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

June 4, 2008
4:30 p.m. – 6:00 p.m.

A G E N D A

I. Call to Order

II. Roll Call

III. Public Comments: *(Note: For matters not otherwise 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 brought up under this section will be taken under consideration and 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. All public comments are limited to this time period on the Agenda.)*

IV. Approval of Minutes of May 7, 2008

V. Green Building Ordinance Update and Cost Benefit Information
Susan Daluddung, Director of Community & Economic Development

VI. Transit Oriented Development
Ann Cheng, Transportation and Land Use Coalition; Laura Hall and Robert Alminana, Hall Alminana Incorporated

VII. Next Meeting: Wednesday, July 2, 2008 –
Green Building Ordinance and "Build It Green" – Susan Daluddung
Bay Friendly Landscape Guidelines for Private Development-Teresa Eade, Senior Program Manager, StopWaste.org

VIII. 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.

Department of Community and Economic Development
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CITY COUNCIL SUSTAINABILITY COMMITTEE MEETING
Hayward City Hall – Conference Room 2A
777 B Street, Hayward, CA 94541-5007

May 7, 2008
4:30 p.m. – 6:00 p.m.

MEETING MINUTES

I. Call to Order-4:35 pm

II. Roll Call

Members:
- Michael Sweeney, Mayor
- Olden Henson, Councilmember
- Bill Quirk, Councilmember
- Rodney Loché, Planning Commissioner
- Julie McKillop, Planning Commissioner
- Al Mendall, Planning Commissioner

Staff:
- Gregory Jones, City Manager
- Fran David, Assistant City Manager
- Susan Daluddung, Director of Community and Economic Development
- Margret Elliott, Building Official
- Bob Bauman, Director of Public Works
- Alex Ameri, Deputy Director of Public Works
- Vera Dahle-Lacaze, Solid Waste Manager
- David Rizk, Planning Manager
- Michelle Koo, Landscape Architect
- Maureen Conneely, Assistant City Attorney
- Steve Osborne, Plan Checker
- Erik Pearson,Senior Planner
- Arlynne J. Camire, Assoicate Planner
- Tiffany Roberts, Planning Intern (Recorder)

Others:
- Doug Grandt, Volunteer and Resident
- Wendy Sommer, StopWaste.org
- Tom Padia, StopWaste.org
- Jim Wieder, Hayward Chamber of Commerce
- Ron Reese, Balch Enterprises, Inc.
- David Stark, Bay East Association of REALTORS®
- Gil Zaballos, R. Zaballos and Sons, Inc.

III. Public Comments

Doug Grandt – commented on snow pack concerns; water and energy consumption.
David Stark – Requested committee to seek more involvement from development community.
Jim Weider – Requested cost/benefit analysis and for committee to keep in mind current economic conditions.

IV. Approval of Minutes of April 2, 2008 - Approved.

V. Green Building Ordinance – Discussion

Discussion of the Green Building Ordinance continued from last month's meeting. Community and Economic Development Director Daluddung stated that developing an effective ordinance is a work in progress. Staff has continued to explore ways that other jurisdictions have implemented similar ordinances. Most jurisdictions have included some type of hardship clause which provides a means of circumventing the ordinance. Planning Intern Tiffany Roberts provided a synopsis of potential cost to builders of LEED certification. Plan Checker Steve Osborne stated that based on his review of jurisdictions he has found that most are using a custom check list. He stated that it is important to understand the language of LEED. LEED is a trademark designation and it may be misrepresentative to use the terminology unless a building or structure has been rated through the US Green Building Council. Mr. Osborne stated that LEED is most appropriate for institutions such as schools, corporations and other types of non-speculative buildings.

CED Director Daluddung stated that it may be appropriate to make revisions and then meet again with the building community.

Councilmember Henson stated that the emphasis of this process has to be on impact. He furthermore proposed the organization of a sub-group that could bring back findings.

Planning Commissioner Mendall questioned the amount of staff time required if the ordinance were to contain stipulations for an internal review process.

Mr. Osborne stated that it is appropriate to add 4 hours to the plan check.

Planning Commissioner Mendall questioned what aspects may be lost if the ordinance were to contain an internal review process versus having third party review process. How do we prevent the process from being "watered down?" He emphasized that Hayward's ordinance should be somewhere between a light version and maximum version.

CED Director Daluddung mentioned the fee structure study and passed around an example of paperwork required to obtain one point under the LEED certification process.

Planning Commissioner Mendall stated that even if Hayward has its own internal review process, it should still require silver level certification.
Mr. Osborne stated that the city does not have the expertise or the staff to require silver level certification due to the amount of time and knowledge necessary for reviewing projects of this nature.

Planning Commissioner Mendall stated that he doesn't understand how we can handle reviewing projects which are certified but not projects which are at a silver level.

Wendy Sommer of Stopwaste.org was asked to briefly explain what some other jurisdictions have done in terms of implementing a Green Building Ordinance. She stated that most ordinances are split- one for public buildings and one for private. She said it's important to keep in mind that in other jurisdictions where there are hardship clauses, projects can only be exempted by council not staff. She stated that the cost associated with certification for any project over $3-4 million would only be a small percentage. A performance based check list may be preferred.

Planning Commissioner Mendall questioned if staff was proposing two separate check lists.

Mr. Osborne responded that Livermore and Rohnert Park both had developed their own.

Building Official Margret Elliott pointed out that these are prescriptive measures since the California Building Standards Commission is writing a green building code that is to be ready in 2012.

Planning Commissioner Mendall expressed frustration at the length of time the development of an ordinance has taken.

Councilmember Bill Quirk stated that he liked the idea of creating a subgroup. He commented that he feels the group is making progress. We are focused on water and energy conservation. We must keep in mind our goal for this process. We need to understand what our objectives are. What would LEED certification mean for the city? He stated he likes the prescriptive approach for a check list. He questioned what it means in terms of inspection. He reiterated that staff is making progress and that he hopes we will be able to formulate an ordinance soon. We must keep in mind that we can't say that the ordinance will become mandatory until after the trial period is over and we have had a chance to understand the results from the trial. He further stated that he hopes we can get an energy standard by Fall. He suggested that we make ordinance voluntary for X amount of time, evaluate the trial after it is over, then look towards making the ordinance mandatory.

