CITY OF
HAYWARD
HEART OF THE BAY

CITY COUNCIL SUSTAINABILITY COMMITTEE MEETING

Hayward City Hall – Conference Room 2A
777 B Street, Hayward, CA 94541-5007

Mission Statement:
Make Hayward a more sustainable community in order to ameliorate negative impacts of climate change, conserve natural resources and promote a clean environment.

September 1, 2010
4:30 p.m. – 6:00 p.m.

AGENDA

I. Call to Order

II. Roll Call

III. Public Comments: *(Note: All public comments are limited to this time period on the agenda. For matters not listed on the agenda, the Committee welcomes public comments under this section, but is prohibited by State Law from discussing items not listed on the agenda. Items not listed on the agenda brought up under this section will be taken under consideration and may be referred to staff for follow-up as appropriate. Speakers will be limited to 5 minutes each; organizations represented by more than one speaker are limited to 5 minutes per organization.)*

IV. Approval of Minutes of July 7, 2010

V. Update on Development of Residential Energy Conservation Ordinance (RECO)
Amelia Schmale, Sustainability Coordinator
Mike Gabel of Gabel Associates, LLC

VI. General Announcements and Information Items from Staff

VII. Committee Referrals and Announcements

VIII. Next Meeting: Wednesday, October 6, 2010
Update on State Green Building Code and its Impacts on Hayward's Green Building Ordinance, including Solar Requirements

Beacon Award Update

IX. Adjournment

Assistance will be provided to those requiring accommodations for disabilities in compliance with the Americans with Disabilities Act of 1990. Please request the accommodation at least 48 hours in advance of the meeting by contacting Katy Ramirez at (510) 583-4234 or by calling the TDD line for those with speech and hearing disabilities at (510) 247-3340.

CITY COUNCIL SUSTAINABILITY COMMITTEE MEETING
Hayward City Hall – Conference Room 2A
777 B Street, Hayward, CA 94541-5007

July 7, 2010
4:30 p.m.

MEETING MINUTES

I. Call to Order – Meeting called to order at 4:34 p.m. by Mayor Sweeney.

II. Roll Call

Members:

- Michael Sweeney, Mayor
- Olden Henson, Council Member
- Bill Quirk, Council Member
- Julie McKillop, Planning Commissioner
- Al Mendall, Planning Commissioner
- Marvin Peixoto, Planning Commissioner
- Doug Grandt, Keep Hayward Clean and Green Task Force (KHCG)

Staff:

- Fran David, City Manager
- David Rizk, Development Services Director
- Alex Ameri, Deputy Director of Public Works
- Vera Dahle-Lacaze, Solid Waste Manager
- Erik Pearson, Senior Planner
- Amelia Schmale, Sustainability Coordinator
- Andrew Sloan, Intern, Public Works Department
- Beth Storelli, Intern, Public Works Department
- Katy Ramirez, Administrative Secretary (recorder)

Others:

- Charles Gardiner, Principal, CirclePoint
- Ivy Morrison, Project Manager, CirclePoint
- Anna May, City Council and Restaurant Owner
- Greg Jones, Hayward
- Miriam Gordon, California Director, Clean Water Action
- Marita Cheng, Owner, Skywest Restaurant
- Emily Utter, Policy Associate, Save the Bay
- Andria Ventura, Clean Water Action
- Aryeh Canter, Clean Water Action
- Makhan Bains, Owner, Raja Indian Cuisine
- Brian Schott, President & CEO, Hayward Chamber of Commerce
- Johnnise Downs, Dir Local Government Affairs, CA Restaurant Association
- David Stark, Public Affairs Director for the Bay East Association of REALTORS®
- Dan Henriques, Resident
- Simon Wong, Tri-City Voice Newspaper

III. Public Comments

David Stark, Bay East Association of REALTORS® - Mr. Stark said that he would like to update the Committee on the residential real estate market and would also like to explain what has happened in the market since the beginning of the year. Mr. Stark said that since January 1, there were a total of 617 single family homes sold in Hayward. Of those sold, 136 or 22 percent have been short sales, which means that they were sold for less than the outstanding balance of the mortgage; 250 or 41 percent have been foreclosed properties, which means 386 of the 617 homes sold have been either short-sales or foreclosed properties, which represents 63 percent of all homes sold in Hayward. Mr. Stark said that when you review the alleged effectiveness of quantitative sale requirements in terms of energy efficiency upgrades, understand that more than half of the homes sold in Hayward to date, have either had no money back to the sellers, or the sellers and/or banks which typically sell properties in "as is" condition, would unlikely be making any kind of energy efficiency upgrades prior to being sold. Mr. Stark said that as of last Friday, there were 292 active units listed for sale in Hayward; of those, 103 were short sales and 64 were foreclosed properties; of the 292 units, 167 or 57 percent of the active listings are troubled properties. Again, no resources are available for energy efficiency upgrades or they are owned by the banks.

Mr. Stark said that he would like to direct the Committee to Appendix E of the Communications Plan and the potential partners and sponsors for communicating with the community for issues like the Climate Action Plan. Mr. Stark said that he is disappointed because Bay East Association of Realtors and Hayward residents whom are also realtors, have been actively engaged in the implementation of the Climate Action Plan. He said that they have attended meetings and offered their support in terms of spreading the word about energy efficiency issues, and feels there is no other profession that has more direct contact with homeowners than the real estate community. Mr. Stark also said he is disappointed to see that Bay East Association, realtors and real estate professionals are not included amongst the potential partners in advancing issues related to energy efficiency. He said there were a number of residents making public comments at the June Sustainability Committee meeting, mainly real estate professionals, and these folks deal with homeowners on a daily basis. Mr. Stark said that the cost to the City for partnering with the real estate community would be zero and that it is potentially a win-win situation for everybody involved. Mr. Stark asked that the Committee, as they move forward with the Communication Plan, to consider partnering with Bay East Association and realty members in terms of spreading the good news about energy efficiency.

Andria Ventura, Clean Water Action – Ms. Ventura thanked the Committee for allowing her to speak today. She said that on behalf of Clean Water Action and its 2,000 members, most of who are in the Bay Area, she would like to congratulate the Committee for picking up the issue of polystyrene and for considering an ordinance. Ms. Ventura said that they enthusiastically support such ordinances in the Bay Area, and said that there are approximately 45 communities throughout the state have some sort of restriction on polystyrene. Ms. Ventura said that the litter associated with polystyrene is severe and it is the second biggest source of litter on the beaches on the coast of California; that it is becoming an immense problem especially in the storm water drains; is it is a public health hazard and affects our wildlife when it break downs in the

environment. Ms. Ventura said that she recognizes the financial impact that it would impose on small businesses, restaurants etc., but reminded everyone that the total clean up costs to communities each year is in the range of billions of dollars. Ms. Ventura said that it appears that the proposed ordinance focuses on expanded polystyrene disposable food products, which is the majority of the bigger problem around these products; however, they would like to encourage the Committee to go further and include major, bigger, polystyrene materials with the same recycling problems.

Emily Utter, Policy Associate, Save the Bay – Ms. Utter said that she represents Save the Bay and hundreds of supporters from Hayward and the 25,000 supporters throughout the Bay Area. Ms. Utter said that they have been working to protect and restore San Francisco Bay since 1961, including their current Clean Bay project, which works with counties and city departments to enact legislations such as this. Ms. Utter said there are numerous cities and counties throughout the Bay Area and California that have already enacted similar legislation, and said they strongly encourage the City of Hayward to do so, as well. Ms. Utter said that polystyrene, especially the expanded polystyrene, is a common complaint of constant litter that suffocates creeks and shorelines, and that jurisdictions and the State are spending billions of dollars in clean up each year. Ms. Utter said that they would like to encourage the Committee to expand this ordinance to include rigid polystyrene; and noted that there is no appreciable recycling market for this product. Ms. Utter indicated that polystyrene is also a risk to human health and studies have found that, when heated, styrene toxins can reach out of polystyrene causing health risks. Ms. Utter said that she recognizes that businesses are concerned about increased costs; however, she wanted to point out that Green Town Los Altos has a cooperative buying program where products such as these are purchased through their company at a 20-25 percent discount. Ms. Utter said this might be something for Hayward to consider and get involved with, or create our own system. Ms. Utter said they highly encourage the City of Hayward to move forward with an ordinance and to consider expanding it to include other types of polystyrene.

Marita Cheng, Owner, Skywest Restaurant – Ms. Cheng said that she is not opposed to the ban of polystyrene foam; however, she said she is opposing what she feels are different tiers of policies for different levels of restaurants. Ms. Cheng said it seems like a very unfair situation and, if foam products are going to be banned, then it should be banned at one level for everyone. Ms. Cheng said that she is wondering about the cost to the City and if the State is also doing a ban, then why wouldn't the City wait for the State-wide ban. Ms. Cheng noted that some restaurants in Hayward already know about this proposal and are gradually on their way of not using foam products. Ms. Cheng said that basically, she is against the ban because it is not fair; ban it for all or don't ban it at all.

Makhan Bains, Owner, Raja Indian Cuisine – Mr. Bains said that he owns an Indian Restaurant in Hayward and feels that the timing is not right for banning foam products. Mr. Bains said that the economy is so bad right now and this ordinance will start something very bad. He said that although he agrees with some of the ordinance, that it would be better in the future when the economy picks up. Mr. Bains said the cost for paper products is too expensive for the Mom and Pop restaurants.

Johnnise Downs, Director, Local Government Affairs, CA Restaurant Association – Ms. Downs indicated that the California Restaurant Association is the largest and longest non-profit restaurant chain association in the nation, with more than 22,000 members throughout the state of California. Ms. Downs said that on behalf of businesses owners in the City of Hayward who are also citizens in the City, they applaud the efforts of the Sustainability Committee. She said that many restaurants have already started to move towards green strategies and especially large chains restaurants have already started phasing out polystyrene products where possible. Ms. Downs said that, as Mr. Bains mentioned, it is the small Mom and Pop restaurants that would be hit the hardest and the cost impact could be quite overwhelming. She said that two cents here and three cents there will add up on a monthly basis and could result in losing a part-time worker or cutting someone's hours back. Ms. Downs said with the current economy, eating out is always a luxury but even more so, people are eating out less and spending less; the impact trickles down. Ms. Downs referenced the staff report regarding a 2-3 percent impact as far as revenue; and noted that the average profit market for a restaurant is 3-5 cents, and indicated how this gives you an idea that they make less than an equal of $30.00 that they bring in, for the most part. Ms. Downs said that she spoke with a restaurant owner that said they have not had a salary in the last two years during this economy. Ms. Downs asks the Committee to consider the impact that this would have on the small Mom and Pop restaurants that are struggling to keep the doors open.

Mayor Sweeney asked if there were any other public comments and there being no additional speakers, Mayor Sweeney thanked everyone for their comments and closed the Public Comments item.

Bill Quirk, Council Member, indicated that he made extra copies of the letter from American Chemical Council and asked if someone from the audience will distribute them. Mayor Sweeney said that since this is an item on the agenda, that it would be fine.

IV. Approval of Minutes of June 2, 2010 – minutes approved. Planning Commission Mendall thanked staff for the detailed minutes, which are helpful for these important items.

V. Prohibit the Use of Polystyrene Foam Disposable Food Service Ware and to Require Recyclable or Compostable Food Service Ware within City Limits

Alex Ameri, Deputy Director of Public Works, reminded the Committee that at its meeting of March 3, 2010, the Committee directed staff to proceed with bringing the ordinance related to Styrofoam containers back to the Committee prior to November when the regional environmental review was going to be completed. Mr. Ameri provided a PowerPoint presentation and an overview of the staff report, and noted that the draft ordinance and environmental review is included with the report, and that an initial study and negative declaration is available for review.

Bill Quirk, Council Member, asked for comments on the letter from American Chemical Council (ACC) that was received today that indicates how litter is just as great in San Francisco after they banned Styrofoam because people were using coated cardboard, which also does not degrade particularly well.

Mr. Ameri said that foam containers are lightweight; they are 95 percent air, airborne easily, and end up in gutters and storm drains. Mr. Ameri said that this is not necessarily the case with heavier paper-based products. Paper-based products are also compostableand recyclable and there are other ways of dealing with them than Styrofoam. Mr. Ameri said that the letter from ACC also talks about the greenhouse gas impacts. He indicated that nowhere in his presentation does he talk about gas, and said that we do not have enough information to make a comparison between the two products. Mr. Ameri said that we are more interested in the litter aspect and the fact that Styrofoam is difficult to manage and hard to clean up, and there is no viable market for recycling this product in California.

Council Member Quirk said that the letter states that the amount of litter did not change in San Francisco, and asked if this information is wrong. Mr. Ameri answered that he has not done any research on that.

Council Member Quirk said that unless you do a life-cycle analysis, we might find out down the line that an ordinance is not the right thing to do. He said that he appreciates the Negative Declaration; however, it is based upon development and not the issues that we are dealing with now, and it is not a life-cycle analysis. Council Member Quirk said that he would have a very hard time recommending that this Ordinance go forward until we do a life-cycle analysis. Council Member Quirk said that he is aware that Council Member Henson is looking at doing this sort of work with the Waste Board and asked the status.

Olden Henson, Council Member, indicated that a life-cycle analysis has been stalled because legislation at the State level has been stalled and they did not see the necessity of moving forward. Council Member Henson said that most of the cities or member agencies are in the process of doing this based on some early analysis of the other cities, particularly Oakland and Berkeley. Council Member Henson said they are using some of that analysis but we are not proceeding as an agency because the cities have taken the lead with the available information. To answer the question about a life-cycle analysis being complete; Council Member Henson responded no, they have not done it yet.

Council Member Quirk asked if we have information from Oakland and Berkeley that gives us more in the way of a life-cycle analysis. Mr. Ameri answered no, that we do not have more information, that ACC has made this information available to other jurisdictions. Mr. Ameri indicated that, basically, the response from other jurisdictions is that they do not have enough information to do this kind of analysis and they don't need to do an analysis. He said that other jurisdictions had other reasons that pushed them to switch and have adopted Negative Declarations similar to what staff has prepared.

Council Member Quirk asked if it is okay to ask the person from Clean Water Action if they have any comments on the green house gas and other issues raised by the letter.

Mayor Sweeney responded yes, briefly, because other Committee Members have questions on this topic.

Andria Ventura, Clean Water Action, indicated that the ACC letter makes an assumption that these materials are going to landfill and not a biodegradable landfill, and said that she is not sure if the Committee is aware that landfills are actually designed to accept biodegradables. Ms. Ventura said that she thinks the assumption from the letter is that these materials are not going to go into a municipal composting program. She said that what we need to look at in our analysis is what percentage of these materials get selected to go to a composting facility where they are properly disposed.

Al Mendall, Planning Commissioner, referenced a section of the staff report, and said that this is not just about greenhouse gas; that it's also about litter and the fact that it gets in the bay and causes health issues. Mr. Mendall said that there is a team of about 20-30 people on the Keep Hayward Clean and Green Task Force that go out on a Saturday once a month and includes his wife who indicated that the two things they pick up the most are plastic straws and Styrofoam. Mr. Mendall said this is what we are finding on our streets and unable to pick up because when you grab it, it crumbles, so it just sits there and eventually makes its way into the bay and our beaches and sits there and crumbles and crumbles forever.

Mr. Mendall said that the Chinese take-out places have proven that you can carry hot, wet, food in something other than Styrofoam quite well for decades now; and Starbucks has proven that you don't need Styrofoam to keep wet liquid in a cup without it disintegrating in a couple of hours. Mr. Mendall feels this ordinance can be done and said that we are not asking for something outlandish. Mr. Mendall recognizes there will be a bit of a cost and there is no getting around that; however, he feels it's small and a couple of cents more for an item is not a huge expense. Mr. Mendall said if someone can demonstrate a hardship, then he thinks the City has them covered; for the most part, it's going to be something that's going to be passed on to the customers. Mr. Mendall said that this will apply to every restaurant in Hayward, not just one or two, so it's not like one restaurant will have an disadvantage over another; it will apply to all. Mr. Mendall feels that July of 2011 is plenty of time for restaurants to find alternatives; plenty of time to go through existing stock; and plenty of time to get the word out. He said that Fremont just passed a similar ban that goes into effect in January, which is six months notice, and the City of Hayward would be giving a whole year; that's more than enough.

Mr. Mendall said that there are so many reasons to move forward and so few unknowns that we may never have an answer. He said the best knowledge that we have right now is that Styrofoam is the worst material to use besides aluminum, and that we should treat it with such and recognize the alternatives, ban it and move forward. Mr. Mendall asked why the stores (Costco, etc.) are allowed to continue selling these products and suggests that we ban it there too.

Mayor Sweeney asked Mr. Ameri if he would like to answer the Costco question.

Mr. Ameri responded that Costco's food counter is going to be subject to the same requirements. However, Costco business will not be subject because they sell their products to other places (i.e., Union City, Newark) that do not have ordinances.

Council Member Henson said that as your representative on the Stopwaste board, he took several trips to landfills and thinks that the Committee would get a unanimous vote if they also visited landfills. He said as you look over the Styrofoam and other materials in landfills, to ask your tour guide, "what do you think that thing is?" And he said that your tour guide will respond, "well, it could be yesterday or it could be 20 years ago." Council Member Henson said the point is that Styrofoam does not biodegrade, and it is comprised of chemicals that are not healthy at all.

Council Member Henson said that one of his big concerns is that we make sure with this lead time that we really tackle the outreach issue. He said that he spoke with Council Member Kwan of the City of Oakland, and she said a lot of the outreach was done with regard to the Asian community mostly because a lot of take-outs were Asian restaurants. Council Member Henson said that he feels it is important for Hayward to do similar and to would like to note that outreach will be done in various languages.

Council Member Henson said that he inquired about cost at a meeting with other agencies that adopted an ordinance, and their study indicated that it is a per transaction cost. So the per transaction cost probably works about the same, as least according to the other agencies.

Mr. Ameri said that yes, our study indicates a food item cost, so if you have two or three items, the cost would be 30 cents for Styrofoam and it would be more like 60 to 75 cents for compostable and recyclable items, about 10 or 15 cents difference per item.

Council Member Henson said that he does not see the downside of this and as someone who has suggested we ban plastic bags he obviously supports this ordinance. Council Member Henson said his final point is that we need to put up here as well, that we have been talking about our Environmental Preferred Purchasing Plan (EPP), and this is a golden opportunity for us to step forward and get this done. Council Member Henson said that he thinks Hayward is one of the two jurisdictions to do this, and that we need to say to the businesses and merchants that we are stepping forward; we are purchasing materials that are environmentally preferred, as we ask you to save our storm drains and do your part, as well.

Julie McKillop, Planning Commissioner, asked if hospitals are included in ordinance.

Mr. Ameri responded that as long as the food is sold in retail shops, then yes, they are subject to the ordinance, however, not the food that is prepared and served in the kitchen. He said that if the food is brought from inside the City and is sold in retail to the hospital, then it would be subject to the ordinance. If it is brought in pre-packaged from an outside jurisdiction, then we do not have any jurisdiction over that.

Ms. McKillop asked Mr. Ameri if he knows what the case is. Mr. Ameri responded that he does not, but he will look into it. Ms. McKillop said yes, she recommends that he contact the hospitals and find out how it works.

