# San Francisco Peak Oil Task Force

**Proposed Energy Section**

*9/18/08 draft*

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Any discussion of energy needs to be held in terms of its two major components: electrical production and use and transportation.

Electricity

In 2002, two major energy studies were conducted in San Francisco and proposals made to increase renewable energy and conservation and reduce our carbon footprint. One was *Energy Resources Investment Strategy* prepared by the Rocky Mountain Institute. The other was the *Electricity Resource Plan*, put together by the SF Department of the Environment and Public Utilities Commission.

Both called for the shut down of the Hunter's Point Plant and completion of the Jefferson-Martin line. Both these goals have been accomplished, and Jefferson-Martin now carries 230 KV of electricity to the city through San Mateo County and up the peninsula.

The issue raised by both when considering ramping up production within the city was citing of the combustion turbines (CT's) and Mirant rebuild. The city study raised the specific concern about natural gas price volatility, favoring it only to assure the shut down of the Hunter's Point plant. Since the Hunter's Point has been closed, pressure for the CT's should be lessened, especially since natural gas price volatility has only worsened since 2002.

Neither study in 2002 envisioned bringing in another power line across the bay from Pittsburg, which is expected to start carrying energy to San Francisco by 2010. While this solution transfers the problems associated with peak oil from here to Pittsburg, and keeps us vulnerable to volatile gas prices and grid outages, it can also be used to bring solar and wind generated power from the East Bay and Hetch-Hetchy. With final approval of CCA, as is being worked on by SFPUC, it will give the city the leverage and authority to oversee and direct efforts to increase distributed production and conservation within the city.

9/18/08 proposed insertion: A major concern is will the proposed Mirant retrofit work against establishing local renewable energy and conservation goals? It may, unless the city realized an economic benefit from NOT getting a majority of its energy from Mirant. Due to the moderate summer time climate of San Francisco, there are many times when a 500MW plant would be able to export much of its available power to the energy market and produce additional revenues. Mirant rebuild, if allowed, should include generous revenue sharing to the City to fund renewable energy and conservation efforts within the city (and therefore allow more energy for export).

Hard work over the years by many safe energy activists, who helped spread word on problems associated with Global Warming and other environmental concerns about fossil fueled energy production, coupled with the electric industry deregulation fiasco and spiking energy prices circa 2000 have led to some headway for renewable energy:

- We now have portfolio standards, requiring a certain level of utility investment in renewable energy.
- San Francisco has passed solar bonding legislation
- State economic incentives are going in place that are increasing subsidies for wind, solar a and conservation services
- We have "reversible metering", making every solar array capable of feeding in to the grid, as well as taking from it
- Headway continues to be made in technology to make renewable energy more efficient and less costly

Escalating energy costs associated with unstable natural gas supplies and institution of carbon taxes are only expected to increase those gains. But powerful forces for the status quo continue to push for "clean coal", "greenhouse gas-free nuclear", biofuels and other ideas aimed at promises of maintaining our, some would say wasteful, lifestyle. They will try to scare the public away from recommendations for more effort to live within our means with horror stories of inflation and recession.

And PG&E continues to hold tight rein over SF energy decisions. PG&E will continue to advocate for its investors, and oppose local control that would eliminate San Francisco as a major revenue producer. Maximizing profits means buying low (usually the dirtiest power) and selling high (to us).

This puts money in investors' accounts that could be going in to city accounts and, more importantly, takes very important decisions about our energy future away from city residents and our elected representatives.

With good diversified solar, wind, distributed generation, demand response and transmission upgrades, fossil peaker sources will be unnecessary (except for individual/small users, like hospital back up generators - which perhaps could be hydrogen fuel cell powered.)

But we must put the City in position to make such decisions in its own behalf.

**The most important thing we can do is take charge of our own energy decisions through providing maximum resources toward implementing Community Choice Aggregation and municipalization of the SF grid.**

That grid must be sustainable in the long run, and maintain stable energy prices. Even without the menace of Peak Oil, the United States faces heavier competition than ever from large and evolving economies in China, India and elsewhere, driving up the costs of all fossil fuels. Maximizing renewable energy and conservation and placing a moratorium on all fossil fueled energy production are requisite to establishing that kind of stability in a 21st Century energy system.