Planning Commissioner Rodney Loché stated that due to the cost, certification doesn't seem feasible. He inquired about the time aspect for internal vs. an external certification process.

City Manager Greg Jones stated that based on anecdotal evidence, the time could be between 3-6 months and the primary concern is handing the control of timing over to a third party. In that respect the city loses control over the process.

Planning Commissioner Loché inquired about a fast track incentive. He reiterated the point that the outcome and results of an ordinance is what we should focus on.

Mayor Sweeney stated that if we get compliance, we get our outcomes. But if the group is serious about compliance, then we must put "meat on [the ordinance]" – we must be able to structure the ordinance in a way that is enforceable. We must be able to get outcomes and reach our goal. He pointed out that Planning Commissioner Mendall's point is well taken.

CED Director Daluddung stated that staff is currently defining what "LEED light" is. She mentioned that we need to talk further with the development community. She also mentioned that both Livermore and Rohnert Park are sending their checklists.

Councilmember Quirk emphasized that it is important to get the working group together so that builders can understand the cost-benefit analysis.

Planning Commissioner Mendall questioned the amount of detail which would be needed in a cost-benefit analysis.

Mayor Sweeney asked if the committee is amenable to having staff and development community work together in the development of an ordinance instead of the council. There is a general consensus to have a sub-group work on development of an ordinance. A list was passed around for interested development community members to sign-up for participation in the sub-group.

VI. Water Conservation – Update by Alex Ameri, Deputy Director of Public Works

Hayward's water supply is subject to cutbacks. Indicators show that Hayward's per capita water usage is one of the lowest in the Bay Area. Furthermore water projections for 2030 indicate an estimated projection of 27.9 mgd.

Councilmember Henson inquired if we were to factor in economic development in the area would we not see a spike in water usage.

Deputy Ameri responded that this was factored in as part of the estimation.

Councilmember Henson stated that sometimes home owners' associations interpret that their lawns must be green. We should think about this with an eye towards Bay Friendly Landscaping, possibly considering an outreach effort to change language to associations.

Deputy Ameri pointed out that the water efficient landscape ordinance is outdated.

Planning Commissioner Mendall commended the city for its low usage of water and inquired if all easy water-reduction initiatives had been achieved.

Deputy Ameri responded that all "lowing hanging fruit" has been achieved.

Councilmember Quirk pointed out that if legislation were to mandate a reduction in jurisdictions' water usage, then as Hayward's water usage is already low, we need to insure the city does not have to reduce its water usage another 20 percent. He recommended setting up a BASQA committee so that we can create a set of best practices.

There is a general consensus from the group that Hayward is doing a good job with water conservation.

VII. Next Meeting: June 4, 2008 – Green Building Ordinance and Transit Oriented Development

VIII. Adjournment – 6:24pm

CITY OF
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DATE: June 4, 2008

TO: Mayor and City Council Sustainability Committee

FROM: Director of Community and Economic Development Department

SUBJECT: Progress Report on Green Building Ordinance

RECOMMENDATION

That the Sustainability Committee reviews and comments on this report.

BACKGROUND

At the May 7th meeting of the Sustainability Committee, staff was asked to meet with interested parties to collaborate on the content and implementation of the Hayward Green Building ordinance. Also, the Sustainability Committee recommended that staff continue to meet with public agencies and affected groups to obtain input and recommendations for the adoption of the Green Building Ordinance. Staff has continued to meet with stake holders, and has found it to be a very helpful for our endeavor. Specific activities undertaken include meeting with the Building Industry Association, the Hayward Chamber of Commerce, Bay East Association of Realtors, and with the staff of StopWaste.org. Staff has also conducted research on the cost-benefit analysis reports currently available (see Attachment A).

DISCUSSION

The following list of meetings has taken place since the May Sustainability Committee meeting:

1. May 14th - StopWaste.org staff and a variety of city department staff met to discuss our options and to learn the next steps of the StopWaste.org agenda.

2. May 27th – CED Director Susan Daluddung and Building Official Margret Elliott attended a morning meeting with Bay East Association of Realtors to present Hayward's Green Building Ordinance efforts and to discuss Hayward's approach and to get feedback from the various county realtors.

3. May 27th – in the afternoon we met with the assigned committee members: Jim Wieder of Hayward Chamber of Commerce; David Stark of Bay East Association of Realtors; Gil Zaballos of R. Zaballos & Sons, Inc.; Ron Reese of Balch Enterprises, Inc.; Michael Kloefkorn of Van Meter Williams Pollack; and Paul Campos of Home Builders Association of Northern California.

4. May 28th- City staff members David Rizk, Arlynne Camire, Glen Martinez, Tiffany Roberts, and Vera Dahle-Lacaze attended The Green Advantage: Builder and Developer Forum in Newark. Most of the speakers emphasized that they would prefer some regional consistency because of the difficulty presented when a builder or contractor has differing guidelines from city to city.

FISCAL IMPACT

The fiscal impacts to the City and to builders associated with this action have not yet been fully measured. Additional staff time for plan review and inspections are being identified. The City is currently updating our fees to reflect the costs of providing services including green building fees. The costs of implementing this ordinance will be included in that study, along with analysis of expected additional plan check timeframes, other additional staff time, education, and marketing materials.

NEXT STEPS

The subcommittee of the Sustainability Committee , which includes members of the development community, builders association, architects, realtors, and Chamber of Commerce suggested another meeting in June; and also that the Sustainability Committee invite Build It Green to attend our July 2nd Sustainability Committee meeting. The subcommittee is tasked with coming up with a collaborative agreement as to the form and implementation of the ordinance and believes we need the summer months in order to get this agreement. At the meeting, full support was shown for the Build It Green approach, which has been successful in many Bay Area cities. The group is seeking consistency, a clear understanding of the proposed standards, and an idea of the savings and marketing advantage under the ordinance.

