gas emissions and make our communities ClimateSmart. These strategies are designed to reduce the major sources of greenhouse gas emissions. Accordingly, the strategies are organized by the main ways we use energy: in our homes, businesses, industries, government operations, and transportation. In addition to making our homes, businesses, industries, and governments ClimateSmart, the Plan is designed to make our power supply ClimateSmart as well.

Each of the strategies is annotated indicating the benefits it brings to the climate ($^{\circ}\text{C}$), the economy in terms of cost-effectiveness ($\text{\$}$), and other environmental impacts (%). The projects are ranked for each area on a scale of zero to four, with four being the highest ranking, or best, strategy.

Appendix A provides a more detailed description of each of these strategies. Appendix B provides more detail on the greenhouse gas impacts, and the cost and benefits for each strategy. As indicated in Appendix B, many of the actions have a positive return on investment, paying for themselves in less than three years.

Key Strategies

Out of the 35 actions identified, 20 actions are recommended for "first tier" adoption based on several criteria. These criteria include the GHG emissions reduction potential of the strategy. The cost of implementation to both the public and private sector, the cost savings of the project and its pay back period, as well as the marginal abatement cost were considered in selecting the first tier strategies. Key strategies were also selected to ensure an equitable distribution across the main GHG contributing sectors such as residential, commercial, industrial, and transportation. Finding ways to enhance the use of more renewable resources to produce energy was also considered a priority. Social equity interests were considered. The persistence of the strategy (how long it will last once it's implemented) is an important criterion. A new building will continue to consume energy for the next forty to sixty years, while a compact fluorescent light bulb will last approximately ten years. Key strategies also include a mix of implementation mechanisms. Voluntary and support actions have been included to promote public awareness and education. Several strategies were selected due to their statewide impacts. Local regulatory programs are also included.

Combined, and accounting for overlap between strategies, these key strategies if implemented will lead to the following goals:

- Emissions reductions in 2012 of more than 1.3 million metric tons of carbon dioxide equivalent and 3.5 million metric tons in 2020
- Emissions reductions 11% below 1990 levels by 2020
- Annual cost savings in 2020 of more than \$445 million dollars

Putting the impact of these strategies into perspective, the Kyoto target calls for developed countries to reduce their GHG emissions 7% below 1990 levels by the year 2012. The SEP strategies will bring the county nearly halfway (46%) toward achieving the Kyoto Protocol target. In addition, with only one exception (vehicle-to-grid), all of these strategies pay for themselves in five years or less.

In the longer term, these strategies will reduce emissions even more significantly. As indicated above, by 2020, the SEP strategies will enable the county to reduce GHG emissions 11% below 1990 levels. Putting this in terms of Governor Ritter's Climate Action goal (which uses a 2005 baseline) the SEP will result in a reduction of emissions 40% below 2005 levels in the year 2020. This is a reduction nearly twice that called for by the Governor.

The SEP is also intended to be a "living document." Participating communities will continue to seek new and innovative strategies to achieve the overall goal of the plan. In addition, these communities have adopted resolutions directing staff to develop programs, projects, and policies that reflect the strategies set forth in the SEP; work in a collaborative manner with other public and private entities to implement these strategies; and seek appropriate funding, within budget constraints, to effectively, efficiently and quickly address GHG emissions in the county in order to achieve the reduction goals set forth in the SEP.

Key Strategies

(Numbers in parenthesis indicate the location of the description of the strategy in the body of the report.)

ClimateSmart at Home

1. Continue to offer high efficiency lighting discounts (1.1)
2. Continue to conduct neighborhood energy awareness sweeps (1.2)
3. Continue to offer discounted residential energy audits (1.3)
4. Develop residential green building codes and ordinances for new and existing buildings (1.4)

ClimateSmart at Work Commercial and Industrial

5. Support energy efficiency projects in small and medium-size businesses through energy assessments and project management assistance (2.1)
6. Develop green building codes and ordinances for new and existing commercial and government buildings (2.2 and 2.1.4)
7. Promote industrial combined heat and power technologies (2.3)
8. Encourage statewide participation in the formation of regional "cap and trade" programs through the Western States Climate Initiative (2.4)

ClimateSmart at Work Local Government

9. Implement controls and policies to limit idling of municipal and county vehicles (2.1.1)
10. Install light emitting diode (LED) traffic signals (2.1.3)

ClimateSmart on the Road

11. Promote sustainable biofuels (3.1)
12. Promote vehicle-to-grid power connection (3.3)
13. Implement a Clean Car Incentive program (3.4)
14. Adopt a statewide Clean Car Standard (3.5)

ClimateSmart Power

15. Develop a sustainable energy financing district (4.4)
16. Maximize the use of rebate incentives (4.1.1)
17. Increase utility demand and power supply incentives, including an aggressive renewable portfolio standard (4.1.2)

Revenue Streams

18. Create energy budgets and rate structures (5.1)
19. Create a revolving loan fund (5.2)
20. Offer "climate offsets credits" and use to build community renewable energy (5.3)

RECOMMENDED STRATEGIES

The following is a summarized list of all 35 actions organized by the main ways we use energy: In our homes, businesses, industries, government operations, and transportation. In addition to making our homes, businesses, industries, and governments ClimateSmart, the Plan is designed to make our power supply ClimateSmart and generate revenue to support program implementation.

1. ClimateSmart At Home

The residential sector provides the second-largest contribution to Boulder County's GHG emissions. In 1990, the residential sector accounted for 877,850 metric tons carbon dioxide equivalent (mtCO₂e), or 25% of the county's GHG inventory. By 2005, residential emissions had risen to 1,305,000 mtCO₂e and continued to represent 26% of the county's GHG inventory. If the business-as-usual (BAU) trend continues, 2012 forecasts show that the residential sector emissions will increase to 1,493,200 mtCO₂e. Like the commercial sector, Figure 5 demonstrates the dominance of electricity as an energy source in this sector.

Residential sector electricity, and natural gas are consumed by home heating, ventilation, and air-conditioning (HVAC) systems; lighting systems; and miscellaneous electrical equipment. Rural mountain homes frequently use propane or wood burning stoves for heating.

There are a host of actions that will enhance the energy efficiency of our homes. Several "early actions" piloted by the Energy Strategy Task Force are already showing success. These programs include assistance identifying energy-efficient technologies and renewable energy sources, and incentives to encourage their implementation. In addition, several communities have recently adopted or updated residential building codes requiring greater efficiency of newly built and existing residences at a specified time such as during a renovation, at the point of sale, or by a set point in time. Continuing to ensure that new and existing buildings meet efficiency standards, including moving toward "net zero energy homes," will result in significant emissions reductions in the residential sector. Use of renewable energy resources in this sector is described in Table 4 below. Increasing the use of highly efficient wood or pellet stoves, in mountain communities, would have a desirable impact on air quality but would not significantly impact greenhouse gas emissions.

Figure 4. 2005 Residential GHG Emissions by Source



Table 1. Residential Sector Strategies

1.1 High Efficiency Lighting Program – Early Action

Compact fluorescent lamps (CFLs) and LEDs show tremendous potential for savings in Boulder County. While more CFLs are being installed everyday, their penetration is still not that high in this area. LEDs are just beginning to be considered.

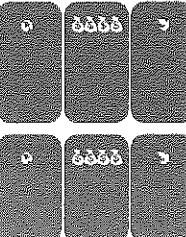
Action: Implement CFL and LED discounts, building on the success of the 2007 pilot.

1.2 ClimateSmart Neighborhood Energy Sweeps – Early Action

Many residents are interested in energy efficiency, but they don't have the time to investigate and implement projects, such as the use of CFLs, power-strips, and energy-efficient refrigerators.

Action: Conduct neighborhood-wide "sweeps" installing energy-efficient devices and educational information.

Mitigation Scores
Mitigation scores are ranked 0-4, with 4 being the highest, based on positive impacts to climate (C). The economy, natural resources, and environmental impacts (E).



1.3 Residential Energy Audit Program (REAP) – Early Action

During the pilot phase of the Residential Energy Audit Program (REAP) the county and participating municipalities provided low-cost, energy-efficiency evaluations for Boulder County homeowners; most participants reported that they intended to invest between \$1,000 and \$5,000 in energy-efficiency upgrades as a result.

Action: Continue this successful initiative.

