

**SF Peak Oil Preparedness Task Force**  
**ENERGY SECTION - DRAFT 1**  
**1/16/09**

**INTRODUCTION**

At its core the issue of Peak Oil is about energy, and in that sense, this entire report is about energy, so it raises the question, why have a distinct energy section and what should be in it? The Resolution Establishing the Peak Oil Preparedness Task Force specifically directed the Task Force to assess “current modes of electricity generation and transmission, and the feasibility of distributed generation alternatives.”<sup>1</sup> This section embodies a response to that directive. Further, limitations in petroleum fuels will likely have impacts across the entire energy sector; therefore, the Task Force has endeavored to take a holistic approach to the problem of Peak Oil.

Electricity generation, transmission, distribution, and end use is an enormous issue. This section does not attempt to address every aspect of the energy sector. Rather, it will focus on the impacts that peak oil and peak natural gas will have on the City and County of San Francisco (City), and the practical, constructive measures the City may choose to implement in response.

Early in its deliberations, the Task Force recognized that in order to adequately address issues such as electricity generation, the other two primary fossil fuels involved in electricity generation, natural gas and coal, would need to be included in the analysis. Natural gas is also used widely in space and water heating in San Francisco. Therefore, this section does assess the degree to which the City depends on natural gas for those purposes, for electricity generation, and for other energy-related purposes, and the risks associated with that dependency. Since a small amount of coal is used for electricity generation, coal is included in the analysis as well.

In recent years, San Francisco and many other cities have adopted programs aimed at reducing greenhouse gas emissions. Responses to concerns about the peaking of fossil fuel supplies must not counteract these programs. Fortunately there is a confluence of interest in this matter in that the primary response that most effectively addresses both problems is the same: reduce and eventually eliminate fossil fuel use. However, this seemingly common sense response is not necessarily the case. There do exist strong proponents of a coal-based approach to mitigating declines in petroleum and natural gas supply. The Task Force does not view an increase in coal use as an appropriate response to decreases in other fossil fuels.

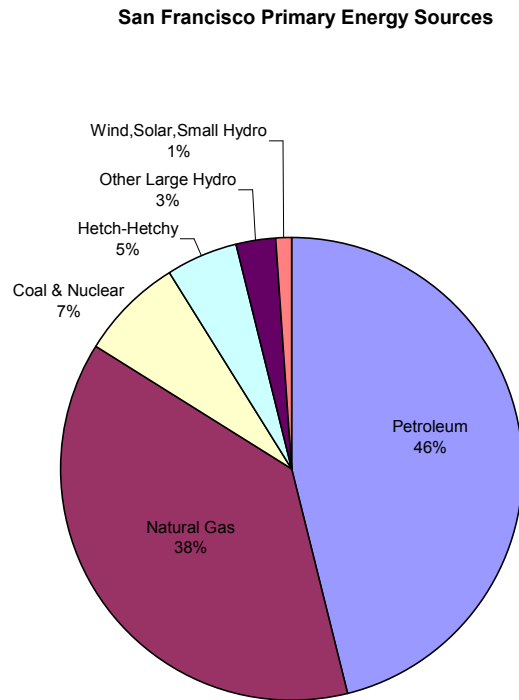
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<sup>1</sup> San Francisco Peak Oil Preparedness Founding Resolution:  
<http://www.sfgov.org/site/uploadedfiles/bdsupvrs/resolutions07/r0268-07.pdf>

## I. Assessment of Current Reality

The picture painted of current energy use in the City of San Francisco is painted in broad swaths with fossil energy. Something on the order of 86% of the total primary energy sources for all purposes are fossil - petroleum, natural gas, and a small amount of coal.

### Total Energy/Fuel Generation/Usage Charts



### Three Principal Energy Sinks *(As reflected in the chart)*

#### 1. Vehicle Fuel

Over 95% of the petroleum fuels used in San Francisco are used in transportation as vehicle fuel. The Task Force Report includes a section dedicated to the issue of transportation. Please refer to that section for information regarding that sector. Some modes of transportation depend on grid electricity. Some scenarios for future mobility include substantial increases in the availability and use of plug-in hybrid electric vehicles (PHEVs) and pure Electric Vehicles (EVs), as well as electrification of currently non-electrified transit lines. In these scenarios, significant increases in the load on the electrical utility are projected. The City must anticipate this potential increase in its forecasts.