Prepared by:

Susan J. Daluddung, Ph.D.
Director of Community and Economic Development

Approved by:

Gregory T. Jones
City Manager

Attachment A: Green Building Cost Benefit Literature Review

GREEN BUILDING COST-BENEFIT LITERATURE REVIEW

Based on requests from the Sustainability Committee, staff has continued to research cost and benefits associated with green building. The following report provides both a review of LEED upfront cost information, which was provided at the last meeting as well as an update based on the review of green building cost-benefit literature.

Review of previously provided information

This review describes LEED rating systems and the levels of certification possible within these systems. It outlines the certification process as well as the cost associated with the process.

Rating Systems and Levels of Certification:

LEED Rating Systems are broken down into subsections which are project specific. The subsections are as follows:

1. LEED-NC – (new construction)
2. LEED-EB – (existing building) *not available until June 2008*
3. LEED-CI – (commercial interior)
4. LEED-CS – (core and shell)
5. LEED Schools – Specific rating for schools
6. LEED Retail – Specific rating for retail – currently in pilot; *date of availability unknown*
7. LEED Healthcare – Specific rating for healthcare facilities; *date of availability unknown*

Under each one of these systems, builders can achieve one of the following levels of LEED certification from lowest to highest:

- LEED Certified
- LEED Silver
- LEED Gold
- LEED Platinum

The number of points necessary to achieve any one level of certification differs based on the type of rating system; for example, new construction, commercial interior, core and shell, or retail, under which the specified project falls. In addition, a very important point is that what may constitute 1 point in one rating system may not constitute 1 point in another rating system. In other words, the points are not comparable across the rating systems. Equally important is that when comparing points in LEED to points in the Green Point Rated system, the amount of work required to earn points is very different. While it may not take a tremendous amount of work to achieve a certain number of points under the Green Point Rated system, the level of work required to earn a point in the LEED certification process is much more intense.

Certification Process:

To begin the process of certification, projects must first be registered with the US Green Building Council (www.usgbc.org). USGBC will provide information, tools, and communication that will help guide project applicants through the certification process. Certification fees are associated with the process and are based on the below fee schedule.Once registration is complete, the project design team begins to collect information and perform calculations to satisfy the prerequisite and credit submittal requirements.

Costs Associated with LEED Certification:

Three areas should be considered when accounting for costs associated with LEED certification: registration and certification fees; consultant and commissioning fees; and green building material fees.

Registration and Certification Fees-
Registration is mandatory and the fee for a USGBC member is $450 while non-members pay a fee of $600. Projects will also incur certification fees. These fees are based on the size of the project and are outlined in the following chart.

	Less than 50,000 Square Feet	**50,000-500,000 Square Feet**	**More than 500,000 Square Feet**
LEED for: New Construction, Commercial Interiors, Core and Shell, and Schools	Fixed Rate	Based on Sq. Ft.	Fixed Rate
Design Review			
Members	$1,250	$0.025/ Square Foot	$12,500
Non-Members	$1,500	$0.03/ Square Foot	$15,000
Construction Review			
Members	$500	$0.01/ Square Foot	$5,000
Non-Members	$750	$0.015/ Square Foot	$7,500
Combined Design & Construction Review			
Members	$1,750	$0.035/ Square Foot	$17,500
Non-Members	$2,250	$0.045/ Square Foot	$22,500

Consultant Fees-
Stopwaste.org states that it is virtually impossible to insure a project is on target and compliant with the LEED certification process unless the project team has a member who is LEED certified. If no one on the team is LEED certified, it will be necessary to contract with a consultant for the duration of the certification process. Although consultant fees will vary according to project size as well as other factors, rough estimates of these fees range from $30,000-$50,000.

Commissioning Fees –
Depending on the size of the specified project, these fees can range from $30,000 to $70,000.

Building Green (Green Materials vs. Traditional Materials) and Potential Increased Costs -
Stopwaste.org referred staff to a study completed by Davis Langdon. Davis Langdon is a construction cost management service provider who works primarily with architects and building owners. A summary of their findings is provided below along with the findings of two other cost benefit studies.

Green Building Cost-Benefit Literature Review
A number of studies have attempted to quantify the cost and benefits of green building. As no simple definition exists for green building, most use the definition of LEED certification as synonymous with green building. These studies have been completed by business, government, and non-profit interests. Most agree that although it is difficult to quantify in a straightforward manner due to the differing details and dynamics involved in individual projects, green building on the whole is a positive trend.

Three studies to highlight are "The Costs and Financial Benefits of Green Buildings, A Report to California's Sustainable Building Task Force"(2003) ; "Green Buildings and the Bottom Line" from *Building Design and Construction*, November 2006; and a study entitled "Cost of Green Revisited" by Davis Langdon, a construction cost management service provider, which analyzes potential cost difference between green building and traditional building.

In 2003, Greg Kats, *et al.* completed the most comprehensive analysis of financial costs and benefits for California's Sustainable Building Task Force. The report "The Costs and Financial Benefits of Green Buildings" began with an aggregation of data on actual or modeled costs for 33 green buildings. The data indicates that the average construction cost premium for green buildings is almost 2%, or finds that a minimal upfront investment of about two percent of construction costs typically yields life cycle savings of over ten times the initial investment. For example, an initial upfront investment of up to $100,000 to incorporate green building features into a $5 million project would result in a savings of at least $1 million over the life of the building, which the report assumes to be twenty years. Although the report was written with specific regard to California state buildings, data is national in scope and conclusions are broadly applicable to other types of buildings and for other public and private sector entities.

Building Design and Construction, a journal with a readership of 75,000+ architects, contractors, engineers, and owners/developers, produced a white paper titled "Green Buildings and the Bottom Line", November 2006. The report focuses on the cost effectiveness of green building across a wide range of building types. The paper evaluates the profitability of green buildings in terms of potential higher lease rates per square foot, reduced liability risk, potential lower insurance rates, and potential marketing or public relations opportunities for developers and owners.

