

Preface:

“What’s being built in high-rise residential architecture isn’t great architecture.” John Rahaim, San Francisco Director of Planning, from “The Architect’s Newspaper,” March 26, 2008 edition, page 22

Since the dawn of the peak oil age is now upon us, we should anticipate that in the future, it will become increasingly costly and difficult to replace our built environment. This means that we will live with our existing building stock for a longer period of time than was anticipated at the time it was constructed. Therefore, when evaluating proposals for new buildings or to retrofit existing ones, we would be wise to prioritize energy performance, so that these structures will remain as useful as possible when hydrocarbon energy becomes rare and expensive.

The aim of the recommendations in this section is to allow us to salvage as much of our current comfortable lifestyles as possible in the low-energy future by re-creating our built environment so that it will perform well for us in the future.

We recognize that better buildings cost more. The question is whether we should view that cost as an investment in San Francisco’s future that repays not only itself in lower utility bills and reduced operating costs, but by improving our quality of life when energy is scarce. If we do not invest in improved buildings now, while we have the option of doing so, the opportunity may be lost as money, materials, and energy become less plentiful. In addition, as energy prices escalate through the post-peak years, the payback period will become shorter and the ultimate value of the investment will be higher.

The improvements we recommend cannot be achieved if we continue to practice “business as usual.” The familiar paradigm may be convenient, but when we remember that it has given us climate change, deforestation, water pollution, topsoil depletion, acid rain, species extinction, chemical contamination, ecosystem destruction, and a host of other ills, we question the wisdom of continuing to be guided by it.

If we are to succeed in preparing San Francisco for the post-peak era, we need to take bolder action. In the words of the City of Portland (Oregon) Peak Oil Task Force, “Go Big, Go Fast!”

Recommendation: The City and County of San Francisco should require that all new development be energy-positive.

“Energy hasn’t been as big an issue as it needs to be. We weren’t preserving energy.” Phil Williams, Vice-President of local construction giant Webcor, quoted in the September 16, 2008 edition of the San Francisco Examiner, page 5

“The goal of achieving significant levels of construction of cost-effective residential zero energy buildings (ZEB) – buildings that use no fossil fuels – by 2020 is feasible, except in hot, humid climates. Most of the required technology to compete with traditional housing is available, but inadequately demonstrated” American Physical Society report titled “Think Efficiency”

“Energy-positive buildings” generate more energy than they and their accoutrements consume. This concept is not new, but it has only recently been looked at in earnest, as public concern over environmental threats has grown. The new Reichstag (parliament building) in Berlin is one example of an energy-positive building. Several European, Asian, and Middle Eastern nations currently lead the United States in efforts to have their buildings achieve energy-positive status.

It is foreseeable that as we continue to transition into the post-peak age, there will be occasional times when San Franciscans will have no energy other than whatever we manufacture ourselves. The ability to generate electricity without the use of fossil fuels, by using solar gain, wind, or other renewable resources, will not only allow us to provide light, cook food, run computers, and otherwise enjoy our living and working spaces, but also grant us greater potential for operating transportation systems, maintaining communications networks, and otherwise enriching our lives above the level of mere subsistence. It will also increase our ability to run a local economy. “Energy is economy” is an axiom in the peak oil community; without energy, our economy will grind to a halt. [Some will argue that it already *has*.]

To create an energy-positive building, two steps are necessary. First, conservation and efficiency are maximized so that the need for energy use is reduced as sharply as possible. Then a building is outfitted with enough generating capacity to (1) account for the amount of energy it requires for its operation and (2) manufacture excess energy to feed into the grid. Since diesel motors and other generators that rely on hydrocarbon inputs will not be useful during times of intermittent fuel availability and will become idle in the post-carbon era, reliance on them is unadvisable. Instead, the sensible choices are tidal, solar, wind, and other renewable forms of generation.

Because our city is densely developed, most of the best places to site new generating capacity are on buildings. However, it is not always possible to provide sufficient on-site facilities to provide for 100% of a building's consumption, so it may be necessary to allow some developers to site compensating generation at another location within the city limits.

Among today’s carbonless technologies, the one that is generally thought to provide the highest return for every dollar of investment is solar hot water. While hot water is valuable, it is not versatile. Electricity, on the other hand, can be used for many purposes, including providing us with hot water. Therefore, equipment that generates electricity should be granted the highest priority. The Mayor’s effort to bring more solar generating capacity to San Francisco is a step in the right direction, and the Mayor’s Task Force on Solar Energy is looking at options for increasing our local generating capacity, including adding generating capacity to structures.

We want our buildings to help us maintain as much of the first-world lifestyle we currently enjoy as possible when there is a scarcity of the oil and gas on which their current performance relies. Therefore, we recommend that the City and County of San Francisco require that all newly constructed buildings be energy-positive.

Recommendation: Retrofit existing building stock for better energy performance.

“At REgrid Power they are offering a solar loan option over a 15-, 20- or 25-year term. It guarantees that people's solar bill will be less than their current electric bill. So if they are paying \$100 monthly for electricity, they can save \$20 or more with the solar financing program,”

“Former President Bill Clinton today announced the creation of a \$5 billion global effort to fight global warming by retrofitting existing buildings with more energy efficient products... [to] provide both cities and their private building owners with access to the necessary funds to retrofit existing buildings with more energy efficient products, which is expected to produce energy savings of between 20 and 50 percent.”

In San Francisco as elsewhere, there are more existing buildings than new ones. If we are to achieve the sort of energy independence that will serve us well in the post-carbon era, we will need to retrofit our existing buildings for high energy performance, by reducing the amount of energy they consume, adding generating equipment, or both. The difficult question is how to finance these upgrades.