#### 2. Electrical Generation

The electricity produced for and used by the City falls within three categories: that provided by PG&E to residential and commercial ratepayers (~78%); that provided by the SFPUC mostly for powering municipal buildings and services (12-16%); and that which is provided to large

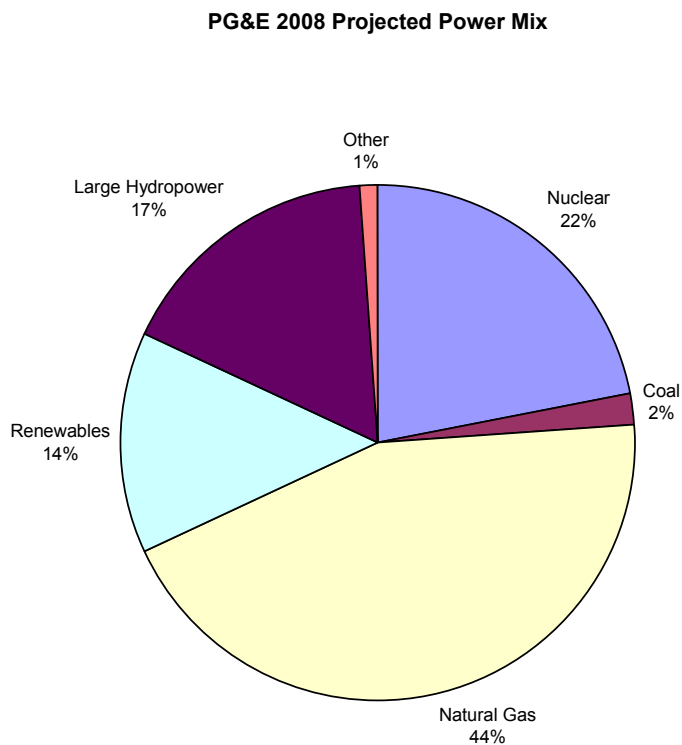
commercial customers via “direct access” a holdover from the deregulation experiment of the late 1990s and early 2000s (6-10%).<sup>2</sup> Total usage in the City peaks at about 900 megawatts (MW, equal to one million watts) in a given year and over the course of a year uses about 5,000 gigawatt-hours of electricity.<sup>3</sup> A gigawatt is one billion watts, or one thousand kilowatts.<sup>4</sup>

Petroleum is not a component of the electricity generation power mix for San Francisco. Although oil is not currently used directly for power generation in the City power mix, it must be acknowledged that oil is necessary in the “platform” that allows non-petroleum energy systems to function. For example, petroleum fuels are used in vehicles that deliver supplies and help maintain infrastructure, and many components of systems and infrastructure currently require petroleum inputs.

### **Pacific Gas & Electric (PG&E)**

PG&E is a private corporation that provides natural gas and electric service to approximately 15 million people in a 70,000 square mile service area in northern and central California that includes San Francisco, but excluding power for municipal buildings, Muni, streetlights, and other City services.<sup>5</sup>

### **PG&E Power Mix - 2008<sup>6</sup>**



<sup>2</sup> Phone Conversation with SFPUC Staff Camron Samii and Jim Hendry 1/14/09

<sup>3</sup> SF Electricity Resource Plan, page 27

<sup>4</sup> A kilowatt is 1,000 watts. A kilowatt-hour is equal to a 100 watt light bulb burning for 10 hours equals one kilowatt-hour (kWh).

<sup>5</sup> PG&E Website: <http://www.pge.com/about/company/profile/>

<sup>6</sup> February 2008 PG&E bill insert:

<http://www.pge.com/mybusiness/myaccount/explanationofbill/billinserts/previous/2008/feb.shtml>

The 14% renewable energy component is comprised of wind (2%), solar (<1%), geothermal (4%), biomass (4%), and small hydroelectric (4%).