The paper finds that although there is a growing awareness of the intangible benefits of green buildings in the real estate community, at this point green buildings are not being valued properly. The main beneficiaries of green building, they found, are the occupants and their businesses, who stand to gain "potentially enormous" health and productivity benefits from green building. "However, contrary to some claims, this does not necessarily translate into higher asset value," they write. "If developers and owners can understand how to tap this benefit, the commercial advantage that they would gain would become the most significant aspect of Green Value." There is some anecdotal evidence that builders can get a premium for green building space; however it is difficult to separate green attributes from other factors that go into a real estate transaction. Another potential liability is obsolescence – that a building is not built to high green standards will be outclassed by other properties at some time in the future. There is some evidence that green buildings are beginning to receive lower insurance rates. Fireman's Fund is the first US insurance company to offer a discount on green buildings. Exploiting the marketing and public relations aspects of green building is probably the most cost-effective toll developers and building owners have at their disposal. However there will be a point in the future when green buildings will generate less attention because they will have become the norm.

The report also focuses on government involvement with green building. It states that the way to get private developers and property owners excited about green building is not to create restrictions, but to provide incentives that make it easier and more profitable to build green. The report states that sped-up permitting, which is like giving hybrid cars access to the HOV lane, has proven to work in a number of cities, such as Scottsdale, Ariz. Chicago is putting its system online, making it even faster and less costly for green developers to get building permits. Cities can also grant density bonuses or added floor area ratio to green projects based on performance. For example, sustainable developments that reduce storm water runoff (thus reducing or even obviating the need for additional sewer capacity) could be awarded greater density or higher FAR. The city saves on capital improvements, and the building owner enjoys an asset (more space to sell or lease) that lasts the life of the property. Other mechanisms to encourage green building include:

- Waiver of development fees for green projects
- Technical training and support
- Property tax abatements (Nevada grants abatements up to 50% for 10 years for LEED Silver)
- Tax increment financing zones, also known as green building improvement districts

States, counties, and cities should work with the local chapters of professional societies, trade associations, and civic groups to develop green building incentive programs that make sense at the local level and add to the property tax base.

The final study "Cost of Green Revisited" suggests that cities that mandate LEED certification for private-sector projects should provide an appeals process for noncertified projects that meet the required performance standards. It points out a concept called "LEED creep at the local level" whereby mayors and city councils extend a requirement for LEED certification for public buildings to private projects. The report states that these mandates are counterproductive. It instead suggests that local government would do better to provide the kinds of incentives described above to encourage sustainable design and construction. City governments should be concerned about the end result of the building projects they regulate, not the process by which they got there. Municipal governments that mandate certification for private-sector projects should put in place a structured review mechanism to allow owners or developers to appeal based on the outcome-based performance of their buildings.

A total of 221 buildings were analyzed. Of these, 83 buildings were selected, which were designed with a goal of meeting some level of the USGBC's LEED certification. The other 138 projects were buildings of similar program types, which did not have a goal of sustainable design. All costs were normalized for time and location in order to ensure consistency for the comparisons. It is important to note that the only distinction made between the buildings was the intent to incorporate sustainable design in order to achieve LEED rating. Many of the non-LEED buildings might have earned some LEED points by virtue of their basic design. Cost per square foot was compared between all projects – LEED-seeking and non-LEED.

As the various methods of analysis showed, there is no 'one size fits all' answer to the question of the cost of green. A majority of the buildings studied were able to achieve their goals for LEED certification without any additional funding. Others required additional funding, but only for specific sustainable features, such as the installation of a photovoltaic system. Additionally, analysis suggests that the cost per square foot for buildings seeking LEED certification falls into the existing range of costs for buildings of similar program type.

Transit towns a step to cut carbon footprint

The Hayward BART station is home to a number of housing projects nearby that are growing more and more popular with people who want easy access to public transit, shops, stores and restaurants. Chronicle photo by Michael Macor

by John King

Friday, April 18, 2008

When DeeDee and Doug Ligibel saw the townhouse they now own in Hayward, DeeDee was taken by the old-fashioned brownstone look and the entryway's fragrant wisteria bloom.

Four years later, she's thrilled with something else: the luxury of living near a BART station, close by a downtown that includes a weekly farmers' market.

"I hardly ever drive," Ligibel said. "I love it, absolutely love it."

Ligibel is part of a small but growing slice of the Bay Area population that lives in a transit village, a term coined to describe high-density housing within easy walking distance of train and bus stops. Long touted by city planners as the cure for everything from sprawl to obesity, they're now being built across the region.

The trend is fueled by more than planning logic or consumer demand. Environmental considerations kick in as well, with the newest prod being concern over climate change. The state government has set a goal of reducing carbon levels to 1990 levels by 2020 - and many supporters say an essential tool is to emphasize compact growth patterns that make it easy for residents to leave their cars at home.

"There's no silver bullet in all this, but transportation accounts for 50 percent of the carbon emissions in the Bay Area," said James Corless, a planner with the Metropolitan Transportation Commission, which oversees the region's transportation projects. "If you don't change land-use patterns so that people need their cars less, it's harder to make an impact."

The MTC is an aggressive booster of what it calls transit-oriented development; this spring it will award $7.5 million in grants to cities and counties that are developing plans to boost density within a half-mile of transit centers. Fifty jurisdictions have applied for grants, a sign that the idea is gaining mainstream acceptance.

But if the notion of high-density growth conjures up images of high-rise enclaves, the suburban reality takes a different form.

In Hayward, 763 residential units have been added within two blocks of BART since a plan to allow such growth was approved in 1993, and nothing is taller than three stories. The long townhouse-style buildings are arranged to look domestic; there are hints of New England and Santa Barbara in the architecture, with magnolia trees and mock-historic light poles along the streets.

"It's like a small town," said Anique Barnes, who grew up in San Francisco and moved back to the Bay Area from Sacramento four months ago. She rents a room in a townhouse in City Walk, a complex across a plaza from Hayward City Hall, and takes BART to her job at San Francisco International Airport. "The convenience is the best thing. Honestly, I miss San Francisco. But this is more calm."