Ms. McKillop asked about rigid polystyrene that everybody is talking about including it in the Ordinance. Mr. Ameri responded that we do not have the same kind of concerns related to garbage, breaking, etc. He said that other jurisdictions that have adopted

similar ordinances have not included this item. As this evolves with other jurisdictions that include these items such as Oakland and Fremont, staff will look into it and bring any modifications and amendments to our ordinance.

Ms. McKillop noted that the other comment she has was about the co-op that one of the cities was going to put together to assist restaurateurs with products at a discounted rate. She asked if there is any outreach program of that kind or anything to work with restaurateurs to make sure they have access to the new type of products. Mr. Ameri responded that maybe two or three years ago that was a concern because the number of vendors were limited; there was one in Palo Alto and one in Richmond, and not too many others. He said that currently these products can be purchased at Costco or Smart and Final and other places, so they are becoming more available.

Mr. McKillop said that it was about expense too, about coming together and buying in bulk and reducing the cost.

Mayor Sweeney said that he forget who it was from the audience that commented on it earlier, and asked if that person would say a little bit more about the co-op program and how it works.

Emily Utter, Save the Bay, said that she believes that Green Town Los Altos has started a co-op. Ms. Utter said her understanding is that merchants purchase through one vendor and receive a significant discount, approximately 20 percent. She said that she is not very knowledgeable about the program, however, she will double-check the information and send it to staff.

Doug Grandt, Keep Hayward Clean and Green Task Force, asked if the meat, fish, and fruit trays from the grocery store are subject to the regulation; Mr. Ameri responded that they are not subject to the regulation. Mr. Grandt asked if there was a reason why they are not subject to the ordinance; Mr. Ameri responded that it is because we do not know where the food is packaged, whether it is packaged from inside the store or if it comes from a wholesaler. Mr. Ameri noted that other ordinances have the same exception as we have in our ordinance. Mr. Grandt asked that if a butcher packages hamburger right there, then it would go into a paper tray. Mr. Ameri clarified that prepackaged food that is sold is not included in the ordinance.

Mr. Grandt said that he thinks it all comes down to behavioral and that we really need to look at the outreach. Mr. Grandt said that the cafeteria where he works sells soup in two sizes of polystyrene cups, which are old and not recyclable. The cafeteria folks switched to biodegradable cardboard and charged 30 cents more. Mr. Grandt said that he doesn't think their business went down, and people paid the 30 cents and, hindsight, he brought his porcelain cup and got a price break and send nothing to the dump. Mr. Grandt said that, to him, is behavioral change.

Mr. Grandt said that he thinks outreach and behavior change could get to the hearts of people. Mr. Grandt said that he is incline not to worry about the numbers and thinks that we could get over the hurdle of the prices, and feels we really need to do this.

Marvin Peixoto, Planning Commissioner, indicated that he would like to follow-up on the issue of cost with Mr. Ameri. Mr. Peixoto said that the staff report mentions that some of the restaurants are getting a break with their garbage and asked Mr. Ameri to explain.

Mr. Ameri said that the contract agreement with Waste Management specifies that all recycling for businesses in Hayward is free of charge. If they can divert their products from garbage cans to recycling containers, then there is potential for a cost saving. This can reduce the amount of garbage service that they have and benefit from it. Mr. Ameri said that composting service cost is 50 percent of the cost of garbage, so it's 50 percent less and to the extent a business can use compostable products, they can take advantage of that and make more use of their composting service.

Mr. Peixoto asked Mr. Ameri to explain the methodology that was used to calculate the cost per food item and the total burden that we will be going by. Mr. Ameri said that, basically, staff went to Costco and looked at various products; for example, they took the cost of hinge containers and divided that cost by the number of containers for a total of 10 cents per container. Mr. Ameri said that the same cost for compostable and recyclable containers was twice as much, a little bit more than 20 cents each. The container cost per food item would be 10–22 cents or so for these containers.

Mr. Peixoto asked Mr. Ameri to explain the per food item. Mr. Ameri said that assuming an inexpensive food item would cost between 4-5 dollars per item. The cost of Styrofoam container is 10 cents for the 5 dollars food item, or 2 percent. For compostable items, the cost becomes more like 20-25 cents, which is about 4-5 percent of the cost per food item. So you go from 10 cents to 25 cents, the impact goes from about 2 percent to about 5 percent.

Mr. Peixoto asked if this was the methodology that other cities used in calculating the cost. Mr. Ameri responded that he does not know if other cities used this methodology, that staff wanted to have factual information. Mr. Peixoto asked if Mr. Ameri recreated this methodology. Mr. Ameri said that he did two things. One way was to look at the methodology this way, as he just explained. The other way was to go to different restaurants and ask them their monthly cost for containers. Mr. Ameri said staff also talked to vendors that provide these products to restaurants. Staff determined that for a small restaurant, the cost is about 100-200 dollars per month, depending on how much take-out business they have, and decided that when you switch to sustainable products then the cost increases from 200-350 dollars per month, which results in a 100-200 dollar increase in the cost per month, per business.

Mr. Peixoto asked if there would be an increase in cost for the vendor because the sustainable products are presumably heavier and the transportation cost would be more. Mr. Ameri indicated that transportation and storage would be included in the product cost.

Mr. Peixoto asked when the State expects the legislation to be active. Mr. Ameri said that it is a two-year bill and this year there is not going to be any actions and that he doesn't know what is going to happen next year. The talk is that it is going to be replaced by another bill that is more comprehensive and cover more items; and staff does

not know where that is going to go. Mr. Ameri said that he doesn't think that we can wait for the adoption of the State ordinance because it may not happen next year or the year after, or it might depending on what happens with a lot of other issues. Mr. Ameri said that right now, it is not the State's priority.

Council Member Henson said he wants to add to Mr. Ameri's answer to Mr. Peixoto's question about the legislation and said it that it is not going anywhere right now. There is a gigantic effort to roll back AB32 , and it qualified for ballot in Southern California, so it's all tied into this and the lobbyist indicated that it's not going anywhere fast.

Mayor Sweeney said that it sounds like the issue on what is covered and what is not covered is pretty simple. If it is prepackaged outside of Hayward then it is exempt, otherwise it is covered. Mr. Ameri confirmed that this is correct.

Mayor Sweeney asked if the CalRecycle report is a life-cycle analysis. Mr. Ameri responded no, they have not done a life-cycle analysis and said that, basically, the State Recycling Board renamed itself to CalRecycle, and they were just providing information that this is the amount on all kinds of Styrofoam that is landfill in California, not only food containers but also packaging.

Mayor Sweeney asked the Committee if they are comfortable with recommending that this Ordinance move forward to the City Council, and said that the Economic Development Committee (EDC) will have an opportunity to comment on this item at their meeting. Mayor Sweeney clarified that this is a proposal that has come out of the Sustainability Committee, EDC can only comment on the proposal, and it is virtually up to this Sustainability Committee to decide if we are ready to go forward or not.

Council Member Quirk asked if Clean Water Action and Save the Bay will find any analysis that can be sent to staff that would address the concerns that American Chemical Council and others are bringing up. Council Member Quirk said he would like to ask staff that if they have to do a Negative Declaration, that it be prepared in a different format. Council Member Quirk also asked that if there is no additional information available, that it be acknowledge and so that the Committee can say yes, we want to go move forward anyway because of x, y, and z. He said that it would also help for the City Council staff report.

Mayor Sweeney said that he believes the Negative Declaration format is that way because most environmental impact wars are filed with development. Mayor Sweeney asked Save the Bay and Clean Water Action to provide staff with anything they have noted, and include information on cooperative purchasing.

Mayor Sweeney asked the Committee Members if there is a consensus to move this item on to the Council. Mr. Peixoto asked for clarification on if this means it would be a positive recommendation, and if this would be a full public hearing. Mayor Sweeney responded that it would be a positive recommendation at this point, with a full public hearing. Mayor Sweeney said that once the additional information is collected and the Committee feels like changing something, then obviously the Committee would not adopt and thereby the City Council does not adopt. Mr. Peixoto indicated that he is reluctant to move it along with a positive recommendation; however, he will move it

along for process. Mr. Peixoto indicated that he hopes when it comes before Council that we have a better cost analysis because he wants to see the bottom line figure. Mr. Peixoto said that he is not comfortable with this and he wants to see how it is going to affect small businesses.

Mayor Sweeney suggested that Mr. Peixoto do something similar to what staff did which was to visit a supplier and compare the cost for "x" amount of polystyrene versus compostable, etc. Mr. Peixoto responded that that was a creative methodology, and said that he wants to know how Palo Alto and Fremont at their calculations. Is there a consistent methodology for calculating the bottom line figure for small businesses? Mayor Sweeney asked Mr. Ameri to research further and report back to the Committee.

Mayor Sweeney asked if there were any other concerns from the Committee and said that it appears that most folks are comfortable, so we will move this proposal along to the City Council with an almost unanimous positive recommendation.

Fran David, City Manager, said that she would like to point out that since this item is going to EDC, for staff to make sure and include any comments into the City Council staff report.

Mayor Sweeney said yes, however, the key point is that since the item comes from the Sustainability Committee, it is this Committee's piece of legislation, and EDC is allowed to make any comments, good/bad/indifferent as they like, but they do not get to hijack the proposal. Mayor Sweeney said that depending on the outcome of the legislation and, if we are not ready in July 2011, then we will move it to later in the year.

Mayor Sweeney thanked everyone for all the good comments and closed item V.

VI. Overview of Community Outreach Plan

Erik Pearson, Senior Planner, said that the Climate Action Plan calls for the preparation of a Communications Plan to get the word out about the overall need to address climate change and address the programs that are being created as part of the Climate Action Plan. Mr. Pearson said that, as a subconsultant to the Sustainability Coordinator, staff hired CirclePoint and then introduced Charles Gardiner and Ivy Morrison.

Charles Gardiner, Principal, said that he knows time is limited and will provide a brief overview of the PowerPoint presentation. Mr. Gardiner described the background of the Communications Plan, how they went about preparing the Communications Plan, communications goals that are identified, the four elements of the communications strategy (branding, messaging, champions, and incentives), and the next steps. Mr. Gardiner described the program in New Jersey called Sustainable Jersey and suggested that the Committee visit their website at www.sustainablejersey.com.

At the conclusion of Mr. Gardiner's Power Point presentation, he said that the key elements to think about are the structure, the measurements to put in place and how to accomplish them, how to recognize or reward people that are doing the right thing, and how to set up some competition to get people to go further than they might if they just heard that it was about Climate Action.

Mr. Mendall said he likes the idea about the logo, branding, and competition. He said that in terms of getting people to change, he feels there are two different categories: the smaller category (i.e., bring canvas bags to grocery stores, etc.), and then there is the larger category (i.e., solar on roof, buying an electric vehicle, etc.). Mr. Mendall said that these categories are very different and the way we treat them should be different. The little category is just encouragement, momentums, etc. (little stickers). However, the larger category includes things that really need financial incentives like CaliforniaFIRST, and has to be something more of a larger scale. Mr. Mendall said that as you think about the changes you are asking people to make, he encourages consideration of these two different categories.

Mr. Grandt said that he thought this was a good report and was really impressed with the idea of branding, it's simple and catchy. Mr. Grandt talked about a couple of existing programs (Eco-Heroes and REDD) that the Committee might look at in terms of a model and ideas. Mr. Grandt said that he feels one way to reach the community is through the children, and a program for children is a good way to get to their parents. Mr. Grandt said he thinks we are on the right track.

Council Member Quirk said that his concern is the media coverage. He said that we have a reporter here from the Tri City Voice with circulation in Hayward of about 2,000-3,000 out of 50,000 homes; and the Daily Review is 12,000 out of 50,000 homes and they never have a reporter attend these meeting.

Mr. Gardiner responded that he wouldn't anticipate that we would rely heavily on the media; however, creating a community event gets coverage in all of those media, including the social networks in your community. Mr. Gardiner said that the media is always looking for positive, feel good stories, especially with kids.

Council Member Henson said that he agrees with Mr. Grandt and thinks the large part of outreach should be directed toward children and feels they have tremendous impact on what can be done. Mr. Henson asked about the measurement process with Sustainable Jersey.

Mr. Gardiner said that for municipality, it is things like pass a municipal water conservation ordinance, do a community green event; there is a whole host of different things. Municipalities have the flexibility to do whichever ones they think but they can to get 100 points to be recognized as a sustainability community. Mr. Gardiner said that in a little over year, they had a little over 50 percent of the communities in New Jersey participating. The relevant part of it is the structure of being measurement-oriented, specific interactions, and champions.

Mayor Sweeney said that he would like to add a comment on the children - the younger the better, and high school might be too late - that we want to get them early. Mayor Sweeney also said that the earlier comments about the website are well taken, it does need work some work, and making it more user-friendly would be a good thing.

Mayor Sweeney asked if there were any additional comments. There being no further discussion, Mayor Sweeney thanked everyone for their comments and moved to item VII.

VII. General Announcements and Information Items from Staff

Update on Formation of the Climate Action Management Team

Amelia Schmale, Sustainability Coordinator, provided a brief overview of the memo and the next steps in the formation of the Climate Action Management Team.

VIII. Committee Referrals and Announcements

Council Member Quirk said that we are going to be looking at the Residential Energy Conversation Ordinance in September. He would like to ask that we particularly look at the homes of the 50's and 60's, and figure out a way that we can schedule them (doing them on sale?), and concerned about the person that is selling the house making the changes; are they really going to be up to par?

Council Member Henson said that the effort to rollback AB32 is a significant effort, and he is not sure if the City wants to take a position on this. Mayor Sweeney asked if it had a ballot number, and Mr. Grandt responded it is ballot 23. Council Member Quirk explained that, as government-funded, we cannot take a position but we might be able to put out a set of facts. Mr. Grandt said that PGE is against 23.

IX. Next Meeting: Wednesday, September 1, 2010

X. Adjournment: Meeting adjourned at 6:21 p.m.

CITY OF
HAYWARD
HEART OF THE BAY

DATE: September 1, 2010

TO: Mayor and City Council Sustainability Committee

FROM: Development Services Director

SUBJECT: Update on the Development of a Residential Energy Conservation Ordinance (RECO)

RECOMMENDATION

That the Committee reads and comments on this report.

BACKGROUND

The development of Residential Energy Conservation Ordinances (RECOs) for both single family and multiple-unit homes are recommended actions in the Hayward Climate Action Plan (CAP), which was adopted by the City Council on July 28, 2009. The CAP listed RECOs as relatively high priorities (11 and 12 out of 25 community-wide actions). The top ten CAP priorities include financing programs for energy efficiency and renewable energy, implementation and modifications to the green building ordinance, and the development of a Commercial Energy Conservation Ordinance (CECO). Financing, or Property Assessed Clean Energy (PACE) programs are being developed through the CaliforniaFIRST program, however, the Federal Housing Finance Agency (FHFA) and Fannie Mae & Freddie Mac, have issued statements and guidance that have stalled PACE programs across the country. Updates on CaliforniaFIRST will be provided to the City Council on September 14, 2010 and to the Sustainability Committee on November 3, 2010. The green building ordinance is scheduled to be reviewed in 2011, related to the new State Green building Code (CalGreen) that will become effective January 1, 2011.

While a CECO is the number two ranked CAP action, the RECO is being developed first because RECOs exist in other cities and there is more data available related to RECOs. Staff is not aware of an existing CECO ordinance, therefore, development will be more challenging. Staff anticipates beginning the development of a CECO in 2011. Staff and consultants provided the Committee with an introduction to RECO on February 3, 2010[1] and an update on research needed for the development of a RECO on June 2, 2010[2]. For the minutes from the June 2, 2010 meeting, please see Attachment I.

[1] Report from the February 3, 2010 meeting: http://www.hayward-ca.gov/citygov/meetings/csc/ccsc/2010/CSC-CCSC020310.pdf
[2] Report from the June 2, 2010 meeting: http://www.hayward-ca.gov/citygov/meetings/csc/ccsc/2010/CSC-CCSC060210.pdf

DISCUSSION

Analysis – Since the June Sustainability Committee meeting, the City's consultant has been analyzing the cost-effectiveness of possible home energy improvement measures that may be required by a RECO. A report by the City's consultant, Gabel Associates, LLC, is included as Attachment II and provides an Executive Summary, followed in Section 1 by an Introduction that references the previous Committee meetings and provides a brief overview of the report contents. Section 2 of the report describes the measures that are most appropriate for Hayward's climate, listed below:

- Air Sealing
- Attic Insulation
- Duct Sealing
- Wall Insulation
- Raised Floor Insulation (above Crawlspace)
- New Water Heater

The report focuses on these natural gas-saving measures for two reasons. First, the large majority of Hayward homes do not have air conditioning, which is typically powered by electricity. Secondly, elements such as lighting and appliances are removable and energy use can vary greatly depending upon the behavior and lifestyle of the home's occupants. The above measures are relatively fixed building improvements that improve the efficiency of space and water heating.

Section 3 of the report provides discussion of current and expected incentives and rebates that may apply to home energy efficiency retrofit measures. This section also describes the Home Energy Rating System (HERS 2) Program, through which the California Energy Commission has established a standardized performance-based rating system for evaluating the energy efficiency of a residential building. The rating system is expected to be used as a basis for incentive and financing programs. The cost-effectiveness analysis, found in Section 4, includes the possible impact of these incentives on the net project cost and effect on the payback for the various measures.

The cost-effectiveness analysis in Section 4 involves the consideration of energy saved in relation to the cost of the project. This section provides project cost, energy savings, associated greenhouse gas reduction, and cost-effectiveness information. Energy savings, expressed in therms of natural gas, can be translated to dollars saved on a resident's energy bill. In this way, paybacks- or the amount of time needed for the amount of money saved on the bill to equal the amount of money invested in the improvement- can be calculated and are included.

Section 5 of the report summarizes the potential greenhouse gas reductions possible with a RECO and Section 6 provides a discussion of the possible 'triggers' for compliance (or the point at which the RECO would be applied). Triggers examined include building permit applications for remodels/additions, the sale of the property, and a date certain option that would apply to every unit within a determined time period (with possible exemptions). The report discusses the number of units that would be affected by each trigger. The number of homes to which the RECO would apply and the amount of energy reduced by the recommended retrofit measures will determine the ability of the ordinance to reach the greenhouse gas reduction goals in the CAP.

Findings – It is important to note that Hayward's mild climate results in relatively low residential energy use for heating and little to none for cooling. This low energy use means that efficiency measures applied will have longer paybacks than areas with greater space conditioning needs. The study found a number of combinations of retrofit measures with the following attributes:

- an installed cost of $3,000 or less;
- a simple payback (before incentives) of approximately 30-35 years;
- greenhouse gas reduction in the range of 8 to 9 percent; and
- a Home Energy Rating System (HERS 2) score improvement of more than 10 percent (explained in Section 3 of the report).

The retrofit combinations that fit these criteria include:

- Air Sealing + R-30 Attic Insulation (from no insulation)
- Air Sealing + Duct Sealing
- Air Sealing + R-19 Raised Floor Insulation (from no insulation)

Following are the estimated energy savings, costs, and paybacks associated with the above retrofit combinations.

