THE ROLE OF LOCAL CARBON REDUCTION INITIATIVES IN CALIFORNIA'S CAP-AND-TRADE PROGRAM INVESTMENTS

By David Gershon

EXECUTIVE SUMMARY

California's Global Warming Solutions Act of 2006 (Assembly Bill 32) directs the California Air Resources Board (ARB) to reduce carbon emissions 20 percent from 1990 levels by 2020 and 80 percent by 2050. A series of market mechanisms have been adopted by ARB to aid implementation of AB 32. Central to these market mechanisms is the nation's largest cap-and-trade system.[1] Implementation of cap-and-trade in California will result in revenues managed by both the California Public Utilities Commission (PUC) and ARB. PUC will manage funds generated from utility ratepayers. ARB will manage funds from industrial sources.

On November 19, 2012 the first California cap-and-trade auction sold out. The total sale came to 23.1 million permits at $10.09 apiece with each allowing for the release of one ton of carbon. The permit sales opened the largest carbon marketplace in the nation and the second biggest in the world after the European Union. ARB will hold four auctions a year and it is estimated that sales from these auctions will generate upwards of a billion dollars. Since AB 32 mandates that there be a strong nexus between investments of these revenues and greenhouse gas (GHG) reduction, California Air Resources Board needs to develop mechanisms to achieve a good return on investment in carbon reduction.

To that end, local carbon reduction initiatives will be important to the success of these carbon reduction investments because approximately 60%[2] of state GHG emissions are generated in the residential sector, which represents on average 70%[3] of a city's carbon footprint. It is also the low-hanging fruit because households can make immediate reductions in their carbon footprint without any quality of life diminishment and it saves them money. In addition, local carbon reduction initiatives can provide the critical co-benefits of demand-driven local green economic development while buying us needed time for the longer-term technology and renewable energy solutions to scale-up.

The problem, however, is that local carbon reduction initiatives aimed at getting people to adopt low carbon lifestyles are hard to do and that is why most GHG reduction solutions target the supply side. But if there is no demand, there is no market, and the best supply-side solutions will fall upon barren soil. Of course this is not an either/or proposition. We must bring about change on the supply *and* demand side, as they are synergistic. But for

---

[1] See www.arb.ca.gov/cc/capandtrade/capandtrade

[2] From Max Wei of Lawrence Berkeley National Laboratory: "About 44% of California's direct GHG emissions are from the residential sector (passenger vehicles, residential power, residential heat). Residential demand and purchases/food are closely intertwined with industry and agriculture/forest production but the Air Resources Board does not break out direct and indirect emissions by residential, commercial, government, and other sectors. Adding indirect emissions due to purchases and food would push residential to well over 50% maybe to 60 or 70%."

[3] These percentages combine residential home energy and transportation use and are based on Empowerment Institute's analysis of residential sector carbon footprints of many cities across America.

policy makers to fully avail themselves of this synergy they need to better understand how to activate the demand-side of the equation. Providing that understanding is a key goal of this white paper.

Residential Retrofits: A Key Lever to Achieve GHG Reduction

The most high leverage opportunity to influence the demand side are local initiatives targeting residential retrofits, since both greenhouse gas reduction and the development of a clean energy economy must pass through this gateway. Buildings represent the lion's share of carbon emissions, expensive renewable energy installations only make economic sense when a building is insulated, and retrofits enable the creation of green jobs and green economic development. As a consequence building retrofits were targeted for ARRA stimulus funding, with single-family homes the priority since they can be as much as 70% of the residential sector carbon emissions.[4] The Obama administration recognized the importance of this intervention and called it "recovery through retrofit."

To take advantage of $146 million dollars of ARRA funding and assist in the implementation of AB 32 and California Public Utility Commission's "Energy Efficiency Strategic Plan," Energy Upgrade California was created with a total investment of $312 million dollars. Its goal was to retrofit 100,000 homes by the end of 2012.

A September 22, 2012 article in the *San Francisco Chronicle* article entitled "Energy Upgrades Fall Short of Goal" by David Baker stated:

> "California last year launched an effort to help 100,000 homeowners save energy by providing rebates for new insulation, windows and furnaces. The stimulus money has been spent, but as of July, just 5,130 homes received upgrades or qualified for rebates, according to the California Energy Commission." Here is what Andrew McAllister, a member of the Commission, had to say in this same article. "California officials want to see roughly 8 million retrofits by 2020. Otherwise, the state will need to build more power plants than are currently planned. And California will have a harder time meeting its goals of cutting carbon dioxide emissions and fighting global warming."

If we are to unlock the great promise of home energy efficiency retrofits to enable GHG reductions and catalyze a clean energy economy in California (and as California goes so goes other states and countries), we need to transform the barriers to participation in household retrofits. And given that California has decided that household retrofits are a major part of its approach to GHG reduction, this knowledge is now essential for the state and those who would follow in its footsteps.

