

STAFF REPORT

DATE: December 16, 2008

TO: City Council

FROM: Mitch Sears, Sustainability Manager
Kim Vincent, Sustainability Intern

SUBJECT: City of Davis Low Carbon Diet Pilot Program Summary

Recommendation

Receive this report, which includes a summary of pilot program results.

Fiscal Impact

This is an informational report only. There is no fiscal impact. Staff time to develop and implement the project was budgeted through regular staff hours and work plans.

Background and Analysis

From October 12th thru November 10th, the Sustainability division under Parks and General Services challenged 100 households to participate in a 30 day pilot program to reduce their carbon emissions by 5,000 pounds each. Over 100 households answered the challenge, with participation ranging from City Council and staff, UC Davis campus administrators, faculty, staff, students, and local business owners to general community home owners and renters.

The program was based on a workbook published by the Empowerment Institute entitled “Low Carbon Diet: A 30 Day Program to Lose 5000 Pounds.” The workbook outlines actions to improve household energy efficiency and assigns a carbon value savings to each action taken. Participants calculated their baseline carbon footprints using a California-specific carbon calculator called CoolCalifornia (Lawrence Livermore National Laboratory, Berkeley, CA), and developed and implemented individual plans of action to reach their household carbon reduction goals. Over the course of the 30 day program, participants were offered support by their peer households and assistance from the City to address questions.

Households were given an initial orientation and met midway through the program. Within these meetings neighboring households broke into groups of ten, led by a facilitator, and discussed opportunities and challenges associated with the program. The feedback from these meetings was compiled and posted to both the City Low Carbon Diet (LCD) website and a Google Blog created specifically for participating households of the LCD.

Households reported their results through an online reporting tool at the end of the 30 day program. From the 47 reports received, households pledged to save a collective 253,723 annual pounds of CO₂, or 5,516 lbs/household on average. While only half of the participants reported

their results, the resultant trend suggests that households were, on average, able to achieve a 5,000 lb minimum carbon reduction.

Of those to report their results, 37 were homeowners, 9 were renters, and 1 declined to state. The reported income per household \$120,000 or more and the average family size was 2.7 persons. Most participants in this program were high income families and homeowners.

Davis, CA is a unique city in that many offices are located on campus or within the city limits. Furthermore, many LCD participants were early adopters of GHG reduction; roughly 40% reportedly bicycle (18), 45% drive an automobile (22), 10% walk (4), and 5% take public transit (3). The average round trip commute for these participants was 15 miles. The survey revealed that participants were willing to give up driving if their round trip commute was 10 miles or less.

The average baseline carbon footprint using the CoolCalifornia carbon calculator was 33 annual tons of CO₂ per year. Households ranged evenly from 10 to 53 tons of CO₂ per year. Figure 1 shows the average carbon footprint broken down by category.

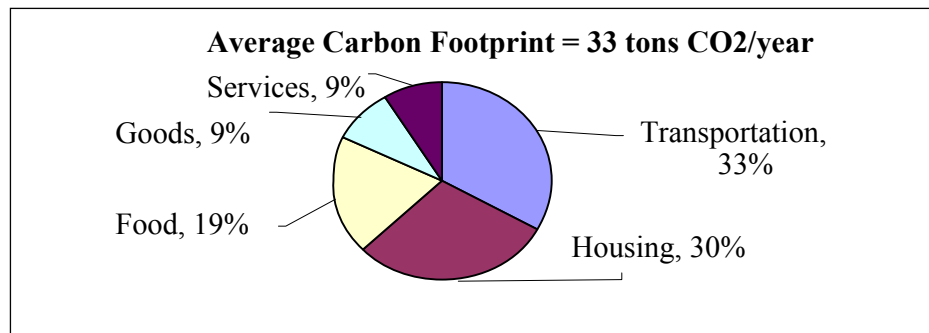


Figure 1. Average carbon footprint of households who reported results, broken down by category.