Energy Retrofit Measures	Annual Gas Saving (Therms/Yr)	Annual CO2e Reduction (Lbs./Yr)	Average Retrofit Cost ($)	Average Payback Before Incentives (Years)
Air Sealing + Duct Sealing	71	841	$2,440	31.0
Air Sealing + R-30 Attic	81	951	$2,589	29.1
Air Sealing + R-19 Raised Floor	76	890	$3,016	36.2

The report also finds that the trigger or combination of triggers chosen will have a significant effect on the RECO's ability to reach the CAP goals. The table below shows that the remodel/addition trigger will reach a very small percentage of Hayward homes and thus produce GHG reductions that total 38 percent of the 2020 CAP goal, and less than one percent of the 2050 goal. A RECO triggered by the sale of the property will produce GHG reductions that are more than five times the 2020 goal, but only nine percent of the 2050 goal, and a date certain trigger would result in more than 14 times the 2020 goal, but only 24 percent of the 2050 goal. While it is clear that the City's 2020 goals can be achieved, the ordinance will likely need to be revisited on a regular basis to ensure the 2050 goals are met. Both energy savings per home and participation rates will need to be monitored. These goals pertain only to the RECO for single-family homes. The CAP identifies other goals for a RECO for multi-family homes and for a CECO.

Goal or Trigger(s)	Percent of Homes Affected by 2021	Eligibility x Compliance Rate	Annual CO2e Reduction (Metric Tons)	% of 2020 CAP Goal by 2021	% of 2050 CAP Goal by 2021
2020 CAP Goal	n/a	n/a	639	100%	1.6%
Remodels Only	2.1%	2.1%	240	38%	0.6%
Point-of-Sale Only	34.3%	30.9%	3,600	563%	9.2%
Remodels + Point-of-Sale	35.7%	32.1%	3,740	585%	9.5%
All Dwellings by Date Certain (by 2021)	100.0%	81.0%	9,437	1477%	24.0%
Pre-1978 Dwellings by Date Certain (by 2021)	72.0%	58.3%	6,792	1063%	17.3%
Remodels + Older Dwellings Date Certain	73.4%	59.4%	6,921	1083%	17.6%
2050 CAP Goal	n/a	n/a	39,304	n/a	100.0%

Note 1: Assumes average CO2e reduction per dwelling unit = 882.34 lbs./year based on the retrofit combinations shown in Section 5, Table 4.

The report recommends the adoption of a RECO that offers retrofit measures that are relatively cost effective and provide the property owner with flexibility in compliance, allowing choice between several combinations of retrofit measures. The report also recommends including a few low-cost mandatory improvements (such as water-efficient toilets and weather stripping) and a limit on the cost of required retrofit measures.

PUBLIC CONTACT

Community Meeting – Staff held a community meeting on August 11, 2010, to present the concept of a RECO and invite public comment. A presentation was given to inform the public of the RECO development process, policy background, and measures and triggers under consideration. Approximately fifty people attended the event and many provided comments. Many local realtors attended and raised concerns, as was done at the June 2 Sustainability Committee meeting, about a point of sale trigger, explaining that Hayward already faces many challenges in attracting home buyers, including difficult economic times, property transfer tax, and a poorly performing school system. Many realtors do not think it is a good idea to add what they see as another challenge to attracting home buyers. Staff asked the audience and found that many of the realtors in attendance indicated that they would support a RECO if it was not triggered at point of sale.

Approximately ten attendees expressed general support for the concept of a RECO, citing the associated energy savings, global environmental benefits, and stimulation of the 'green' economy and jobs as benefits. One attendee expressed her interest in having an energy efficient home but was concerned about how a RECO would interact with the improvements she had already made and how she would know whether or not she was in compliance. Many people expressed the need for more extensive outreach so that more residents could be aware of and attend future public meetings. Staff recommends that a special meeting of the Sustainability Committee be held in the evening this fall to allow for a more focused discussion on the details of Hayward's RECO and more public input before the Committee.

Correspondence – Three letters were submitted to the City in response to the announcement of the RECO community meeting. Gabriel Hernandez of the Hayward Day Labor Center provided suggestions for the development of the ordinance that would promote job development in the community and raised several questions regarding the economic impacts of the ordinance (Attachment III). Chait Diwadkar suggested that a point of sale trigger could be feasible in light of the economic benefits to the economy, such as job creation, as well as stipulations that could be included in the ordinance that would ensure these benefits are harvested by local businesses (Attachment IV). Cam Bauer, a local resident who installed a gray water system for his home, expressed his support for requiring upgrades to homes so that they are structurally ready for the future installation of solar and grey water systems. Solar and grey water compatibility are not currently under consideration for required measures under a RECO, but staff notes this suggestion may be considered for future revisions to the Green Building Ordinance.

ECONOMIC IMPACT

The economic impacts of the program are not completely known at this point and depend upon the details of the ordinance. Potential costs include the cost of energy efficiency upgrades to property owners and the cost of enforcement to the City. The cost of the upgrades will depend on the measures selected as the ordinance is developed. The economic benefits to homeowners from reductions in energy use will also depend upon the measures selected.

The cost of the upgrades could be partially offset by incentives offered by the federal HOMESTAR program and compliance monitoring could be offset by an inspection fee. Energy efficiency retrofits are expected to create work for local contractors; the associated economic benefits have not been quantified.

FISCAL IMPACT

No negative impact to the City's General Fund is expected as administrative and enforcement costs could be offset by inspection fees. However, an evaluation of the staffing required to administer and enforce the RECO would need to be conducted as the RECO details are developed, to ensure that other staff functions, such as building inspections, could be maintained.

NEXT STEPS

Staff seeks the Committee's direction regarding further research, community meetings, and ordinance development.

Prepared by: Amelia Schmale, Sustainability Coordinator

Recommended by: David Rizk, AICP, Development Services Director

Approved by:

for Fran David

Fran David, City Manager

Attachments:

Attachment I	Minutes from June 2, 2010 Sustainability Committee Meeting
Attachment II	Research Report on a Hayward Residential Energy Conservation Ordinance (RECO), prepared by Gabel Associates, LLC
Attachment III	Letter from Gabriel Hernandez, Executive Director, Hayward Day Labor Center
Attachment IV	Letter from Chaitanya Diwadkar

CITY COUNCIL SUSTAINABILITY COMMITTEE MEETING
Hayward City Hall – Conference Room 2A
777 B Street, Hayward, CA 94541-5007

June 2, 2010
4:30 p.m.

MEETING MINUTES

I. Call to Order – Meeting called to order at 4:34 p.m. by Mayor Sweeney.

II. Roll Call

Members:

- Michael Sweeney, Mayor
- Olden Henson, Council Member
- Bill Quirk, Council Member
- Julie McKillop, Planning Commissioner
- Al Mendall, Planning Commissioner
- Marvin Peixoto, Planning Commissioner
- Doug Grandt, Keep Hayward Clean and Green Task Force (KHCG)

Staff:

- Fran David, City Manager
- David Rizk, Development Services Director
- Bob Bauman, Public Works Director
- Glen Martinez, Building Official
- Erik Pearson, Senior Planner
- Amelia Schmale, Sustainability Coordinator
- Katy Ramirez, Administrative Secretary (recorder)

Others:

- Mike Gable, Gable Associates, LLC
- Rosemary Howley, Gabel Associates, LLC
- Kali Steele, Master in Public Policy, Mills College
- Cynthia Chiasson, Realtor
- Bill Espinola, Windermere Real Estate
- Jan Lebby, Realtor, Re/Max Accord
- Lori Kiser, Realtor, Bay East Association of REALTORS®
- Serean Kimmel, Windermere Real Estate
- Ori Skloot, President, Advanced Home Energy
- Otto Catrina, Bay East Association of REALTORS®, Catrina Real Estate
- Craig Ragg, Bay East Association of REALTORS®, Craig Ragg Real Estate
- Larry C. Smith, Real Estate Broker
- David Stark, Bay East Association of REALTORS®
- Carlos Dominguez, Smart Builders, Inc.

III. Public Comments

Jan Lebby, Realtor, Re/Max Accord – Ms. Lebby said that she has lived in Hayward for 32 years and practices her real estate in the Hayward area. She said that one of the common problems that she has been experiencing with her clients is concerns about Hayward schools and that many of them prefer Castro Valley, Pleasanton, or Dublin schools. Ms. Lebby expressed her opinion that Hayward schools are not very good, but that they have wonderful teachers. Ms. Lebby suggested to the Committee that parents take a moment and visit Hayward schools. Ms. Lebby also expressed concerns about vacant properties in Hayward and about the many properties that are not maintained. She said that she would like some help with these situations and would like to see improvements.

Serean Kimmel, Realtor, Windermere Real Estate – Ms. Kimmel said that she has background on economics, energy and natural resources and understands the importance for government leaders to impose policies. Ms. Kimmel expressed her concern for imposing an ordinance that would force homeowners to bring their home to current energy efficient standards and the financial burden it would impose on the buyer and/or seller, and the difficulties this would create for short sale and foreclosed homes.

Lori Kiser, Realtor, Bay East Association of REALTORS® - Ms. Kiser said that she is a Hayward resident, real estate broker, and landlord. She said that she has many concerns about the point-of-sale ordinance that is being proposed, and feels that it would cause a burden, be intrusive, and make jobs for realtors more difficult. Ms. Kiser feels that a RECO is a must for our future, but it should be done in a gentler way and be designed to make it work for all participants.

Bill Espinola, Realtor, Windermere Real Estate –Mr. Espinola said that he has been a landlord in the City of Hayward for over 25 years and has been living in Hayward for over 10 years. Mr. Espinola said that although we are all in favor of energy conservation, he is against the point-of-sale ordinance. He said that selling real estate in Hayward with today's climate is a challenge, and the point-of-sale ordinance would just further complicate those challenges. Mr. Espinola said that he hopes the Committee will take into consideration other fair ways to go about conserving energy.

Cynthia Chiasson, Realtor – Ms. Chiasson said that she is a resident of Hayward and a realtor for the past 18 years; and most of her business sales have been in the Hayward area. Ms. Chiasson said that she is totally against the point-of-sale ordinance, that it makes realtors very nervous, it tends to drive clients to other areas, and the cost of energy efficient upgrades will become a real conflict for the seller and the buyer. Ms. Chiasson said that she is all for energy efficiency if there is a way that it can be done through education and/or incentive programs and not cheat the first time homebuyers.

David Stark, Public Affairs Director for the Bay East Association of REALTORS® - Mr. Stark said that the staff report and other analyses indicate that there is political opposition with point-of-sale requirements. Mr. Stark said there is no evidence that greenhouse gas emissions have been reduced in communities that have adopted residential energy conservation ordinances. Mr. Stark said that in January, he raised concerns about the status of the real estate market in Hayward and what impacts they

may have on the effectiveness of point-of-sale requirements; and feels that those observations have been ignored. Mr. Stark said that he thinks the term paper included in the packets is an interesting study and there are some unique qualities to all the real estate markets identified in that paper, but that, unfortunately, Hayward doesn't share those qualities in terms of demand for homes, sales prices, availability, and transactions. Mr. Stark further stated that, in terms of establishing a foundation for public policy, we really need to look at what would work in Hayward. Mr. Stark said that he was hoping to have a representative from the Berkeley Association of Realtors to talk about her experiences with RECO, but unfortunately, she was not able to make it, but she did provide written comments and he encouraged the Committee to read them.

Mr. Stark said that Bay East Association of Realtors is currently helping Stopwaste.org to design and market their new program. He said it was called the Green Packages Program, but Stopwaste is rejuvenating the marketing approach and name of that program. Mr. Stark said Bay East is excited to be part of the solution when it comes to energy efficiency and that Stopwaste was looking to involve 3,000 plus homes and hoping to partner with the City of Hayward.

Otto Catrina, Bay East Association of REALTORS®, Catrina Real Estate – Mr. Catrina said that he has lived in Hayward since 1960 and his family has owned personal and commercial property in the City of Hayward for over 30 years. Mr. Catrina said that he is a big advocate of green energy efficiency and sits on the California Association of Realtors Committee, and he just returned from a trip to Washington D.C. where he attended a National Association of Realtors meeting. Mr. Catrina said that point-of-sale is not a new topic and realizes that this is an issue that has to be dealt with on a state and national level.

Larry C. Smith, Real Estate Broker – Mr. Smith said that he has lived in Hayward for 34 years and has built homes in the Hayward area. Mr. Smith said that real estate is a struggling industry and feels that a point-of-sale ordinance will affect very few people; however, the impact would be significant for people who are trying to make a living. Mr. Smith asked the Committee and the City of Hayward to rethink point-of-sale carefully and feels there are other alternatives to explore that would have a lasting effect on homeownership.

Craig Ragg, Real Estate Broker, Castro Valley – Mr. Ragg said that he has sold real estate in Hayward for over 30 years, and agrees with many of the comments that have been made today. Mr. Ragg said that he recently checked on the statistics for home sales in Hayward and said that 65 percent of the properties sold were distressed properties, either short-sale or foreclosed properties, and last year it was well over 80 percent for Hayward; the highest in Alameda County for distressed properties. Mr. Ragg said there are many comments about how banks will not finance short-sales and foreclosed properties, and that point-of-sale requirements are difficult to deal with, especially in the market today. Mr. Ragg said that he supports green and understands it; however, he feels that we have to find a way that will work for the industry, the homeowner, and the community.

Ori Skloot, President, Advanced Home Energy – Mr. Skloot said that he has been doing work in Berkeley for 15 years as a home performance contractor and one of the main

things he does is RECO work. Mr. Skloot said that he has never heard of a deal not going through because of RECO. Mr. Skloot said that he is also a broker and sits on a number of Berkeley Association of Realtors and they also have a green committee and part of their green work is to install CFL's (compact fluorescent lamps). Mr. Skloot said that he understands the comments that have been made and doesn't disagree with them, but that everyone should support change and that we have to start somewhere and a point-of-sale ordinance is a good place to start.

Carlos Dominguez, Smart Builders, Inc. – Mr. Dominguez said that he is a local general contractor in Hayward and said that they support this ordinance. Mr. Dominguez said that based on his experience in the field, people would be surprised by the number of homes being sold that do not perform and, that with this ordinance, the homebuyers will know exactly what they are purchasing and therefore, he strongly encouraged this ordinance.

IV. Approval of Minutes of April 7, 2010 – the minutes were approved with the following corrections:

Doug Grandt, Keep Hayward Clean and Green Task Force – requested that wording in a sentence on page 4 be changed from "Committee on Environmental Public Works" to "U.S. Senate Committee on Environment and Public Works," and "during the conversation, he" to "who".

Julie McKillop, Planning Commissioner – requested that a paragraph on page 3 be revised to read, "Planning Commissioner Julie McKillop questioned if this proposal would be attractive to larger energy users. Ms. McKillop supports the idea of focusing on not for profits and feels the funds would be more beneficial to these users. Ms. McKillop also said that she like the concept of large users partnering with local not for profits and using the funds to create energy savings for not for profits."

V. Update on Development of a Residential Energy Conservation Ordinance (RECO)

David Rizk, Development Services Director, said that RECO is one of the actions that was identified in the Climate Action Plan that was adopted by City Council last summer as a fairly high priority. Mr. Rizk briefly summarized the why, the what and when of the RECO, which are identified in the staff report, and said there are a lot of issues that need to be addressed and considered. Mr. Rizk said that staff anticipates that this process is going to take several months before any decisions are made, and that this item will return to the Committee in the fall.

Mr. Rizk introduced Amelia Schmale, Sustainability Coordinator, and indicated that Ms. Schmale will introduce the speakers for today.

Amelia Schmale, Sustainability Coordinator, introduced Kali Steele, who recently graduated from Mills College with a Masters in Public Policy and said that Ms. Steele completed her requirements doing a thesis on a possible RECO for Hayward by researching RECOs throughout the country. Ms. Schmale thanked Ms. Steele for her work and for providing the report in the Committee's packet.

Kali Steele provided a PowerPoint presentation and overview of her report, and noted that she surveyed eight RECOs throughout the country, including Berkeley and San Francisco, which are two of the oldest RECOs in the country that were adopted in the 1980s. Ms. Steele gave an overview of the benefits, statistics, common barriers (i.e. lack of information and awareness), financing, and rebates associated with RECOs, as detailed in her report.

Mike Gable, Gable Associates, LLC, said that his general comment is that RECO is a big subject and there are a lot of moving parts. Mr. Gable proceeded with a PowerPoint presentation and provided an overview of the goals, performance, schedule, cost to homeowners, and state and federal funding programs. Mr. Gable said his recommendation is to keep collecting data; not make any decisions for four or five months; and monitor state and federal funding programs.

Bill Quirk, Council Member, described his own experience with a duct leakage in his house where he had to spend $7,000 to replace the insulation; however, he did not see a significant difference in his utility bill from 2009 and 2010. Council Member Quirk said that he doesn't think with the current housing market that this is the right time to tell people that they have to fix their house before they sell it especially when they are not making money on their homes.

Erik Pearson, Senior Planner, pointed out to the Committee that there was a typo in the letter dated May 26, 2010 from David Stark of the Bay East Association of Realtors for the 2009 home sales, which is actually 1,429 homes.

Doug Grandt, Keep Hayward Clean and Green Task Force, said that we need to understand the cost effectiveness of each implement of what we are doing and said he would like to know more about it. Mr. Grandt said that he doesn't think we should put energy efficiency improvements on the seller and thinks it should go to the buyer, because the buyer is going to benefit and get a return on the investment. Mr. Grandt also said that he thinks we should have a survey, do an audit at point-of-sale, get an inventory of what is out there at the time of sale, and use care rather than enforcement.

Al Mendall, Planning Commissioner, thanked the realtors for attending the meeting and said that he appreciates their perspectives. Mr. Mendall noted that one of the concerns that he is struggling with is if not at point-of-sale, then at what point should energy efficiency improvements be made? Mr. Mendall said that he is having a hard time thinking of an alternative that makes sense and is suggesting that if anyone has other ideas, then please follow-up with an email for consideration by the Committee. Mr. Mendall pointed out that there will be a cost, but the homeowner will save money over time. Mr. Mendall said that he agrees with Mr. Grandt that an audit should be required at point-of-sale or at point of remodel. He said that one measure would be to have audits required based on the age of the home, such that over a 20-year period every home in Hayward would get and audit, and those details would have to be worked out. He indicates that once an audit is completed, then he would like to see a certain amount of improvements made within one to three years, and said that the audit should not be done by the seller in the case of point-of-sale. Mr. Mendall said that the buyer often makes improvements anyway, so as the buyer proceeds with improvements, the upgrades will meet the requirements of the audit. Mr. Mendall said that we are trying to put in place

mechanisms that reduce up-front costs. He suggested that an incentive to encourage improvements would be to refund the cost of the audit after the energy efficiency improvements are made.