1.4 Residential Green Building Codes and Ordinances for New and Existing Buildings

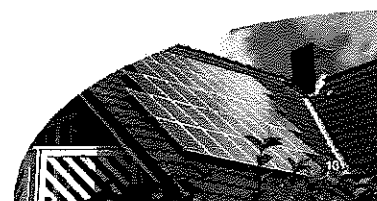
Residential energy use accounts for 25% of the county greenhouse gas inventory. While existing buildings account for nearly 90% of this energy use, new buildings are being built every day that will be in use for the next 40 years or more.

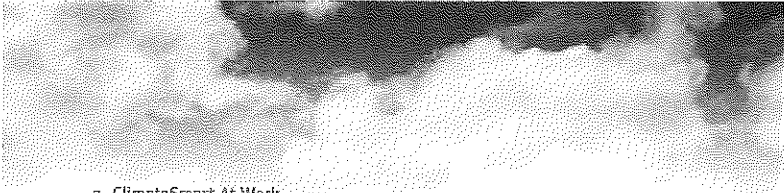
Action: Develop a "Green Building" code for new construction and a "residential energy conservation ordinance" for existing buildings.

1.5 Net-Zero Energy Home (ZEH)

A net-zero energy home (ZEH) is connected to, and uses energy from, the local electric utility, but unlike typical homes, a ZEH combines state-of-the-art, energy-efficient construction techniques and equipment with renewable energy systems to return as much energy as it takes on an annual basis. ZEH communities are the leading edge of technologies that will someday produce as much energy as they use.

Action: Explore the creation of building codes and ordinances requiring that all homes over a certain size be required to achieve net zero energy use and the expansion of this requirement, over time, to all new home development.





2. ClimateSmart At Work

The commercial sector provides the largest contribution to Boulder County's GHG emissions. In 1990, the commercial sector accounted for 899,500 metric tons of carbon dioxide equivalent (mCO₂e), or 29% of the county's GHG inventory. By 2005, commercial emissions had risen to 1,591,300 mCO₂e and accounted for 31% of the county's GHG inventory. If the business-as-usual (BAU) trend continues, 2012 forecasts show that the commercial sector emissions will increase to 1,945,850 mCO₂e. The industrial sector represents the fourth largest sector contributing 18% of Boulder County greenhouse gas emissions. Combined these two sectors represent nearly 50% of emissions. Commercial sector electricity and natural gas are consumed by building heating, ventilation, and air conditioning (HVAC) systems; lighting systems; and miscellaneous electrical equipment. As indicated, electricity is the dominant source of energy for this sector.

Figure 5. 2005 Commercial GHG Emissions by Source



Actions to reduce emissions from the commercial sector include: maximizing the use of available rebates and incentives to install and implement energy-saving measures and working closely with smaller businesses that lack in-house energy management resources. As in the residential sector, codes for new and existing buildings and requiring energy-efficient construction and operational practices should also be considered for this sector.

Actions to reduce emissions in the industrial sector include the capture of "waste" heat and materials to produce energy, the use of energy-efficient technologies, and policies to encourage and incentivize emission reduction measures. Table 2 provides a list of such actions. Use of renewable energy resources in this sector is described in Table 4 below.

Table 2. Commercial and Industrial Sector Strategies

Mitigation Scores
Mitigation scores are ranked 0-4, with 4 being the highest, based on positive impacts to climate, the economy, and other environmental impacts.

2.1 PACE EnergySmart Project – Early Action
Even with financial incentives and free energy audits, small- and mid-sized businesses have difficulty finding the time to implement energy-efficiency projects. The Partners for a Clean Environment (PACE) EnergySmart program helps these business by providing energy assessments and assistance with project implementation.
Action: Remove implementation barriers through the guidance of energy experts.



2.2 Green Building Codes and Ordinances for New and Existing Commercial Buildings
Twenty-nine percent of county greenhouse gas emissions stem from the demand for energy required by the commercial sector.
Action: In partnership with municipal and county building officials, create building codes requiring the high performance of new and existing commercial buildings.



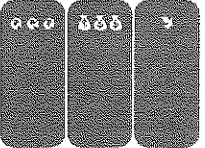
2.3 Combined Heat and Power
Combined heat and power (CHP), also known as cogeneration, is an efficient, clean, and reliable approach to generating power and thermal energy from a single fuel source. CHP systems typically achieve electrical efficiencies of 50% to 70%.
Action: Explore the opportunities for CHP and methane capture in food processing, beverage, and other industries.



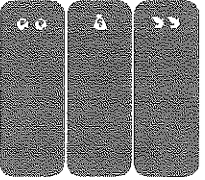
2.4 Western States Climate Initiative
Five governors from Western states agreed to work together to create a regional "cap-and-trade program." A similar system is close to being implemented among 7 Northeastern and Mid-Atlantic states. Together, these initiatives will spur demand for a national system.
Action: Encourage Colorado's participation.



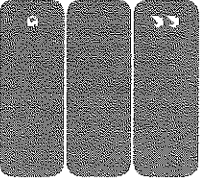
2.5 Statewide Lighting Efficiency Standard
Rising energy costs and environmental concerns are encouraging states to follow the lead of Australia and Canada and ban incandescent light bulbs altogether. Nevada took a different approach becoming the first state to pass legislation establishing minimum energy-efficiency standards for general-purpose lights sold in the state on and after January 1, 2012.
Action: Support legislation establishing a statewide minimum energy efficiency standard for lighting.



2.6 Net Zero Energy Commercial Buildings
Using a combination of renewable power and high-efficiency products, commercial buildings are poised to become net zero energy users. Farnie Construction's new headquarters uses a combination of renewable energy and high-efficiency measures to reach a high plane in energy conservation. According to the U.S. Green Building Council, it is believed to be the nation's first commercial building that can produce at least as much electricity as it uses – known as "net zero energy."
Action: Encourage the implementation of additional net zero energy buildings.



2.7 Net Zero Electric Industrial Plants
High efficiency applications, solar power, and methane recovery are the key ingredients necessary for an industrial plant to produce more energy than it uses. Frito-Lay plans to launch just such a plant by 2010. The company will build at least 50 acres of solar concentrators and a biomass generator to provide renewable fuel. The retrofit would reduce electricity and water consumption by 90% and natural gas use by 80%. Greenhouse gas emissions would be cut by 50% to 75%.
Action: Identify opportunities for and encourage the implementation of net zero electric industrial plants.



Local governments can lead by example and influence the adoption of energy efficiency and renewable energy technology. This section explores the opportunities that local governments face as large users of commercial building and transportation technology to reduce greenhouse gas emissions in these sectors. Actions include: anti-idling measures, reducing heat gain on roofs, improving the energy efficiency of traffic signals, and demonstrating leadership in building energy performance. These strategies together can significantly reduce energy use in government operations.

In addition, municipal and county governments can also play an important role steering a course for community-wide action. Such actions include: setting and working to achieve a countywide greenhouse gas reduction goal; providing information to residents and businesses on how they can improve their energy efficiency; and developing aggressive energy management plans. While these last items are critically important, they are not quantifiable in terms of specific reductions.

Table 2.1. Government Sector Strategies

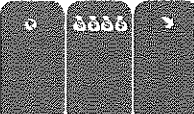
Mitigation Scores

Mitigation scores are ranked 0-4, with 4 being the highest, based on positive impacts for climate (C), the economy (E), and other environmental impacts (O).

2.1.1 Anti-Idling Controls and Policies

Unnecessary idling of government vehicles wastes fuel, leads to unnecessary air pollution, reduces engine life, and increases maintenance costs.

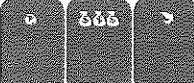
Action: Enable a 5-minute auto shut-off control and implement anti-idling policy for all appropriately equipped county and municipal vehicles.



2.1.2 Green or Light-Colored Roofs

Surfacing the roofs of county and municipal buildings with greenery and/or light or reflective coloring can reduce energy use and storm water runoff.

Action: Promote light, white, or "green" surfacing.



2.1.3 Light Emitting Diode (LED) Traffic Signals

LED technology is expected to reduce energy use by 90%; lower maintenance due to increased life; and incorporate innovations like battery backup using photovoltaics.

Action: Complete replacement of incandescent traffic and crosswalk signals with LEDs.



2.1.4 Leadership in Efficient Public Buildings

This strategy will ensure that new and existing public buildings lead the way in energy efficiency and performance. Through codes, standards, policies, or ordinances, public buildings will be required to achieve a higher level of efficiency than the private sector building codes or ordinances envisioned in this plan.

Action: Make new and existing municipal and county buildings leaders in energy efficiency.



2.1.5 Goal Setting

More than 500 mayors, representing 65 million people, have now signed onto the U.S. Mayors Climate Protection Agreement that includes a commitment to meet or beat the Kyoto goals calling for a 7% reduction in greenhouse gas emissions below 1990 levels by 2012.

