

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



Fast Facts

Activity: Urban Forestry

Launch Date: 2008

Purpose: To offset five years of the carbon dioxide (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 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).

Protocol: No protocol used; calculations guided by the U.S. Forest Service publication by McPherson et al. (see page 5).

Verifier: None used

Price: \$18.76 per tCO₂e

Payment Mechanism: The contractor 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; 2,132 tCO₂e offset as of the completion of the 2010 planting season (533 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, property value increase, and enhanced quality of life (see page 5 for more 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 fourth planting season (2011), funds from the agreement will have resulted in the planting of 464 trees on private property throughout the Sacramento region, translating into 2,132 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 with urban forestry. It involves a private and nonprofit collaboration, engaging residents of Sacramento in the care of 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 the vehicle emissions. The leaders of HMH were motivated not only by 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 (4). 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 (2008-2011), 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 (9). From 2008 to 2011 the total desired amount of CO2 equivalent to be offset through the agreement was estimated to be

2,132 tCO2e (533 tCO2e per year). Then, using the U.S. Forest Service report titled *Tree Guidelines for San Joaquin Valley Communities* (5), a baseline of 4.6 tCO2e 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 2012 tCO2e 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). 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 \$18.76 per tCO2e offset (1).

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 space) and are given the proper instruction and guidance on how to plant and maintain them. The residents have a choice of over 30 species, which come in #5 containers;



STF purchases the trees, which average \$12—\$15 each, from five California nurseries. 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 (properties not within the SMUD service district), filling a funding gap to help provide trees to all interested Sacramento residents, businesses, and nonprofit organizations. This also addresses the concept of additionality since these trees would not have been planted by STF if not for the HMH offset project (1).

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.

Participant Perspectives

Angel Purpura, the Leadership in Environmental and Energy Design (LEED) Coordinator for HMH, states that “we at HMH Builders are continually motivated and strive 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 of 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 (464 by the end of the 2011 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 Climate Action Reserve's *Urban Forest Project Protocol*, only universities, utilities, and municipalities can register projects: where do nonprofits fit in? Another of Caditz's concerns 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 (2).

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 on page 5 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 CO2 Offset Agreement include:

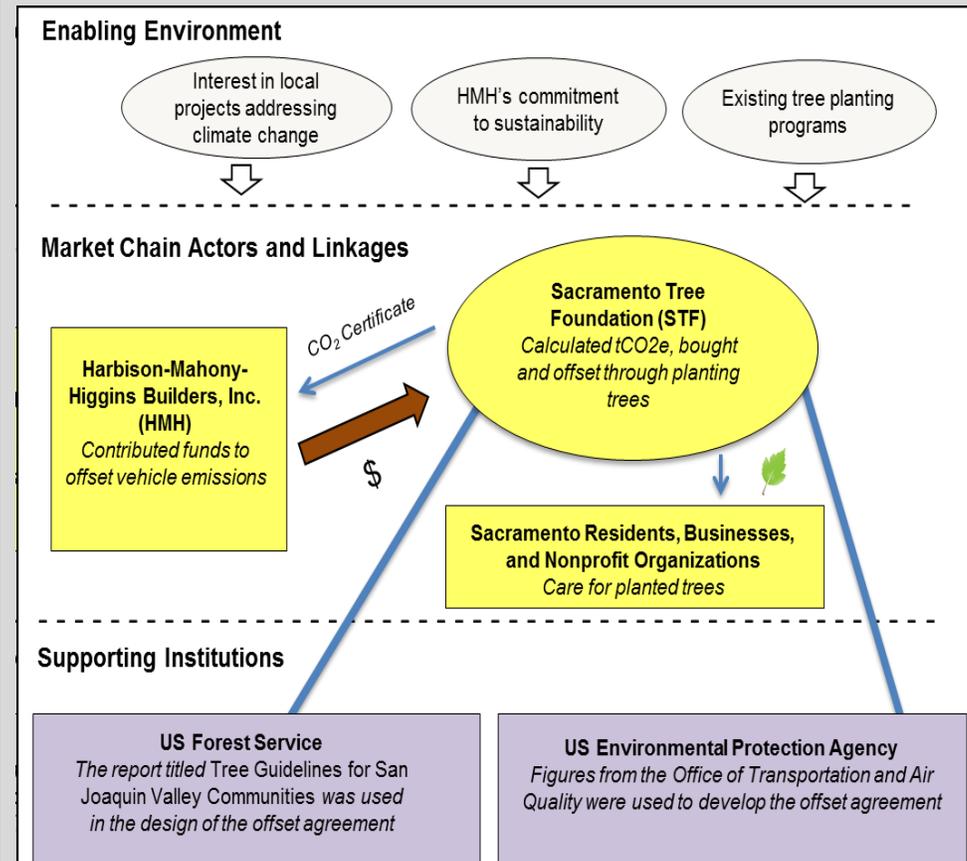
- ◆ While there are carbon offset mechanisms that incorporate aggregators, verification by third parties, and registries, *this project demonstrates the possibilities for success found in less complex options for participation in voluntary carbon markets.*