Olden Henson, Council Member, said that he agrees with some of the ideas discussed and thinks that they should probably be undertaken. He said that he doesn't know of any other cities that has the amount of distressed properties that Hayward currently has and, if the realtors are correct, then Hayward is either number one or two in Alameda County (vice versa with Oakland) for distressed properties. Mr. Henson said that he likes Mr. Grandt's idea about requiring an audit if that audit is reasonably priced; and he likes Mr. Rizk's idea about using some of the $250,000 federal Energy Efficiency and Conservation Block Grant funds to pay for the audits, which would cover quite a bit. Mr. Henson said that quantifiable data is necessary, that we are going to have to show improvements to people, and that sales would be difficult without data. Mr. Henson said that we can take a lead, but he is very concerned about the current market. He said that he is not sure which triggers would work, perhaps an audit or perhaps in three to five years when the market moves. Mr. Henson said that we are all currently in dire straits financially.

Marvin Peixoto, Planning Commissioner, said that he spoke out against point-of-sale before and his rationale was that improvements can be done voluntarily over the normal course of maintaining and/or repairing your home. Mr. Peixoto said that it bothers him that we are taking this one Hayward issue of trying to become energy efficient and treating it as a stand-alone discreet item without regard to the vision that we have for the City of Hayward, and feels this impacts that vision in a negative way. Mr. Peixoto said that the previous goal was to have 70 percent homeownership, and we are currently at a point where people can afford to purchase a house, and we want that demographic in Hayward. Mr. Peixoto said that this industry is down already; that we talk about Hayward being business-friendly, but this would not be a business-friendly decision. Mr. Peixoto said that now is not the time to requirements at point-of-sale and there is no way that he will support it.

Julie McKillop, Planning Commissioner, said that she thinks we need data and totally opposes point-of-sale at this time. She said that she would like to see a pilot program put into place that would be strictly voluntarily out of incentives; however, she doesn't know if this would be possible or a waste of time. Ms. McKillop said that we have at least five years before the economy and housing market will turn around, so we have that time to collect data and then be ready to go at that time.

Mr. Mendall said that he would like to comment that he doesn't see how it is business unfriendly to encourage or require someone to make changes that would save them money, especially if we can make the cost manageable by paying for the upfront costs such as the audit. Mr. Mendall said that if we can encourage someone to spend $1,000 that will save $500 per year for life, that he thinks this as business-friendly, not business unfriendly.

After more discussion, Mayor Sweeney said that staff will review the comments from the meeting today and we will revisit this item again in September, where staff will

update the Committee with any progress, provide data, and determine where we are at the state and federal levels.

Mayor Sweeney said that he thought this was a good discussion and thanked Mr. Gabel, Ms. Steele, staff, and the audience members. He said that it seems there is a lot on the table in terms of options and he is not willing to make any decisions at this point. Mayor Sweeney said that we have a good Climate Action Plan with some reasonable goals, which may need to be revamped based on what the state or federal governments do.

VI. General Announcements and Information Items from Staff

Mr. Grandt announced that October 10, 2010 is "Let's Get to Work Day" to demonstrate local green initiative and said that he plans to build a solar panel at the front steps of Hayward City Hall. Mr. Grandt said if anyone is interested in working with him over the next couple of months to put together a solar panel, get information out to the community, and show them that we are doing our job, to please let him know.

Mr. Rizk said that staff is working on participating in Solar Day 2010 scheduled for June 19th, which is celebrated throughout the world and in the Bay Area. He said they are working out details to piggyback on the Farmer's Market, and will send out more information in a weekly report item.

VII. Committee Referrals and Announcements

None.

VIII. Next Meeting: Wednesday, July 7, 2010

Mr. Mendall said from what he has heard, the recently adopted Fremont ordinance to ban styrofoam appears to be a reasonable platform from which to build and this would be the obvious place for the Committee to begin discussion. Mr. Mendall asked that, if possible, for staff to cut, paste, make minor modifications to the Fremont ordinance, in an effort to make Hayward's ordinance standard with other cities.

IX. Adjournment: Meeting adjourned at 6:28 p.m.

Research Report on a Hayward Residential Energy Conservation Ordinance (RECO)

August 19, 2010

Prepared for:
Mayor and City Council Sustainability Committee
City of Hayward

Prepared by:
Michael Gabel
Gabel Associates, LLC

This report was prepared by Gabel Associates, LLC, under a contract between the City of Hayward and QuEST, Inc. Support in the development of data, analysis and in writing this report was also provided by Pacific Gas and Electric Company's Codes and Standards and and Government Partnership Programs.

Acknowledgements

We would like to thank many people for their generous assistance and support over the past six months in providing Gabel Associates with valuable information, insights, suggestions and encouragement in the research and analysis that went into this report. While in no way should their mention here suggest any responsibility for the content, we would like to express our great appreciation for their help.

Doug Beaman
Misti Bruceri
Marina Chavez
Kirk Dahl
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Martyn Dodd
Pat Eilert
Kevin Gilleran
Jeff Gleeson
Matt Golden
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Arlene Teves
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Contents

Executive Summary

The Hayward Climate Action Plan, adopted on July 28, 2009, recommends the adoption of a Residential Energy Conservation Ordinance that would require residential energy improvements in existing buildings. City Council Sustainability Committee meetings held this year on February 3rd and June 2nd presented major elements of a possible RECO, and the kinds of options and choices associated with each of them. The purpose of this report is to answer key questions that will inform the development of a RECO:

- What retrofit measures make sense to consider in Hayward, and what do they cost?
- How much energy do these measures save annually, and are they cost-effective?
- What is the amount of greenhouse gas reduction that results from specific retrofit measures for an individual dwelling? And what is the aggregate greenhouse gas reduction if measures are implemented citywide?
- How do the potential criteria that might trigger an ordinance such as remodels, point-of-sale and date certain (explained in Section 6) affect how the City is able to meet its Climate Action Plan goals?

The approach used to answer these questions includes a mix of existing research data, utility energy use data and original analysis with building energy software.

Costs and Cost-Effectiveness

Individual retrofit measures such as duct sealing, attic insulation, air sealing and new gas tank water heater cost on average in the range of $1,000 to $1,600. A combination of air sealing plus either attic insulation or duct sealing or R-19 floor insulation cost on average in the range of $2,400 to $3,000. Air sealing + attic insulation + duct sealing cost on average in the range of $3,600 to $3,900. Other measures – usually a combination of four or more individual measures – can average from $4,000 to $8,000 as shown in Tables 2a and 2b in Section 4 of this report.

Table 1 below shows the typical range of paybacks with and without potential utility and tax incentives based on the combination of installed cost and annual energy cost savings for each retrofit measure or set of measures. The table is very conservative in that is assumes no increased resale value of the house as a result of the energy improvements. With no incentives, paybacks range from 25 to 34 years for all measures except air sealing + floor insulation (36 years) and new gas water heaters (42 to 58 years). If incentives are included, paybacks for all measures except water heaters range from 8 to 24 years.

If an increase in resale value from energy improvements is accounted for, paybacks are reduced accordingly. For example, if 30% of the retrofit cost accrues to the resale value, paybacks without incentives are also reduced 30% the range of 17 to 25 years (excluding water heaters).

Table 1. Cost and Cost-Effectiveness of Retrofit Measures

Energy Retrofit Measures	Average Retrofit Cost ($)	Average Payback with No Incentives (Years)	Net Retrofit Cost with Incentives ($)	Average Payback with Incentives (Years)
Duct Sealing	$1,029	27.8	$415	11.2
R-30 Attic (from R-0)	$1,178	24.6	$1,028	21.5
R-38 Attic (from R-0)	$1,319	27.0	$1,169	23.9
Gas Water Heater EF=0.58	$1,400	58.1	$1,400	58.1
Air Sealing	$1,411	33.9	$706	16.9
Gas Water Heater EF=0.62	$1,625	41.8	$1,625	41.8
Air Sealing + Duct Sealing	$2,440	31.0	$1,220	15.5
Air Sealing + R-30 Attic	$2,589	29.1	$1,589	17.8
Air Sealing + R-38 Attic	$2,828	31.2	$1,414	15.6
Air Sealing + R-19 Raised Floor	$3,016	36.2	$1,508	18.1
Air Sealing + R-30 Attic + Duct Sealing	$3,617	31.1	$1,809	15.6
Air Sealing + R-38 Attic + Duct Sealing	$3,856	32.7	$928	7.9

Selected Energy Retrofit Measures

As covered with Table 2b in Section 4 of this report, several combinations of measures

(a) have an installed cost at or below $3,000; and

(b) have a simple payback without any incentives around 30 to 35 years; and

(c) reduce greenhouse gases in the range of 8% to 9%; and

(d) improve the Home Energy Rating System (HERS 2) score of the existing house by more than 10% (explained in Section 3).

The retrofit combinations which that these criteria appear to be appropriate for consideration as required improvements:

(1) Air Sealing + R-30 Attic Insulation (from no insulation)

(2) Air Sealing + Duct Sealing

(3) Air Sealing + R-19 Raised Floor Insulation (from no insulation)

RECO Recommendations

A review of the report analysis and data suggests a RECO that

- Gives the individual homeowner flexibility through several prescriptive choices as well as a performance option in meeting the RECO requirements;
- Promotes retrofit measures with quality assurance that are cost-effective in securing energy savings even without utility or other incentives;
- Achieves citywide reductions in greenhouse gas emissions in line with the Hayward Climate Action Plan 2050 Single Family/Duplex RECO targets.

A RECO would include a list of *Mandatory Features*, *Compliance Options* (prescriptive or performance), a *Cost Cap*, and a combination of *Triggers* to reach the City's greenhouse gas reduction goals.

Mandatory Features

Research done for other Bay Area RECOs indicates that a set of relatively inexpensive measures which are cost-effective would be appropriate as minimum requirements for a Hayward RECO. These include items such as low flow toilets, showerheads and faucet aerators (generally offered at low cost or no cost by EBMUD); hot and cold water piping insulation at least 5 feet from the water heater; exterior door weather-stripping; fireplace closures; and simple furnace duct repair if tested duct sealing is not performed as part of a compliance option.

Compliance Options

The homeowner would choose any one of the following four retrofit options:

Prescriptive Approach

1. Air sealing + R-30 roof/ceiling insulation (if < R-13 existing roof/ceiling insulation)
2. Air sealing + duct sealing (if existing forced air heating system)
3. Air sealing + R-19 raised floor insulation (if no existing raised floor insulation)

.. or ..

Performance Approach

4. HERS 2 audit and rating on the existing house (costing approximately $700 to $900), and any combination of retrofit measures which improve the HERS score by at least 10% or achieves a rating of $\leq$ 120.

Cost Cap

If the RECO is triggered by a permit request for a remodel with a valuation greater than $50,000 (see below), there would be no cost cap on compliance which represents a modest percentage increase in overall construction cost.

If the RECO is triggered by Point-of-Sale (if Point-of-Sale is used as a trigger), there would be a cost cap of 1.0% of the sale price of the property. If the homeowner can demonstrate that no compliance option can be achieved for less than the cost cap, any prescriptive option without air sealing is acceptable.

If the RECO requirements must be met by all dwellings or older dwellings by a certain future date (see the Date Certain trigger), there is a cost cap of 1.0% of the assessed valuation of the property. If the homeowner can demonstrate that no compliance option can be achieved for less than the cost cap, any prescriptive option without air sealing is acceptable

Impact of Triggers on Greenhouse Gas Reductions

The decision on the conditions or criteria which trigger the RECO requirements has the major impact on the amount of citywide greenhouse gas reductions reached. Table 2 shows how, in the ten years following a hypothetical July 1, 2011 RECO effective date, possible RECO triggers would result in the total amount of GHG reductions compared with the Hayward Climate Action Plan (CAP) 2050 RECO goal for single family and duplex units.

Table 2. Single Family Greenhouse Gas Reductions from Different RECO Triggers

Goal or Trigger(s)	Gross % by 2021	Eligibility X Compliance Rate (%)	Total Metric Tons/Year [1]	% of 2050 CAP Goal by 2021
2020 CAP Goal	n/a	n/a	639	1.6%
Remodels Only	2.1%	2.1%	240	0.6%
Point-of-Sale Only	34.3%	30.9%	3,600	9.2%
Remodels + Point-of-Sale	35.7%	32.1%	3,740	9.5%
All Dwellings by Date Certain (by 2021)	100.0%	81.0%	9,437	24.0%
Pre-1978 Dwellings by Date Certain (by 2021)	72.0%	58.3%	6,792	17.3%
Remodels + Older Dwellings Date Certain	73.4%	59.4%	6,921	17.6%
2050 CAP Goal	n/a	n/a	39,304	100.0%

Note 1: Assumes average CO2e reduction per dwelling unit = 882.34 lbs./year based on the retrofit combinations shown in Section 5, Table 4.

What seems clear is that the 2050 CAP goal is very ambitious for single family RECO, a total of 39,304 metric tons/year of CO2e reduction. To move along the path toward the 2050 CAP goal at a reasonable pace by 2021, more than remodels will be necessary which alone achieves only 240 metric tons/year or 0.6% of the way to the 2050 goal. An ordinance for remodels and date certain or older homes would reach 6,921 metric tons/year or 17.6% toward the 2050 goal.

1. Introduction

The February 3, 2010 meeting of Hayward's City Council Sustainability Committee included a brief presentation and initial discussion on a possible Residential Energy Conservation Ordinance (RECO). The June 2, 2010 meeting gave direction to City Staff and Consultants to continue targeted research into a potential RECO) and to deliver findings of the research to the Sustainability Committee in advance of its September 1, 2010 meeting.

A RECO requires energy efficiency upgrades to existing homes. While many jurisdictions have adopted green building ordinances, these requirements only apply to new buildings. A RECO addresses energy use by the existing building stock and therefore has a much greater potential for overall energy savings and greenhouse gas reductions.

This report presents the major research data and analysis completed by Gabel Associates since the June 2nd Committee meeting. It summarizes research done with respect to the following RECO development topics for single family and duplex dwelling units:

- Costs of typical residential retrofit energy measures
- Energy savings, energy cost savings and reduction in greenhouse gas (GHG) emissions from a variety of retrofit measures
- Average reductions in GHG emissions per home from different energy measures
- Cost-effectiveness of retrofit measures
- Citywide GHG reductions from different RECO triggers

The work in this research effort was performed in June, July and early August, 2010 to provide the best information that could be assembled for the Sustainability Committee to consider before their next scheduled meeting. The methodology was developed to utilize available existing home energy performance and energy use data combined with an energy model calibrated to typical Hayward residential building conditions.

Multi-family buildings are not included in this initial research for a few reasons. In the interest of time and the primary focus of this RECO, single family homes in Hayward are the most important category of residential dwellings. Previous utility studies, such as the 2004 RASS study referred to and discussed in Appendix A of this report, show annual space heating in the typical multi-family unit to be around half of that in a single family house. Since 60% of dwelling units in Hayward are single family, single family and duplex units represent approximately 75% of space heating in all residential buildings in Hayward. In the East Bay, reducing space heating is one key to residential energy savings, cost-effective savings and a large impact on carbon dioxide equivalent or CO2e reductions.

To account for the differences in the warming effect of various greenhouse gases, emissions of various gases are expressed in terms of CO2 equivalent or "CO2e". This represents the amount of CO2 that would have the same relative warming effect as the combination of greenhouse gases (GHG) actually emitted.

Because multi-family housing is likely to be included in a RECO, and RECO goals are in the Hayward Climate Action Plan, multi-family RECO measures will be evaluated in a future phase of research.

2. Energy Efficiency Measures

The home energy retrofit measures evaluated in this report are those selected as appropriate in the Hayward climate zone from a list by the California Home Energy Retrofit Coordinating Committee (CA HERCC). CA HERCC is an ad hoc group of over 90 energy efficiency and program development/implementation experts from many agencies and groups including the U.S. EPA, the California Energy Commission, the California Public Utilities Commission, the California Air Resources Board, Pacific Gas and Electric Company, Sacramento Municipal Utility District, the California Building Performance Contractor's Association, county and local governments, and non-governmental organizations.

As part of its effort to coordinate, support and advance home energy efficiency retrofitting of existing homes in California, CA HERCC completed a draft *Recommended Technical Specifications for Proposed Eligible Measures* designed to clarify specific eligibility requirements for a variety of retrofit incentive programs. The measures listed are:

- Air Sealing
- Attic Insulation
- Duct Sealing (Existing)
- New Sealed Duct System
- Combustion Appliance Safety
- Wall Insulation
- Raised Floor Insulation (above Crawlspace)
- New Heating System
- New Cooling System
- New Water Heater
- Variable Speed Fan Motor
- Refrigerant Charge and Airflow
- Cool Roofs

Hayward is mild climate that is cool in winter and mild in the summer, and has very little air conditioning. As a result, several items are eliminated from the above list: new cooling system, variable speed fan motor, refrigerant charge and airflow and cool roofs. Combustion appliance safety is functionally combined with air sealing as part of a single energy measure, and a new duct system is not considered because of a high first additional cost relative to the incremental improvement over sealing an existing duct system. This leaves the following measures that were analyzed:

- *Air Sealing*
- *Attic Insulation*
- *Duct Sealing (Existing)*
- *Wall Insulation*
- *Raised Floor Insulation (above Crawlspace)*
- *New Heating System*
- *New Water Heater*

Air Sealing

Studies done over the past several decades confirm that the thermal envelope of typical existing homes leak considerably as a result of many air gaps in their construction. This leakage is associated with gaps in the roof or attic air barrier, sill plates at exterior walls, door and window frames, mail chutes, electrical and gas service penetrations, cable TV and phone lines, outdoor water faucets, dryer and other vents, exhaust fans, and room air conditioners.

A qualified professional contractor (e.g., Home Energy Rater or certified home performance contractor) can use diagnostic tools such as a blower door test to accurately measure an existing home's air leakage. By means of visual inspection, smoke testing, infrared camera and blower door, air leaks can be identified and sealed with caulking and other means to significantly reduce overall building leakage with a high level of quality assurance. Air leakage reductions in the range of 40% to 60% are not uncommon. This process is more comprehensive and more thorough in its reliance on tested quality assurance than what was referred to as "weatherization" in earlier years.

After air sealing, a qualified practitioner also checks to make sure that combustion appliances (e.g., gas furnace or wall heater, water heater, gas dryer) are venting properly to ensure a safe level of Indoor Air Quality. The contractor may also install a carbon monoxide (CO) alarm. Air sealing improves fire and combustion safety, improves moisture control and increases occupant comfort by reducing drafts and increasing the radiant temperatures of some the interior surfaces.

Air sealing is listed first as the essential retrofit measure in all major home retrofit incentive programs, and is required before any insulation is added to the house. It is first in "loading order" because most other energy measures don't make sense to install until significant leaks have been plugged; and because it includes other important health safety and other benefits beyond energy efficiency.

In interviews with staff from Gabel Associates, several home performance contractors cited an air change rate per hour (ACH) of around 1.0 as typical for existing homes in the Bay Area prior to retrofit air sealing work. This means that in one hour 100 percent of the air in a home is replaced with air from outside the home. These home performance contractors reported that the air change rate is commonly reduced to a post-retrofit value of 0.5 ACH as a result of reasonably feasible and careful air sealing.

The above pre-retrofit air leakage rate value is consistent with the so-called "normalized leakage" per home reported at 1.03 ACH to 1.24 ACH in a Lawrence Berkeley National Laboratory paper titled "*Air Leakage of U.S. Homes: Model Prediction*" published 2007 by Sherman and McWilliams (LBNL-62078).

