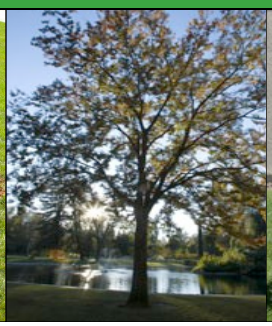
Carbon Offsetting Through Urban Tree Planting: The Sacramento Tree Foundation and Harbison-Mahony-Higgins Builders, Inc.






Fast Facts

Activity: Urban Forestry (Forestation)

Launch Date: 2008

Purpose: To offset five years of the CO2 emissions of the vehicle fleet of a local building contractor by planting trees on private property in Sacramento, CA.

Tree Ownership: The Sacramento Tree Foundation (STF) allocates the trees to private landowners in Sacramento. They are planted and cared for by the residents and are monitored yearly by the STF.

Funding: The local building contractor pays the STF $10,000 each year for five years (2008-2012).

Market: Private, Voluntary

Protocol: Calculations guided by the U.S. Forest Service publication by McPherson et al. (see page 5).

Aggregator: None used

Verifier: None used

Payment Mechanism: HMH directly pays the STF, who purchases and distributes the trees.

Climate Benefits: An estimated project total of 2,665 tCO2e offset from 2008-2012 through 580 trees planted; 1,599 tCO2e offset as of the completion of the 2010 planting season (532.4 tCO2e/year).

Co-Benefits: Air pollutant removal, prevention of air pollution through reduced energy use due to shading, stormwater runoff mitigation and other water benefits, wildlife habitat, reductions in home cooling costs through direct shading, and property value increase (see page 5 for details).

Overview

In 2008 a local building contracting business entered into a five-year voluntary contract with the nonprofit organization the Sacramento Tree Foundation (STF) to offset the emissions of the company's new vehicle fleet. By the end of the third planting season (2010) funds from the agreement will have resulted in the planting of 348 trees on private property throughout the Sacramento region, translating into 1,599 tons of carbon dioxide equivalent (tCO2e) offset. The details of the agreement were developed internally. This project highlights a mechanism for carbon offsetting that incorporates an interest in supporting local sustainability, urban forestry, a private and nonprofit collaboration, and the residents of Sacramento, who care for the planted trees.

The Project

In 2008, Harbison-Mahony-Higgins Builders, Inc. (HMH) acquired 66 new vehicles for its fleet and approached the nonprofit organization The Sacramento Tree Foundation with a desire to offset their emissions. The leaders of HMH were motivated by not only the company's dedication to its community but also by the emerging prominence of tangible carbon offset mechanisms. On its 50th anniversary in 2007, the general contracting company had announced that it had reduced its overall emissions by 15% that year and had a goal to continue to do so for each year thereafter (2). Recognizing the potential in a partnership to provide the area with direct benefits through tree planting while offsetting the vehicle emissions, HMH and STF quickly drafted a voluntary five-year, $50,000 carbon offset agreement.

The details are fairly simple: based on the five-year expected lifespan of the 66 vehicles, the agreement is renewed and resigned annually. Each year (2008-2010), HMH provides STF with the vehicle mileage to calculate the estimated emissions using U.S. Environmental Protection Agency (EPA) determination for miles per gallon for the vehicle model and then using EPA figures for average carbon emissions per gallon of gas (6). In 2008, 2009, and 2010 the total desired amount of CO_2 equivalent to be offset through the agreement was estimated to be 532.4 tCO_2e. Through the third planting season, then, the total offset amount has been 1,599 tCO_2e. Then, using the U.S. Forest Service report titled "Tree Guidelines for San Joaquin Valley Communities" (3), a baseline of 4.6 tCO_2e offset per tree over its lifetime has been used to determine that 116 trees be planted to achieve the annual desired offset. STF estimates that the 2011 and 2012 tCO_2e quantity and number of trees planted will be similar. Finally, HMH donates $10,000 by April 1st of each of the five years to cover the costs associated with planting and establishing the trees throughout the spring and the fall (and replacing those that do not survive) (2). Of the annual funding STF spends roughly $1,700 on trees, ties, and stakes, $3,300 on oversight, marketing, and evaluation, and $5,000 on outreach, site selection, instructions, education, stewardship, and monitoring (staff time). The annual funding breaks down to $86 per tree planted and $18.7 per tCO_2e offset.