Extensive quantitative analysis of how bad the situation is or will get is not necessary. News reports on rising gasoline, diesel and natural gas prices and falling economic indicators are doing a lot of that work. The prudent thing would be to prepare responses based on a worst-case scenario analysis.

**Worst Case Scenario**: External grid power is often not available for Jefferson-Martin and the trans-bay cable to bring power to SF, and hydro (at 50% production due to a draught) is not making it to SF due to grid demand as gas and coal powered plants are taken offline due to costs of fuel (including carbon taxes), and the city is called on to go it alone for extended periods.

A major problem identified is that residential solar arrays connected to reverse metering currently need to be removed from the grid connection for workers' safety as they seek to make repairs.

| **Major problems with extended electrical outages.** | **Mitigations** |
|---|---|
| • Food spoilage- commercial | Subsidize on-site efficiency and renewables |
| • Food spoilage- residential - | Subsidize on-site efficiency and renewables |
| • Emergency service | Allow only access to CT power (if sited) |
| • Hot water | promote solar |
| • Cooking (household) | solar cookers |
| • Commerce | Subsidize on-site efficiency and renewables |
| • Industrial productivity loss | Worker support and retraining |
| • Street lighting and traffic signals | LED/Solar |

RECOMMENDATIONS:

- Immediate moratorium on all fossil fueled generation, including opposing Mirant upgrades and citing of combustion turbines.
- Immediate implementation of CCA plan and install renewables and conservation totaling 350 MW
- Develop SF community power and take over PG&E grid
- Full private utility buyback, and/or, preferably, CCA/public full buyback of renewable electricity from individual owners
- Design solar connection such that if it is disconnected from the grid, power can be shunted in to a parallel house grid to power refrigeration and other essentials.
- Expand roof top array limit from 5 MW
- Pay commercial rates for energy put in to the grid
- Survey for micro wind zone areas in the city to develop
- Maintain sustainability skill sets through school curricula in organic and biointensive gardening, solar design, construction and maintenance, windmills, etc.
- Raise value of recyclables
- Support micro- businesses in recycling

- Evaluate our progress with past proposals and studies aimed at reducing greenhouse gasses, implementing renewable energy, etc., such as:

*Recommendations from* 1996 Sustainable San Francisco *section on Energy, Climate Change and Ozone (!)*

Remember Ozone? Proof headway can be made on human emissions when there is public and political will.

- Web info on sustainability
- Energy Sustainability curriculum in public schools
- Recruit manufacturers of sustainable and renewable technologies to relocate in SF
- Access to small business loans for energy efficiency and renewables (Prop. I bonding)
- Lobby state for carbon tax and access to revenues for establishing local sustainability
- Incentives for low energy use
- Time of day pricing
- Energy efficiency guides on new construction
- Establish city certification of modifications to property for sustainability
- Mitigate heat islands through tree planting, asphalt reduction
- Energy saving efforts in public housing
- Energy audits to city departments and businesses
- Set city worker guidelines for conservation
- Establish regional co-op buying of renewable energy and conservation technologies
- Solar access ordinance and simplifying permitting
- Utility buy-back of solar production

**Transportation**

Scenario: Conservatively, if Peak Oil is accepted as fact, we are likely to see, and should prepare for, at minimum, $5 per gallon for gasoline, and $150/bbl for oil, with predictable raises in prices of things related to oil. A $6/gal., $200/bbl scenario may not be out of the question.

Food production and distribution will be a major concern. Petroleum-based fertilizers and the cost of transportation will have severe impacts to the "2000 mile salad". San Francisco's unique position as a Pacific Rim port will cushion us, somewhat, as ocean transport is most efficient for volumes carried.

Ocean transport carries its own environmental implications. We need to remain vigilant that ship designs and maritime procedures are adopted aimed at bringing food, consumer goods, and oil in to the bay in the safest way possible.

City contracted food services should be encouraged to buy local, and given subsidies, if necessary, to do so. SF School District should also purchase food locally.