Schematic of Home Envelope and Sources of Common Air Leakage

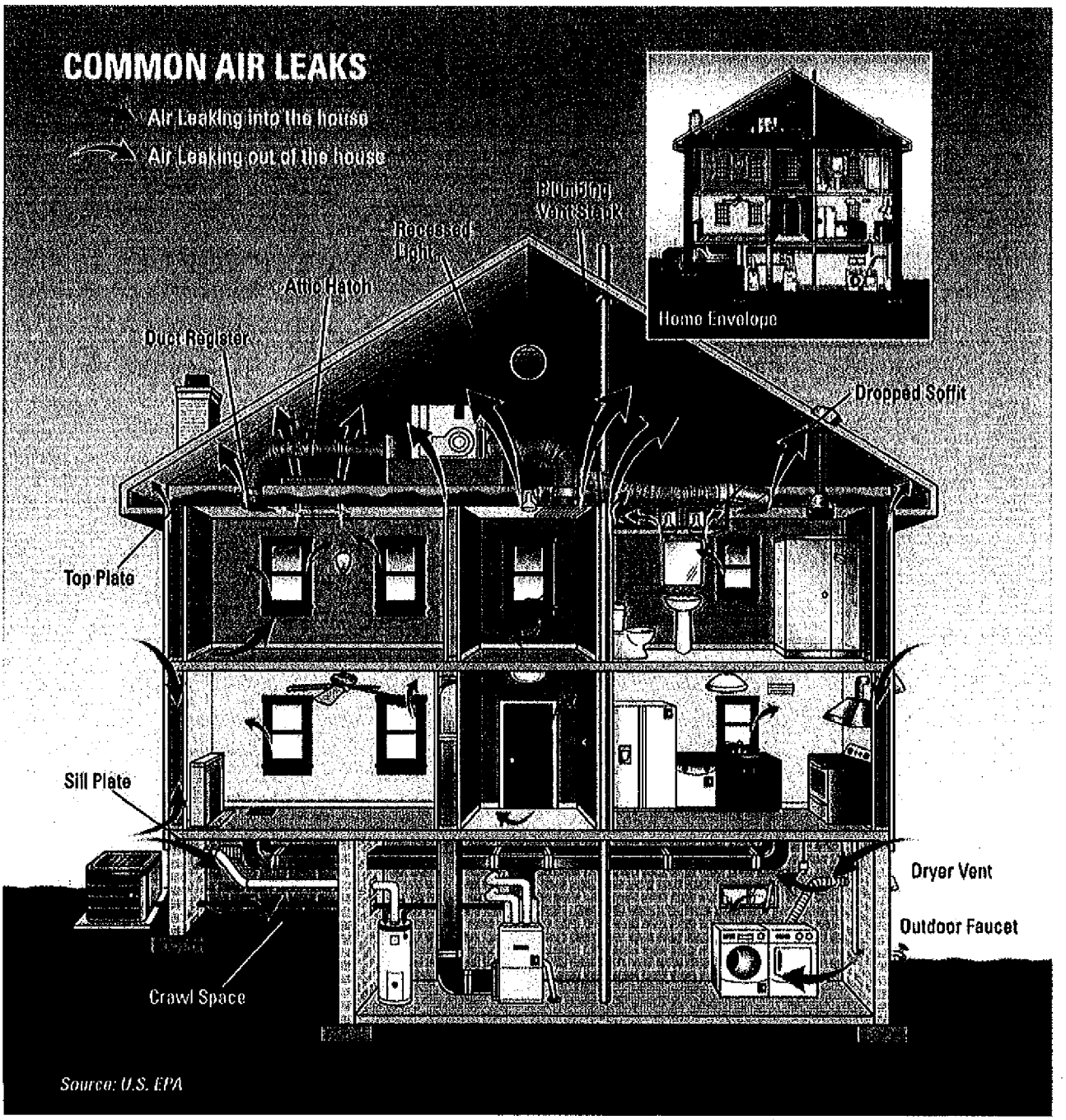


Photo courtesy of U.S. EPA Energy Star

Blower Door Test Equipment

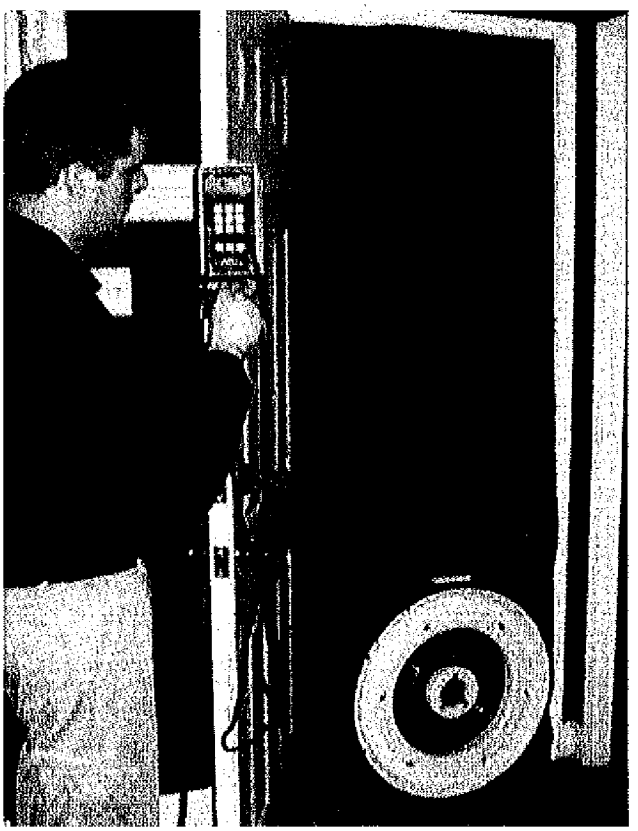


Photo courtesy of resourcefulenergy.net

Attic Insulation

After air sealing has been completed attic insulation should be evaluated. New insulation in a previously un-insulated attic should be installed in accordance with the "Quality Insulation Installation" (QII) criteria specified in the Title 24 energy standards by a qualified contractor. If there is already some existing attic insulation in place, the main issue is to decide whether to upgrade it. That will depend on assessing both the quality of the previous installation as well as the thickness of the existing insulation. Installation flaws that can seriously degrade the thermal performance of the insulation include:

- Insulation not in contact with the air barrier;
- Gaps or voids in the insulation that leave some areas not insulated;
- Compression of the insulation reducing the thickness and rated R-value.

It is not uncommon for poorly installed insulation batts to have their overall rated R-value effectively reduced by 20% or 40% or more because of these problems. For example, existing "R-13" labeled insulation batts may be providing an effective thermal resistance of only R-9 or less based on a multitude of flaws with the original installation.

The current Title 24 energy standards require that an upgrade to attic insulation in Hayward (Climate Zone 3) must achieve a minimum of R-30 which is equivalent to a 9.5 inch thickness of blown-in or batt insulation. Major home energy retrofit incentive programs generally require that attic insulation be upgraded to R-38 (e.g.,12 inches thick) to be eligible for energy rebates. Section 4 of this report discusses the differences in cost-effectiveness based on the pre- and post-retrofit attic insulation levels in the mild San Francisco Bay Area climate.

Poor Installation of Roof Insulation: Compression and Gaps

Photo courtesy of Rick Chitwood

Sealing Existing Duct Systems

The extent to which duct systems in existing homes contribute to heating and cooling energy use has been a subject of much study since the late 1980s. Research work done in the 1990s "*showed that air duct losses on the order of 35% were typical in residential construction (Jump, et at, 1994)*" as summarized in a 2001 paper by John A. Bryant. Interviews of Bay Area home performance contractors by Gabel Associates indicate that tested duct leakage in existing homes is typically in the range of 30% to 35% or higher. One home performance contractor who tested the duct leakage in 200 existing homes in the past few years reports that the average duct leakage value was 37.5%.

Qualified technicians use duct testing equipment to (a) measure the overall leakage of an existing or new duct system; (b) find leaks in the system; (c) employ several different methods to seal duct leakage and (d) re-test the system to achieve the specified level of performance. In existing California homes, the goal of sealing existing ducts is established in the state's *Reference Appendices for the 2008 Building Energy Efficiency Standards*, Table RA3.1-2. This table sets leakage criteria as a percentage (%) of total fan flow for sealed and tested altered existing duct systems at 15%, a value that Bay Area home performance contractors indicate they achieve in a very high percentage of homes.

Duct Testing Equipment

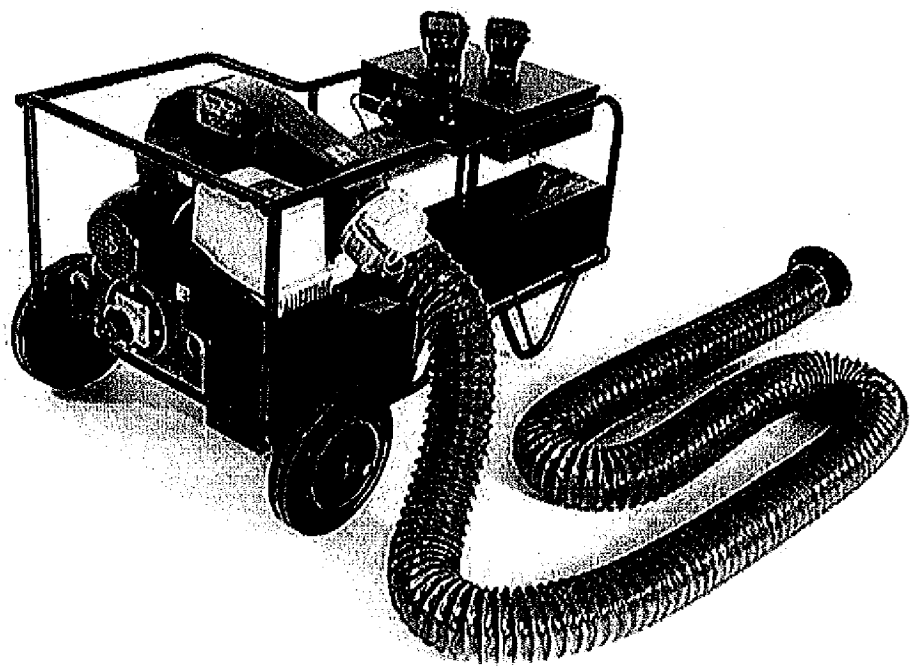


Photo courtesy of directindustry.com

Wall Insulation

Prior to the 1970s, which included the 1973 Oil Embargo and the initial 1978 Title 24 building energy standards, most existing homes in the Bay Area were built with no wall insulation. While insulating walls is a potentially important option in reducing home energy use, there can be a significant cost with this upgrade if interior sheetrock or plaster or other interior siding has not already been removed as part of a major alteration.

When interior and exterior wall sidings are not removed, insulation is blown into the cavities by drilling holes between the wood studs, injecting the insulation, patching the holes, and applying or repairing the finish. If holes are drilled through interior dry wall, holes can be filled and smoothed, but the surface must be repainted. Holes cannot be drilled through plaster, as plaster will crack; or through any material that cannot be easily repaired (e.g. tile or unpainted wood). Insulation can also be blown in through holes in exterior sheathing, but the process involves similar limitations with respect to exterior siding and finishes.

For the purpose of this study, the cost of upgrading wall insulation is assumed to be blown-in through inside dry wall of exterior walls, with all steps taken to repair and prepare the dry wall without repainting. The idea is that a homeowner having already decided to repaint the interior of the house might choose to add the extra cost to insulate the walls.

Retrofit Blown-in Wall Insulation

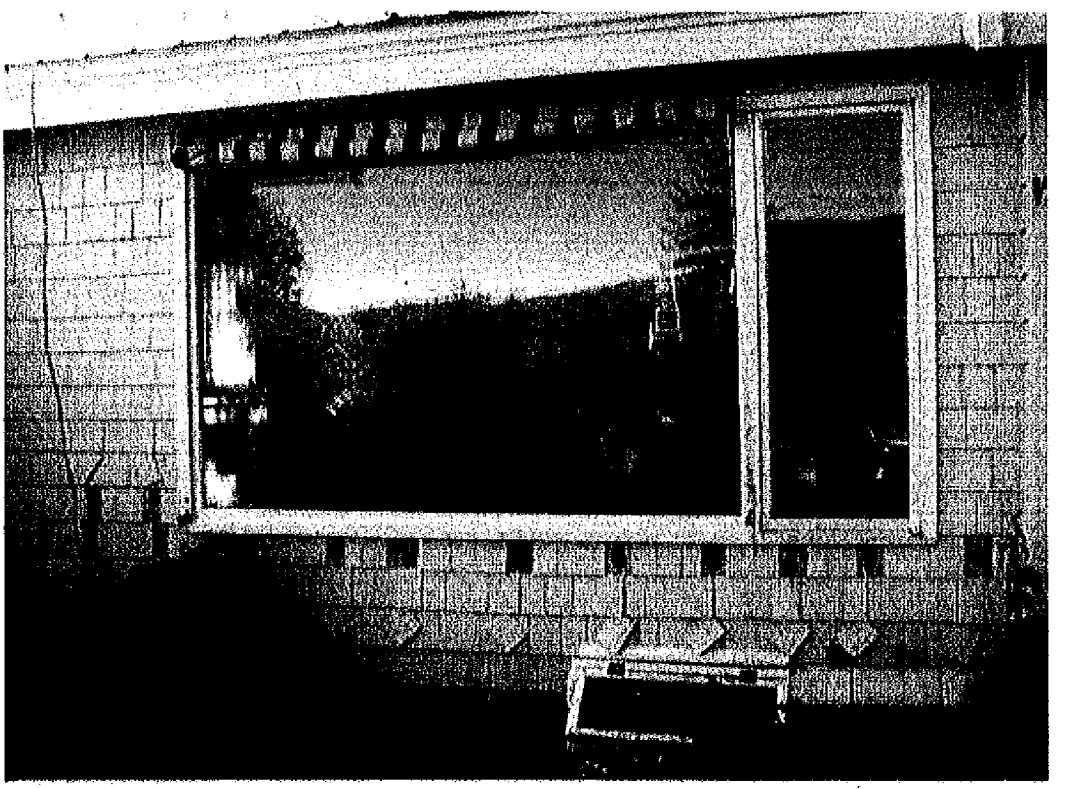


Photo courtesy of northerninsulation.biz

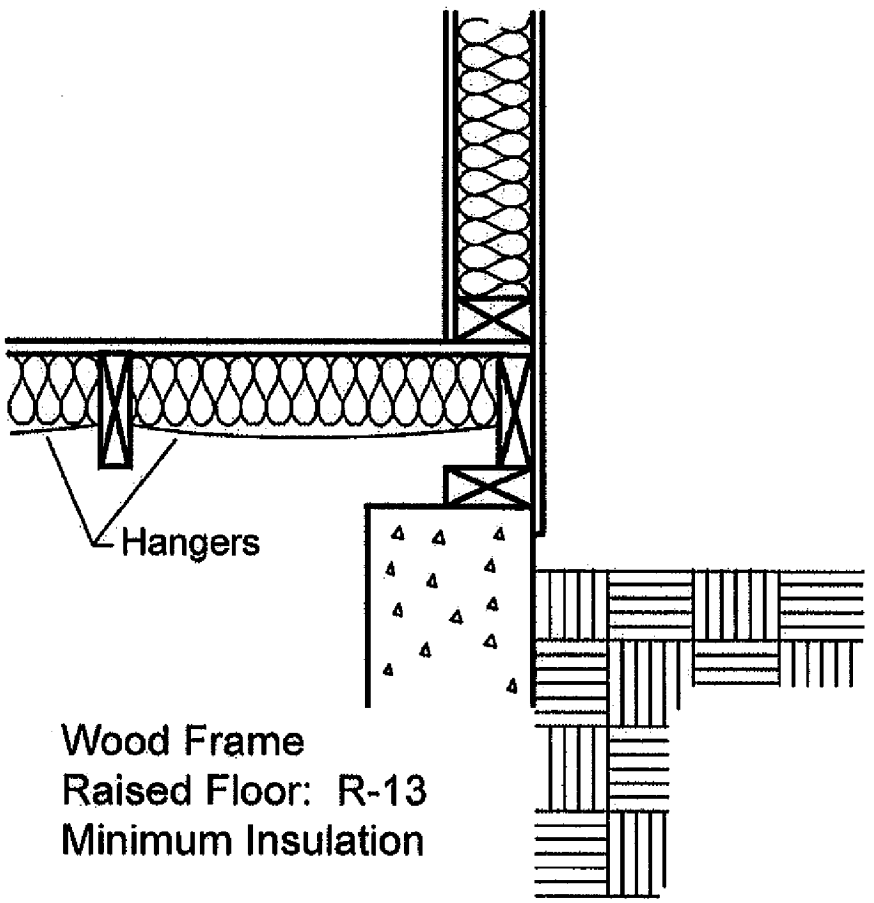
Raised Floor Insulation

Most existing homes built prior to the 1970s as discussed above also have no insulation in the raised floor over unconditioned areas such as crawl spaces, garages and unheated basements. If above an accessible crawl space, insulation is typically installed between floor joists. Quality installation means ensuring that insulation batts are in full contact with the air barrier (e.g., subfloor); and that mechanically fastened netting or fabric ensures the insulation does not sag or droop or is compressed. In some instances, a vapor barrier on the floor of the crawl space may be required to reduce moisture.

If raised floor joists are open below to an existing garage or basement space or to an outdoor area, installation of insulation may be relatively easy.

The cost data for upgrading floor insulation in this study is based on an accessible crawl space with a minimum height of 18 inches.

Raised Floor Insulation



From the 2008 Residential Compliance Manual

New Space Heating

While replacing an older, inefficient forced air furnace may significantly reduce energy use, space heating equipment as a retrofit measure is not included in this evaluation of potential RECO retrofit measures. This exclusion is based on two significant issues:

(1) A condensing furnace upgrade alone – without altering the existing duct system – is normally in the range of $3,000 to $5,000 according to a reputable local mechanical heating contractor; and,

(2) Federal appliance (NAECA) standards do not allow local jurisdictions to establish a prescriptive requirement for furnace efficiency that exceeds the national minimum of 78% AFUE.

New Water Heating

Because replacing a standard gas tank water heater is normally in the range of $1,200 to $1,800 (as reported in Section 3), first cost is not an insurmountable barrier in considering it for a RECO ordinance. While water heater efficiency is regulated by NAECA, an energy performance approach can essentially circumvent the federal appliance standards restriction if a local code does not explicitly prescribe installing a high-efficiency water heater. A new gas water heater was included in the study as a performance option.

Appliances and Permanently Installed Lighting

The California Home Energy Rating System for existing homes (HERS 2) includes both audit and analysis of an inventory of major appliances including refrigerator, stove/range, dishwasher and washing machine; as well as the presence of a swimming pool, spa, well pump or sewer grinder pump. A listing of fixed (permanently installed) indoor and outdoor lighting is also included. However, while these items have an impact on overall home energy use and CO2-e emissions, they are excluded from this particular study for several reasons:

(1) Given the limited time available within which to conduct this study, the main focus has been on reducing space heating and water heating energy use which together comprise almost 70% of the energy use and CO2 emissions of a small existing Hayward home.