Research done by Empowerment Institute, which I co-founded and am CEO of, has demonstrated promising results for overcoming many of these barriers to participation.

In a pilot in San Antonio, Texas 41% of the 205 households participating in a peer-support group called an EcoTeam and using Empowerment Institute's behavior change program, *Green Living,* did some form of energy efficiency retrofit. Another small pilot conducted in

[4] From Max Wei, Lawrence Berkeley National Laboratory

Sonoma, California with eight households has also shown promising results. Using our *Low Carbon Diet* behavior change program and the EcoTeam peer support group model, each of these households participated in Energy Upgrade California's audit program. They then used this information and impetus to take one or more energy efficiency measures in their homes. Further, they invited neighbors to learn about their results and many of them also participated in Energy Upgrade California.

Our analysis on why these results were achieved is that the peer support group process enabled three outcomes unavailable when people are approached as single households. 1) It created a sustainability ethic as a new social norm in the group that can be easily emulated. 2) It provided demonstrations by a trusted messenger (EcoTeam member) to help other team members have a direct experience of the new behavior or energy upgrade. 3) And it provided support, motivation, and accountability to help team members follow through on their good intentions.

Combining these results with Empowerment Institute's neighbor-to-neighbor block-based recruitment rate of 25%[5] indicates that this approach is capable of achieving up to 10 times the best-case conversion rate of doors knocked on to energy efficiency measures taken of 1%. Further, because the household recruitment and support is done on a voluntary neighbor-to-neighbor basis, this approach, in comparison to major media marketing campaigns, is quite cost-effective. And it is scalable.

This whole system approach, which I describe in more detail later in this paper, is embedded in an initiative, called the "Cool City Challenge," to scale up Empowerment Institute's proven behavior change and community engagement methodology in three early adopter California Cities and then disseminate it statewide and beyond. We currently have letters of intent requesting to participate in this initiative from the cities of Davis, San Francisco, San Rafael, Sonoma, and Palo Alto from which we will choose three. The goal of this initiative however is not just to increase the uptake of residential energy retrofits, but to achieve substantial household carbon reduction.[6]

This behavior change methodology is based on two decades of rigorous research and social learning that has demonstrated how a peer-to-peer support system combined with recipe style actions set in the context of a structured program and compelling community vision, move citizens to take action. Key co-benefits of the Cool City Challenge initiative include low carbon economic development and green jobs, household and block-level disaster preparedness, strengthened social connectedness of the community, and a new model of partnership between citizens and their local governments.

---

[5] These results are based on working with 20,000 people in 9 U.S. cities. Results also included substantial natural resource and financial savings per household. See Chapter 2 "Environmentally Sustainable Lifestyles in America" in *Social Change 2.0: A Blueprint for Reinventing Our World* for a case study.

[6] Empowerment Institute's *Low Carbon Diet* program enabled between 22 and 25% carbon footprint reduction in households based on self-reported data from 1,500 households in Portland, Oregon and communities across the states of Vermont and Massachusetts. See in-depth analysis of Low Carbon Diet and its community engagement methodology applied in Portland, Oregon.

Desired Outcome for California

This white paper makes the case for the importance of investing cap-and-trade revenues into scalable local initiatives capable of engaging citizens in achieving substantial GHG reductions. This type of initiative can meet the demand-side need currently unmet by building and vehicle efficiency programs. Primed and scalable local carbon reduction initiatives that could be implemented relatively rapidly by ARB and other partners include:

Cool City Challenge: This initiative, as outlined above, has as its goal over three years to mobilize a minimum of 25% of each community's households to reduce their carbon footprint by 25% or more with at least 40% of these program participants doing home energy retrofits. Each city will also develop a low carbon economic development strategy around the increased residential demand generated by the campaign for low carbon goods and services, energy efficiency retrofits, and renewable energy. In addition, each community will be supported in creating a plan to transition toward citywide carbon neutrality. At the completion of this demonstration phase the Cool City Challenge model will be rolled out to communities across the state. To accelerate this scaling process interested communities will be supported through a one-year web-based preparatory program.

Carbon Aggregation and Participation Tracking Information Network (CAPTIN): Design and build an information management system for carbon aggregation and participation tracking in all sectors of the community. Additional features include comparison and analysis of participating cities climate action plans and results in attaining AB 32's goals, a simulator to help a city visualize the environmental, economic and social benefits at different levels of GHG reductions and participation to help motivate the community to take vigorous action, a community of practice for exchange of ideas on program implementation, and a start-up program to prepare new cities and accelerate the scaling process.

Along with helping to provide the policy and programmatic justification for local carbon reduction initiatives, this paper also outlines how the two described above could be implemented. I was requested by California State Senator Lois Wolk to prepare this white paper because of my expertise in behavior change and community engagement strategies. I wish to thank Joe Krovoza, Mayor of the City of Davis, Mitch Sears, Sustainability Manager for the City of Davis and Dr. Max Wei, Program Manager at Lawrence Berkeley National Laboratory, for their contributions.