### **San Francisco Public Utilities Commission (SFPUC)**

The SFPUC provides electric power derived almost exclusively via the O'Shaughnessy Dam at Hetch Hetchy to meet the municipal requirements of the City, including power to operate Muni streetcars and electric buses, street and traffic lights, municipal buildings and other City facilities, including the airport. This totals about 140MW/day and comprises between 12 and 16% of total electrical power use in the City.<sup>7</sup>

### **3. Direct Use of Natural Gas**

#### Residential

- Space Heating
- Water Heating

#### Commercial

- Industrial Process Use
- Co-generation
- Space Heating
- Water Heating

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<sup>7</sup> Phone conversation with SFPUC staff Camron Samii and Jim Hendry 1/14/09

## II. Vulnerabilities.

The principal vulnerability is that so much, nearly all, of the sources of energy that San Franciscans use to power their lives are fossil fuel sources - petroleum, natural gas, and coal. None of these sources are derived from within the City's boundary. In fact, San Francisco has limited capacity to generate any kind of power within its political boundary due to the fact that it is "built out" and very little developable land remains within the City. This leaves rooftops, parking areas, and few areas of open space as possibilities for energy generation within the City.

A second major vulnerability is a populace that is woefully unaware of the predicament that the City and society at large will face as the global extraction peak is passed and we are forced to learn to live in a contracting energy environment.

**Petroleum** (*This will be covered very briefly here because it will be addressed in other areas of the Report*)

- Price
- Supply
- End Use/s

Over 95% of petroleum fuel is used for transportation purposes. The remainder is used in industrial applications.

### Natural Gas

- Price

It is likely that the price of natural gas will be the limiting factor before actual economically significant shortages of supply become a reality. The eventual high prices due to competition and other factors will render natural gas effectively unavailable. Prices are notoriously difficult to predict with accuracy. Therefore, the Task Force recommends that the City adopt a general policy of erring on the side of high price estimates when conducting forecasts in this regard. For the periods when high estimated prices do not materialize, the City and consumers will benefit by unexpectedly lower prices. If prices are at or above anticipated estimates, the City will be better prepared than if lower estimates had been used (rec. G).

- Supply

Natural gas production peaked in the U.S. in 1973.<sup>8</sup> However, in recent years, production has increased nearly to the level of this historic peak due to an increase in the number of wells drilled and improvements in natural gas drilling technology. Even so, California and San Francisco increasingly rely on natural gas imported via pipeline. Supplies from overseas can be liquefied and shipped then returned to the gaseous state for end use, but this system is extremely dangerous, controversial, and requires extensive infrastructure investment for supply that cannot be guaranteed.

- End Uses

Space Heating. (x%) of natural gas consumed by the City is used to heat homes and businesses...

Water Heating. (x%) of natural gas consumed by the City is used to heat water for homes and businesses...

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<sup>8</sup> High Noon for Natural Gas, Julian Darley 2004

Electric Utility (already addressed above)

## **Coal**

Although coal is the largest single source of fuel for the generation of electricity worldwide, the City uses very little for this purpose, or for any other purpose. Therefore, the Task Force does not anticipate that coal prices or supply will be a significant factor in energy decision-making for the City in the foreseeable future. This does not imply that the City will be immune to economic impacts in the broader U.S. and international context due to future coal price/supply fluctuations.

- Price

Thermal coal (the coal used in power generation) is priced in short tons (a short ton = 2000 lbs.). In the year 2000 coal stood below \$25/short ton. As of January 2008, the median price per short ton of thermal coal is \$100. The near-term price is expected to decline due to the current global economic downturn.<sup>9</sup>

- Supply

Global coal supply estimates range from “enough coal to last us over 190 years” (World Coal Institute), to “a global production peak in about 15 years” (Energy Watch Group). Although coal exists in far greater quantity than oil or gas, extraction and combustion impacts may inhibit fully exploiting this resource. The Task Force urges the City to resist public policies that would facilitate increased coal use as a primary electricity generation source in nearby states and nationally. Similarly, and for identical reasons, coal-to-liquid fuel technology should not be considered as an option to mitigate declining petroleum supply.

- End Use

Coal is used in San Francisco exclusively for electrical power generation and comprises about 2% of PG&E’s power mix.

## **Geographic Characteristics**

San Francisco is perched at the end of a long narrow peninsula. This presents challenges for the City in terms of transmission of electricity in that most transmission, and the least-cost method, is land-based. However, the Trans-Bay Cable from Pittsburg will bring power to the City on transmission line beneath the Bay. The source of power transmitted via the cable remains an issue of concern. The fact that the City is surrounded by water may be advantageous in some respects - offshore wind, ocean wave, and marine current potential.