(2) Improving the efficiency of major appliances and fixed lighting which total around 25% of the home energy use is based on a series of many incremental steps for which average cost data is more difficult to obtain.

(3) Possible prescriptive measures do not include appliances, and probably will not include lighting. A separate analysis of upgrading fixed lighting efficiency may be done in future work.

(4) Previous work by Gabel Associates for the City of Berkeley studying the HERS 2 rating index indicates that improvements to appliance and lighting efficiency do not significantly improve the overall HERS 2 score as compared with measures that reduce space heating and water heating.

For further description and discussion of the HERS 2 rating system, see Section 3.

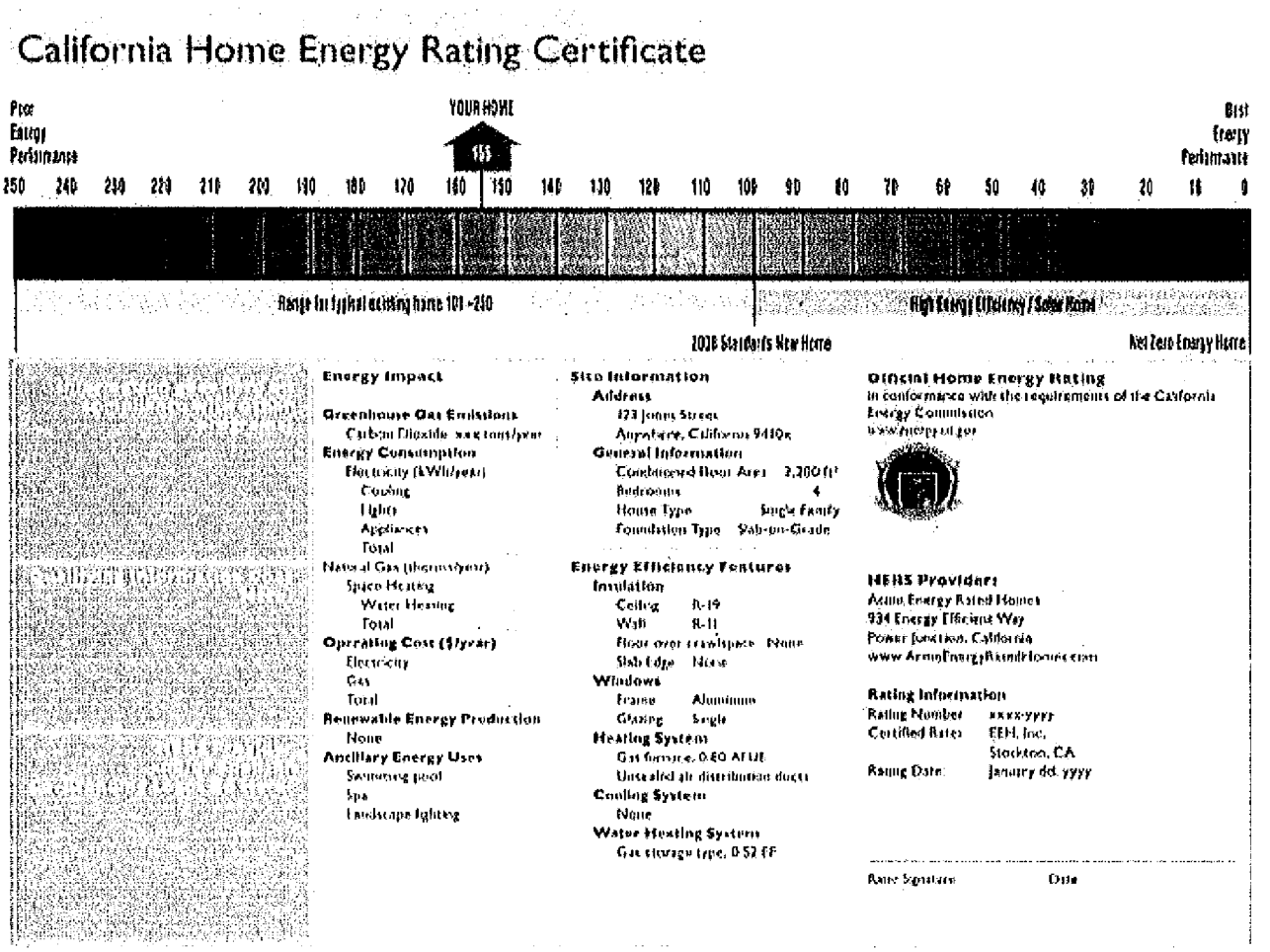
3. HERS Description and Incentives

HERS 2 Software

The California Home Energy Rating System for Existing Homes – known as "HERS Phase II" or "HERS 2" -- is a residential building energy audit and rating system that has been established by California Public Resources Code 25942. The main goals of a HERS 2 Rating as described by the California Energy Commission (CEC) are "*a consistent, accurate and uniform rating based on a single statewide rating scale; and estimates of potential utility bill saving and recommendations on cost-effective measures to improve energy efficiency.*"

The HERS rating includes (a) a detailed home energy audit including a field inspection and different tests performed by a certified HERS Rater; (b) an energy analysis of the existing conditions to determine the HERS score; and (c) a standardized report which identifies which retrofit measures are most cost-effective based on specific existing house conditions, the cost of measures and projected annual energy cost savings.

HERS 2 Rating Label for Existing Homes



The HERS rating certificate (shown above) indicates how the projected annual energy use of an existing home compares to the same home which just meets the 2008 Title 24 Building Energy Efficiency Standards. The 2008 Title 24 home is defined as having a score of 100, while a Net Zero Energy home has a HERS score of zero. Existing homes often have scores above 100 (e.g., 150 to 200). The HERS rating has been developed to be independent of the behavior of residents, and is based solely on the physical characteristics of the existing house including roof, walls, floor, windows, overall building leakage, mechanical system and ducts, water heater, lighting and major appliances.

Recently released HERS 2 software was approved on July 28, 2010 by the California Energy Commission. The main energy calculation within the HERS 2 software is a residential hourly computer simulation or energy model (e.g, Micropas or Calres) that has been used and revised by the CEC since it was first used for Title 24 compliance of new buildings in 1983. Aside from calculating annual time dependent valuation (TDV) energy use -- the basis of the 2008 Title 24 standards and the HERS 2 rating -- it also calculates annual building site energy use of natural gas and electricity. As the EPA Highway Mileage tests the relative performance of a car's gasoline mileage independent of an individual's personal driving style or particular traffic conditions, the computer simulation within the HERS 2 software provides a good relative indicator of the impacts of specific energy design improvements to an existing or base case building design.

The HERS 2 computer simulation models the heat transfer in and out of the house through every surface – roofs, walls, floor, windows – as well as through natural infiltration, and including the typical internal gain from people, lights, appliances, TVs, computers and other items plugged into electric outlets. The program does this calculation for all the hours in the year – 8,760 hours – based on local hourly weather data, the position of the sun, how much solar gain enters the house through the area and orientation of windows, and so on; and based on the specified daytime and nighttime thermostat settings.

Most useful and interesting about computer simulations is that they keep everything about the building energy design and the weather constant except for the energy features that change from one run to the next. As a result, it is possible to isolate the effects of particular energy efficiency measures or combinations of measures. The value of parametric studies is to get a better understanding of the relative performance of different energy measures. This type of energy software – in the hands of experienced users with attention paid to operating assumptions, occupant assumptions, accurate inputs of building design features, and knowledge of how the program is modeling specific features -- has a good track record in ranking the energy impacts of different energy design choices.

One of the great challenges in interpreting the results of energy software is ensuring that total predicted energy use is reasonably similar to what a typical real-world building with the exact same modeled design specification will actually use. In this study, we have had the cooperation and assistance from PG&E which provided average utility data for the approximately 29,000 single family units and single family attached (duplex) units in Hayward. Because the Base Case model is calibrated to real energy use data in this study, the HERS 2 energy software is helpful in predicting relatively accurate energy use effects of different retrofit measures. This is the basis of the approach used to estimate energy performance and cost-effectiveness.

Residential Energy Retrofit Incentives

There are a variety of home energy retrofit incentives and tax credits currently available, soon-to-be available or possibly to be implemented within the next year. Prescriptive incentives are based on verifying the installation of one or more identified measures by a qualified contractor. Performance incentives are based on installing one or more measures resulting in a certain amount of energy savings as calculated by the HERS 2 software. A summary of these incentives is expected this fall under the statewide program name "Energy Upgrade California" which will have a web site providing details and eligibility rules for these rebates and financing opportunities.

PG&E Incentives

Current prescriptive incentives include specific amounts for individual retrofit measures such as $150 for insulating at least 1,000 square feet of attic space to R-30; and $100 for sealing and testing of existing duct systems. Added to that is a $1,000 incentive beginning in the fall, 2010 through March, 2012 for the combination of air sealing, R-38 attic insulation and duct sealing.

Performance-based utility incentives will be based on the following eligibility criteria:

- $2,000 or half the project cost, whichever is less, for upgrades which reduce the HERS rating score by at least 20%;
- Each additional 5% reduction earns another $375 up to a total of $3,500 or half the project cost.

Federal Tax Credits (Pending)

U.S. Home Star Silver prescriptive incentives are part of the energy bill pending in Congress which may be approved and funded by the end of the year. Home Star Silver would provide rebates to homeowners of up to $3,000 for specific energy upgrades, and up to 50% of the project cost (whichever is less).

U.S. Home Star Gold performance incentives would provide rebates up to $3,000 for upgrades which reduce the HERS rating score by at least 20%; and up to $8,000 when additional savings are achieved.

PACE Financing

PACE (Property Assessed Clean Energy) programs were established to enable local governments to finance renewable energy and energy efficiency projects on private property, including residential, commercial and industrial properties. The chief advantage for the building owner is very low or no upfront cost. Most PACE financing has been on hold since a July 6, 2010 statement by the Federal Housing Finance Agency (FHFA) indicating that senior PACE liens are in violation of their standard mortgage contracts. Shile a national legislative strategy is in place to mitigate the position of the FHFA, the ultimate fate of PACE financing is in doubt. In California, PACE funding has been designed to fund residential energy efficiency projects which reduce the HERS rating score by at least 10%.

4. Cost of Measures, Energy Savings and Cost-Effectiveness

To establish the current costs of standard retrofit measures for a typical Hayward home, two sets of cost data were gathered from a total of seven certified home performance contractors. Table 1 in the Executive Summary (and distilled from the full data in Tables 3a and 3b presented in this section) shows a number of measures according to their average cost. Section 2 contains a discussion of the retrofit measures. Descriptions of terminology in these tables are included at the end of this section.

An important aspect of the research into the cost-effectiveness of energy retrofit measures is to obtain current, real-world installation costs. The general approach used in obtaining this information was to use two sources of data:

- **Cost Data Set A.** Data from two Bay Area home performance contractors operating in the East Bay who completed a detailed spreadsheet developed specifically for this study by Gabel Associates; and,

- **Cost Data Set B.** Data obtained via a utility company whose consultant compiled similar current information from five home performance contractors operating in the Bay Area and in other parts of Northern California.

The data is presented in Appendix A, Detailed Cost Data. A summary of the average cost for each retrofit measure is included in Table 1b in the Section 5.

Tables 5a and 5b summarize the results of study in illustrating several important impacts of installing various home energy retrofit measures, followed by a description of key terms.

Table 3a. Retrofit Energy Savings and HERS Ratings

		Existing Home + Energy Retrofit Measures (ERMs)				
ERM #	Description of Measures	Total Space & Water Heating (Therms/Yr)	Adjusted HERS Rating	Annual Gas Saving (Therms/Yr)	Improvement in HERS Rating (%)	Annual CO2e Reduction (Lbs./Yr)
	BC: Base Case Home with No Attic Insulation	*499*	*194*	*NA*	*NA*	*NA*
1	BC + Air Sealing	461	184	38	5%	445
2	BC + R-30 Attic	456	172	43	11%	511
3	BC + R-38 Attic	454	171	44	12%	522
4	BC + Air Sealing + R-30 Attic	418	161	81	17%	951
5	BC + Air Sealing + R-38 Attic	416	160	82	18%	967
6	BC + Duct Sealing	465	182	34	6%	396
7	BC + Air Sealing + Duct Sealing	427	173	71	11%	841
8	BC + Air Sealing + R-30 Attic + Duct Sealing	393	152	105	22%	1,242
9	BC + Air Sealing + R-38 Attic + Duct Sealing	392	151	107	22%	1,268
10	BC + DHW EF=0.58	477	190	22	2%	257
11	BC + DHW EF=0.62	463	188	35	3%	415
12	BC + Air Sealing + R-13 Walls	385	158	113	19%	1,335
13	BC + Air Sealing + R-19 Floor	423	173	76	11%	890
14	ERM 8 + R-13 Walls	314	125	184	36%	2,171
15	ERM 8 + R-19 Floor	355	136	143	30%	1,687
16	ERM 8 + R-13 Walls + R-19 Floor	290	120	209	38%	2,462

Table 3a can be used to understand the natural gas savings and HERS rating adjustment due to the installation of a specific energy retrofit measures (ERM) or combination of ERMs. For example, compared to the base case (BC), Air Sealing (ERM 1), reduces annual natural gas use by 38 therms and improves the HERS rating by 5%.

The improvement in the Adjusted HERS Rating (%) is a significant metric because it's used as the basis for performance incentives as explained in the previous section.

The "Average Payback with No Incentives" represents the simple payback of the measures (Cost / Annual Energy Cost Saving) with no incentives or rebates from the utility company, or any tax credits from the federal government. To illustrate the potential impacts of incentives, the last two columns include the combined impacts of prescriptive home energy retrofit rebates from PG&E and expected U.S. Home Star Silver prescriptive tax credits not yet funded by Congress.

Of particular note are several ERMs which (a) have an installed cost at or below $3,000; (b) have a simple payback without any incentives of around 30 to 35 years; and (c) improve the HERS rating score by more than 10%. The ERMs which meet all three criteria are:

- ERM 4: **Air Sealing + R-30 Attic Insulation (from an R-0 attic)**
- ERM 5: **Air Sealing + R-38 Attic Insulation (from an R-0 attic)**
- ERM 7: **Air Sealing + Duct Sealing**
- ERM 13: **Air Sealing + R-19 Floor (from an R-0 raised floor over a crawl space)**

Utility company performance-based retrofit incentives and the U.S. Home Star Gold incentives both require that homes be improved by at least 20% using the HERS 2 rating score to be eligible for those programs. ERMs which meet the 20% threshold include:

- ERM 8: **Air Sealing + Duct Sealing + R-30 Attic Insulation (from an R-0 attic)**
- ERM 9: **Air Sealing + Duct Sealing + R-38 Attic Insulation (from an R-0 attic)**
- ERM 15: **ERM 8 + R-19 Floor (from an R-0 raised floor over a crawl space)**
- ERM 16: **ERM 8 + R-13 Walls (from R-0) + R-19 Floor)**

Table 3b. Retrofit Costs and Paybacks

		Existing Home + Energy Retrofit Measures (ERMs)				
ERM #	Description of Measures	Improvement in HERS Rating (%)	Average Retrofit Cost ($)	Average Payback with No Incentives (Years)	Net Retrofit Cost with Incentives ($)	Average Payback with Incentives (Years) [1]
	BC: Base Case Home with No Attic Insulation	*NA*	*NA*	*NA*	*NA*	*NA*
1	BC + Air Sealing	5%	$1,411	33.9	$706	16.9
2	BC + R-30 Attic	11%	$1,178	24.6	$1,028	21.5
3	BC + R-38 Attic	12%	$1,319	27.0	$1,169	23.9
4	BC + Air Sealing + R-30 Attic	17%	$2,589	29.1	$1,589	17.8
5	BC + Air Sealing + R-38 Attic	18%	$2,828	31.2	$1,414	15.6
6	BC + Duct Sealing	6%	$1,029	27.8	$415	11.2
7	BC + Air Sealing + Duct Sealing	11%	$2,440	31.0	$1,220	15.5
8	BC + Air Sealing + R-30 Attic + Duct Sealing	22%	$3,617	31.1	$1,809	15.6
9	BC + Air Sealing + R-38 Attic + Duct Sealing	22%	$3,856	32.7	$928	7.9
10	BC + DHW EF=0.58	2%	$1,400	58.1	$1,400	58.1
11	BC + DHW EF=0.62	3%	$1,625	41.8	$1,625	41.8
12	BC + Air Sealing + R-13 Walls	19%	$4,275	34.2	$2,275	18.2
13	BC + Air Sealing + R-19 Floor	11%	$3,016	36.2	$1,508	18.1
14	ERM 8 + R-13 Walls	36%	$6,481	31.9	$2,481	12.2
15	ERM 8 + R-19 Floor	30%	$5,222	33.1	$1,611	10.2
16	ERM 8 + R-13 Walls + R-19 Floor	38%	$8,086	35.1	$4,086	17.7

Note 1: Includes combined Prescriptive incentives from PG&E and U.S. Home Star Silver program

BC. For the purposes of this study and in the previous tables, the Base Case is the pre-retrofit home that is 1,292 square feet and has no attic insulation detailed in Appendix A

ERM#. The Energy Retrofit Measure number that represents one retrofit scenario in which one or more energy efficiency measures are installed as compared with the Base Case Home with No Attic Insulation (ERM-0).

Description of Measures. The existing Base Case (BC) plus one or more retrofit items added to test their impact. ERMs #15 through #18 include all ERM-8 features and add to that other items listed.

Total Space + Water Heating (Therms/Year). The total annual natural gas use for space heating and water heating combined as calculated by the HERS 2 energy software; and normalized according to average Hayward home utility data (explained in Section 4.)

HERS Rating (Adjusted). The HERS 2 rating generated by the HERS 2 software for the specific energy retrofit measure(s) listed; and, in some instances, adjusted to account more accurately for some aspect of the installed features than the software is currently capable of modeling (see findings in Section 7.) The lower the HERS rating number, the more energy efficient the building.

Annual Gas Savings (Therms/Year). The annual natural gas savings as a result of the installation of the ERM as compared with the Base Case home with no attic insulation.

Reduction in HERS Rating (%). The percentage reduction in the adjusted HERS Rating score for the listed ERM as compared with the Base Case Home with No Attic Insulation.

Annual CO2e Reduction (Lbs.). The annual reduction in CO2-equivalent greenhouse gases according the conversion factors used in the Hayward Climate Action Plan: 11.79 Lb. CO2e/Therm and 0.49 Lb. CO2e/KWh. This value is discussed further in Section 5.

Average Retrofit Cost ($). The average cost obtained for ERMs as explained in Section 3.

Average Simple Payback (Without Incentives) . This is the payback of installing the retrofit measure, expressed in years, without accounting for any incentives or rebates. The formula used to calculation this value = (Average Retrofit Cost in $) / (Annual Gas Saving in therms/year) x (unit cost of gas in $/therm). The unit cost used is $1.104/therm which is the average unit cost paid by Hayward homeowners from 2007 through 2009.