Market Chain Map

The market chain map summarizes the roles of participants and contributors to market-based initiatives (6). The Enabling Environment section indicates the external factors that facilitated the development of this urban forest carbon program. The Market Chain Actors and Linkages section includes the producers, purchasers, facilitating intermediaries and flow of funds. The Supporting Institutions section lists entities that provided critical support, but were not part of the market transaction. Because forest carbon markets are

newly emerging, the same organizations may show up in more than one capacity as they work to develop all of the components needed for a successful, market-based program. The dollar signs indicate flow of funds and the leaves indicate trees planted.

HMH's commitment to sustainability, STF's existing tree planting programs, and increased interest in local projects to address climate change were all conditions that contributed to the decision of STF to enter into the carbon offset agreement with HMH. HMH directs funds to STF, which identifies residents, businesses, and nonprofit organizations to plant and maintain trees provided by the organization, resulting in carbon offsets. Information available online from the U.S. Forest Service and the U.S. Environmental Protection Agency were used to develop the 5-year offset agreement.



- ◆ Useful tools and information required to develop carbon offset projects may be accessible and free of cost (such as the U.S. Forest Service report, *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.
- ◆ By providing trees to residents who would not have qualified without the additional funding, the project demonstrates additionality.
- ◆ This project was initiated by a business that was eager to voluntarily collaborate with a local group for tangible carbon offsets. This initiative on behalf of the contractor both enhances the company's image and benefits the community in which it operates.
- ◆ This carbon offset project was developed by a reputable Sacramento area business and nonprofit organization. The fact that both are well established in the community and have reputations for integrity is likely to have contributed to the ease of the project's implementation. The desire of local institutions to maintain or develop a good reputation can imply a level of accountability and confer a form of legitimacy on participants in voluntary carbon offset markets. This advantage is missing for would-be players that are non-local, obscure, or perceived as short-term in their local involvement.

These overall messages demonstrate that one-off projects such as the STF-HMH CO₂ Offset Agreement can be designed to suit the capacities of the participants and meet their particular objectives. The benefits to the community, STF, and HMH are evident. Although STF has not been approached by any other businesses interested in a similar arrangement as of 2011, the HMH project could be replicated with relative ease.

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

	<u>Units</u>	<u>Dollars</u>
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	\$274,899
Air Benefits		
Air Pollutants Avoided Through Reduced Energy Consumption (3)	14,384 lbs	\$69,368
Air Pollutant Uptake (4)	135,488 lbs	\$586,728
<i>Air Quality Subtotal: Air Pollutants Avoided & Uptake</i>	<i>149,872 lbs</i>	<i>\$656,096</i>
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 (Water and Air) Subtotal		\$837,033
Property and Other Benefits (Energy Included)		\$465,856
Total Tree Benefits		\$1,302,889
Total Tree Cost		(\$238,728)
580 Trees: Total Lifetime (40 Years) Net Benefits:		\$1,064,161
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: <i>Tree Guidelines for San Joaquin Valley Communities</i> by McPherson, Simpson, Peper, and Xiao, U.S. Forest Service Center for Urban Forest Research. March 1999.		

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Table 1: This table was created by the Sacramento Tree Foundation to highlight quantified benefits from the CO2 Offset Agreement with Harbison-Mahony-Higgins Builders, Inc. The 580 trees estimated to be planted through the five year agreement will provide over \$1 million in benefits over their expected lifetime.

Contact Information

The Sacramento Tree Foundation

Jacobe Caditz
Director, Sacramento Shade Program
(916) 924-8733, ext.105
Jacobe@sactree.com
www.sactree.com

The Authors

Elise Schadler
University of Vermont
Rubenstein School of Environment &
Natural Resources
Elise.Schadler@uvm.edu
www.uvm.edu/forestcarbon

Cecilia Danks
Associate Professor
University of Vermont
Rubenstein School of Environment &
Natural Resources
cdanks@uvm.edu
www.uvm.edu/forestcarbon

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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 SMUD, a native tree planting program, environmental education efforts, and the opportunities provided for citizen involvement in tree planting and care illustrate the multiple ways in which the organization has a positive impact on its community (8).



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 (3).

References

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- 9.) United States Environmental Protection Agency: Office of Transportation and Air Quality (2010). Accessed July 2010 at www.epa.gov/otaq/index.htm.

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