When Hayward officials in 2004 polled residents in the new housing developments, more than half of the

respondents said their household owned two cars. At the same time, 31 percent said they used BART to commute to work; another 7 percent relied on AC Transit, which routes a number of bus lines past the station. By comparison, just 6 percent of residents in the rest of the city reported using transit for their commute.

The complexity of the appeal of these projects was shown by another finding. Nearly 40 percent of owners said they made their decision to buy based on the relatively affordable price of their homes - the same percentage as was drawn by the proximity to transit.

That's the case with Hayward resident Priya Barmanray; one evening last month she was walking home after a work-related visit to San Francisco on BART, but most days she drives alone to her retail job in Pleasanton. Similarly, her husband uses his car to commute to Foster City.

"This was our first place, and we bought at the peak of the market," Barmanray said in explaining why they live where they do. They walk to the nearby shops to run errands ("It depends on the load."). As for BART, "Once in a while we use it for an event where parking is a problem."

For DeeDee Ligibel, though, the location has been a revelation.

She and her husband lived in Florida until 1999, in a private house on a lake; the 17-mile drive to work averaged an hour. On moving west, they purchased a home in the Central Valley and commuted to the Peninsula - often a two-hour trek each way.

No longer. The commute from Hayward is a carpool shot across the San Mateo Bridge; Dan needs the car for work, DeeDee takes an AC Transit bus home at night. They ride BART into San Francisco every other weekend, along with short trips to downtown Oakland followed by a stroll to Jack London Square.

They've also plunged into Hayward life, visiting each store or restaurant that opens downtown, or going to the farmers' market. DeeDee even serves as the president of her homeowners association and belongs to a civic beautification task force.

Asked if she lived this way in her prior hometowns, she laughed.

"I have never done this kind of thing before," she said. "It's really a change."

John King, jking@sfchronicle.com

This article appeared on page **W - 12** of the San Francisco Chronicle

CLIMATE CHANGE AND URBAN GROWTH IN CALIFORNIA: THE CHOICES BEFORE US

(Adapted from a Policy White Paper with the same name and authors dated Sept. 21, 2007)

INTRODUCTION

As of late 2007 we can make two confident assertions about climate change. The first is that there is overwhelming scientific consensus that the phenomenon is occurring, and that urgent action is needed to avoid - or in some cases to adapt to – large-scale disruptions. The second is that climate change is certainly not the only challenge we must deal with if we are to ensure a prosperous and livable human environment.

In that light it would seem unwise to regard climate change as an isolated crisis of the moment. It is more accurately described as one egregious example of a wider set of interrelated environmental and social challenges.[1] Thus the more alarming aspects of climate change may serve as a timely wake-up call to mitigate less immediate but equally critical long-term issues that we have neglected in the past, because we have been unable, until now, to marshal the political will or technical skills to do so.

The wider challenge before us is, undoubtedly, to greatly reduce our negative impact upon the natural systems upon which we ultimately depend; but more accurately, it is to improve the *ratio* of human benefit to environmental cost. That is surely the essence of sustainability: not merely to limit our impact, but to create healthy, livable communities that do not over-consume the resources on which their residents depend. This ratio of benefit to cost can be called *settlement efficiency*.

A low settlement efficiency is the production of relatively little human benefit over time, in comparison to the cost in resources. By contrast, a high settlement efficiency produces such benefits at a higher rate, over a longer period of time. It is what we may describe in the popular parlance of the day as "sustainable prosperity."

An extremely high settlement efficiency is routinely observed in natural ecosystems, where species are often able to thrive for millions of years. The opposite condition is also occasionally seen in nature: a quick over-consumption of resources for immediate benefit, followed by a period of distress and deprivation, or worse. Numerous examples of this kind of condition can be seen in our own human history, in a number of past civilizations that offer us cautionary lessons today.

What the science is showing us today, and what this paper will summarize, is that settlement efficiency is measurable, analyzable, and closely related to particular kinds of settlement patterns -- and to the choices that produce them. In particular, it has a direct and significant effect upon carbon emissions, and the buildup of greenhouse gases (GHGs). The opportunity to increase settlement efficiency also presents an opportunity to reduce GHGs.

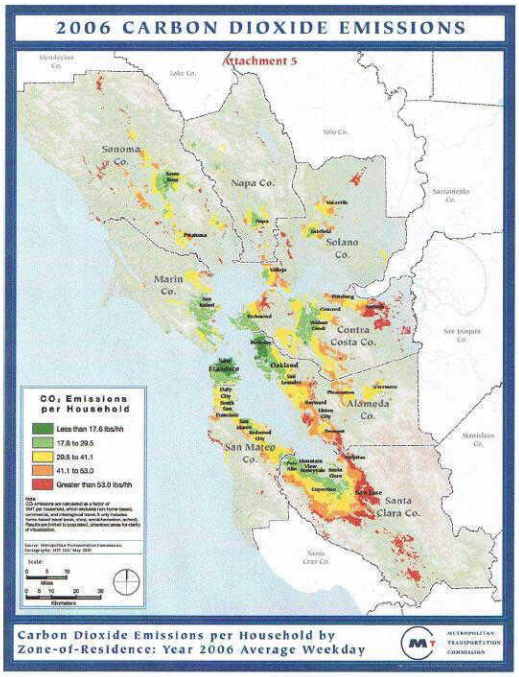
While individual building efficiency is a major part of the equation - indeed, representing almost one-third of all energy use - so is the larger arrangement of buildings, transportation and daily activities, accounting for almost another one-third. (The remainder includes industrial and other activities.) A disordered, diffused pattern that is heavily dependent on high-energy transport systems like automobiles – what is commonly called "sprawl" – is a highly inefficient pattern in comparison to others available, and its sustainability is therefore in considerable doubt. Its relative increase in contribution to greenhouse gases can be measured. We will summarize these findings here.

Furthermore, the science is beginning to show us much more clearly that certain kinds of decisions – economic, political and legal – over time produce certain kinds of settlement patterns that have direct implications for carbon emissions and other negative impacts.