Action: Encourage all local governments within Boulder County to adopt a greenhouse gas reduction goal.



2.1.6 ClimateSmart – Early Action

Governments play an important role of providing the information, tools, and resources that residents and employers need to make the choices and decisions that will promote a sustainable energy path. The ClimateSmart program provides these resources and education through outreach, programming, and its website.

Action: Continue to grow and implement the ClimateSmart program.



2.1.7 Municipal and County Energy Management Plans

A key to implementing and realizing the benefits of energy efficiency in local government buildings and operations is the creation of comprehensive, multi-year management plans that include specific energy performance goals.

Action: Work with municipal and county facilities managers to implement energy efficiency management plans through efforts such as the Facility Managers Network.



3. ClimateSmart On the Road

Vehicle transportation is the third-largest sector contributing to Boulder County's GHG emissions. In 1990, the transportation sector accounted for 670,300 mtCO₂e, or 20% of the county's GHG inventory. By 2005, transportation emissions had risen to 1,232,300 mtCO₂e and made up 24% of the county's GHG inventory. If the business-as-usual (BAU) trend continues, 2012 forecasts show that the transportation sector emissions will increase to 1,375,000 mtCO₂e and comprise roughly 23% of the BAU inventory.

Transportation sector emissions are produced through the consumption of gasoline, diesel, and jet fuel. Gasoline and diesel are used in vehicles, while airplanes use gas and jet fuel. Figure 6 demonstrates the dominance of gasoline as the primary energy source in this sector. Gasoline well exceeds diesel fuel as an energy source in the transportation sector.

Actions to reduce greenhouse gas emissions in the transportation sector include reducing the number of vehicle miles traveled by increasing the use of alternative transportation and other means. While this is an extremely important initiative, these actions are not the focus of action in the SEP because they are being pursued in other venues. Instead the plan focuses on the use of less greenhouse gas intensive fuels to run our vehicles and increasing the fuel efficiency of our vehicles. Nonetheless, reducing vehicle emissions remains a significant and necessary action that must be pursued aggressively in order to reduce GHG emissions in this sector.

Figure 6. 2005 Transportation GHG Emissions by Source



Table 3. Transportation Sector Strategies

Mitigation Scores

Mitigation scores are ranked 0-4, with 4 being the highest, based on positive impacts for climate (C), the economy (E), and environmental impacts (E).

3.1 Biofuels Promotion

The promise and expectations of biofuels to replace petroleum-based diesel and gasoline are high. These fuels do have tremendous potential if they are sustainably produced.

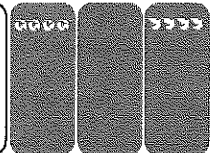
Action: Promote the use of sustainably produced biofuels.



3.2 Vehicle-to-Grid

Increasing the use of electric-drive hybrid vehicles would not only reduce dependence on foreign oil, but these vehicles could also provide storage capacity to power the electric grid during the many hours of the day that they sit idle. This strategy would reduce the need to build new power plants to meet peak power demand and allow for greater use of renewable energy.

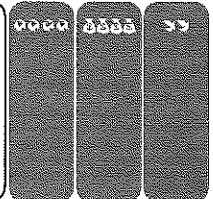
Action: Promote opportunities for vehicle-to-grid power through education, pilot projects, and incentives.



3.3 Clean Car Incentive

A clean car incentive charges users of less fuel-efficient vehicles a fee and applies the funds from this fee, as an incentive, to the purchasers of more fuel-efficient vehicles. The benefits of this approach are that it is a relatively efficient way of promoting the purchase of more fuel-efficient vehicles; users of less fuel-efficient vehicles directly pay for the externalities that they inflict upon society; and it sends a potentially strong market signal to auto manufacturers.

Action: Encourage adoption of a statewide Clean Car Incentive program for Colorado and as a countywide program as part of the vehicle registration process.



3.4 Clean Car Standard for Colorado

The "California Clean Car" standard gives car companies until 2016 to achieve a 30% reduction in greenhouse gas emissions from new cars, pickups, minivans, and SUVs sold in the state. At least twelve other states are moving to adopt the rules.

Action: Encourage the state to adopt the standards.



4. ClimateSmart Power

This section outlines the opportunities to reduce GHG emissions through reductions in energy use and the GHG intensity of grid-supplied electricity through the use of hydroelectric capacity, the purchase of renewable energy credits (RECs), other "carbon offsets" that fund clean energy project investments, and the installation of photovoltaic (PV) and solar water heaters on commercial and residential buildings.

Table 4. Renewable Power Strategies

4.1 Renewable Portfolio Standard
While the state legislature passed legislation in 2007 strengthening the state's Renewable Portfolio Standard, these efforts may not be sufficient to meet Boulder County's Sustainability goals.

Action: Seek legislation encouraging an even stronger standard.

4.2 Concentrating Solar Project
Concentrating solar power systems are large centralized power generation plants that use the sun's energy rather than fossil fuels. These systems are currently being developed and tested as a means of fulfilling our growing power demand.

Action: Identify partners and project sites in Boulder County to encourage the demonstration of these technologies.

4.3 Community Wind Farm
Municipality and county owned renewable resources account for about .5% of Colorado's energy. While residents can purchase renewable energy credits, these credits lack the full-benefits of a community-owned system. The University of Colorado is also exploring options for local wind.

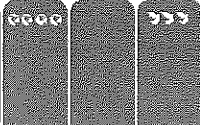
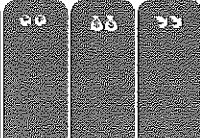
Action: Explore county/municipal and county participation in building a multi-turbine farm to deliver a significant amount of wind power to the community.

4.4 Sustainable Energy Financing District
Initial capital costs remain a barrier to the broad adoption of solar power and energy-efficiency measures for homeowners and businesses. Local governments are exploring the use of a bond mechanism to finance low interest loans repaid by a transferable property tax assessment or other secured means to accelerate installation and adoption of sustainable energy systems.

Action: Investigate the application in Boulder County or Colorado.

Mitigation Scores

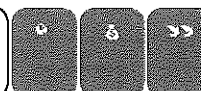
Mitigation scores are ranked 1-4 with 4 being the highest, based on positive impacts to climate (C), the economy (E), and other environmental impacts (O).



4.5 Solar-Powered Public Buildings

Public buildings can set an example and take advantage of the long-term paybacks associated with photovoltaics (PV) and solar thermal systems.

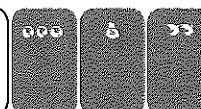
Action: Install PV and solar thermal systems in public buildings.



4.6 Maximum Rooftop PV

Incentives for new or retrofitted photovoltaics (PV) on rooftops in the county would help convert light energy into electrical energy.

Action: Provide incentives, such as a "solar cooperative" and/or building codes, to maximize the use the largest rooftops in Boulder County as the source of the most cost-effective PV.



This section explores the unique opportunities electric utility providers can play in encouraging energy efficiency and renewable energy. It documents and evaluates some of the more innovative utility demand-side and renewable energy programs that will be explored.

Table 4.1. Utility Partnerships

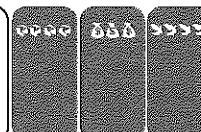
Mitigation Scores

Mitigation scores are ranked 1-4 with 4 being the highest, based on positive impacts to climate (C), the economy (E), and other environmental impacts (O).

4.1.1 Maximum Use of Rebate Incentives

Boulder County energy providers all offer incentive programs to reduce the upfront costs of energy efficiency and renewable energy projects. In order to maximize the use of these rebates, programs should be put into place to ensure that these opportunities are fully utilized.

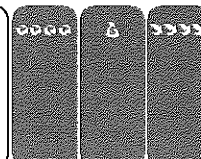
Action: Assess and implement a broad range of educational and assistance programs ensuring the maximum use of these funds.



4.1.2 Utility Demand and Power Supply Incentives

Several utilities are currently revisiting or renewing their incentive programs for energy demand management and renewable energy supplies. In addition, several municipalities are reviewing their franchise agreements with Xcel Energy to consider the pros and cons of various power mix strategies, particularly those that can lead to the best combinations of demand reduction, efficiency, and renewable supply options.

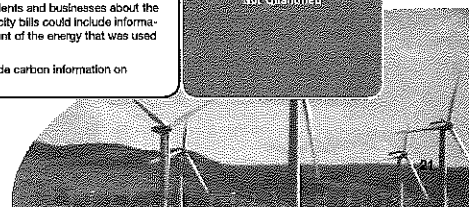
Action: Collaboratively investigate and pursue alternative power mix strategies with Boulder County power suppliers.