The nineteen actions presented in the workbook were split into practices that required simple changes in behavior (e.g. reducing hot water usage) and actions that required changes in the system (e.g. installing water heater insulation). To our surprise, participants were already practicing about 50% of actions listed in the workbook prior to the program. Approximately 30% of the actions listed in the workbook were newly adopted as a result of the program, and 20% of actions were not adopted at all despite aid offered by the program (Figure 2, Attachment 1).

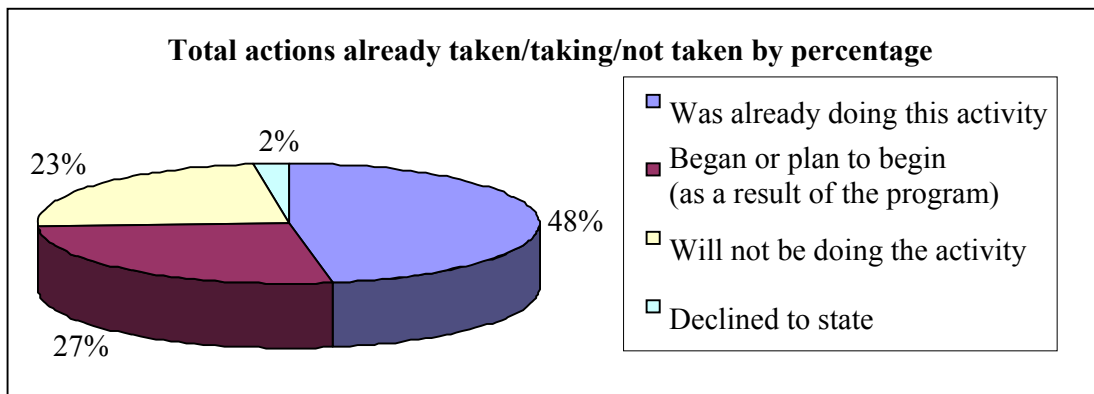


Figure 2. Percentage of actions that were already being practiced, were adopted through the program, or were not adopted despite the program.

Table 1 lists the top five most popular actions to be adopted within the program. Not coincidentally, all of the most popular actions involve changes in behavior. *Behavioral changes were reportedly easier and cheaper to adopt.*

Rank	Action	Lbs CO2 Saved	# of Households
1	Turning appliances all the way off	19600	34
2	Switching from meat to vegetarian meals one or more days a week	28000	28
3	Reducing hot water used in showers	15600	26
4	Reducing warm or hot wash loads per week	6800	26
5	Reducing miles driven in a car or truck by 20%	30513	22

Table 1. Most popular actions to be adopted as a result of the Low Carbon Diet Program.

While Table 1 lists the most popular actions that were taken, these individual actions did not necessarily render the greatest carbon savings. Table 2 lists the five actions that were the most efficient at reducing carbon emissions given their popularity to be adopted.

Rank	Action	Lbs CO2 saved	# of Households
1	Reducing solid waste to a smaller container	30680	14
2	Reducing vehicle miles traveled by 20%	30513	22
3	Switching from meat to vegetarian meals one or more days a week	28000	28
4	Implementing fuel efficient driving practices	23500	19
5	Turning appliances all the way off	19600	34

Table 2. Actions that were the most efficient at reducing carbon emissions given the number of households who adopted them.

On the opposite spectrum were actions that were least likely to be adopted. Each of these actions involved system level changes and *were either cost-prohibitive or too energy-intensive to adopt.* Table 3 lists the five least popular actions to be adopted.