The policy implications are becoming equally clear: if we want to address carbon emissions, we will have to address these other issues of urban form and urban process as well. We can do so, it appears, through certain kinds of rules and codes, including a promising new set of alternative codes and mechanisms. We will discuss these new alternatives briefly from the following perspectives:

- The Science
- The Economics
- The Politics
- The Law

THE SCIENCE: WHAT WE KNOW ABOUT URBAN FORM AND CARBON EMISSIONS



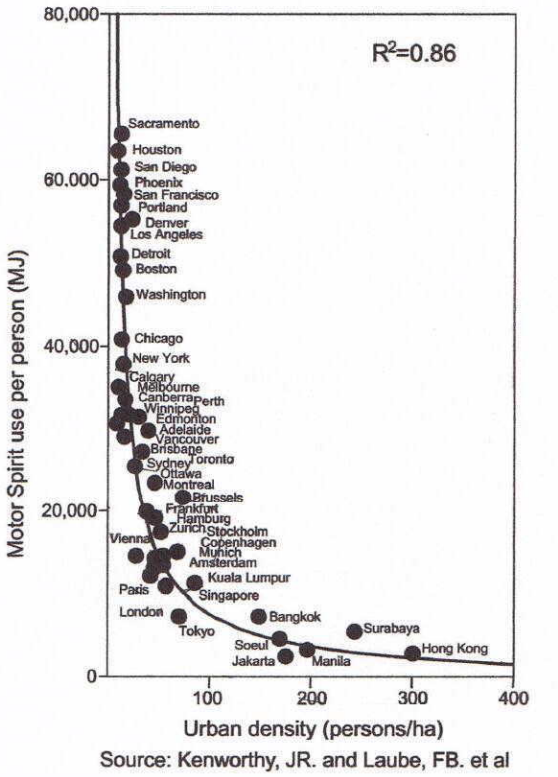
A growing body of recent peer-reviewed studies shows compelling correlations between urban form and greenhouse gas emissions, particularly from vehicle travel. For example, a recent study by the Bay Area Metropolitan Transportation Commission (2006) shows a dramatic disparity in CO_2 vehicular emissions per household between compact urban communities such as San Francisco, and surrounding low-density suburban areas – amounting to as much as a tripling of emissions per suburban household on average. (See chart at left.) Other studies show similar dramatic ranges.

In the quest to identify opportunities to significantly reduce greenhouse gas emissions this finding is certainly attention-getting. But it is not so simple to identify the actual factors

that account for the disparity. Among them density is one major factor, but also to be accounted for are income disparities, variations in household size, availability of public transit, diversity and proximity of uses, neighborhood walkability, and other factors.

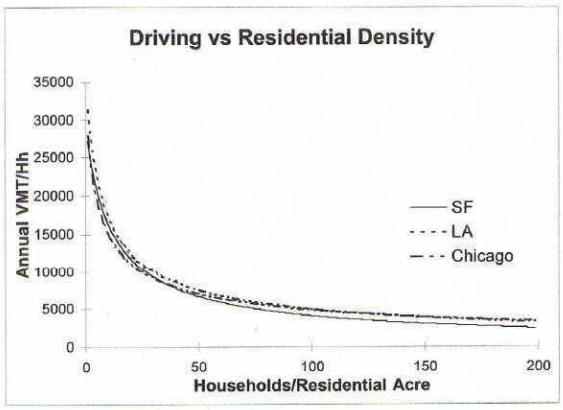
Nonetheless, evidence does point to the individual significance of a number of these factors, particularly factors that can be varied by design. We can summarize the correlations as follows. (Detailed citations are given in the appendix.)

Density. There is a well-established close correlation between residential density and average daily automobile driving distance per person or "Vehicle Miles Traveled" (abbreviated "VMT"). This in turn has a strong correlation with carbon emissions. There is a comparatively modest variation from other factors such as the fuel efficiency of vehicles. This makes sense intuitively, as more things packed more closely together would seem to require shorter trips between them. (See the diagram on right; note that "motor spirit" refers to gasoline or diesel.)



Source: Kenworthy, JR. and Laube, FB. et al

In addition, greater density implies shorter distances per residence for roads and other infrastructure, further reducing emissions from construction and maintenance (and also reducing the cost to taxpayers of future maintenance).

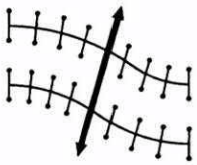


SOURCE: Holtzclaw, J. et al (2002)

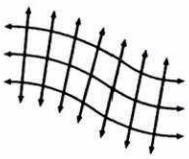
At the same time, it is important to understand that density is only one variable among many. Badly-designed neighborhoods with high density are likely to result in decline over time, and may well erase any benefits conferred by density alone.

Location Efficiency. There is a less well understood, but still compelling, correlation between the *distribution* of daily needs, and average automobile driving per person. Roughly, a more evenly mixed pattern of employment, shopping and other needs correlates to lower VMT, and to lower emissions. This too makes intuitive sense: if the distribution of your job, shopping and other daily needs is well-mixed, you will not need

to drive as far on average to access them, and in some cases you may be able to walk, bike or use more efficient public transportation. A number of new measures of location efficiency have been developed, and in some cases have been used as the basis for reduced-qualification mortgages, or so-called "Location-Efficient Mortgages" (since the buyers will save on their commuting cost on average, hereby qualifying for a larger monthly mortgage).



Dendritic Pattern



Network Pattern

Street Network. A "dendritic" street, based upon a hierarchy of arterials, collectors and local streets, has been shown to require longer trips on average than a more interconnected street grid. This is because a trip between two random points generally only has one path within a hierarchy -- up and down the hierarchy -- whereas it will have a number of possible paths in the network. One of these network paths is likely to be shorter, and may also be suited to walking, biking or other transit modes.