Average Payback (With Incentives). The Simple Payback (without any incentives) is adjusted to include the net reduced installation cost to the homeowner of each ERM taking into account current or expected PG&E prescriptive incentives and the U.S. Home Star Silver prescriptive incentives. The U.S. Home Star program legislation has not yet passed or been funded by the Congress.

5. Greenhouse Gas Reductions

In addition to the results of the study summarized in Section 4, CO2-e reductions for each energy retrofit measures have been calculated. From this information, and from data from City staff on the demographics of key energy-related features of single family and duplex dwelling units in Hayward, it is possible to establish the larger impacts of a Hayward RECO with respect to citywide CO2-e greenhouse gas reductions and the goals contained in the October 8, 2009 *Hayward Climate Action Plan (CAP)*.

The CAP calls for reducing 639 metric tons per year of CO2-e in single family homes by 2020 and reducing 39,304 tons/yr by 2050. It also calls for reducing CO2-e in multi-family units 993 tons/yr by 2020 and 33,033 tons/yr by 2050.

The CO2e reduction calculations shown in Table 4 have been done assuming all single family and duplex units meet the proposed RECO requirements. These results are adjusted in Table 5 to reflect the total percentage (%) of single family units affected by a RECO over a 10 year period based on different trigger requirements such as Remodels, Point-of-Sale and Date Certain discussed further in the next section.

Table 4. Summary of GHG Impacts on Single Family Units

ERM #	Description of Measures	Total Dwelling Units	Annual CO2e Reduction (Lbs./Unit)	Annual CO2e Reduction (Metric Tons)
4	Air Sealing + R-30 Attic (QII): from R-0 attic	8,189	951	3,531
7	Air Sealing + Duct Sealing	14,205	841	5,417
13	Air Sealing + R-19 Floor (accessible crawl spaces)	3,810	890	1,538
	Exempt: 10%	2,912	0	0
	Totals:	29,116		10,486

Table 4 assumes that all single family and duplex units are upgraded under a RECO ordinance that exempts 10% of all units (e.g., extreme financial hardship, medical disabilities of the owners) while requiring the following of eligible units:

- *Homes with un-insulated attics are retrofitted with air sealing + R-30 attic insulation.* This is estimated as 34% (from RASS study) of the 26,761 units (from City of Hayward data) listed as having attic spaces = 9,099 units. When reduced by 10% exemptions this value = 8,189 units.

- *Homes with some existing attic insulation or with no attics would be required or encouraged to retrofit with air sealing + duct sealing if there is a forced air system.* This would be all the remaining units with forced air furnaces which, according to City data, is 83% of all homes (i.e., 17% of homes have wall heaters). So: (29,116 – 9,099) x 0.83 = 20,017 x 0.83 = 16,614 units in this category. When reduced by 10% exemptions this value = 14,205 units.

- *Homes with wall heaters and no attic or existing attic insulation would be required to retrofit with air sealing + R-19 raised floor over an accessible crawl space.* The

remaining total dwelling units not included above = 4,234 units in this category. When reduced by 10% exemptions this value = 3,810 units.

Under a Date Certain RECO in which all single family and duplex units meet RECO requirements by the end of 2020, and assuming a 100% compliance rate, the overall citywide reduction in CO2e is projected to be 10,486 metric tons. Table 5 shows the 10 year performance of a RECO with the above required retrofit measures assuming that there is a 100% compliance/enforcement rate only for the remodels trigger, and a 90% compliance/enforcement rate for Point of Sale and Date Certain.

- Remodels are projected to reach 2.1% of single family units;
- Point-of-Sale is projected to reach 34.3% x 0.90 = 30.9% of single family units;
- Date certain is projected to reach 90% x 0.90 = 81% of single family units.

Table 5. Hayward Climate Action Plan Metrics

		Single Family/Duplex RECO Triggers			
	2020 CAP Goal	Remodels by 2021	Point-of-Sale by 2021	Date Certain by 2021	2050 CAP Goal
Eligibility x Compliance Rate	n/a	2.1%	30.9%	81.0%	n/a
Total Metric Tons/year	639	240	3,601	9,439	39,304
% of 2050 CAP Goal	1.6%	0.6%	9.2%	24.0%	100.0%

6. Findings and Recommendations

As presented in earlier meetings of the Sustainability Committee on February 3rd and June 2nd, Hayward is a relatively mild Bay Area climate with a modest amount of space heating and very little cooling. As a result, retrofit measures that may pay back more quickly in inland areas of the state have much longer paybacks in coastal areas. The results show a wide range of paybacks, generally over 25 years without incentives. The majority of the measures and measure combinations can be installed for under $5,000 and many improve the HERS rating by more than 10% for $3,000 or less.

The study shows that even in Hayward's mild climate, and without incentives, the installation of air sealing results in relatively acceptable cost effectiveness. In particular, several retrofit combinations look promising:

- Air Sealing + R-30 Attic (if the existing attic is un-insulated)
- Air Sealing + Duct Sealing (if there is an existing forced air system with ducts)
- Air Sealing + R-19 Floor (over an accessible crawlspace or other unconditioned area)

Other benefits of these retrofit combinations include:

- Each averages between $2,500 and $3,000 in installed cost without incentives
- Average annual CO2e reduction ranges from 841 to 951 pounds per year; and,
- The reduction in the HERS 2 rating is 11% to 17%.

Additionally, many retrofit measures add real and substantial value beyond energy and cost savings. For example, air sealing provides several additional co-benefits:

(1) Air sealing improves fire and combustion safety, and also improves indoor air quality which can include the installation of a carbon monoxide (CO) sensor;

(2) Air sealing increases the value of the home and/or improves marketability in the eyes of prospective educated buyers; and,

(3) Air sealing is a key measure that must be installed to be eligible for several utility and potential federal incentive programs.

Possible RECO Triggers

Remodels

The most common RECO trigger, remodels, requires that an application and set of construction drawings for permit be approved by the building department. This trigger is generally defined as a minimum construction cost. For example, the City of Berkeley RECO has set the remodel cost $\geq$ $50,000. Typically this would be a 200 sq.ft. or 250 sq.ft. addition to existing house, or substantial home remodels that make other improvements. In this scenario, the cost of RECO compliance is considered a reasonable incremental cost as compared with the overall permitting and construction costs.

Based on recent Hayward permit data, up to 400 single family and duplex units are expected to undergo a remodel in the next 10 years that would be affected by this trigger; or only 1.4% of all dwelling units. As shown in Table 5, this would reduce CO2e by 163 metric tons/year as compared with the relatively low Hayward CAP 2020 goal of 639 metric tons/yr for single family and duplex homes. Therefore, remodels alone reduce CO2e only 0.5% of the total CO2e reduction called for by the CAP by 2050 for Single Family RECO.

Point of Sale

Point of Sale is a trigger that has been in place for many years within the Berkeley and San Francisco RECOs. Either the seller fulfills RECO requirements prior to sale, or the buyer verifies RECO compliance within a certain number of months after the transfer of title (i.e., time after sale). The grace period provided to the buyer is 12 months in Berkeley and 6 months in San Francisco. The grace period could be a longer period such as 24 or 36 months if the City can track and enforce the RECO provisions after transfer of title. Depending on how the City decides the policy, an investor who purchases a home and resells it within the grace period might or might not be exempt from the RECO requirements. For example, Berkeley allows a property to be re-sold within the time-after-sale grace period without requiring RECO compliance.

The percentage (%) cap on homeowner spending to meet the requirement under the Point of Sale trigger is based on the property purchase price. Assuming an annual average of 1,000 single family and duplex units sold in Hayward, the Point of Sale trigger alone would reach 34.3% of homes by 2020. With a net compliance rate of 90%, that would reduce CO2e by 3,601 metric tons/yr and achieve 9.2% of the 2050 CAP greenhouse gas reduction goal. With some overlap, the combined Remodel and Point of Sale might succeed in reducing CO2e by 9.4% of the 2050 CAP goal (see Table 2 in the Executive Summary).

A considerable obstacle in adopting a RECO implementing the Point of Sale trigger is the strong opposition by local real estate agents who have appeared at public meetings to express their concern that this trigger unfairly targets their clients. Our research has not yet identified any statistical data that the Berkeley Point of Sale RECO has had any effect on home sales as compared with home sales in surrounding communities since the Berkeley RECO first took effect.

Date Certain

A potential RECO trigger that was discussed but not implemented in the revised Berkeley RECO is what has been termed "Date Certain". This is the scenario in which all dwelling units covered by the RECO – or only older homes built before 1978-- must meet compliance requirements by a certain or fixed date (e.g., 10 or 12 years from the RECO effective date). As discussed briefly at the June 2nd Committee meeting, the advantage over other triggers is much greater market penetration of quality home energy retrofits if this can be successfully implemented and enforced.

Table 5 assumptions for this trigger are a total of 10% of homes exempted for as yet non-specific reasons, and a compliance/enforcement rate of 90% of eligible dwellings for a net penetration of 81% of single family dwellings. Based on this rate, 2020 reductions in CO2e are projected at 9,439 metric tons/yr, or 24.0% of the CAP 2050 greenhouse gas reduction goal. If only older homes are targeted (e.g., built prior to 1978 Title 24 energy standards), 2020 reductions in CO2e are projected at 6,792 metric tons/yr, or 17.3% of the CAP 2050 greenhouse gas reduction goal. Because 2020 is one-quarter of the way from 2010 to 2050, a Date Certain ordinance can keep the pace of CO2e reductions set by the CAP 2050 greenhouse gas reduction goal.

The main disadvantage and obstacle of a Date Certain approach is the great likelihood that the vast majority of homeowners simply wait until very close to the final deadline (e.g., 2019) to take RECO compliance seriously and have the required retrofits installed only at the last moment to avoid a fine. Additionally, there is the risk that public pressure might persuade a future City Council to delay the ordinance, reduce the requirements or rescind it entirely.

However, there are other ways of considering the Date Certain trigger that may make it an attractive option that would work well within a larger context.

(1) Knowing that their home would eventually require certain energy efficiency improvements, homeowners will be more likely to use whatever incentives are available to get the work done sooner than later along with lower utility bills and other benefits.

(2) A delay by most homeowners in complying with a Date Certain ordinance has several implementation advantages. It allows time for the City to get the basic RECO procedures in place, test them out, do education and outreach to the community, develop the web site, and generally get the RECO functioning before large numbers of homeowners are ready to file and comply.

(3) Date Certain allows the City to conduct a mid-course review of the ordinance three to five years after it takes effect to determine how well the projections of energy savings, CO2e reductions and cost-effectiveness of the required retrofits compare with monitored data. A review could lead to a mid-course correction to the ordinance concerning implementation procedures or the types of RECO measures required for compliance. An important question to consider is how to ensure that the right kind of future data can be gathered to conduct a review in, for example, 2016.

(4) Even if the Point of Sale or Time After Sale trigger is not implemented, some percentage of home sellers in Hayward will be motivated to voluntarily meet the RECO requirements to achieve a marketing advantage. And educated home buyers are likely to place a competitive value on a home which has already met RECO.

(5) Given the challenges in planning and implementing effective tracking, notification and enforcement of a RECO affecting a large fraction of single family homes, there would be several years during which City staff could work out the most efficient way to manage the administration of the ordinance preceding the final deadline.

Conclusions and Recommendations

This study establishes that there are three good and generally equivalent combinations of prescriptive RECO measures for typical single family Hayward homes that significantly reduce energy use and are cost-effective. We recommend that all three retrofit options be offered to homeowners as part of a prescriptive path within a Hayward RECO. We further recommend that the performance option be the HERS 2 audit and rating plus a demonstration that the existing HERS 2 score is improved by at least 10%.

Our discussions about the structure of these proposed RECO requirements with a home performance contractor and a HERS rater have been positive. They like the amount of flexibility offered within the prescriptive path. And there is the opportunity for a home performance contractor, after making an initial visit to a home, to consult with the homeowner about existing house conditions and which retrofit option would make the most sense without having to perform a full HERS 2 audit, rating and report.

Even though policy makers and the home performance contracting industry is understandably trying to move homeowners toward performance-based audits and retrofit solutions, a RECO which provides several good and cost-effective prescriptive retrofit choices makes the ordinance more workable for all concerned. This approach also helps make the requirements easier for homeowners who don't want to pay the $700 to $900 cost of a HERS 2 rating which, by itself, does not produce any energy savings.

Recommended Retrofit Measures

Mandatory Features

- Low flow toilets, showerheads and faucet aerators
- Hot and cold water pipe insulation at least 5 feed from the water heater
- Exterior door weather-stripping
- Fireplace closures
- Duct repair (if tested duct sealing is not a part of the selected compliance option)

Compliance Options

The homeowner chooses any one of the following four retrofit options:

Prescriptive Approach

1. Air sealing + R-30 roof/ceiling insulation (if < R-13 existing roof/ceiling insulation)
2. Air sealing + duct sealing (if existing forced air heating system)
3. Air sealing + R-19 raised floor insulation (if no existing raised floor insulation)

.. or ..

Performance Approach

4. HERS 2 audit and rating on the existing house, and any combination of retrofit measures which improve the HERS score $\geq$ 10% or achieves a rating of $\leq$ 120.

Cost Cap

- If a remodel ≥ $50,000, there is no cost cap on compliance.
- If a point-of-sale, there is a cost cap of 1.0% of the sale price of the property. If the homeowner demonstrates that no compliance option can be completed for less than the cost cap, a less stringent compliance option (to be determined) shall be allowed.
- If date certain (e.g., all older homes by a fixed future date), there is a cost cap of 1.0% of the assessed property value. If the homeowner demonstrates that no compliance option can be completed for less than the cost cap, a less stringent compliance option (to be determined) shall be allowed.

While the RECO measures recommended here are similar in some ways to Berkeley's proposed revised RECO (scheduled for adoption this fall), there are several differences:

- Hayward mandatory measures required in all homes is a list of low cost items that may be identical to Berkeley's, and similar to the mandatory items contained in the San Francisco RECO.

- Hayward prescriptive options include the one Berkeley prescriptive option – Air Sealing and R-30 Attic Insulation – but it also provides two more: Air Sealing and Duct Sealing; and Air Sealing and R-19 Raised Floor Insulation.

- The Hayward performance option as we recommend it would require both the HERS 2 rating and combined home energy improvements to reduce the HERS 2 score of the existing house by at least 10%; while the proposed Berkeley RECO requires only the HERS 2 rating without any requirement to actually perform any further energy upgrades (aside from the mandatory measures).

While we suggest having a robust performance option as part of the Hayward RECO, we do not recommend pushing homeowners toward a performance path yet until a few important HERS 2 software limitations are addressed and the HERS rating is shown to be working somewhat better.

Triggers

Remodels that cost ≥ $50,000 are appropriate candidates for RECO compliance. Since many alterations and additions already include upgrades for attic and/or raised floor insulation, the extra cost for air sealing and the few mandatory measures might be in the range of $1,500 to $1,800 without incentives. It seems fairly straightforward that any RECO would, at a minimum, include remodels as a basic trigger.

Point of Sale, despite strong opposition by the real estate community, has significant advantages that should be considered. Transfer of title is a clear trigger event that can be

tracked during the grace period for the buyer within which the RECO requirements should be met. A grace period (time after sale) of up to 3 years may take pressure off buyers and real estate agents negotiating a sale, especially if the City allows the resale of the property within the grace period without RECO compliance.

The inherent challenges of a Date Certain RECO are significant, but a strategic approach to implementing this trigger also includes the many advantages discussed above. A suggested refinement to this approach is to require compliance only of older (e.g., pre-1978) homes by, for example, 2021 or 2023.

Appendix A. Analytic Method

The methods and data applied in this study use several steps and components that are more likely to give reliable results than other energy analysis and cost-effectiveness studies done to evaluate a RECO ordinance. This increased level of certainty is due to several factors:

(1) The fact that it is possible to establish a reasonably accurate profile of what existing conditions and energy-related features and efficiencies comprise an average Hayward home.

(2) The ability to calibrate annual space heating calculated by the HERS 2 software to three full years of actual utility data used to disaggregate space heating from the remaining natural gas use (e.g., domestic hot water and miscellaneous); and use the actual unit cost of natural gas paid by Hayward homeowners.

(3) The use of current home energy retrofit cost data for specific retrofit measures in the Bay Area, including data related to retrofits of smaller homes typical of Hayward.

(4) The use of data from City staff to help identify the number of homes with key attributes or systems (e.g., attic vs. non-attic roof, central furnace vs. wall heater).

(5) The "*California Statewide Residential Appliance Saturation Study", Final Report Executive Summary* from June, 2004 (the "RASS" study), CEC Consultant Report 400-04-009 which fills in a few holes in the Hayward-specific data.

The new HERS II software appears to be generally working well in taking energy audit field data and producing a relative rating of home efficiency based the specification of energy features independent from occupant behavior. Based on three decades of reviewing computerized energy simulations of buildings and monitored energy data in the mild Bay Area climate, relative performance of different home retrofit measures as calculated by the HERS II software generally produces expected results.

However, the beta version of the program used was lacking in a few capabilities that we uncovered and that initially required special modeling techniques to overcome. The most significant of these, specifying pre- and post-retrofit duct leakage, was corrected as a result of Gabel Associates bringing this problem to the attention of the California Energy Commission and to EnergySoft, the author of EnergyPro. EnergyPro v5.1.3 now includes this capability. We also noticed what appears to be a difference in the HERS 2 calculation as compared with Micropas 8.1 in modeling an un-insulated single story house with an attic in Climate Zone 3 (Hayward) and comparing it to the same house with R-30 attic insulation. HERS 2 is indicating an 8.5% reduction in space heating, while Micropas 8.1, the other state-approved 2008 Title 24 performance software, is projecting a 14.7% reduction. Based on a review of other data and analytic methods, we decided to use the 14.7% improvement in the results shown in Section 5.

The following approach has been used to estimate energy savings, energy cost savings and the amount of reductions in greenhouse gas emissions (CO2-e) for the average Hayward single family house, and energy efficiency retrofit improvements to the base case:

(1) A 1,292 square foot existing 1-story house is modeled with the latest HERS 2 (see below) Rating (CHEERS) software in EnergyPro v5.1.3. The house size is selected to align with the average Hayward home size according to Zillow.com data.

(2) Annual natural gas usage in therms for space heating and domestic hot water calculated by the HERS 2 energy model is normalized by (a) average natural gas usage for single family homes in Hayward provided by PG&E; and (b) typical values for water heating and miscellaneous (e.g., cooking) natural gas use from the RASS study. Because a relatively small percentage (e.g. 10%) of Hayward homes have air conditioning, electricity use the base case and cooling energy savings from retrofit measures are not included.

(3) An Average Base Case is used to test the energy performance and energy savings of both individual retrofit measures and specific combinations of retrofit measures; and an un-insulated attic base case is used to look at the incremental energy savings starting with an old house with no insulation.

Average Base Case Model

The average base case model is a 1,292 square foot, 1-story existing house assumed to have a standard width of 25 feet, an 8' ceiling height, and a total 16.2% glazing to floor area ratio. The latter value was derived from the Gabel Associates database of existing homes described below, with each orientation (North, East, South, West) containing one-quarter of the total glazing to average orientation effects. Gross wall area, based on the above defined aspect ratio, is also equally divided by orientation.