THE POTENTIAL GHG REDUCTION IMPACT OF LOCAL INITIATIVES

"The world's cities are responsible for up to 70% of harmful greenhouse gases. They have become the real battleground in the fight against climate change. What goes on in cities, and how they manage their impact on the environment, lies at the core of the problem."
"Hot Cities: Battle Ground for Climate Change" – UN-HABITAT's 2011 Global Report

An Opening for Change

With international and national climate change legislation failing to get traction, the responsibility for addressing global warming in the United States has devolved to states and

communities. California, with its tradition as the trend-setting state for progressive environmental legislation in America, has stepped into this vacuum with the passage of its groundbreaking legislation, AB 32, and a cap-and-trade system to support its implementation. But now the work begins—actually getting substantive GHG reduction in a timely manner.

To just get California to its first benchmark of 20% GHG reduction by 2020 against 1990 levels will require a speed and magnitude of change well beyond the traditional experience of government. Its primary policy tools of command and control and financial incentives, at their best, enable slow, incremental change. Moreover the goals of 2020 are only the starting point for a much longer-term process of reducing GHG emissions 80% against 1990 levels by 2050.

If the social change tools of carrots and sticks alone are unlikely to meet AB 32's needs, what else is available? Are there assumptions we might rethink about what motivates people to change? Taking a page from Thomas Jefferson's playbook, might we be able to motivate people to change because of a dream that inspires their imagination, enlivens their sense of possibility, and lifts their spirit as human beings? Or to ask this question in a more tangible way, how might we empower individuals to voluntarily adopt new behaviors that help them operate at a higher level of social value, which in this context is the reduction of GHG emissions?

I have been attempting to answer this question over the past three decades, at the individual, local, national, and international levels; working with government agencies, nonprofit organizations, corporations, and ad-hoc community groups; in developed and developing countries alike, and around a multiplicity of issues.

My research has taught me that *people are willing to change if they have a compelling vision and are provided tools to help them bring it to fruition*. The vision must touch their core to engender the necessary passion and commitment needed to overcome the inevitable obstacles on the path to its achievement. They need others of like mind going on the journey with them to stay motivated. And with a well-designed transformative change platform that is replicable, these behavior changes can be widely disseminated throughout a community, organization, state, country, and across the planet.

I have also seen that when individuals become personally part of the solution it creates a new dynamic in the way we tackle large societal challenges. We are able to see beyond the traditional social change formula of business as the problem and government as the solution, with nonprofits lobbying government for better regulations against business and citizens sitting on the sidelines complaining about the coziness between politicians and business.

When citizens are empowered to adopt socially beneficial behaviors, such as a low carbon lifestyle, an opening can occur for traditionally adversarial relationships to establish new arrangements of cooperation in service to this new voting constituency and purchasing community. When all the parts of a system begin working together and there is no "other" to combat or protect against, more innovative and generative solutions start to emerge.

The model of social change that I have been describing represents what systems theory calls *second-order change* – change that transforms and reorganizes a system to a higher level of performance and social value. When the easier-to-implement change solutions prove inadequate for the magnitude of change required, the system goes into stress and must either evolve or breakdown. This white paper represents an attempt to expand the parameters for social change solutions so that we can evolve our social systems. I call it "Social Change 2.0." It stands on the shoulders of "Social Change 1.0" – command and control, financial incentives, and protest – because it could not function optimally without these. But it is designed to go beyond the constraints of these more incremental approaches to change.

The Social Change 2.0 framework aspires to tread in the territory where some have thrown up their hands and wondered if change was really possible. It addresses issues that are complex and require many people to change in fundamental ways; issues for which there are no easy solutions and those that exist are exceedingly difficult to implement and require the cooperation of the whole system; issues which if not adequately addressed will cause an ecological or social system to break down. These issues include global warming, depletion of our nonrenewable natural resources, chronic poverty, ethnic and racial animosity, and overpopulation.

Global warming is a prime example of the need for a second-order change solution. The *New York Times* says the "climate crisis is at its very bottom a crisis of lifestyle. The Big Problem is nothing more or less than the sum total of countless little choices. Most of them made by us (consumer spending makes up 70 percent of our economy) and most of the rest of them made in the name of our needs and desires and preferences."

In a democratic society we can't legislate the kind of lifestyle change that would be necessary to have a major impact on global warming. Passing a law that commands people to lower their carbon footprint and then penalizing them if they don't is not acceptable or practical. Offering people financial incentives to reduce their GHG emissions is sending the right signal, but people are still free not to avail themselves of these incentives. If people are not already predisposed to changing, financial incentives have a limited effect.