SOURCE: The Lexicon of the New Urbanism

Walkability. It would seem intuitively obvious that an environment that is hostile to pedestrians, even where location efficiency is high, will see on average less walking, more driving, and an increase in carbon emissions. Yet many jurisdictions do not have a comprehensive policy to promote a walkable network, and any breaks or degradations in the network can result in a non-functioning system. The elements that promote a more walkable network are not well-documented in research, nor is the overall potential contribution to reduction of greenhouse gases, and more research here would be beneficial. But it is clear enough that such pedestrian networks benefit from neighborhood compactness, efficient layout of daily needs, pedestrian amenities, perception of safety, and a visually appealing streetscape. Healthy pedestrian networks are damaged by high-speed streets and hierarchical street systems (which are both longer on average and require navigating high-speed arterials). Those same streets are also more expensive to build and maintain, further increasing emissions.

Bikability. Similar issues apply to bicycle networks. Dendritic systems that force bikers onto busy, high-speed arterials are not as beneficial as networks, where quieter and more efficient paths can be customized for each trip. Safe paths and appealing streetscapes promote biking, as do relatively high locational efficiencies. Once again, more research in this area would be beneficial, as its potential contribution to reduced emissions has likely been underestimated (particularly in milder climates, but even in colder climates, as suggested by European examples).

Quality over Time. Much of the emission generated in the life of a building – perhaps as much as half - is generated during construction. Therefore the longer the buildings and structures last, the lower their emission contributions, all other things being equal. The

more the structures are durable, repairable, adaptable, and well cared for by residents, the more likely they are to last a longer time, and to reduce their greenhouse gas contribution. The same is true for the neighborhood as a whole: the quality of place matters.

Such a qualitative criterion is not always easy to measure. The best assessment is done in collaboration with the residents themselves, in post-occupancy surveys, visual preference surveys, and other diagnostic tools. Professionals can also incorporate evidence-based design and other best-practice standards, combining research from wider sources. No less importantly, the planning process needs to include potential residents as stakeholders within a meaningful representative process.

THE ECONOMICS: LIMITS AND CORRECTIONS TO THE RATIONALITY OF MARKETS

Active policy lobbyists within the U.S. frequently advocate a radical *laissez-faire* approach to development policy, and to related issues such as climate change. Markets, they argue, are far more efficient mechanisms than government regulations for allocating costs through pricing, and creating disincentives from the costs of environmental damage.

Markets are indeed sophisticated self-organizing and allocating systems. But recent Nobel Prize-winning work in economics has also clearly demonstrated a sobering "bounded rationality" in market processes. In particular, future costs are often under-represented or not represented at all in current prices. This can result in disastrous consequences, of the sort that public and scientific institutions were designed precisely to avert.

When scientific institutions identify likely future costs – as is happening, imperfectly but convincingly, in the science of climate change – the responsibility must fall on regulatory institutions to take those costs into account and to work with market mechanisms to allocate them most efficiently. This may represent an optimal combination of the efficiency of markets and the collective intelligence of scientific and other human institutions.

For example, a "cap-and-trade" scheme creates a shared regulatory standard for overall emissions limits, and it exploits a market process to allocate those limits efficiently, preserving incentives and economic opportunities. Similar mechanisms are already used in the development process, as, for example, with Tradable Development Rights (TDRs). A promising area of exploration is whether a similar "cap-and-trade" system could be established for developments, allowing the trading of VMT values, or other capped credits.

Another market incentive mechanism is the use of certification systems which can become the basis of buyer incentives, such as the environmental standard LEED (Leadership in Energy and Environmental Design). The new LEED-ND standard ("ND" refers to "Neighborhood Design") has been created to rate the "green" design quality of neighborhoods, with a close correlation to settlement efficiency. Other similar certification systems are also in development.

Lastly, we cannot afford to overlook more direct pricing mechanisms on high-emissions activities, and credits for low-emission activities. For example, parking at dense urban employment sites often carries a cost, creating an incentive to use public transit. Yet current Internal Revenue Service rules work against this incentive and tend to encourage employees to drive to work, by allowing a deduction for jobsite parking costs. Models and empirical studies have convincingly shown that the elimination of such a deduction, coupled with additional pricing mechanisms on automobile commuting (for example, through congestion pricing or tolls) can significantly reduce VMTs.

Indeed, transportation modeling tends to show that dramatic reductions in greenhouse gas emissions are possible, up to 30%, through a strategic combination of land use changes and pricing strategies. For example, Robert A. Johnston at University of California, Davis, has surveyed European modeling research literature, and combined these findings with his own modeling, to draw the following conclusions (Johnson, 2006):

1. Expanding road capacity increases auto travel and emissions, compared to doing nothing. New HOV lanes on radial freeways increase travel and emissions. They also increase sprawl. Congestion generally becomes worse, in spite of adding highway capacity.

2. Expanding transit (only) decreases emissions about 1%, compared to doing nothing. It decreases travel costs for lower-income households. It can increase sprawl somewhat due to the outlying rail stations.

3. Expanding transit (only) and supporting it with land use intensification around Light Rail stations decreases emissions about 5%. It decreases travel costs for lower income households.

4. Expanding transit (only) and supporting it with land use intensification around Light Rail stations and with urban growth boundaries decreases emissions about 10%. It decreases travel costs and travel delays for all households.

5. Expanding transit (only) and supporting it with higher fuel taxes and with workplace parking charges (refunded in higher wages as cash-in-lieu-of-parking incentives) and shopping parking charges (refunded through lower costs for goods and services) lowers emissions about 10%. It greatly increases economic benefits to all travelers, due to better transit and faster freeways. This scenario reduces congestion significantly.

6. Expanding transit (only) and supporting it with land use intensification and urban growth boundaries and with fuel taxes and parking charges, as above, lowers emissions about 15-30%. This scenario maximizes economic welfare for the region and reduces congestion the most.

THE POLITICS: BROADER ISSUES OF LIVABILITY, COMMUNITY AND PARTICIPATION

Beyond the market mechanisms, we face a civic question of how we will jointly manage our "commons" – not only our shared environmental resources, but also our shared public realm: that is, our streets, walkways and public spaces. It is becoming much clearer that this public realm has important implications for public health, environmental impact, economic prosperity, and long-term sustainability. It is in the public realm that "settlement efficiency" best expresses itself, in a well-organized, well-connected urban system of streets, public spaces and buildings.