As gas prices put more people out of their car, we need to anticipate more stress on public transit, and see that it is funded adequately to answer the call. A carbon tax, especially on gasoline, needs to be adopted to fund a transformation of our transit system to see there is adequate funding to build public transit ridership and other alternatives to the car.

City auto fleets, i.e. police, public works, welfare, fire department, and other fleets should be evaluated for minimizing fossil fuel use WITHOUT RESORTING TO BIOFUELS. Department heads should be invited to help crunch numbers for how the above scenario might impact their department, and ideas they might offer to mitigate fiscal effects. That could help give them buy-in for the report's recommendations.

The goal of reducing fossil fuel use should be a given and a starting point for all analysis.

Other Recommendations:

- Investigate use of BART for night time delivery from airport and railroad locations to downtown locations.
- All capital planning processes should incorporate rising oil prices as an element in department planning budgets
- Stress local purchasing
- Solicit input from department heads for remedial actions.
- Electrify virtually all MUNI routes
- Eliminate all new parking space requirements for new housing
- Revitalize working wharves for barge, coastal and intermodal shipping. Much of our food can come by barge from the central valley.
- Guard industrial zoning, especially near rail and water transport
- Rebuild rail freight yard in SF
- Examine increased use of local barge and ferries in transporting goods and people regionally and throughout the state or entire Western Seaboard
- Work with community groups to implement proposals made to increase pedestrian and bicycle access
- Implement recommendations of Backstreet Business Advisory Board (?)
- A carbon tariff formula should be developed and applied to the retail price of consumables.. Based on how far a commodity needs to travel, and weighted by transport method, fuel type, etc. There should be no carbon tariffs for products consumed within 300 (?) miles of where it is produced.
- Convene a "Business Congress" of bay area business organizations to hold focused discussion and resolution of issues raised by Peak Oil, Global Warming, etc. to propose regional solutions.
- One regional solution would be to refit Oakland port with rail shipment capabilities to reduce highway transport. This will, in turn, reduce stress on highways and congestion in general, and lower transit money going for repairs, allowing it to be put elsewhere, where it is needed.

**Curbing Gasoline Use and Paying for Needed Infrastructure**

430 million gallons of gasoline were sold in SF in 2006, producing $15 million in sales tax

20 pounds of carbon is emitted per gallon of gasoline burned =

86 billion pounds of CO2 were created.
SOME PRICE SHOULD BE PUT ON EACH POUND OF CO2 AT THE PUMP

- A charge of 2 cents a pound for carbon emissions would add about 40 cents to a gallon of gas.
- An extra 40 cents a gallon would depress sales, which should be seen as a good thing in a post carbon world. Even sales at 200 million gallons (more than a 50% drop) could produce annual revenues of some $80 million to support MUNI and other public transit

Cons:

- Locals who travel only in the city would be disadvantaged.

Commuters will be able to buy elsewhere.

Remediation:

- Carbon tax could be added to non-resident parking fees
- City resident parking fees should be subsidized to allow cars to remain parked as much as possible.

**Deeper Ecology**

***The question we need to answer is how can we carry on as a city in the complete absence of affordable fossil fuels?***

Moreover, we need to examine the role of consumerism in fomenting tight energy supplies and identify how to maintain a decent standard of living while slowing and reversing the economic growth paradigm. ***We need to embrace economic contraction as a goal, not consider it "recession" that needs to be avoided.***

Mitigating job loss should be a big part of our economic analysis.

RECOMMENDATIONS:

- Focus on meeting all city needs for food and consumer goods in Cooperative Sustainable Development Zones within 300-500 mile radius of the city. Leverage SF demand and availability of capitol to develop sustainable models of business and industry in the region to meet local needs. Bioregional approach.
- Establish a carbon tax on transport of items from farther than 500-1000 miles away to help develop regional organic food and cotton farming, and small business in solar panel production and other renewable energy industry and services, and local textiles and other consumer goods, including local cottage industry development in arts, crafts, performance art and other services.