Social protest is a gift of our democracy that has allowed Americans to speak out against injustice and government policies with which we disagree. It contributed to ending an unpopular war in Vietnam and furthering the civil rights of disenfranchised members of our society. But as important as social protest has been and always will be in a democratic society, it is reactionary and defined by the problem. It is a great tool for objecting to what is wrong in society, but not for creating what is right. Saying no to global warming and lamenting the lack of bold and effective national political leadership are very different from providing a viable alternative.

I have no pretensions to believe that the Social Change 2.0 design principles and practices described here are the solution to the enormous challenge of GHG reduction that the State of California has boldly committed to addressing with its landmark AB 32 legislation. The nature of this problem defies any single approach to change. And this framework is still very much a work in progress. But I have seen enough evidence applying these tools over the past thirty years to believe that they can make a contribution, either in whole or in part,

to tackling any issue that requires fundamental transformative change. And global warming is certainly such an issue.

So where do we begin? Where are the high leverage intervention points for addressing GHG reduction? Certainly it makes good sense to work with power suppliers, and much has already been done in the AB 32 legislation and its cap-and-trade program to accomplish this. *But an undeveloped strategy is the power-users who actually create demand for these supplies of energy. This is a relatively untapped part of the change equation with huge potential.* Further, if we can influence change from the demand side we will have developed a long-term solution. For example, when utilities pass on the costs of buying additional renewable energy to the consumer in the form of a higher price for the green energy option, it is still the end user who decides if they wish to pay more for it. And currently the vast majority of people are not choosing this option.

Of course this is not an either/or proposition. We must bring about change on the supply *and* demand side, as they are synergistic. But for policy makers to fully avail themselves of this synergy they need to better understand how to activate the demand-side of the equation. Providing that understanding is a key goal of this white paper.

What kind of potential are we talking about? As noted earlier, cities generate 70% of the planet's carbon emissions with citizens living in these communities responsible for on average 70% of its carbon footprint. In California, the residential sector generates approximately 60% of the state's GHG emissions and is the low-hanging fruit because households can make immediate reductions in their carbon footprint while also saving money. And from a transformative social change point of view, local carbon reduction initiatives can provide the critical co-benefits of demand-driven local green economic development while buying us needed time for the longer-term technology and renewable energy solutions to scale-up.

What would it look like if we were able to scale up a robust demand-side intervention in California's communities? Here is an historical account *from the future* for the Cool City Challenge project I am spearheading. Hopefully it will look just like this in 2020.

<u>California 2020: A Vision of Possibility</u>

Three of the most progressive California cities and their citizens embarked upon a bold experiment to develop a game changing social innovation around greenhouse gas reduction. Its goal: rapid and substantial carbon reduction in the short-term and carbon neutrality in the long-term, with vibrant livability and disaster-resiliency for its citizens, and green prosperity for its businesses. And they are succeeding!

Here's how they did it…

Over a three-year period citizens substantially lowered their carbon footprints and in so doing built demand for green products and services, as a result local low carbon economies emerged. With this carbon literacy and sense of self-efficacy, these empowered citizens continued pushing the envelope and advocated to their local politicians to become carbon neutral cities, which these elected officials heartedly accepted. Carbon neutral cities became the new "cool" in California. And the race began to achieve the

coveted title of the first city in California to become carbon neutral. It also did not hurt that an "X Prize" was established that awarded ten million dollars to the first city to accomplish this audacious goal.

These communities sent a profound message to the world that citizens in the highest per capita greenhouse gas emitting country were willing to lead the way in reducing their high carbon-emitting lifestyles for the sake of the greater good. But paradoxically, rather than this being a sacrifice, they discovered it opened up a whole new set of unexpected benefits. People now knew their neighbors, their neighborhoods had become more resilient and livable, and civic participation had become the new coin of the realm for people young and old.

At the community level, to the delight of the community economic development agencies and chambers of commerce, many green businesses had sprouted up and were flourishing. And with them, numerous high paying green jobs were being created. This was because between 25 to 75% of the citizens of these communities were now engaged in reducing their carbon footprint by an average of 25%, entire blocks were becoming carbon neutral, and each of these cities was reinventing its technological infrastructure to become carbon neutral. These cities were realizing the potential that many communities had talked about, but few had come close to achieving – a thriving local low carbon economy.

Knowledge about the amazing success of these three cities began to spread and soon other California cities came to learn from them. This was not only because they wanted to replicate this success in their communities, but also because the state of California had wisely decided to invest a portion of their cap-and-trade revenues in helping its communities make these types of changes. The universities in these cities became repositories for this learning and played a key role in their dissemination to the visiting cities. These universities also attracted many students who wished to be part of a real-world social innovation laboratory around an issue so vital to their future. The students were fully integrated into the community-organizing aspects of the program and many built green businesses that grew out of the first-hand knowledge they gained about services needed to meet the burgeoning demand for GHG reduction.