4.1.3 Carbon Labeling

To bring greater awareness to residents and businesses about the impacts of their energy use, electricity bills could include information on the carbon dioxide equivalent of the energy that was used the previous month.

Action: Work with utilities to provide carbon information on monthly electricity bills.



IV. REVENUE GENERATION

To support these strategies, resources will be necessary. This section explores investment and incentive opportunities, such as rebates, low interest loans, revolving funds, bonds, and other strategies to attract the necessary resources to cost-effectively reach our GHG reduction objectives.

Table 5. Revenue Generation

Mitigation Scores
Mitigation scores are calculated based on the number of strategies implemented, the estimated impact on GHG emissions, and the estimated cost of implementation.

5.1 Energy Budgets and Rate Structures

Similar to what communities are doing with water charges, create a rate structure that incentivizes conservation.

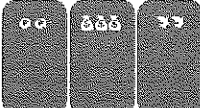
Action: Create energy budgets for home/office use and charge a higher rate for usage above that amount or as a ratepayer moves into higher tiers of energy use.



5.2 Revolving Loan Fund

Seed funding can go a long way toward helping businesses take on the initial costs of installing energy-efficient projects, while the savings from these projects can create incentives for future actions.

Action: Create a revolving loan fund to cover the start-up costs of a large-scale energy-efficiency program.



5.3 Climate Offset Credits

Everyone uses some amount of energy in daily life. Climate credits can allow for the purchase of more cost-effective greenhouse gas reductions to offset this use. Funds generated could be used to enhance community renewable energy supplies.

Action: Allow businesses or residents to contribute funding to enhance existing energy.



5.4 Targeted Sales Taxes

Statutory cities and counties lack the taxation tools to incentivize energy efficiency and renewable energy designs.

Action: Seek legislative authority to implement targeted sales tax strategies, such as vehicle registration or carbon taxes.



V. CONCLUSIONS

The Sustainable Energy Plan provides a range of programs and strategies to protect our climate and our way of life for generations to come. It also lays out a path toward a more energy-efficient and secure future. As indicated in Attachment B, many of the strategies save money and pay for themselves in the near-term. ClimateSmart strategies are often financially smart as well.

The SEP is also intended to be a "living document." Participating communities will continue to seek new and innovative strategies to achieve the overall goal of the plan. In addition, these communities have adopted resolutions directing staff to develop programs, projects, and policies that reflect the strategies set forth in the SEP; work in a collaborative manner with other public and private entities to implement these strategies; and seek appropriate funding, within budget constraints, to effectively, efficiently and quickly address GHG emissions in the county in order to achieve the reduction goals set forth in the SEP.

Appendix A.

Detailed Strategy Description



ClimateSmart At Home

There are a host of actions that will enhance the energy efficiency of our homes. These include: adoption of codes and standards requiring greater efficiency of newly built and existing residences; incentive and/or technology standards to enhance the adoption of energy-efficient technologies and renewable energy sources; and assistance to residents in identifying and implementing energy efficiency and renewable energy options.

1. High Efficiency Lighting Program – Early Action

Compact fluorescent lamps (CFL) and light emitting diodes (LEDs) show tremendous potential for savings in Boulder County. While more CFLs are being installed everyday, their penetration is still not very high in the area. Evaluators assert that the bulbs will "pay off the value" if discounts can reduce the cost to within \$1.00 to \$3.00 of standard bulbs. Promoting these products is often offset by the benefit of being able to include a wide variety of bulb types and sizes in the incentive program. The program will be conducted in conjunction with other programs and will be coordinated with the U.S. EPA's "Change-A-Light" campaign. Retailers/manufacturers' promotions, in-store signage, and end-cap displays will also help promote the program. The City of Fort Collins conducted a similar program and found it to be their most cost-effective effort. LED technologies are just beginning to reach the home lighting market through specialty lighting and other specialty fixtures.

This initiative is designed to build on successful efforts planned in 2007 and expanded in 2008.

2. Neighborhood Energy Sweeps – Early Action

This project would seek to identify and install energy-efficient devices in homes on a neighborhood-by-neighborhood basis. Residents, typically in lower income neighborhoods, would be informed of the date of the energy-efficiency sweep in advance to optimize their availability. The sweeps would result in the direct installation of several energy-saving devices at no cost to the homeowner, including:

- ENERGY STAR-qualified compact fluorescent lamp light bulbs
- Power strips to eliminate phantom electric loads

In addition, bulk purchasing could bring energy savings to neighborhoods. For example, residents could be invited to purchase an energy-efficient refrigerator at a reduced cost due to a bulk purchasing agreement directly with the manufacturer. The installation of refrigerators would be conducted on a predetermined date. Projected savings on energy bills would exceed \$500 per household from the lighting measures alone, and when coupled with a new refrigerator, would be significantly more. A recycling and disposal program for collected refrigerators will also be part of the initiative. The City of Fort Collins found that during their program's first year, 400 refrigerators were purchased, resulting in 818 megawatt-hours (MWh) saved and 1,017 MTCO₂e avoided. Approximately 30% of the CO₂e savings resulted from the environmentally appropriate destruction of chlorofluorocarbon-11 (CFC-11) used to maintain the appliances.

Bulk purchases could also be conducted and made available on a neighborhood level for the purchase of insulation, programmable thermostats, or real-time monitoring devices. This initiative will build on and continue the successful sweep being conducted in 2007 and 2008 in Longmont and Boulder.

3. Residential Energy Audit Program (REAP) – Early Action

The Center for Resource Conservation (CRC), Boulder County, and participating municipalities in the county created the Residential Energy Audit Program (REAP) to provide low-cost energy efficiency evaluations for Boulder County homeowners working with existing local energy service professionals. Local utilities for energy efficiency and renewable energy investments have created new opportunities for consumers to offset the costs of some energy-conservation upgrades for their homes.

This program was conducted as a pilot in the spring of 2006. Initial feedback on the program was excellent, with most participants reporting that they intend to invest between \$1,000 and \$5,000 in energy-efficiency upgrades as a result. A 5-mile program in Burlington, Vermont, yielded annual kilowatt-hours (kWh) savings of 204,605,000 with lifetime economic value of \$189,577,600 and reduction of more than 2 million MTCO₂e over the typical lifetime of the measures installed after five years of implementation.

In 2008, participating Boulder County communities include: Boulder County, Boulder, Jacksonville, Lafayette, Longmont, Louisville, Nederland, and Superior.

This project would continue the success of this initiative in identifying and encouraging homeowners to make cost-effective investments in energy efficiency and renewable energy.

4. Residential Green Building Codes and Ordinances for New and Existing Buildings

Residential energy use accounts for 25% of the county's greenhouse gas inventory. While existing buildings account for nearly 90% of the energy use, new buildings are being built every day that will be in use for the next 40 years or more. A green building program would promote the use of cost-effective and sustainable building materials, the recycling and reuse of construction materials, and the use of "healthy" construction materials in order to conserve natural resources, reduce air emissions, and improve the indoor environment. A residential energy conservation and source (RECS) would ensure that existing buildings would eventually meet modern building codes. Home rule cities currently have the authority to implement RECs. Boulder County and cities would need to obtain this authority from the state.

Several communities across Boulder County are implementing or considering these types of programs. For example, Boulder County recently updated the Boulder County Comprehensive Plan and Land Use Code to implement a "Sustainable" program for new construction and renovations in unincorporated Boulder County. This performance-based program will be administered through the building permit process.

The City of Boulder currently implements the Green Points program and the City of Longmont has recently adopted Green Built. These programs consider such elements as: deconstruction & recycling, land use & water conservation, framing, plumbing, electrical, HVAC, solar, and indoor air quality of a new building. Different point totals are required, depending on type and size of the building project. The program is flexible – these are mandatory measures, but a variety of measures can be used to make up the necessary number of points. Some local governments allow for building permit fees related and expedited permit processing as incentives.

Home rule cities would consider the adoption of code requirements (like a RECS) for existing buildings that could be implemented at the point of sale, during a remodel, or by a local utility in the future that would allow enough time for homeowners to prepare for and implement the required changes. Rental properties could be an initial focus of this initiative, since most renters pay their own utility costs. Statutory communities would seek the authority from the state to implement this type of program.

5. Net-Zero Energy Home (ZEH)

A net-zero energy home (ZEH) is connected to and uses energy from the local electric utility, but unlike typical homes, on an annual basis, a ZEH produces enough energy to offset the amount purchased from the utility. This results in net-zero annual energy consumption.