Property owners have more options than renters. They can pay for their retrofits out of the resulting savings in several ways. Purchasers can obtain a “green mortgage,” a type of loan that takes into account the fact that people who pay lower utility bills have more money leftover and therefore are more creditworthy; such loans cover the cost of the improvements as well as the purchase building’s price. Berkeley recently created a solar assessment district, which allows the city to finance the cost of solar panels for homeowners, who make repayments through their property taxes over a 20-year period; San Francisco would be wise to follow suit. Several solar leasing companies offer programs that allow building owners to enjoy the benefits of solar photovoltaic panels without bearing the cost of purchasing them. Fireman’s Fund Offers “green insurance” that makes retrofits more affordable.

San Francisco property owners who retrofit their buildings with solar equipment can receive a \$6,000 cash incentive from the City plus receive a \$1.90 per watt rebate from the State of California plus receive a 30% federal tax credit. A two-kilowatt solar electric generating system (which can be reasonably expected to produce approximately 300 kilowatt-hours per month in our climate) would cost its owner less than \$6,000 out of pocket. This expenditure would be quickly recouped and after that, savings would accrue every month. (www.frescosolar.com)

However, two-thirds of San Francisco’s residents rent rather than own their homes. Few landlords are interested in spending money that will lower their tenants’ energy bills, and few tenants are interested in spending money to improve properties they do not own. The term used to describe this situation is “split incentives.” Split incentives are a form of market failure, and problems that are not likely to be solved by market forces – or not solved quickly enough – can be resolved by government action. Therefore, we recommend that San Francisco abandon the “business as usual” approach by requiring that steps toward retrofitting existing buildings be taken.

In Chicago, tenants are allowed to withhold one-half on one month’s rent per year that they can spend on improvements of their choice. By itself, adopting this would not move us forward enough, but it does point the way toward retrofitting our building stock. We urge the City to pass additional means of ensuring that rental properties are brought up to the highest level of energy performance.

While on the campaign trail, President-elect Obama spoke of spending \$150 billion over the next decade to improve our nation’s energy efficiency and create five million jobs. Among the projects he mentioned is a proposal to make one million a year more energy efficient. We hope that San Francisco will be able to participate in any such new programs and direct its share of federal monies, in part, to improving the homes or renters, especially those occupied by economically vulnerable families..

Recommendation: Update San Francisco's Green Building Ordinance.

“Although the deployment of the LEED Standard has raised awareness of Green Building practices, its scoring system is skewed toward the ongoing use of fossil fuels. More than half of the available points in the Standard support efficient use of fossil fuels, while only a handful are awarded for the use of sustainable energy sources. Further the USGBC has stated support for the 2030 Challenge, an effort that has set a goal of efficient fossil fuel use by 2030.”

www.wikipedia.org

“Recent studies have found that as many as 30% of LEED platinum buildings perform no better than conventional buildings.” www.newbuildings.org

“The energy impacts of better fan systems in climates where economizers are used can result in 20 to 50 percent lower HVAC energy use! We have often found that designers are overlooking these options because they are not rewarded with additional LEED points. Once a building is built these things are often impossible to retrofit. This represents a huge lost opportunity.”

“Energy Plus is set to consume only 16 kilowatts of energy per square meter, a whole lot less than the 80 to 250 so common among traditional office buildings.”

... it now takes 90,000 BTUs a square foot to run the average building for a year, but this can be reduced to 40,000 or even 35,000 if the latest building technologies are applied.

The City and County of San Francisco recently adopted a Green Building Ordinance that focuses on climate change, as do all of the similar ordinances that have been adopted in other jurisdictions. This is a forward-thinking step, but it does little to address peak oil concerns, which require giving foremost consideration to a building's energy use. We recommend that SF become the first city in the nation to strengthen its requirements to higher peak oil standards. To bring the current ordinance up the level that peak oil mitigation requires, several changes would be necessary.

The current law relies heavily on Leadership in Energy and Environmental Design (LEED) evaluations as a major criterion for determining whether a building meets the new green standards. However, LEED does not address itself to peak oil concerns. It incentivizes a checklist rather than encouraging integrative planning. This encourages pointmongering rather than pushing developers to choose as green a building as possible. Its points are not weighted, though some provide greater benefit than others. It caps innovation at four points, thereby limiting creative problem-solving. As a result, LEED misses opportunities and falls short of what is possible. Most importantly, LEED does not emphasize a project's energy performance.

As part of updating the Green Building Ordinance to replace the use of LEED as a criterion with performance-based evaluations, we recommend requiring performance audits to evaluate the actual energy performance of buildings after they are in operation. Among other benefits, this would provide the sort of reality-based feedback that we will need if we are to improve future versions of San Francisco's green building requirements.

We further recommend creating dynamic standards that incorporate new inventions and techniques as they become available and are tested. Our green standards should be monitored continually and, as a result of lessons learned, evolve to generate ever-better energy savings.

[Laundry list of specifics to be listed in an appendix.]

Recommendation: All new construction activity should be covered.

When the City Office of Economic Analysis issued its 17 September 2007 evaluation of the initial draft of the Green Building Ordinance, titled *Green Building Construction Requirements: Economic Impact Report*, it determined that “38% of all annual construction activity in the city would be covered under the proposed ordinance” (page 10). The final version of the bill exempts so-called “laboratory” buildings, effectively removing the Mission Bay projects from any green building requirements. It is not possible at this time to know with certainty how much this will decrease the percentage that falls under the ordinance’s provisions.

Buildings that are not independently sustainable will not be optimally useful in the post-carbon era. Therefore, we should strive to have fewer of them in San Francisco. To achieve this, all new projects should be covered by our green building requirements.