All this success spawned a strong sense of confidence, civic pride and a can-do spirit in these communities. Combining this with the new competencies they had learned in how to engage the whole community and design transformative social innovations, engendered an outpouring of social inventiveness. These cities were now not just devising new ways to reduce their GHG emissions, but generating solutions to a wide variety of social, environmental, and economic issues as well. They were also living the maxim, "many hands make light work."

After several years, knowledge of the bold social experiments taking place in these three pioneering communities—who were now actively exchanging best practices and collaborating with one another—had spread far and wide across the state, country and world. Many communities had come to learn and were now beginning to replicate this success in their cities. And California – it had once again served its role well as the planet's premier social laboratory for visionary public policy initiatives. But this time it had gone after the biggest challenge and opportunity facing humankind and delivered!

Meeting the Challenge and Seizing the Opportunity

While getting people to reduce their carbon footprint is the low-hanging fruit to GHG mitigation, will we be able to pick it? Can we empower citizens to get out of their comfort zones and adopt low carbon lifestyles? Will cities be willing to get out of their comfort zones and learn the skills necessary for engaging their citizens in behavior change? And if both cities and citizens are willing to make these changes, can such an initiative be brought to scale?

In 2006 Empowerment Institute—a pioneer in environmental behavior change and community engagement strategies—began attempting to answer these questions by creating a community-based behavior-change program called *Low Carbon Diet*. The program consists of twenty-four actions to reduce one's carbon footprint by at least 5,000 pounds in thirty days and to help others do the same. It is based on two decades of experience working with several million people in hundreds of cities around the world who are organized into peer support groups of 5 to 8 households called EcoTeams.

The *Low Carbon Diet* helped empower the movement that had been building in America around personal action and community-based solutions, and immediately took off. It was driven by the many local governments and civic groups committed to the issue of climate change who were wishing to engage community members; faith-based groups like Interfaith Power and Light representing some 5,000 congregations, wishing to engage congregants; and environmental groups, like Al Gore's Climate Project, which gave the book to the 1,000 people he trained to lead his "An Inconvenient Truth" slide show. All this interest resulted in the development of a community engagement strategy called Cool Community.

There are now over 300 communities in thirty-six states across America, including 46 in California, who received training in how to deliver the *Low Carbon Diet* behavior change program and Cool Community citizen engagement strategy. Participants using *Low Carbon Diet* are achieving a 25 percent carbon footprint reduction and reaching out to fellow citizens to accomplish the same. *Low Carbon Diet* and the Cool Community model has also been translated and culturally adapted for China, Japan, South Korea, Australia, Canada and the United Kingdom.

But wide proliferation of these tools is not the same as effectively applying them. After several years of watching many cities dive into this behavior change and community engagement process with gusto, but fizzle out after they bumped up against the hard work and deep knowledge required to be effective, it became apparent to me that we had gone a mile-wide and an inch deep. Having an effective carbon reduction tool and community engagement strategy was just the first step; we now needed to help communities skillfully deploy them if we wished to realize the potential of a demand-side GHG reduction strategy.

It also became clear that this next phase was going to take very special cities – those with a very strong commitment to carbon reduction and determined political and civic leaders. This endeavor was not for the faint of heart. My search for the right cities eventually led me to California because of the political commitment of the state to GHG reduction as evidenced by AB 32. To a specific part of the state, Northern California, because of the

widespread sustainability ethic that permeated cities and citizenry in this region. And eventually to identifying five cities (from which we will select three) that had demonstrated early adopter credentials around taking climate action and was a manageable size for such an innovative endeavor. Those cities are Davis (population – 66,000), San Rafael (population – 58,000), Palo Alto (population – 65,000), Sonoma (city and surrounding county, population – 50,000), and San Francisco (one district, population approximately 60,000).

One of these cities, Davis, first showed up on my radar screen in 2008. They had sought out Empowerment Institute's *Low Carbon Diet* program and Cool Community methodology after they determined that 70% of the community's carbon footprint was being generated by the residential sector. They concluded that their "climate goals could not be met without the community becoming the primary driver of local GHG emission reduction."

From October 12, 2008, through November 10, 2008, the city organized 100 households to participate in *Low Carbon Diet* EcoTeams. Participation included the city council and staff; University of California, Davis, administrators, faculty, staff, and students; local businesses; and community members at large. Households reduced their carbon footprint an average of 5,516 pounds.

Inspired by these results, they reworked their Climate Action and Adaptation Plan in 2010 to have the city become carbon neutral (the first city in America to make this an official city policy) and committed to engaging 75% of Davis households to participate in household GHG reduction.

However, when they tried to scale up the pilot program, their lack of expertise in this behavior change and community engagement methodology combined with limited financial resources led to several unsuccessful efforts. But undaunted and now more cognizant about just what it takes to be successful, they sought out the Empowerment Institute for help. In many ways it is Davis' aspiration to push the envelope around bold carbon reduction and citizen engagement, and their can-do spirit that led to the development of the Cool City Challenge.