A ZEH combines state-of-the-art, energy-efficient construction techniques and equipment with renewable energy systems to ensure at least as much energy as it uses on an annual basis. Such efficiency, when renewable resources cannot provide all of the home's power, such as at night or on a cloudy day, the homeowner purchases energy from the utility. When renewable resources produce more than the house is using, for instance on sunny days when no one is home, power is sent back into the utility grid. During these times, the home's electric meter runs in reverse, essentially providing homeowners with real value for their energy.

ZEH communities are the leading edge of technologies that might someday enable houses that produce as much energy as they consume. Premier Gardens, which opened last summer, is one of a half-dozen subdivisions in California where every home cuts power consumption by at least 50%, mostly by using low-power appliances and solar panels. Several more are under contract on the way, including the first ZEH community for seniors.

The initiative will explore the creation of building codes and ordinances requiring that all homes over a certain size achieve net-zero energy status. This requirement will expand over time to allow some development.



ClimateSmart At Work

ClimateSmart At Work reduces greenhouse gas emissions from commercial sector buildings by codes and standards, requiring energy-efficient construction and operational practices for new and existing buildings, maximizing the use of available rebates and incentives to install and implement energy-saving measures, and working closely with smaller businesses that lack in-house energy management resources. A list of actions is described below. Use of renewable energy resources in this sector is described in the ClimateSmart Power section below.

1. PACE EnergySmart Project – Early Action

Even with financial incentives and tax breaks, businesses have a difficult time implementing projects due to the constant stream of "urgent issues" they face. The objective of this program is to remove these implementation barriers. Using Partners for a Clean Environment (PACE) Program staff to introduce the program through this initiative, an outside consulting firm provides energy experts to guide the businesses through the process of identifying energy efficiency options and service providers, securing simple paybacks, overcoming the institution, and completing the necessary paperwork to receive available rebates. Additional rebate incentives could be offered to further sweeten the deal.

The project is included an successful business outreach in facilities conducted in Austin, Texas; Long Island, New York; and in Oakland and Berkeley, California. It successfully took project could also be repeated up via adaptation to local energy, Longmont Power and Communications, and other county power providers.

2. Commercial Building Codes and Ordinances for New and Existing Buildings

23% of county greenhouse gas emissions stem from the demand for energy required by the commercial sector. In partnership with municipal and county building officials, this initiative will seek to create building codes requiring that the performance of new and existing commercial buildings over time be enhanced to meet a designated standard under the U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager as other emerging building performance programs, such as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standards.

ENERGY STAR Portfolio Manager rates building energy performance on a scale of 1-100 relative to similar buildings nationwide. The rating system accounts for the impact of weather variations, as well as key operating and operating characteristics of each building. Buildings that achieve a rating of 75 or greater may qualify for the ENERGY STAR LEED for Existing Buildings is a green building rating system that was designed by the U.S. Green Building Council to guide and distinguish high-performance commercial and residential construction projects. Credits are awarded based on five categories of performance: Sustainable Sites, Energy and Atmosphere, Water Efficiency, Indoor Environmental Quality, and Materials and Resources. A project can earn a certain amount of points with each of these credit areas. The number of points the project earns determines the level of LEED certification the project receives.

Through the LEED system, combined with local code development processes, there is the potential to promote a wide range of strategies, including the use of control systems such as:

- Motion detectors
- Centralized control systems to shut down equipment when not in use
- Centrifugal fans
- Use of green, white, or reflective roofing
- Water conservation practices
- Ventilation
- Window glazing
- Design solutions for energy-efficient buildings and vehicles

This initiative will investigate the use of individual performance systems and/or a combination of them. Other strategies that will be investigated for reducing emissions associated with the demand from existing commercial buildings include the Architecture 2030 challenge (www.architecture2030.org) and Berkeley's Commercial Energy Conservation Ordinance. For existing buildings, codes could be required at the point of sale, during a renovation, or at a time established in the future that would give building owners enough time to prepare for and implement the required changes.

3. Promoting Combined Heat and Power (CHP)

Combined heat and power (CHP), which is known as cogeneration, is an efficient, clean, and reliable approach to generating power and thermal energy from a single fuel source. CHP is not a specific technology, but rather an application of technologies to meet an energy user's needs. CHP systems achieve typical effective electric efficiencies of 50 to 70% – a dramatic improvement over the average efficiency of separate heat and power. Since CHP is highly efficient, it also reduces traditional air pollutants and carbon dioxide, the leading greenhouse gas associated with climate change. The CHP system can produce the same electrical and thermal output at 75% fuel conversion efficiency as compared to 45% for separate heat and power. This is a 50% gain in overall efficiency, resulting in a 50% fuel savings.

In addition, there are more than 100 food processing, beverage, and food processors in Boulder County, and each produces a significant amount of organic waste matter. Nearly every operation either composts this material or sends it to local farms for livestock feed. More benefit might be gained from this material if it were to be digested under a suitable condition to produce methane gas. The gas would then be captured and used for local electric generation. Material could be collected from the various operations and transported to a digester. The New Belgium Brewery in Fort Collins has successfully developed such a process at their facility. It should be noted that a regional drive to New Belgium to install the digester was to avoid large fees from the wastewater treatment plant (WWT) for the discharge of high biological oxygen demand wastewater.

New Belgium uses the methane produced by the digester to generate renewable electricity and heat. The system is a 200-kW engine with heat recovery. The recovered heat is fed back to the anaerobic digester to maintain the digester's optimal temperature of 55°F. In the winter, the digester requires supplemental heat to maintain the optimal temperature. In the summer, the digester can't use all of the waste heat, and New Belgium is looking into other ways in which to use the excess heat. The system is ideally suited to run between 200-250 kW. This initiative will encourage the use of CHP in as many instances as possible across the food processing sector, taking the tools and resources available through the U.S. Environmental Protection Agency's CHP Partnership. Companies will be encouraged to assess the benefits and subsequently apply these systems. It will also explore the opportunities to increase the use of anaerobic digestion in the food processing and beverage industries.

4. Western States Climate Initiative

In February 2006, five governors from Western states agreed to work together to reduce greenhouse gases. A central piece of this agreement is the creation of a regional "cap-and-trade program." This approach lets companies that can't meet their emissions reduction targets buy credits from those that reduce carbon dioxide emissions below their allotted levels. A similar system is close to being implemented by seven Northeastern and Mid-Atlantic states.

The Regional Greenhouse Gas Initiative (RGGI) creates a mandatory cap-and-trade program to reduce carbon dioxide emissions from power plants in the region. The RGGI emissions trading program is scheduled to launch January 1, 2009. Modeled after the federal sulfur dioxide trading program, RGGI includes several innovative program components, including the auctioning of emissions allowances and penalties for periodic-based reductions or "offsets" as non-utility companies can participate.

Together, the Western and Northeastern regional cap-and-trade programs will provide a framework for developing a regional cap-and-trade program and serve as a model for a national system by businesses concerned about participating in multiple and variable programs. The State of Colorado has currently elected to participate as an "observer" in this important process. Boulder County could one day be able to encourage active participation.

5. Statewide Lighting Efficiency Standard

Many energy codes and environmental concerns are encouraging states to follow the lead of Australia and Canada and ban incandescent light bulbs altogether. A bill has been proposed in California that, if passed, would ban the sale of incandescent bulbs. Louisiana is Connecticut and Rhode Island have begun considering bans, and Texas and New Jersey are considering bans in public buildings. Several states are taking a different approach, banning the first sale to prevent lighting manufacturers from energy efficiency standards of 23 lumens per watt for general-purpose light bulbs in the short- and mid-term markets by 2012.

Incandescent bulbs are about 75% less efficient than compact fluorescent bulbs (CFLs) and generate 75% more heat. CFLs cost more to purchase, but because they last longer, they actually cost less – saving consumers \$30 or more on electricity over the lifetime of the bulb.

This initiative would support legislation establishing a statewide minimum energy efficiency standard for lighting. Rather than erecting a ban on one technology, this approach would ensure that energy efficient lighting is sold in the state, whatever the technology may be. In addition, the standard can be strengthened over time as new technologies such as LED lighting or super-efficient incandescent bulbs become commercially available.



GOVERNMENT SECTOR

Local governments can lead by example and influence the adoption of energy efficiency and renewable energy technology. Local governments are also large users of energy for commercial buildings, signs and transportation. The section explores the opportunities that local governments have to reduce greenhouse gas emissions in these sectors.