IMPLEMENTATION STRATEGY:

- Need to outreach and involve local governments, non-profits and business organizations within the chosen radius (500 miles?) to participate and help define

and discuss governance and accountability issues, identify ways to share power and resources and maintain local economic integrity and get buy-in for the idea

- Go to state legislators, state DOE and before LAFCO and try to develop legislation to establish state authority and regional boards empowered to oversee collection of carbon taxes and identify projects and recipients for funding. It's about funding for local development and establishing a carbon tax will be necessary at some point, the sooner, the better, to raise funds for the job ahead and begin to trim use now through increasing costs.
- At risk workers and families can be protected through a "gas stamps" program that will allocate funds to help offset the costs, either through free vouchers or a subsidy of any cost over some amount, say, $3.50/gal.? Difficulty here would be getting the vouchers in to the right hands as easily and discretely as possible through a number of venues: welfare departments, EDD, small businesses to employees, hiring halls, etc.

**Should there be a carbon tax on natural gas?**

Usually, gasoline is exempted from consideration for carbon taxes. Instead, many promote carbon taxes on natural gas.

We think his is a bad idea for several reasons:

- Gasoline puts out more CO2 than natural gas and there are more options available for curbing its use
- Natural gas is used primarily in residential use for cooking and heating, and taxing use may put special populations at risk of going without warmth and food.
- The 25% of natural gas that goes for electric production should be assessed a carbon value, payable by that industry.

**Carbon Taxes and Cap and Trade**

Economic analyses should speak strongly to need for funding initiatives through carbon taxes. Should also speak out strongly against cap and trade, whose aim is not to end carbon production, but prolong it and allow potential market manipulations that reward polluters.

Pollution should be taxed and the money put in to public coffers, rather than pollution credits being sold and bought. We run a risk if we establish some market that insiders will likely pillage without reducing carbon use in significant levels to make headway on peak oil and global warming, which are connected at the hip.

Twenty-five percent of the local budget is from state and federal funds. We need to push for carbon assessments at the state and federal level, at oil and gas well heads, auto registrations, production facilities, Internet server farms, airlines, ocean lines, any business whose practices utilize fossil fuels and/or produce warming gasses.

The committee should draft and submit a Board Resolution to state and federal legislators ASAP opposing cap and trade pollution credits in favor of direct taxes directed in to a public goods fund for solar and mass transit. There are also efforts being

made to give carbon credits for nuclear power, and this must also be strongly opposed.

SF Energy Primer

Total 2000 Electricity use 5660 GWH
By sector:

- Industrial 110 GWH = 2%
- Municipal 820 GWH = 15%
- Commercial 3300 GWH = 58%
- Residential 1430 GWH = 25%

Sources

- Hetch-Hetchy 401 MW max capacity
- Mirant 207 MW plus 3-52 MW peakers
- Jefferson-Martin 230 KV – 350 MW equivalent

Proposed Sources

- CCA 360 MW- 107MW of that in conservation within 3 years
- Mirant refit 540 MW natural gas
- Combustion Turbines 220 MW ea. gas
- Trans-bay cable 400 MW gas, with increasing share from renewables

Estimated potentials available annually:

- Conservation 668 GWH
- Solar 550-1300 GWH (240-600 MW late fall peak.)
- Wind 975 GWH
- Co-generation 1142 GWH (natural gas)

SF Summer Peak 945 MW
Winter Peak 900 MW (at night)
Nat gas use in 2000 40 trillion BTUs (39.1 B cubic feet)
10.1 T BTU's (25%) for electricity

Glossary of Power

- Watt = Amp X Volt (W=AV, so A = W/V, and V = W/A)
- 1 AMP = 6.25 X $10^{18}$ electrons per second
- 1 KW = 3413 British Thermal Units (BTU's)
- 1 W = 3.413 BTU'S
- 1 W = 1 joule/sec.
- 1 BTU = 1055 joules
- 1000 W = 1 KW
- 1,000,000 W = 1 MW
- 1,000,000,000 W = 1 GW
- 1 Horse power = 746 W = 2546 BTU's
- Natural gas- 1 CCF = 100 Cubic Feet = 100,000 BTU's = 1 Therm = 748 gallons (of water)
- If Electricity were Water: Watts = available energy= gallons; Watt Hours = energy supplied over time = gal/hr.; Amps = trickle rate = nozzle flow (1 AMP = 6.25 X $10^{18}$ electrons per second); Volts = available current = water pressure