The aim of greater settlement efficiency requires a well-functioning political process – one that cannot be derailed by scattered NIMBY opposition, or mired in bureaucratic stalemate. Yet that is the regrettable state of too much of the public process in modern planning.

On the one hand, local and individual decision-makers are best able to judge local issues, and best able to determine their own local needs free of external obstructions. But on the other hand, an aggregation of local actions does not necessarily add up to a greater whole.

Neither is it sufficient to impose a restrictive top-down scheme or a one-size-fits-all solution. But all too often the public process is mired between these two poles: onerous top-down restrictions and chaotic bottom-up congestion.

What is needed is a new approach to the public process, integrating local information and knowledge of needs into a wider regional collaboration between professionals and stakeholders. Such a process can engage more meaningful public participation in creating a more efficient and more rational plan – of exactly the sort that is urgently needed to respond effectively to current challenges.

A number of promising and efficient collaborative approaches exist, including the community charrette and related processes. Such processes have been used successfully across the U.S., perhaps most notably in the recovery of the Gulf Coast after Hurricane Katrina.

In Mississippi, for example, hundreds of New Urbanist professionals from throughout the country were invited by the Governor's Commission on Recovery, Rebuilding and Renewal to prepare emergency rebuilding plans and codes for eleven damaged coastal communities; astonishingly, they completed the entire draft plan over an intense eight-day design charrette. This provides us with an effective model for other urgent regional and global planning matters before us.

THE LAW: REFORMING THE "RULES OF THE GAME" – AND THE RULES FOR MAKING RULES

Even the most laissez-faire economy operates within a strong legal framework. In the case of the U.S., and in California in particular, that legal and regulatory framework is a

notably vast and complex one. Many of these mechanisms are the means by which political decisions are implemented, including, we might add, the decisions made at successful community charrettes. Even the most intricate laws and regulations have evolved in response to very real conditions and needs, and for that reason their importance should not be dismissed.

Yet, over time, such regulatory mechanisms can become overly complex and confusing. Various added provisions conflict with one another in unforeseen ways and, over time, emergent outcomes can produce unintended consequences. The IRS deduction for employee parking is a case in point. Meant to encourage worker productivity and economic development, it has the unintended consequence of increasing driving and, it follows, greenhouse gas emissions.

A particular challenge comes from the legal structures that govern planning, and in particular the zoning ordinances that regulate new and infill development. In many cases these ordinances originally reflected the belief that conflicts between uses could best be resolved through segregation – much as a parent might deal with fighting siblings by separating them. If cities experienced overcrowding, then new zoning would move residents to low-density, segregated subdivisions, connected by the new automobile. Of course the eventual system-wide consequences of this scheme, with its increasing sprawl and congestion, were not foreseen.

Today we recognize that settlement efficiency requires not segregation, but a higher degree of integration, through careful design. Buildings can include a mix of uses, for example, so long as their partitions are designed to deal with issues of fire safety, noise, privacy and other issues. A new generation of mixed-use codes and regulations is coming on line, supplanting the older accretion of segregationist rules and ordinances.

Similarly, new legal mechanisms are being developed to allow condominium and other more flexible forms of co-development. Legal structures are also allowing new kinds of tradable financial instruments and incentives, which we believe will prove very important in the effort to reduce greenhouse gases.

Lastly, we believe that the reduction of greenhouse gases warrants legislation to effect large-scale pricing schemes, to transmit the future cost of settlement inefficiency to the present, and thereby to reward high-efficiency behavior, and to avoid passing these costs on to future generations. We stress that this is a market-based pricing mechanism, designed to have a net neutral effect on economic activity. (Indeed, in some cases there is evidence that these efforts actually create new economic opportunities.) It only requires a legal enabling ordinance, established through a collaborative public process. We believe that as such – and assuming it is designed to be flexible and adaptive - this is an entirely proper public response to a threat to the commonwealth.

CONCLUSION: A NEW "OPERATING SYSTEM" FOR GROWTH

In computer science, an "operating system" is a set of processes, codes and rules that allow specific programs to function efficiently. The design of the operating system governs what can happen within the system, and broadly defines its characteristics. The comparison has proven useful in a number of fields where similar rules operate to produce complex and often unintended consequences.

The analogy is a particularly useful one in the world of urban growth. The laws, economic processes, political processes and other protocols, all function together in what amounts to an "operating system for growth." The features of that operating system, more than the intentions of clever designers or policy makers, often define and limit the characteristics of the development that results.

Our old operating system – the one that specifies single-use zoning, wide streets, large setbacks, economic monocultures and economies of scale – has shown itself incapable of producing the necessary settlement efficiency required in today's environment. In an age of climate change and related challenges, we cannot bear this cost indefinitely. We need a new operating system. In that light, following are the policy elements we recommend.

POLICY RECOMMENDATIONS

Policy Recommendation One: Reform the old zoning and traffic codes. Replace them with a new generation of form-based codes such as the SmartCode, and new standards of street design reflecting networked, pedestrian- and bike-friendly layouts.

Policy Recommendation Two: Reform the participatory processes that involve the community in planning decisions. Require greater accountability on the part of citizen participants, to be involved throughout the process. Require public agencies and jurisdictions to provide the community with the education, tools and processes needed for meaningful participation. Encourage true representative participation, and not mere self-selection of a vocal minority. Consider a number of useful processes such as the Community Design Charrette.

Policy Recommendation Three: Create new incentives to encourage brownfield, infill and preservation work, in areas of existing high settlement efficiency. Develop additional tax credits and public financing mechanisms. Develop public-private models where private-sector entities can assess market dynamics and develop successful responses. Coordinate with the participatory processes to ensure successful neighborhood participation. Emphasize the "reduce, re-use, recycle" model.

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NOTES

1 Among these we might include such well-recognized modern phenomena as pollution, resource depletion, habitat destruction, environmental illnesses (including "lifestyle" diseases related to obesity), social isolation, and psychological stress. There is a growing body of literature on the real and growing costs of these phenomena, and their unsustainable consequences; see the references attached.

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