1. Anti-Idling Controls and Policies for Government Vehicles

Unnecessary idling of government vehicles wastes fuel, leads to unnecessary air pollution, reduces engine life, and increases maintenance costs. A simple mechanical adjustment of technology already available on many-day vehicles will automatically shut the vehicle off at the moment of idling. Because the device has already been installed on many vehicles and only needs a simple adjustment to activate, this low-cost measure has big results in saving energy and reducing greenhouse gas emissions. Policies will also be drafted and implemented prohibiting unnecessary idling. This initiative will enable a 5-minute shut-off control on all appropriate public vehicles and implement anti-idling policies for all other county and municipal vehicles.

2. Green or Light Colored Roofs

Painting the roofs of county and municipal buildings with greenery and light or reflective coloring can significantly reduce energy use associated with the buildup of heat on the roof. In addition to their energy savings, green or vegetated roofs reduce stormwater runoff.

The City of Chicago found that installing a green roof on its city hall building lowered the temperature by 3-7°F, which translated into a 10% reduction in air conditioning requirements. While the city's green roof was 90°F on the sunniest hottest days, neighboring roofs measured over 160°F. The degree of savings depends on the type of roof and the climate. Boulder County's climate offers greater energy savings, because green roofs reduce air conditioning costs more efficiently than they lower heating bills. Thus, it is a strategy that targets more greenhouse gas intensive electricity use rather than natural gas, which is commonly used for heating.

Part of this initiative will investigate and promote more conventional roofing strategies, such as light- or white-colored roofing. In addition, more innovative strategies, such as rooftop photovoltaics, will be encouraged as a higher tier option for use of the roof space.

3. Light Emitting Diode (LED) Traffic Signals

Replace energy-intensive incandescent bulbs in traffic signal light and pedestrian crosswalk signals with highly efficient LEDs. The technology is expected to reduce energy use by 50%, lower maintenance due to increased life, and incorporate innovations like battery backup using photovoltaics. Most energy offers rebates for such conversions. The payback period for such conversions is typically less than one year.

This initiative will encourage the full adoption of LED traffic lighting.

4. Leadership in Efficient Public Buildings

This initiative will ensure that new and existing public buildings lead the way in energy efficiency and performance. Through codes, standards, policies, or ordinances, public buildings will be required to achieve a higher level of efficiency than the private sector building codes or ordinances envisioned in this plan. For example, public sector buildings would have more efficient heating and cooling system requirements, as well as more efficient windows, and would allow control systems for office equipment.

This initiative will make at least one existing municipal and county building leaders in energy efficiency.

5. Goal Setting

Setting a greenhouse gas reduction target is a good first step for establishing energy efficiency and renewable energy actions as a community priority. More than 500 mayors, representing 65 million people, have now signed the U.S. Mayor's Climate Protection Agreement that includes a commitment to meet or beat the Kyoto goals calling for a 7% reduction in greenhouse gas emissions below 1990 levels by 2012. The City of Boulder and Boulder County have already adopted the Kyoto goals.

Much like the County and the City of Boulder have, this initiative will encourage all municipalities within Boulder County to adopt a greenhouse gas reduction goal.

6. ClimateSmart

ClimateSmart plays an important role in providing the information, tools, and resources that residents and employees need to make the choices and decisions that will promote a sustainable energy path and economy. The ClimateSmart campaign provides such resources, including informational advertising and timely connections, as well as tools to assess GHG impacts and identify opportunities for improvement.

This initiative will develop measures to the creation of an educational campaign and tools, such as a carbon calculator, that enable local governments, businesses, and residents to set a reduction goal and create an action plan. This may help with planning options.

7. Municipal and County Energy Management Plans

A key to implementing and realizing the benefits of energy efficiency in municipal and county buildings and operations is the creation of comprehensive, multi-year management plans. These plans provide a systematic process for auditing, prioritizing, financing, and installing improvements. The plan will also establish energy performance goals, such as an energy use per square foot target relative to the approach used by the University of Colorado, Boulder Campus.

This initiative will work with municipal and county facilities managers to develop energy efficiency management plans.



ClimateSmart On the Road

1. Biofuels Promotion

When compared with petroleum-based, biofuels dramatically reduce sulfur, particulate matter, CO₂, volatile organic compounds, which form harmful smog and carbon monoxide, while producing a slight increase in nitrogen emissions. Biofuel can be used in existing life model diesel engines, requiring little or no modification, and can be distributed through the existing fuel distribution infrastructure. It mixes easily with petroleum and can be improved performance in colder months and provides improved lubrication necessitated by the new low sulfur petroleum-based fuels. Bio-diesel costs are currently the same or slightly less than petroleum-based.

Ethanol is another biofuel that is subject to gasoline to decrease air pollution and to reduce GHG emissions. However, at the time most ethanol is derived from grains, such as corn and wheat or soybeans, though it boasts that the greenhouse gas benefit compared with gasoline.

Cultivated ethanol is produced from a wider variety of biomass feedstocks than conventional ethanol fuel. These new feedstocks include forest waste, agricultural plant wastes, plant wastes from industrial processes (sawdust, pine pulp), and energy crops grown specifically for fuel production (such as switchgrass). This process is expensive at present, however, advances in biotechnology could decrease conversion costs substantially. If Department of Energy (DOE) goals are met, the cost of producing ethanol could be reduced by as much as 60 cents per gallon by 2015. The use of conventional ethanol in the short-term can pave the way for cultivated ethanol in the near future.

This initiative will promote the use of biofuels consistent with sustainability criteria. Educational barriers will be identified and addressed, beginning with government operations and large diesel fuel users.



ClimateSmart On the Road (cont.)

2. Vehicle-to-Grid (V2G) Connection

Increasing the use of electric-drive hybrid vehicles would not only reduce dependence on foreign oil, but these vehicles could also provide battery/storage capacity for renewable sources to power the electric grid by plugging hybrid vehicles into the electric grid to provide power during the many hours of the day that they sit idle. This strategy would reduce the need to build new power plants to meet peak power demands. They would also allow for greater use of renewable energy supplies because renewables require storage capacity.

Estimates indicate that if manufacturers were to make 1 million next-generation V2G vehicles by 2020, they could generate up to 10,000 MW of electricity – about the capacity of 20 average-size power plants. Studies also show that it would be far cheaper for utilities to top the batteries of thousands of cars than the current practice of keeping huge batteries constantly spinning to supply power at a moment's notice. There would be little risk of leaving the office to discover a car with a dead battery, because V2G cars would have onboard controls to prevent their batteries from being drawn below the minimum level needed set by the owner – for example, a 20-mile trip. The additional cost to outfit today's Toyota Prius with an adequate battery pack to make it able for 1200 power would add roughly \$400 to a car's overall cost, and full-size cars will be around hybrids in their electric-generating potential.

This initiative will explore and promote opportunities for vehicle-to-grid through education, pilot projects such as the county's plug-in hybrid vehicle purchase, and potential incentives.

3. Clean Car Incentive

A clean car incentive is a financing mechanism to incentivize the purchase of high fuel-efficiency vehicles. The incentive is funded by charging users of less fuel-efficient vehicles a fee and apply the funds from the fee, or an incentive, toward the purchase of two a fuel-efficient vehicle. The approach is a relatively efficient way of promoting the purchase of more fuel-efficient vehicles. Users of less fuel-efficient vehicles directly pay for the externalities that they incur upon society.

The type of approach has been considered by state and federal lawmakers over the past 15 years, however, it has never been implemented. Various analyses have been done based on modeling of consumer choice and manufacturer behavior. These studies indicate that with existing technologies, a national feebate program could reduce CO₂ emissions from vehicles by 20%.

The initiative would consider and potentially propose a statewide Clean Car Incentive program for Colorado and/or a countywide program as part of the vehicle registration process. Some vehicles, such as those used for work purposes, could be exempted from the program. Fully commercial vehicles, however, require more rational resources to produce and operate and cost more carbon dioxide. These vehicles would not be eligible for the incentives that they incur upon society.

4. Clean Car Standard for Colorado

The "California Clean Car" initiative gave car companies until 2016 to achieve a 30% reduction in greenhouse gas emissions from new cars, pickups, minivans, and SUVs sold in the state. While new car buyers will pay more once the new standards are in effect, the standards will have less as well as emissions. To date, 15 other states have adopted the rules. A survey conducted in 2004 of 1,200 voters nationwide found that 70% support California's emissions law. Adoption by additional states, including Colorado, would give more support for their national approach.