Rank	Action	Lbs CO2 Saved	# of Households
1	Installing storm or high-efficiency windows	800	2
2	Insulating walls & attic	2400	3
3	Purchasing an energy-efficient furnace	4800	3
4	Replacing old refrigerator with a new, Energy Star® model	1500	3
5	Installing a solar water heater	7500	4

Table 3. Least popular actions to be adopted as a result of the Low Carbon Diet program

Overall, households expressed that they had a positive experience with the program. They reported that the workbook was a great tool to help construct an action plan, asserted that the program made them more aware and more committed to taking action, and felt that the discussions amongst participating community households were helpful and motivating. The pilot program was critiqued for not imbedding sufficient collaboration and accountability amongst team members, for setting program meetings at inconvenient times, and for not recognizing that certain actions would be adopted only if additional information and/or economic incentives were made available (Attachment2). To this end, *households suggested that the City take four actions to improve the program:*

- Hold meetings in casual settings and amongst natural groupings of people (and hold an additional meeting to increase accountability)
- Make it easier for the whole family to become engaged by the LCD
- Provide information on economic incentives for installing PV and energy efficient appliances
- Give incentive to reduce waste by persuading waste management to offer lower rates for smaller trash receptacles

Comments were also made regarding the CoolCalifornia carbon calculator (Attachment2). Overall, households thought that the calculator was an adequate tool for understanding how carbon emissions are generated and calculated in addition to being fun and easy-to-use (except for a few save and print functions). Participants felt, however, that the calculator made too many assumptions in its calculations and that the options available to select from were too limited in scope to accurately reflect the source of household GHG emissions.

Because a significant portion of the participants within the pilot program were early adopters of GHG reduction and were hence already practicing many of the suggested actions prior to their involvement in the LCD, they recommended that an addendum to the workbook be created for future participants to benefit from (Attachment2). *Reporting households requested the following six actions to be included in future LCD programs as additional suggested practices to reduce carbon emissions:*

- Compost/Worm bin
- Purchase locally grown food (or grow own vegetables)
- Practice good habits (e.g. close windows and draw drapes/blinds)
- Decrease consumption (e.g. reusing clothes/appliances)

- Reduce outdoor water usage (e.g. drip irrigation, reduce run-off, decrease size of lawn)
- Install whole house/ceiling fan

Conclusion

The staff feels that the pilot program was a success and received widespread support:

- Participants are on pace with meeting their reduction goals and have become more aware and committed to taking action to reduce their carbon emissions as a result of the program.
- The feedback from participants and facilitators was exceptional and was key to further developing the program for future participants.
- Improvements to the CoolCalifornia calculator have been made because of the feedback provided through this program.

Next Step

The next step is to return to the council in early January with a plan to scale up the program and challenge 500 Davis households with the Low Carbon Diet come early February 2009.

Attachments

1. Total Actions Taken Already/Taking/Not Taken
2. Summary of Participant Feedback for Davis Low Carbon Diet Program

Attachment 1

Total Actions Taken Already/Taking/Not Taken

N o.	Activity	A. Was already doing this activity	B. Began or plan to begin(as a result of the program)	C. Will not doing the activity	Declined to state
1	Reducing solid waste to a smaller container	30	12	5	0
2	Recycling Curbside 100%	39	6	2	0
3	Install low-flow shower heads	32	9	6	0
4	Reducing Hot Water Used in Showers	10	26	10	1
5	Adopt sustainable hand-dishwashing habits	17	19	10	1
6	Purchase Energy Star® dishwasher	28	5	13	1
7	Reduce electric dishwasher use per week (100 lbs./load)	23	18	5	1
8	Reduce warm or hot wash loads per week	21	24	1	1
9	Reduce number of weekly dryer loads (260 lbs./load less)	19	17	10	1
10	Purchase Energy Star® Front load washer	20	4	22	1
11	Set thermostat to 65-68° when people are home and active; 55-58° at night & when no one is home (1400 lbs)	29	13	4	1
12	Turn your appliances all the way off	5	33	8	1
13	Replace or clean AC Filter	25	17	4	1
14	Raise your A/C thermostat 4 degrees	35	6	5	1
15	Reduce miles driven in a car or truck by 20%	16	22	8	1
16	Implemented fuel efficient driving practices	22	20	4	1
17	Switch from meat to vegetarian meals one or more days a week	16	26	4	1
18	Set temperature of your water heater to 120 degrees	31	8	7	1
19	Insulate your water heater	29	6	11	1
20	Install a solar water heater	3	3	40	1
21	Install five compact fluorescent bulbs.	29	12	1	5
22	Install more than five compact fluorescent bulbs	21	21	3	2
23	Thoroughly sealing air leaks in your home	17	16	13	1
24	Furnace Tune-Up	15	12	19	1
25	Sealing & insulating warm air heating ducts	20	5	21	1
26	Purchasing an energy-efficient furnace	16	2	28	1
27	Insulating your walls & attic	26	2	17	2
28	Installing storm or high-efficiency windows	25	3	18	1
29	Replace old refrigerator with a new, Energy Star® model	23	3	20	1
	Total	642	370	319	32