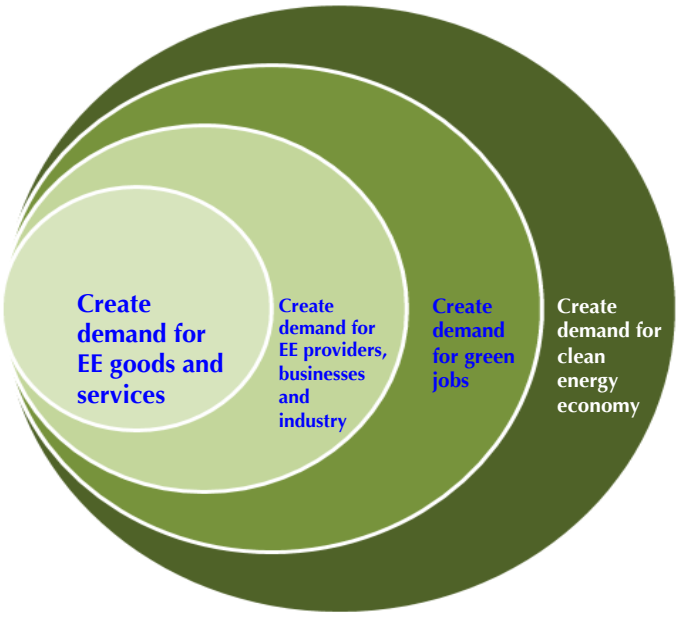
But before we get to the Cool City Challenge, it is important to gain greater insight into a central component of a demand-side GHG reduction strategy—residential energy retrofits—and the current state of play in California and nationally.

BUILDING DEMAND FOR RESIDENTIAL RETROFITS

Both greenhouse gas reduction and the development of a clean energy economy must pass through the gateway of energy efficiency retrofits. Buildings represent the lion's share of carbon emissions, expensive renewable energy installations only make economic sense when a building is insulated, and retrofits enable the creation of green jobs and green economic development. As a consequence building retrofits were targeted for ARRA stimulus funding, with single-family homes the priority since they can be as much as 70% of the residential sector carbon emissions.[7] The logic of this strategy, which the Obama administration called "recovery through retrofit," is illustrated in this schematic figure.

[7] Ibid. footnote 4.

Residential energy efficiency retrofits are a key lever to unlock and enable a clean energy economy



As mentioned in the executive summary, to take advantage of ARRA funding and assist in the implementation of AB 32 and California Public Utility Commission's "Energy Efficiency Strategic Plan," Energy Upgrade California was created with an investment of $312 million dollars. Its goal was to retrofit 100,000 homes by the end of 2012. As of July 2012 just 5,130 homes received upgrades or qualified for rebates, according to the California Energy Commission. In spite of this this result, Energy Upgrade California was reauthorized by the state with a new goal of 8 million household energy upgrades by 2020. This is because of the criticality of this intervention to GHG reduction and the paucity of residential energy efficiency options available.

If we are to unlock the great promise of residential energy efficiency retrofits to enable GHG reductions and catalyst a clean energy economy, we need to understand how to transform the barriers to participation. The chart below describes four major barriers that exist and suggests how the type of whole system approach developed by Empowerment Institute can help in overcoming them.

Whole system approach to mitigate home retrofit barriers

Home Retrofitting Barriers	Whole System Approach
(-) Energy efficiency is not a priority for people and as a result it is difficult to interest them.	(+) Provide a program that delivers broader and more appealing benefits (conserving resources for the sake of our children, getting to know neighbors, and creating safer and healthier block).
(-) Traditional approaches of engaging people through advertising and websites are scattershot, costly, and have proven to be ineffective.	(+) Engage people through the trusted messenger of a neighbor who presents the appealing co-benefits described above.
(-)Transaction costs are too steep: time consuming and complicated paper work for rebates, difficulty finding a qualified contractor, disruptions in house and life, making a major cash outlay with a long and perhaps uncertain payback period.	(+) Use EcoTeam to create a new social norm around lowering carbon and environmental footprint to motivate deep retrofit actions. Use EcoTeam to assist in implementation through shared leadership responsibility to reduce the time burden on any one person and bundling audits/ retrofits for contractors to reduce costs.
(-) Retrofits as a stand alone benefit are a narrow basis for expansion and scaling community-wide.	(+) Program's co-benefits appeals to a broader segment of population. Broad community benefits can attract civic, public and private sectors and make going to scale feasible.

Research done by Empowerment Institute has demonstrated promising results for overcoming many of these barriers to participation.