Through the initiative, Boulder County could use as reference to encourage the state to adopt these standards.



ClimateSmart Power

1. Renewable Portfolio Standard

Colorado became the first U.S. state to create a renewable portfolio standard (RPS) by ballot initiative when voters approved Amendment 37 in November 2004. Colorado's original RPS, which has since been expanded, required large investor-owned utilities to generate or purchase 90% of their retail electric sales from renewable-energy resources. In 2007, the state legislature increased the RPS and extended the requirement to electric cooperatives, among other changes. Colorado's current RPS requires each investor-owned utility to use specific percentages of renewable energy either installed energy according to a schedule that culminates in obtaining 30% of its retail electricity sales in Colorado for the year 2020 and for each following year.

In addition, Colorado's RPS requires all electric cooperatives and each municipal utility serving more than 40,000 customers to use specific percentages of renewable energy and/or installed energy according to a schedule culminating in obtaining 10% of its retail electricity sales in Colorado for the year 2020 and each following year.

This initiative will investigate the need for a more stringent standard.

2. Concentrating Solar Project

Concentrating solar power systems are large centralized power generation plants that use the sun's energy rather than fossil fuels. These systems are currently being developed and tested as a means of fulfilling our growing power demand. This initiative would encourage the use and continued development of concentrating solar power technology by identifying partners and project sites in Boulder County.

Concentrating power plants today use fuel rods as a heat source to boil water. The steam from the boiling water rotates a large turbine, which activates a generator that produces electricity. However, concentrating solar power systems use the sun as a heat source rather than fossil fuels. Unlike the photovoltaic units installed on our rooftops, these systems employ mirroring systems to concentrate the solar energy reaching the system.

For example, parabolic-tower systems concentrate the sun's energy through long rectangular, curved (U-shaped) mirrors. The mirrors are tilted toward the sun, focusing sunlight on a pipe that runs down the center of the trough. It is heats the oil flowing through the pipe. The hot oil then is used to boil water in a conventional steam generator to produce electricity.

This initiative will explore the possibility and encourage the building of a concentrating solar facility in Boulder County.

3. Community Renewable Energy

Currently, renewable energy sources offset about 10% of Colorado's GHG emissions by 1%. The purchase of renewable energy credits (RECs) for about half of this, with county/financially owned renewable resources accounting for the other half, increasing the purchase of renewable energy credits (RECs) can increase the amount of renewable resources being used by county residents and businesses to offset GHG emissions. As a long-term strategy, the county could investigate the possibility of establishing a community wind or concentrated solar project, to supply a portion of our electrical needs.

4. Sustainable Energy Financing District

Although solar power is an attractive option for some homeowners and businesses thanks to federal, local, and utility rebate incentives, significant hurdles stand in the way of broad adoption. These include high installation costs (roughly \$15,000 to \$15,000 with the rebates for homeowners), a long payback period (10-20 years), and the possibility that the property will be sold before the project pays off. To address these issues, the Berkeley, California, City Council created its staff to design and develop an energy financing district.

The general concept involves the local government establishing a bond-financed fund that is available to property owners to use to purchase solar systems (photovoltaic or hot water) and energy-efficiency improvements (some energy-efficiency measures may be repaid). The fund is repaid, with interest, through an assessment on the property. Administrative costs would be rolled into the property owner's tax. According to City of Berkeley staff, through the financing system, property owners would pay very little in upfront costs. This project became particularly attractive if the interest rates offered by a county bond are lower than through commercial equity lines. Since the tax assessment is levied on the property, the property is sold before the project is paid for the next owner would take over the payments. While this adds an additional expense to the property, the "green" nature of the home may actually attract prospective buyers.

This initiative would track the progress of the analytical efforts being conducted in Berkeley and investigate its application in Boulder County and Colorado.

5. Solar-Powered Public Buildings

Public buildings are a showcase for the public and can be an example of what is possible. In this way, they represent an ideal opportunity for the use of solar power. In addition to providing an example, public buildings can also take advantage of the long-term paybacks associated with photovoltaics (PV) and solar thermal systems.

This initiative would focus on installing (where practical) large-scale PV on public buildings in the 100kW to 1MW range. Their partial ownership is an alternative mode that will be considered, as well as the use of other financing mechanisms.

In addition, this initiative will work to encourage the use of solar hot water systems on all large municipally-owned water consumers, such as pools, recreation centers, jails, etc.



ClimateSmart Power (cont.)

6. Maximum Rooftop PV

Incentives for new or retrofitted photovoltaics (PV) on rooftops in the county would convert light energy into electrical energy. This initiative would seek to maximize the use of the largest rooftops in Boulder County as the source of the cost-effective PV. Incentives under building codes could be used to ensure that our largest retail and industrial sites take greatest advantage of this renewable resource.

Incentives to incorporate PV into residential design could be provided through the county's "Build Smart" program. Not every home could be retrofitted, since PV modules need to be mounted facing the sun, avoiding shade for best results; however, these issues can be considered during the design phase for new construction.

Some utilities, including Austin Energy, have established controlled PV power stations. The program allows customers to pay a small fee on their monthly utility bill that will be used to construct additional PV panels, which would add more renewable energy inputs for the City's overall energy production base.

Another use is the concept of a solar cooperative. In this model, homeowners or renters that want to "own" PV systems can do so by purchasing an equity position in a local PV system. The panels go up at a central location in their neighborhood and they receive a check every month. The panels, once again, are placed in a location most suitable for PV. Regulatory authority to implement these types of programs may be necessary to overcome existing barriers.

This initiative will explore these ideas, as well as additional financing mechanisms, and the authority needed from the Public Utilities Commission.



Utility Partnerships

This section explores the unique role that electric utility providers can play in encouraging energy efficiency and renewable energy. It documents and evaluates some of the more innovative policy demand-side and renewable energy programs that will be explored.

1. Maximum Use of Rebate Incentives

In January 2006, Xcel Energy launched several rebate and incentive programs to help its rate electrically savings for their business customers. The demand-side management (DSM) program's goal is to reduce system demand by 350 megawatts (MW) and conserve 800,000 megawatt-hours (MWh) of energy annually by 2014. Xcel Energy plans to spend up to \$100 million on energy conservation in Colorado within the next eight years – much of that will be available as equipment rebates when their customers install qualifying energy-saving equipment, such as lighting, motors, and cooling systems. In April 2007, new DSM legislation applying to both electricity and natural gas demand was passed by the legislature. Longmont Business Center was up to \$500 per kilowatt (kW) for installing energy-efficiency improvements. Longmont Power and Commercial Inc. (LPC) and Public Power Agency (PPA) offer their customers to 20 commercial rate customers for installing energy-efficient equipment or controls that reduce electric demand during the summer peak period. Qualified electric efficiency measures pay rebates, but are not limited to lighting, heating, ventilation, cooling, motors, manufacturing equipment, thermal energy storage controls, or other technologies.

In order to maximize rebate use, programs should be put into place to ensure that these rebates are considered when making any equipment purchases or building design, commissioning, or retrofit. Such programs would identify where rebates are available and possibly change purchasing and design decisions to take advantage of rebates.

This initiative will assess several strategies for ensuring the maximum use of these funds. In addition, it will assess city and county statutory authority to add rebate and incentive funds to those provided by utilities.

2. Utility Demand and Power Supply Incentives

The City of Boulder and several other municipalities are currently revising or renewing their franchise agreements with Xcel Energy. Other power supply contracts in place across the county may be coming up for renewal as well. This is a time to consider the pros and cons of various power mix strategies, particularly those that can lead to the best combination of demand reduction, efficiency, and renewable supply options.

While the state legislature has just passed legislation supporting stronger demand-side management programs and strengthening the state's Renewable Portfolio Standard, these efforts may not be sufficient to meet county demand goals.

This initiative will investigate and pursue alternative power mix strategies with Boulder County power suppliers, such as municipal aggregation and other strategies, to enhance demand management and renewable resources.

3. Carbon Labeling

Bringing greater awareness to residents and businesses about the impacts of their energy use, electricity bills could include information on the carbon dioxide equivalent of the energy that was used the previous month. Additional information such as the average emissions per home or business associated with annual automobile use could also help people understand the impact of their energy use.



Revenue Generation

To support these strategies, measures will be necessary. This section explores investment and incentive opportunities, such as rebates, low-interest loans, revolving funds, bonds, and other strategies to attract the necessary investment to cost-effectively reach our GHG reduction objectives.

1. Energy Budgets and Rate Structures

Providing incentives for conservation energy budgets could be established for certain home or office uses. For usage above that amount, a higher rate could be charged. This is similar to what communities are doing with water charges.