Existing Roof/Ceiling, Wall, Raised Floor and Windows

Existing roof/ceiling, wall, floor and window conditions in the model are assumed to be the average U-factor calculated from a data survey of 200 existing houses in Gabel Associates archives of recent projects completed in Climate Zone 3 from Title 24 analyses as follows:

Roofs/Ceilings:	U-factor = 0.071 [equivalent to R-13 nominal attic insulation]
Exterior Walls:	U-factor = 0.334 [equivalent to no insulation]
Raised Floors:	U-factor = 0.097 [equivalent to no insulation w/ crawl space]
Windows:	U-factor = 1.01; SHGC=0.73 [equivalent to single pane wood windows]

Although the nominal existing roof/ceiling U-factor for existing homes was determined to be 0.071 from the Gabel Associates database of existing home projects, this value is increased to 0.109 to account for a reduction in overall effectiveness from insulation gaps and reduced insulation thickness from settling of loose insulation and/or compression of batt insulation. This is probably a relatively conservative value given the generally poor quality of insulation installation common in existing attics as observed by home performance contractors.

Retrofit insulation upgrades are modeled as meeting the Quality Insulation Installation criteria in the current Title 24 standards, and having that verified by a HERS 2 Rater or BPI-certified installer.

Building Leakage and Air Sealing

A pre-retrofit air change rate per hour (ACH) of 1.0 is converted in the HERS 2 software to a Specific Leakage Area (SLA) value. Assuming an 8 ft. ceiling height, 1.0 ACH is equivalent to an SLA = 10.18. Post-retrofit ACH is assumed to be 0.5, equivalent to an SLA = 5.09.

Existing HVAC and Water Heating Systems

The existing heating system is assumed to be a forced air furnace with an AFUE = 75%. Ducts are assumed to be in the crawl space with duct insulation of R-2.1. Duct leakage is discussed below.

The existing water heater is assumed to be a tank gas water heater of 30 to 50 gallons, with an Energy Factor (EF) = 0.525 and no hot water pipe insulation. This EF value was the minimum efficiency heater allowed to be sold in the U.S. in the 1990s and 2000s.

Duct Leakage and Sealing

Existing duct leakage is assumed to average 34%. After duct sealing and testing, duct leakage value are assumed to be reduced to 14%. The 20% differential is appropriate in that home performance contractors claim that they can consistently reduce duct leakage down to even lower than 14% in a large percentage of existing homes.

Hayward Utility Data and RASS Study

PG&E provided 2007, 2008 and 2009 data on the monthly and annual natural gas use of all 29,116 single family and duplex dwelling units (as of 2009). Total gas annual? use was 469.8 therms, and the average unit price was $1.104/therm. A baseline gas use was calculated from the lowest monthly value representing a combination of water heating and miscellaneous use (e.g., gas range/oven, gas clothes dryer). The annual baseline gas use was 240.7 therms, so annual space heating is assumed to be the difference which is 229.1 therms. Total annual space heating predicted by the HERS 2 energy model for the 1,292 sf Average Base Case has been calibrated to 229 therms to establish the incremental energy savings of each of the retrofit measures studied and modeled.

The RASS study confirms the relative amounts of different natural gas use, and puts the annual miscellaneous gas use for small older homes at around 38 therms. Annual water heating is then assumed to be around 203 therms.

Figure 12 of the RASS study indicates that 15% of space heating in the mild coastal areas in PG&E territory is provided by some form of electric heat such as permanent or plug-in electric resistance space heaters. If all space heating were gas source, this would mean that the annual gas space heating use would be 229.1 / 0.85 or 269.5 therms.

Annual energy cost savings shown in the results are conservative because electric heating has a much higher cost per unit of heat delivered than natural gas. The average Hayward home which meets 15% of its annual heating load with electric space heaters will pay $351/year total for gas and electric space heating (assuming same $1.104/therm for natural gas and $0.17/KWh electricity). The same house with only gas space heating will pay $298/year or $53/year less without the electric heating.

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Appendix B. Detailed Cost Data

Section 3 provides an overview of the approach used to gather cost data for the various retrofit measures. This appendix provides more specific data on the information obtained.

Cost Data Set A

Three home performance contractors were asked to complete a spreadsheet to determine specific costs for defined energy retrofit measures in a 1,000 sq.ft. and 1,500 sq.ft. home. For each, they were asked to input a "Typical Low" and "Typical High" value. The low value "represents relatively easy access, simple construction and architecture, and no special [installation] issues". The high value "represents more difficult access and/or more challenging existing conditions".

According to the real estate web site Zillow.com, the average single family home in the City of Hayward is calculated as 1,292 square feet. From the above data, a spreadsheet has been developed which interpolates values between the 1,000 sq.ft. home and 1,500 sq.ft. home data points. This adjusted cost data for the average Hayward home is shown in Table A-1.

Cost Data Set B

More general data gathered recently from five Northern California home performance contractors has been compiled to fit – somewhat roughly in a few instances -- within the same spreadsheet matrix as shown above. Because this data has been shared with Gabel Associates indirectly through a major utility company, the data remains anonymous and cannot be verified as to precisely what, in each case, is the installed condition it represents. These cost estimates are somewhat lower than those in Cost Data Set A perhaps because this cost data includes firms which operate outside the Bay Area and, as a result of lower overhead, may be able offer lower home retrofit prices.

Although no specific home conditioned floor area was included in these submitted costs, the assumption for this information is that it applies to older existing homes. According to an August, 2008 report ("*Meeting AB 32 – Cost-Effective Green House Gas Reductions in the Residential Sector*" by Consol for the California Homebuilding Foundation), California homes built prior to the 1970s average less than 1,500 sq.ft. (Table A-2).

Table A-1. Cost Data Set "A"

Upgrade Energy Measures	Interpolated Values for a Hayward 1292 sf 1-Story Home		
	Typical Low ($)	Typical High ($)	Average ($)
Blower Door Test In; Air Sealing w/ caulking, foaming, weather stripping, and thermal bypass mitigation; Test Out w/ BPI compliance Combustion Safety test & CO alarm (if needed)	$1,496	$2,168	$1,832
R-30 Attic Insulation (from no insulation)	$1,234	$1,492	$1,363
R-30 Attic Insulation (from nominal R-11)	$1,056	$1,299	$1,178
R-38 Attic Insulation (from no insulation)	$1,589	$1,981	$1,785
R-38 Attic Insulation (from nominal R-11)	$1,292	$1,680	$1,486
R-38 Attic Insulation (from nominal R-19)	$1,214	$1,607	$1,411
Duct repair and sealing: accessible crawl space	$1,089	$1,705	$1,397
Duct repair and sealing: accessible attic	$856	$1,395	$1,126
New 40 gal Water Heater, EF=0.58	$1,200	$1,600	$1,400
New 40 gal Water Heater, EF=0.62	$1,450	$1,800	$1,625
R-13 Wall Insulation (from no insulation): Blown In Cellulose or Fiberglass[1]	$2,450	$3,278	$2,864
R-19 Raised Floor Insulation (from no insul.)	$1,098	$2,111	$1,605
R-30 Raised Floor Insulation (from no insul.)	$1,594	$2,649	$2,121
Air Sealing + R-30 Attic Insulation (from no insul.)	$2,730	$3,660	$3,195
Air Sealing + R-30 Attic + Attic Ducts Sealed	$3,586	$5,055	$4,321
Air Sealing + R-38 Attic Insulation (from no insul.)	$3,086	$4,149	$3,617
Air Sealing + R-38 Attic + Attic Ducts Sealed	$3,942	$5,544	$4,743

Note 1: Assumes all work done with holes drilled through drywall from the interior, but excluding the cost of interior repainting

Table A-2. California Average House Size by Decade

Decade	Average House Size (square feet)
1950s	1402
1960s	1495
1970s	1654
1980s	1819
1990s	2116
2000s	2367

From "*Meeting AB 32 – Cost-Effective Green House Gas Reductions in the Residential Sector*" by Consol for the California Homebuilding Foundation: August, 2008 report.

Cost Data Set B values placed into the previous spreadsheet framework looks as follows:

Table A-3. Cost Data Set "B"

Upgrade Energy Measures	Cost Data Set "B" Typical Existing Home		
	Typical Low ($	Typical High ($	Average ($)
Blower Door Test In; Air Sealing w/ caulking, foaming, weather stripping, and thermal bypass mitigation; Test Out w/ BPI compliance Combustion Safety test & CO alarm (if needed)	$899	$1,080	$990
R-38 Attic Insulation (from no insulation)	$1,438	$1,713	$1,576
Duct repair and sealing: accessible attic	$796	$1,065	$931
Air Sealing + R-38 Attic Insulation (from no insul.)	$2,337	$2,793	$2,565
Air Sealing + R-38 Attic + Attic Ducts Sealed	$3,133	$3,858	$3,496

Table A-4 shows a comparison of the two different Cost Data Sets:

Table A-4. Comparison of Cost Data

Upgrade Energy Measures	Comparison of Cost Data for Typical Hayward Home			
	Set "B" Avg.	Set "A" Avg.	Average	Range (+/-) % from Average
Blower Door Test In; Air Sealing w/ caulking, foaming, weather stripping, and thermal bypass mitigation; Test Out w/ BPI compliance Combustion Safety test & CO alarm (if needed)	$990	$1,832	$1,411	30%
R-38 Attic Insulation (from no insulation)	$1,576	$1,785	$1,681	6%
Duct repair and sealing: accessible attic	$931	$1,126	$1,029	9%
Air Sealing + R-38 Attic Insulation (from no insul.)	$2,566	$3,617	$3,092	17%
Air Sealing + R-38 Attic + Attic Ducts Sealed	$3,497	$4,743	$4,120	15%

The two sets of cost data show a large range in cost estimates for air sealing and testing, but relatively consistent cost estimates for attic insulation and for duct repair/sealing and testing. This may be as a result of a large range of the types of specific causes that result in air leakage, and a range of estimates by different contractors as to the likely effort involved in reducing the overall air change rate. It isn't precisely known what assumptions for improving air sealing are made by the Set "B" home performance contractors for their cost estimates, and this group may possibly be somewhat less aggressive in their effort and expectation of how effectively they will generally reduce air leakage.

August 08, 2010

To: Amelia Schmale
Sustainability Coordinator
City of Hayward

From: Gabriel Hernandez
Executive Director
Hayward Day Labor Center

RE: Residential Energy Conservation Ordinance

C: HDLC Solar Initiatives Group
David Korth
Anne Culver

Dear Amelia:

I have some comments to make about the development of the above-mentioned ordinance. I also would like to make some suggestions about the HDLC's Solar Initiatives Program, how it ties to this type of ordinance, and the City of Hayward's interests in job development as part of the City of Hayward 'going green.".

With regards to the above-mentioned ordinance:

1. The ordinance could contemplate minimum standards for homeowners to comply with, to improve the "weatherization" of the household. Doors, windows, water leaks, incandescent light conversion, water heater insulation, water conserving toilets, energy efficient appliances, ceiling insulation, what plants and/or trees could be used on the outside of the home to improve energy conservation, etc., can all be part of a "energy audit." The City can require minimum things that the homeowner "has" to install, improve, update, and/or change while making suggestions about other items for the homeowner to consider (conservation education) to improve the home energy efficiency. Should this audit include an assessment of the cost to convert the home to solar energy?

2. The City could require an "energy audit" of the home prior to home ownership change and/or other similar event that could include the review of the items above in #1. What "triggers" the ordinance?

3. The City could also require minimum standards for new home construction, redevelopment construction, etc., for the "weatherization" of homes to be built. Any new dwelling automatically meets the minimum standards (i.e.).

4. Is there a "phase-in" process to require the minimum standards of the ordinance? The City has limited resources. Can the ordinance be phased in based on the age of the home? Houses built before a certain date get "triggered" first. Then after a decade, the

next set of homes get triggered, etc., until we catch up to the newer homes that are now required to meet the minimum standards.

5. The City could help to secure resources to employ auditors (job development).

6. The City could help to secure resources to employ workers to make the changes at the home to comply with the ordinance (job development).

7. The City could help to secure resources to help homeowners comply with the minimum standards. Some homeowners may not be able to afford the changes. What happens? Is there an appeal process? What if a homeowner does not comply with the ordinance? Home improvement loan program? Grants? Rebates? Are there other discounts, rebates at the state or federal level?

8. What is the economic impact to the City by improving energy conservation? By reducing the utility costs of a home, doesn't the City loose revenue from the utility tax? Is there another way that the City can recoup this loss in revenue?

9. If the City invests in this type of efficiency and conservation, doesn't the utility company(ies) directly benefit from these savings too? Can the City receive some of the revenue savings from the utility company(ies) for the City's investment in enforcing the ordinance?

Other suggestions and/or ideas:

1. The City could require a long-term phase in of its own properties. (Maybe not as part of this ordinance, but as part of a larger city policy.) For example, to protect the existence of public hospitals, policy makers created a regulation that "all hospitals had to be earthquake retrofitted by a certain date. Over the past several decades, politicians saved the money to make these changes happen. Most public hospitals now have new wings that meet the minimum standards of the rule that was created decades ago. But, the reality is that public hospitals still exist.

   The City could do this same thing. "By 2050, all city facilities will be solar powered or wind powered, etc." This creates a market for jobs and allows the City to set aside monies to make it happen. The time element also allows for time for technological improvements (i.e. smaller, more powerful panels, smaller, but more efficient storage of power, etc.).

2. The City can require that any new redevelopment in the City include the use of solar power. If the City redevelops a shopping center and invests in solar energy, doesn't this help business owners save on their utility costs so that they can stay in business longer. What is the cost analysis of this type of investment? A business that pays less in utilities can stay in business longer? Employ workers longer? What is the amount of time for the City to "break even" for this type of investment?

From: chaitanya diwadkar [cdiwadkar@gmail.com]
Sent: Thursday, August 12, 2010 9:29 AM
To: Amelia Schmale
Subject: RE: RECO community meeting

Dear Amelia,

Thanks to you and your colleagues for organizing the community meeting!
As we discussed briefly post-meeting, I would be more than happy to volunteer in any way possible in terms of community outreach (creating flyers, distributing flyers, getting educational materials translated) and also if you need volunteers to do research etc.

I also wanted to add some comments about the presentation in light of some of the comments heard:

1. Point of sale trigger - In my opinion there was a bit of a knee-jerk reaction to this trigger that was unfounded even in the issues that the realtors brought up.
I think their opposition to this trigger *could* be countered if the job creation aspect and general economic stimulus of such a program can be quantified and shows that any loss in realtor business would be countered by overall growth in the local economy. Then surely they have no reason to oppose this trigger.

2. Incentives - In addition to the Fed, State and City incentives, perhaps there could be additional programs that could be implemented in collaboration with the Regional Occupation Program (ROP) center in Hayward and in collaboration with the Chamber.
For instance could the RECO mandate that a certain % (can it be 100%?) of work done under various triggers must be done by Hayward based businesses and the homeowners get a discount on the cost of inspections?
Hayward based businesses that are working on RECO triggered upgrades could get priority for City inspections.
Could the City also negotiate discounts with City based hardware stores for materials that are used for RECO triggered upgrades (this might be hard for the stores to implement but could be as easy as showing a permit application from the City)
Could the ROP introduce skill learning programs in collaboration with Hayward businesses (the Chamber) that would train unemployed Hayward residents as installers etc.?

3. Outreach - I think some places to distribute flyers would be
Farmers market - volunteers
Flea market - volunteers
Library locations - library staff?
Any physical locations where residents pay City bills (water and sewage) - staff?
PTA meetings at local schools
I think there would be a better mix of stakeholders by reaching out to the above locations than simply asking the realtors to distribute materials to their clients (who would either be existing or prospective homeowners).

Best regards,
Chait Diwadkar
(415) 683-0525

Sustainability Committee Monthly Meeting Topics for 2010

Presenting Department	Date	Topics	Climate Action Plan Action Number (priority)
~~DS~~	~~January 6, 2010~~	~~Annual Review of Green Building Ordinances and Implementation~~	~~Actions 4.1, 4.2, 4.3~~
~~DS~~		~~Bay Area Climate Collaborative (BACC)~~	
~~DS~~		~~Summary of Education and Outreach Efforts (Permit Center Green Display, Website, etc.)~~	~~Actions 9.1, 9.2, 9.3~~
~~DS *Sustainability Coordinator*~~	~~February 3, 2010~~	~~Introduction of Sustainability Coordinator and Initial Discussion on the Residential Energy Conservation Ordinance (RECO) and Commercial Energy Conservation Ordinance (CECO)~~	~~Actions 3.1(11), 3.2(12), 3.3(2)~~
~~DS~~		~~Review of Purpose and Productivity of the Sustainability Committee and 2010 Meeting Topics~~	
~~PW~~	~~March 3, 2010~~	~~Summary of Issues and Regional Efforts Regarding a Ban on Plastic Bags and Styrofoam Containers~~	~~Action 6.4(25)~~
~~DS~~	~~April 7, 2010~~	~~South Hayward BART Form-Based Code Parking Strategies Options~~	~~Action 1.3(23)~~
~~DS~~		~~Opposition to State Proposition 16~~	
~~DS *Sustainability Coordinator*~~	~~May 5, 2010~~	~~Large Energy Users Program~~	~~Actions 3.9(1), 5.2(5)~~
~~DS~~		~~Energy Efficiency and Conservation Strategy (Informational Item Only)~~	
~~DS *Sustainability Coordinator; Grad Student Kali Steele*~~	~~June 2, 2010~~	~~Update on Development of a Residential Energy Conservation Ordinance (RECO)~~	~~Actions 3.1(11), 3.2(12), 3.3(2)~~
~~*DS Sustainability Coordinator*~~	~~July 7, 2010~~	~~Overview of Community Outreach Plan~~	~~Actions 9.2*(10), 9.3*(11)~~
~~PW~~		~~Draft Ordinance Ban on Styrofoam Containers~~	~~Action 6.4(25)~~
~~DS~~		~~Update on Formation of the Climate Action Management Team~~	~~CAP Implementation~~
	August 2010	*No Meeting – annual recess*	
DS *Sustainability Coordinator*	September 1, 2010	Update on Development of Residential Energy Conservation Ordinance (RECO)	Actions 3.1(11), 3.2(12), 3.3(2)
DS *Building Division Staff*	October 6, 2010	Update on State Green Building Code and its Impacts on Hayward's Green Building Ordinance, including Solar Requirements	Actions 4.1(9), 4.2(7), 5.3(8)
DS *Sustainability Coordinator*		Beacon Award Update	
DS *Sustainability Coordinator*	November 3, 2010	CaliforniaFirst Pilot Financing Program Implementation and Program Continuation	Actions 3.7(3), 3.8(4), 3.9(1), 5.1(15), 5.2(5),
PW	December 1, 2010	Increase Participation in Food Scraps Collection, Recycling, and Construction and Demolition Debris Programs	Actions 6.1(14), 6.2(13), 6.3(6), 6.6(19)
PW		Update on Ordinances to Ban Plastic Bags	Action 6.4(25)
DS		Discussion of Topics for 2011	

*emissions reductions not quantified in the Climate Action Plan