HMH carbon offset funds are allocated to providing trees in areas that do not qualify for tree planting through existing programs, such as the Sacramento Shade Program. Through Sacramento Shade, a partnership with the Sacramento Municipal Utility District (SMUD), property owners in the SMUD service area are offered free trees (up to 10 for residents and then for businesses and nonprofit organizations, it depends on available

This map details a 2009 tree-planting that was conducted by the Sacramento Tree Foundation through HMH CO_2 Offset Agreement funds at the Mt. Vernon Mortuary in Sacramento. The exact location of the 31 trees planted at the site are indicated, including 3 replacement trees.

space) and are given the proper instruction and guidance on how to plant and maintain them. The residents have a chose of over 30 species, which come in #5 containers (5 gallons). STF purchases the trees from five California nurseries: Frantz Wholesale Nursery, Boething Treeland Farms, High Ranch Nursery, Inc., Grover Wholesale Nursery, and Valley Crest Tree Company. The trees average $12-$15 a piece. To date, the trees planted through the HMH offset funding have been done so on private property that does not qualify for the Sacramento Shade Program, filling a funding gap to help provide trees to all interested Sacramento residents, businesses, and nonprofit organizations and addressing the concept of additionality: these trees would not have been planted by STF if not for the HMH offset project.

Other elements of the HMH CO2 Offset Agreement are that STF must provide HMH with the exact location of each tree planted, provide a certificate of CO2 offset participation for HMH's office, recognize HMH on the nonprofit organization's website, and provide employees of HMH with the opportunity to participate in volunteer tree planting events.

Project Partners

The Sacramento Tree Foundation (STF) was founded in 1982 and is a national leader in urban forestry. Through collaborations with community partners, local businesses, and volunteers, the nonprofit organization runs multiple programs throughout the Sacramento region to increase the tree canopy and awareness of the benefits and importance of urban trees. Its Greenprint Initiative to increase overall tree canopy cover, the Sacramento Shade Program in partnership with the Sacramento Municipal Utility District, environmental education efforts, and a native tree planting program are just examples of the multiple ways in which the organization positively impacts its community and provides opportunities for residents to be involved with increasing the number of trees throughout the area.

Harbison-Mahony-Higgins Builders, Inc. (HMH) is a commercial general building contractor that has operated in Sacramento since 1957. A prominent business in the area, HMH's dedication to community has been exemplified by participation in community initiatives, positions on local nonprofit boards, and substantial financial donations to organizations in the area. HMH has also been active in the green building movement, employing LEED-accredited professionals, promoting the use of hybrid vehicles, and reducing the environmental impacts of its operations. This carbon offset project is a part of their commitment to achieving sustainable practices.

Participant Perspectives

Angel Purpura, the LEED Coordinator for HMH, states that "we at HMH Builders are continually motivated and strived to 'do the right thing', whether it involves our buildings, or community, or our environment. We feel that the STF partnership has been a great success; we are continually informed or new plantings and locations". Mr. Purpura also notes that HMH hopes to continue working with STF and to become more involved with the actual tree planting process as a volunteer opportunity for its employees.

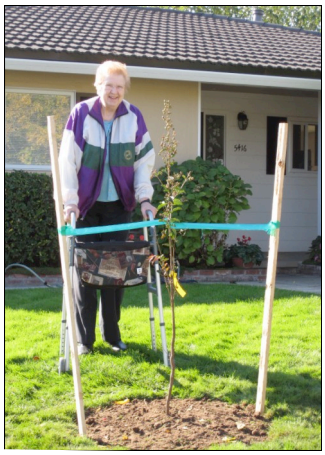
According to Jacobe Caditz of STF, after its initial setup, this carbon offset mechanism has been relatively easy to implement, primarily because of the large demand for shade trees in the Sacramento region. STF would strongly consider participating in a similar agreement with another interested entity. Since the trees planted through the agreement (348 by the end of the 2010 planting season) are leveraged against existing programs, tree and delivery costs are marginal since the trees are part of a larger bulk order. Also, since residents voluntarily plant and care for the trees, there are minimal labor costs and the maintenance costs (watering, mulching, fertilizing) are not included in STF's project budget. The majority of cost for the program lies in STF staff time. Specifically, 17% of the overall funding for the project is spent