2. Revolving Loan Fund

Similar to Massachusetts' "MassFLEX" initiative would establish a revolving loan fund to cover the start-up costs of a large-scale energy-efficiency program. The fund could be established at the state or local level, beginning with private contributions or tax funds. Massachusetts will begin with \$2 million in seed and is projected to reach \$100 million in efficiency measures, meaning a portion of the cost savings from saving less energy will be used to pay for additional energy-efficiency measures. In addition to energy-efficiency measures, the project could include new renewable and clean energy generation, and technologies that use electricity use during peak demand periods.

3. Climate Offset Credits

This initiative will explore the potential of funding for energy-efficiency projects through the sale of "offset" credits. Under this approach, businesses or residents would be able to directly contribute funding to enhance existing energy efficiency or renewable energy projects. These funds would be applied to expand the scope or impact of these projects to increase the amount of energy saved or renewable energy produced. The value of the credits to the purchasers is that they must offset the greenhouse gas impacts of the energy they use in a more cost-effective way.

4. Targeted Sales Taxes

The proposal would encourage legislation providing statutory cities and counties with the ability to implement targeted sales tax strategies, such as vehicle registration or carbon taxes. These funds would be used to promote investment and incentive opportunities, such as rebates, low-interest loans, revolving funds, bonds, and other strategies to attract the necessary resources to cost-effectively reach our greenhouse gas reduction objectives.

Appendix B.
Table of Emission Reduction Strategies and Impacts
ClimateSmart at Home

GHG Reductions (tCO2e)*			Cumulative Cost to Implement		Simple Pay Back (Years)	Cost-Effectiveness (\$/tCO2e)	
2023	2030	Total 2023-2030	Government (Million \$)	Private Sector (Million \$)			Annual Cost Savings in 2030 (Million \$)
Residential Projects							
High Efficiency Lighting Program – Early Action							
2,000	0	14,000	0.3	0.045	0.37**	0.9	-91
Neighborhood Energy Sweep – Early Action							
340	0	1,700	0.03	0	0.037**	0.8	-87
Industrial Energy Audit Program (Phase 1) – Early Action							
3,395	3,395	302,575	2.2	27.3	4.4	5.3	-48
Residential Building Code for New and Existing Buildings							
113,000	990,600	1,803,600	0.5	476.72	39.7	8.9	-17
Net: 260 tCO2e/yr savings							
14,540	24,390	172,480	0.455	71	4.7	15.1	23

Key Assumptions

Program and 2030 tCO2e savings are calculated with a 2023 electricity price of \$0.12/kWh.

Program is only active in the first 10 years of the program. After 10 years, the program is assumed to be inactive.

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** Due to end of project cost savings achieved prior to 2020.

ClimateSmart at Work

Commercial and Industrial Sector Projects

GHG Reductions (tCO ₂ e)*			Cumulative Cost to Implement		Simple Pay Back (Years)	Cost-Effectiveness (\$/tCO ₂ e)	
2023	2030	Total 2023-2030	Government (Million \$)	Private Sector (Million \$)			
PACE Energy Performance Project – Early Action							
482	482	29,400	0.1	3.1			0.65
Commercial Building Codes and Ordinances for Low-carbon Building							
359,800	449,300	2,755,000	0.5	223	46.9	3.0	-70
Combined Heat and Power							
74,551	209,894	1,441,040	0.0275	115	19.79	5.8	-35
Western States Electric Initiative							
565,300	404,250	2,840,700	48.51	247	37.7	5.1	-56
Singapore's Energy Efficiency Scheme							
30,865	56,528	246,416	0.033	8.1	2.5	2.3	-49
LED Lighting in Public Buildings							
5,428	27,158	245,065	0.377	12	0.98	6.0	537
GHG Reductions (tCO ₂ e)*			Cumulative Cost to Implement		Simple Pay Back (Years)	Cost-Effectiveness (\$/tCO ₂ e)	
2023	2030	Total 2023-2030	Government (Million \$)	Private Sector (Million \$)			
Government Sector Projects							
516	519	7,482	0	0			0.15
Energy-efficient Public Buildings							
213	266	2,658	1.3	0	0.17	7	-129
LED Public Signage							
717	717	9,321	0.15	0	0.063	2.4	-63
Weatherstripping and Sealing Public Buildings							
9,386	65,569	302,083	11.8	0	1.4	9.8	11

Key Assumptions

Program is only active in the first 10 years of the program. After 10 years, the program is assumed to be inactive.

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SUSTAINABLE ENERGY PLAN

BOULDER COUNTY CONSORTIUM OF CITIES

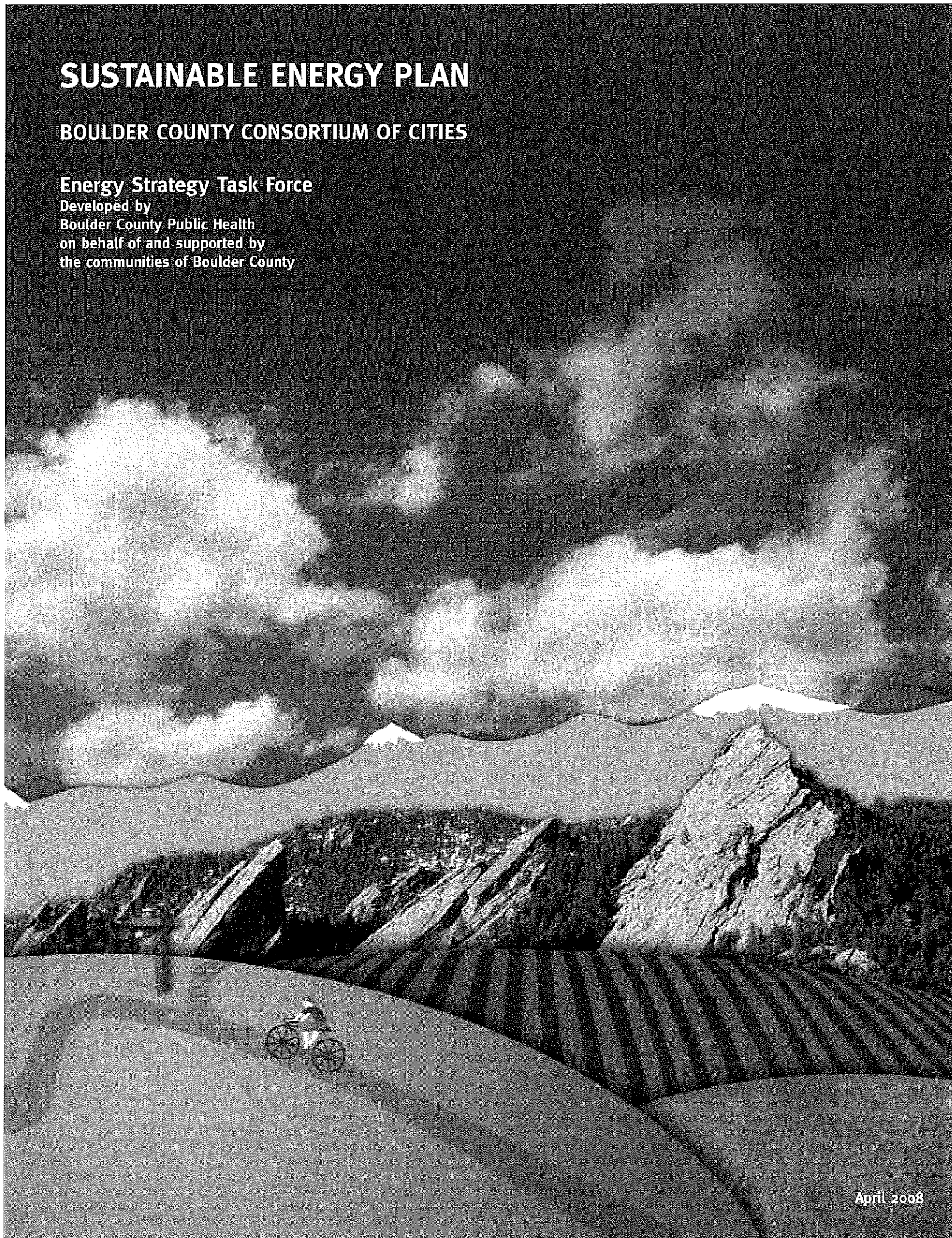
Energy Strategy Task Force

Developed by

Boulder County Public Health

on behalf of and supported by

the communities of Boulder County



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