In a pilot in San Antonio, Texas 41% of the 205 households participating in a peer-support group called an EcoTeam and using Empowerment Institute's behavior change program, *Green Living,* did some form of energy efficiency retrofit. Another small pilot conducted in Sonoma, California with eight households has also shown promising results. Using our *Low Carbon Diet* behavior change program and the EcoTeam peer support group model, each of these households participated in Energy Upgrade California's audit program. They then used this information and impetus to take one or more energy efficiency measures in their homes. Further, they invited neighbors to learn about their results and many of them also participated in Energy Upgrade California.

Combining these results with Empowerment Institute's neighbor-to-neighbor block-based recruitment rate of 25%[8] indicates that this approach is capable of achieving up to 10 times the best-case conversion rate of doors knocked on to retrofits installed of 1 to 2%. Additionally, because the household recruitment and support is done on a voluntary neighbor-to-neighbor basis, this approach in comparison to major marketing campaigns is quite cost-effective. And it is scalable.

It is important to stress that while these results are promising, they are quite preliminary and have not fully been put to the test. Also there are a number of other factors involved in

[8] Ibid. footnote 5.

making all this work including the quality of the contractors, access to financial incentives, and ease of use of the whole rebate system. The good news is that these components have benefitted from Energy Upgrade California and ARRA Investments and best practices have emerged. In the future, we will be engaging in applied research to carefully assess this whole system approach for achieving household energy upgrades and part of that evaluation process will be through the Cool City Challenge. So let's now turn to it.

COOL CITY CHALLENGE: A WHOLE SYSTEM SOLUTION

A key leverage point in combating climate change is cities engaging local citizenry to achieve significant carbon reduction. But even though more than 100 local climate actions plans have been developed in California over the past few years to further this objective, they often lack implementation strategies and face stiff headwinds in community awareness and acceptance, much less financing. Action plans tend to focus on high-level targets with no methodology for structured implementation, measurement or verification. Moreover, state and local approaches focus on technology-based solutions and adoption but generally lack strategies that include human and social factors that can either drive or hinder technology or policy adoption.

As discussed previously, initiatives for residential energy efficiency retrofitting programs targeting single-family homeowners have not been successful or cost-effective despite hundreds of millions in federal and state funding. Concurrently, personal transportation is the "800-pound gorilla"—the largest source of emissions in many cities—and city officials are largely vexed by this sector, with little in the way of short-term policy fixes and/or affordable technological solutions.

Fundamentally, this is a systems problem spanning multiple issues and perspectives: people's attitudes and actions, how people view and use energy, technology choices and cost considerations, existing policies and incentives, market acceptance, and larger social contexts such as norms and values. Traditional approaches that focus on technology, policy, and markets often neglect or underestimate the human and social factors that interact with policy acceptance, technology adoption and market dynamics.

Unlike conventional climate action approaches, the Cool City Challenge is a whole system climate change intervention designed to address the 70% of a community's greenhouse gas emissions that come from the residential sector. Since 70% of the planet's emissions come from cities, if a scalable model can be built, it could have a huge impact.

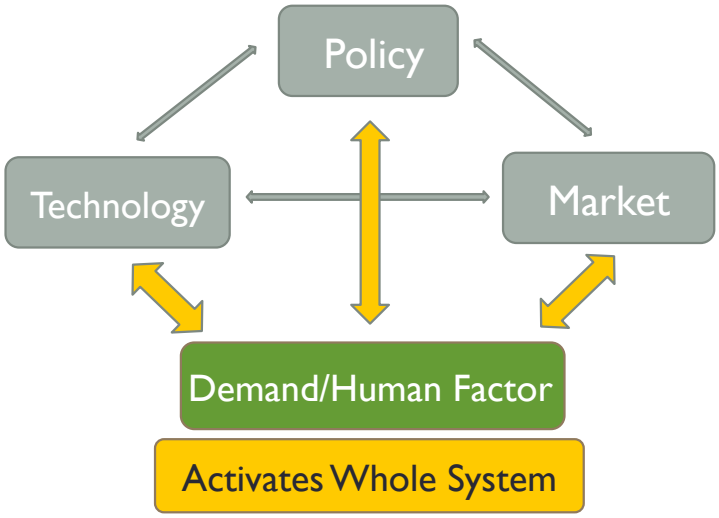
Working at the grassroots level, this social innovation empowers citizens to reduce their carbon footprint through participation in a structured behavior change program—the Low Carbon Diet—with a peer support group of neighbors. A full suite of carbon reduction actions is provided including home energy, transportation and diet.

At its core, the Cool City Challenge is bringing to scale citywide Empowerment Institute's proven behavior change methodology and community engagement systems. Centered on household level GHG reduction, it uses the existing social infrastructure present in neighborhoods, community organizations, educational institutions and businesses. This behavior change methodology is based on two decades of rigorous research and social learning that has demonstrated how a peer-to-peer support system combined with recipe style actions set in the context of a structured program and compelling community vision, move citizens to take action.