Attachment 2

Summary of Participant Feedback for Davis Low Carbon Diet Program

Positive Comments		Count
1	Both fun and interesting (good exercise), glad Davis is doing it	16
2	Easy to implement, well thought-out, gave us incentive to act (ie carpooling)	15
3	Learned additional actions to those we already knew/made us more aware	14
4	Already doing a lot of things listed in this book/increased my commitment	10
5	Helpful to share ideas with others in community/Meetings constructive	10
6	Good to get kids involved/family forum - important for long-term sustainability	7
7	Helped us pinpoint where we were spending the most energy	4
8	No problems. No inconvenience	4
9	Workbook helpful in constructing plan	4
10	Staff support great - emails helped remind participants to stay on track	3
11	The quantitative challenge/point system works well to set and attain goals	3
12	Already doing things not listed in book	2
13	Hope that our contribution can be useful in establishing the program	1
14	Important to take the one-time, simple steps which pay long-term benefits	1
15	Having the City of Davis as a sponsor added a legitimacy and accountability to it that was	1
16	Available resources listed helpful (CoolCalifornia and PG&E)	1
17	Concise - allows even busy folks to easily gain benefit	1
18	Survey interesting	1
Critical Program Comments		
1	Insufficient collaboration/reinforcement amongst Ecoteams	11
2	Meetings were not held at convenient times/need to consider working spouses	4
3	Wasn't very much change we could implement that we aren't already doing because of t	3
4	Too short to implement small changes, but long enough to think and commit to them	3
5	Not realistic to change out appliances, etc without better state incentives	3
6	As a renter, difficult to justify many of the actions that required investments	3
7	Some things were omitted in the survey (ie reducing junk mail, switching soaps)	2
8	City needs policy changes/serious involvement in addition to outreach	2
9	Blog should have been started at beginning to increase communication	2
11	It cost me a lot of money	1
12	Survey doesn't provide space for actions already being taken	1
13	Difficult to make changes with small kids in home	1
14	Frustrating that workbook and calculator were not connected	1
15	Needs to be a better handle on the realistic impacts of these changes	1
Addendum of Actions (not listed in book)		
1	Composting/worm bin	9
2	CSA, local/grass-fed beef purchase/locavores	7
3	Good practices of keeping drapes closed/windows shut/blinds closed	7
4	Decreasing consumption/reusing clothing/appliances/holiday practices	6
5	Growing own vegetables	6

6	Whole house fan, ceiling fan	6
7	Watering practices - reduce lawn size, drip irrigation, reduce water run-off	4
8	PV installation	4
9	biodiesel	2
10	Planting shade trees to reduce energy/sun shades	2
11	Green cleaning supplies	2
12	Energy conservation for pools/spas	2
13	chickens for food scraps and eggs	1
14	credit for taking containers to restaurants in replace of "doggie-bags"	1
15	Vacationing closer to home (which would reduce transport emissions)	1
16	Sustainable gardening practices - lawn mulching, non-petrol based fertilizers	1
17	Reducing family size (having one kid at 35 instead of large family at 25)	1