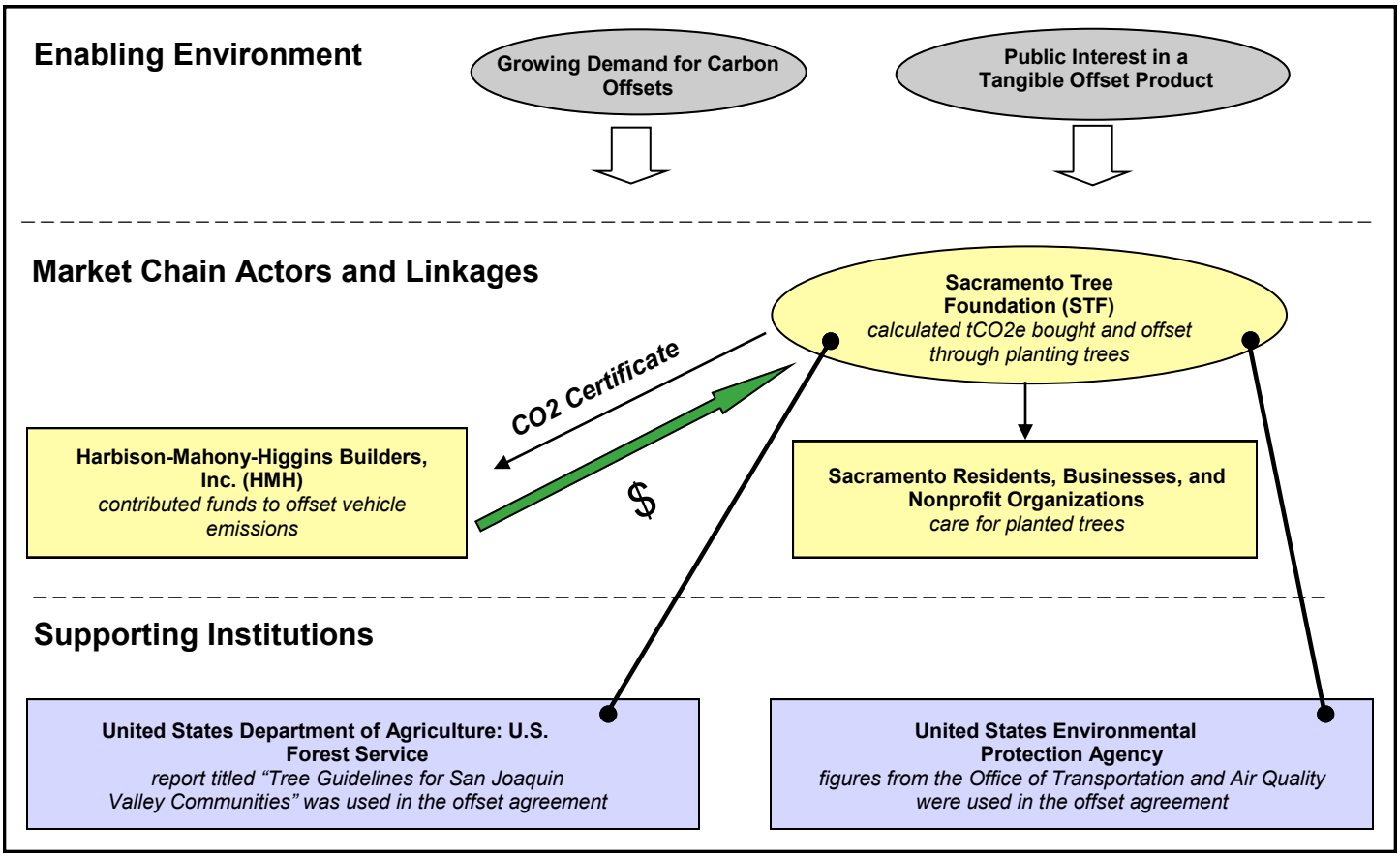
on trees, ties, and stakes while 33% is spent on overall marketing and evaluation and the remaining 50% is allocated to staff time for outreach, education, monitoring, and resident assistance with planting and maintenance.

Caditz, who heads the HMH collaboration and is also the director of the Sacramento Shade Program, says that the organization is interested in incorporating carbon offsets into its operations regularly but is aware of the obstacles for urban forestry's participation. Specifically, because of permanence issues, under the new Climate Action Reserve's Urban Forest Project Protocol for California, only universities, utilities, and municipalities can register projects: where do nonprofits fit in? Another concern of which Caditz is aware is that of additionality: how do urban forestry groups demonstrate that the trees planted through a carbon offset project would not have been otherwise planted? Though not required under their voluntary agreement, STF has been able to address this issue in the HMH CO2 Offset Agreement by specifically allocating the project's trees to landowners and residents whose properties do not fall under the guidelines of their other programs.