To further the social learning and accelerate the ability of the Cool City Challenge model to diffuse to other cities, analysis and quantification of the carbon impact of these efforts will be done utilizing technologies in home energy management and personal vehicle data collection, as well as comprehensive "carbon calculator" tools.

The Cool City Challenge initiates a new paradigm in addressing climate change: coupling state-of-the art behavior change and community engagement strategies with deep data collection and analysis, and enabling technology adoption, policy implementation and market development. See schematic below.

Whole System Approach to Carbon Reduction



Cool City Challenge

Focusing solely on policy, technology and markets—the traditional supply-side approach to carbon mitigation, is an incomplete strategy without including the human factor. This is because households represent the most immediately accessible and largest carbon footprint and because behavior change activates the whole system by driving demand for new technology, policy adoption and market creation

If the early adopter cities targeted by this initiative are able to achieve significant carbon reduction they will serve as role models and teaching cities to the many communities throughout California and across America looking for a cost effective and replicable climate change solution.

Empowerment Institute has assembled a world-class team including Lawrence Berkeley Labs, Stanford, UC Berkeley, UC Davis, and World Wildlife Fund, to support the implementation, research and scaling of the Cool City Challenge. This team will support each city to achieve the following goals over a three-year period.

COOL CITY CHALLENGE GOALS

1. Engage a minimum of 25% of each city's households to reduce their carbon footprints by 25% or more with a minimum of 40% of doing home energy retrofits.

2. Redeploy the social capital generated by block-based teams to increase the individual and collective resiliency of residents in neighborhoods to address climate-related risks and enhance overall sustainability and livability.

3. Develop a green economic development strategy around the increased residential demand generated by the campaign for energy efficiency retrofits and renewable energy.

4. Create a whole system solution through engaging and developing synergy between the local government, community-based organizations and businesses. This approach will not only enable the campaign to accomplish its EcoTeam recruitment goals, but leave a legacy of enhanced community leadership, strengthened community partnerships, and a deepened environmental stewardship ethic.

5. Help each city deploy the political will of its engaged and carbon literate citizenry to assist it in developing a carbon neutral city strategy.

6. Document, measure and evaluate the GHG reductions, retrofits, community participation levels, economic and social outcomes, and community engagement processes to optimize the learning and assist with the future dissemination of the Cool City Challenge.

7. At the completion of the three-year Cool City Challenge disseminate this methodology throughout California, nationally and internationally.

CONCLUSION

Achieving AB 32's goal of reducing carbon emissions 20 percent from 1990 levels by 2020 will be difficult without some sort of game changing social innovation or multiple social innovations. And California's GHG reduction trajectory goals get significantly steeper thereafter. The social change policy tools of command and control and financial incentives take a long time to work if they can get traction at all around a second-order change problem like GHG reduction. However, given the state's ability to invest up to a billion dollars of cap-and-trade revenues per year in carbon reduction activities brings a new variable into the system – this funding can be used to catalyze the needed social innovation and bring it to scale.

As I have been sharing throughout this paper, I believe the place where the greatest potential exists for spawning such social innovation are California's many progressive communities because they are bubbling with talent in the form of creative people, community-based organizations, small businesses, and local governments. And by bringing

all these sectors of a community together many new points of intersection can occur and as a consequence more intelligent solutions can be generated. Further, when we cast a wide net, particularly among people and organizations that are looking at this issue with fresh eyes, all manner of imaginative new possibilities can be born.

With limited resources and a small window of time before 2020, each dollar spent needs to be invested in social innovations capable of producing significant short-term GHG reductions and be brought to scale relatively quickly. Because there are already over a 100 local climate action plans in California ready to go, the residential sector of these communities is the source of so much available GHG reduction, and cities are networked for rapid diffusion of best practices, again they are a natural choice for investment.

Finally, it is wise to make these investments in a manner that can also stimulate California's economy. Since the low hanging fruit for both substantial GHG reduction and a clean energy economy both rely on home energy retrofits, supporting cities who wish to deploy the sort of whole system solution described in this paper is a smart investment.

As the UN HABITAT 2011 report explained, "Cities have become the real battleground in the fight against climate change. What goes on in cities lies at the core of the problem." Unleashing the potential of California's cities and citizens to become part of the global warming solution is one of the most promising paths forward.

David Gershon, one the world's foremost experts in behavior change and community engagement, is the author of eleven books including the award-winning Social Change 2.0: A Blueprint for Reinventing Our World and best-selling Low Carbon Diet: A 30 Day Program to Lose 5,000 Pounds being used in over 300 cities in six countries. He has lectured at Harvard, MIT and Johns Hopkins and served as an advisor to the White House and United Nations. David is CEO of Empowerment Institute and co-directs its School for Transformative Social Change. For more information on the Cool City Challenge or the community-based whole system solutions described in this white paper contact David Gershon dgershon@empowermentinstitute.net or visit www.coolcitychallenge.org.