Program Suggestions

1	Provide more opportunities for participants to interact in casual setting	3
2	Have more meetings and accountability	3
	* Use natural groupings of people that can meet and discuss - such as churches, schoc	1
	* Invite local experts to talk about certain issues in greater detail (e.g. installing/financ	1
	* Keep discussion going (post program?) via facilitator	1
3	Make it easier for whole family to get involved	3
4	City needs to offer lower service rates for smaller cans! (Berkeley does)	2
5	Provide information on incentives for installing solar, appliances	2
	* List local vendors who can assist homeowners with some of these actions	1
5	Contact civic groups ie Rotary and churches for next round	1
	* Give incentive to participate, speak about conservation	1
	* Instill idea that American Value system shouldn't be about larger family, larger car	1
6	Survey: On screen 6, I do not remember the individual scores, just the total of 28	1
7	Focus more on renters/students - they make up large proportion of Davis residents	1
8	Reduce prerogative to fudge numbers to get to the 5,000 lb mark...	1
9	Make sure results can be verified (if City is claiming that program reduces GHG)	1
10	The program starts with an absolute for current usage then applies a delta for current sa	1

Support Wanted

1	Easy access to people who do energy auditing	2
	* Education/additional tools to use in evaluating energy use (ie vampire leaks)	1
2	Tips for composting (in addition to what is already offered)	2
3	Tips for going vegetarian	1
4	Information about green power options offered by PG&E	1
5	Sources for reliable carbon-offsets	1

Critical Workbook Comments

1	The word "bicycle" doesn't appear in the book	3
2	When you work from home, you can't separate it out	2
3	Workbook has built-in assumptions and omissions that would be relevant	2
5	Doesn't account for actions already taken	2
6	Doesn't mention wastewater impact of garbage disposals	1

Carbon Calculator

Positive Carbon Calculator Comments

1	Worked well, with some limitations (useful as a general tool)	16
2	Easy to use	6
3	Good to compare averages (global, local)	5
4	No problems	3
5	Made us aware of all of what emits GHG	2
6	Short and not too tedious and has graphs so there is not a lot of text	2
7	Great that it included embodied carbon from goods and services	1
8	Fun to use	1
9	Excellent	1
10	Resources available from the Berkeley Cool California web site helpful	1

Critical Carbon Calculator Comments

1	Too many assumptions/Options too limited to make it reflect our household	8
2	Okay	5
3	We buy expensive organic, locally grown food and this is not reflected in calculator	5
4	"Goods & Services" defaults and determining factors were a bit confusing	4
5	Somewhat confusing	3
6	Save/load capability is broken	2
7	Couldn't get print-out of results	2
8	Frustrating because relation between dollars and energy is not linear (PG&E has a tiered	1
9	Water & sewer question should have asked which line items on bill to enter	1
10	Should say explicitly that it is necessary to enter 2x miles if 2 family members	1
11	Frustrating that we had to enter numbers even if we wanted the default settings	1
12	My house is two stories - some questions applied to only one story	1
13	Too detailed to be convenient, not detailed enough to be accurate/useful	1
14	Income: should ask for spending family income and not gross (some families spend a lot	1

Suggestions for Calculator Website

1	Would like to see it also show monetary savings associated with carbon savings	1
2	Would like education on reading my power meter	1
3	Explain where the assumptions come from	1

Program Success Stories

1	Reduce personal long distance travel	1
2	Replaced HVAC system with 95% FUE	1
3	Purchased a hybrid car and now paying 1/2 the amount in gas as before	1
4	New roof and windows	1
5	Will walk/bike to grocery store	1
6	Make car trips more efficient and drive hybrid on weekends	1
7	Installed the fenders, rack, and baskets on a bicycle	1