Market Chain Map

The market mapping technique used in this report was adapted from research conducted by the Food & Agriculture Organization of the United Nations and Policy Innovation Systems for Clean Energy Security (7). The large green arrow represents a revenue stream. In the Market Chain Actors section, the left-side square represents carbon "producers", the right-side square markets, and the oval "processors". The Enabling Environment represents the surrounding set of circumstances in which the program finds itself, but has no direct control over. The Supporting Institutions are not directly a part of the market chain, but provide vital services or support. The thick black lines indicate the connections between market participants and supporting institutions.





Lessons Learned

The carbon offset project between the Sacramento Tree Foundation and HMH Builders is an example of an effective and relatively simple collaboration between two entities with interests in local sustainability and community. The table below was provided by STF and outlines major environmental and economic benefits of the 580 trees estimated to be planted by the end of the project (2012). Specific lessons that can be taken from the HMH Carbon Offset Agreement include:

- The voluntary carbon market is dynamic and models for participation continue to develop; while there are offset mechanism that incorporate

Sacramento Tree Foundation
How 580 Trees Work for Us
to Save Energy and Improve Our Air and Water*

	Units		Dollars
Energy Saved			
Reduced Electricity Use	2,363,987	kWh (1)	$283,685
Effect on Natural Gas Used to Heat Homes	(1,072,738)	kbtu (2)	($8,786)
Net Energy Saved Through Trees	**22,567,686**	**kbtu**	**$274,980**
Air Benefits			
Air Pollutants Avoided Though Reduced Energy Consumption (3)	14,384	lbs	$69,368
Air Pollutant Uptake (4)	135,488	lbs	$586,728
Air Quality Subtotal: Air Pollutants Avoided & Uptake	*149,872*	lbs	*$656,096*
Net CO2 (Carbon Dioxide) Absorbed	5,244,147	lbs	$78,625
Total Air Benefits from Trees			**$734,721**
Water Benefits			
Stormwater Reduction and other Hydrology Benefits	12,803,152	gal	**$102,312**
Environmental Benefits Subtotal			**$1,112,245**
Property and Other Benefits			**$465,856**
Total Tree Benefits			**$1,578,101**
Total Tree Cost			**($238,728)**
580 Trees: Total Lifetime (40 Years) Net Benefits:			**$1,339,373**

Notes:

* Based on an average mix of tree size, tree location, and compass orientation for the Sacramento region.

(1) kWh : Kilowatt hour = one kilowatt of electricity supplied for one hour

(2) kbtu : one thousand british thermal units = measure of gas energy used to heat homes

(3) Pollutants Avoided: NO2, PM 10, VOC's

(4) Pollutant Uptake: O3, NO2, PM 10, O2

Data Source: *Tree Guidelines for San Joaquin Valley Communities* by McPherson, Simpson, Peper, and Xiao, U.S. Forest Service Center for Urban Forest Research. March 1999.

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aggregators, verification by third parties, and registries, this project demonstrates the possibility of less complex options showing success.

- Along the same lines, for nonprofit organizations whose resources may be stretched as is, it is useful to know that the tools and information required to develop the STF-HMH project were accessible and free of cost (the U.S. Forest Service report titled *Tree Guidelines for San Joaquin Communities* and data from the EPA's Office of Transportation and Air Quality website).
- By incorporating this carbon offset project into its current programming, STF staff has been able to minimize costs and also to address the concept of additionality by providing trees to residents who would not qualify to receive them if not for the additional available funds.
- This project was initiated by a business that was eager to voluntarily collaborate with a local group for a tangible carbon offset mechanism. This both enhances the company's sustainability profile and benefits the community in which it operates.
- This carbon offset project was developed by a reputable Sacramento area business and nonprofit organization; both are established and have demonstrated their integrity to the overall community, which could be related to the ease with which the project was implemented. Voluntary carbon markets are evolving and there is a level of accountability that should be considered by the participating entities in order to demonstrate legitimacy.

These overall take home messages demonstrate that one-off projects such as STF-HMH Carbon Offset Agreement can be achieved according to the objectives and capacities of the participants. The benefits to the community, STF, and HMH are evident and although STF has not been approached by any other businesses interested in engaging in a similar agreement, the HMH project could be replicated with relative ease.

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