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<sup>9</sup> Reuters 11/27/08 Fayen Wong

### III. Mitigation Strategies

Mitigation strategies in response to the problem of Peak Oil will likely be subject to a similar factor that mitigation strategies for global climate change are subject to, namely, that they are both problems that are global in nature. This does not mean that the City's efforts are unimportant, but ultimately it will require concerted effort at the international level in order to respond effectively. For this reason the Task Force recommends that the City take steps to "wag the dog," meaning that the City should take actions that compel responses and action at the state, federal, and international levels (see recommendation A in this section).

It is not important for the City to try to predict what petroleum fuel and natural gas prices might be in the future, nor is it likely to be

*"Securing energy supplies and speeding up the transition to a low carbon energy system both call for radical action by governments - at the national and local levels..." - International Energy Agency, World Energy Outlook 2008*

accurate no matter how sophisticated the models used. The important thing is to anticipate more than one scenario, and at least one scenario included should be the one where prices are high enough to render petroleum fuels and natural gas effectively unavailable (see recommendation G in this section).

In order for the City to meaningfully respond in the context of what it can do for itself, the City will require an ongoing commitment to the issue with City staff dedicated to carrying out, for example, infrastructure investment analysis that takes into account a constricting fossil fuel universe. It would also be in the City's interest in this regard, to operate an "Energy Transition Resource Center" that would provide information and services to residents and businesses to assist them in "de-carbonizing" their energy consumption (see recommendation C in this section).

In 2002 the City produced an Electricity Resource plan (ERP). This plan is now becoming out-of-date, particularly in light of looming fossil fuel supply limitations. The City should produce a new Plan, similar to the 2002 ERP, retaining consideration of the drivers of that effort (environmental justice, public health, and energy deregulation) but updated to take into account fossil fuel scarcity considerations, and explicitly incorporating the goal of ending dependency on fossil fuels. The plan should also include a requirement that, once the report is published, follow-up public meetings in the months and years ahead should be held to address the status of implementation of the plan (see recommendation D in this section).

Public Education [more]

#### **Demand Side Management**

Demand reduction may turn out to be the single most important response in addressing peak oil & gas. All of the alternative and renewable energy possibilities will likely only fill a fraction of current energy demands. *(This section will contain an assessment of how much energy can be saved by maximizing energy efficiency)*

A critical component of implementing demand side mitigation measures is having the trained workforce available to do the actual work of retrofitting buildings and installing cleaner more energy efficient systems (see recommendation H in this section).

### **Conservation**

Strictly speaking, conservation and energy efficiency are two different things, but they are closely related. Energy efficiency is a form of conservation. Energy efficiency means using a low wattage compact fluorescent light bulb that puts out as much light as a higher watt incandescent bulb. Conservation means turning off the light. Most of what this report will recommend falls under the category of energy efficiency technology implementation. However, the Task Force feels that the City should not forget the value of promoting conservation as a public education imperative.

### **Energy Efficiency**

Energy Efficiency measures have the potential to give the City the greatest “bang for the buck” in terms of mitigating demand. (*Cite some figures or reference to chart*). Powerful momentum is building on a national level to inaugurate a “green economy” that will be comprised of thousands newly trained in “green collar jobs” to retrofit existing homes and businesses with things as simple as weather-stripping and water heater jacketing to installing the latest energy efficient technologies. The City can take a lead in this arena by establishing a green jobs workforce development program to train and place people in this vocation.

### **Smart Grid**

The “smart grid” concept is basically creating an energy Internet - replacing the conventional system of monolithic, centralized power generation with little ability for the generator to communicate with the consumer within the system. The smart grid is a decentralized system where a web of interactive electronic communication exists between large generation centers, distribution nodes, smaller distributed generation, and end users. Advantages of the smart grid are that it increases efficiency, reduces peak demand, and allows for small, distributed renewable energy generators.<sup>10</sup> On December 9<sup>th</sup>, 2008, the San Francisco Board of Supervisors passed Resolution 081562, establishing City policy supporting Smart Grid technology and protocols for City electric systems urging the Public Utilities Commission to prepare a study to identify the most effective and economic means to implement smart grid technology<sup>11</sup> (See recommendation F in this section).

### **Supply Side Management**

*(What is needed is an estimate of how much energy can be generated in the city by each non-fossil method of electrical generation. Combining maximum demand reduction with the theoretical maximum of solar in SF, plus the Community Choice Aggregation plan to put solar and wind along the Hetch-Hetchy corridor, plus CCA's energy use reduction plan, to get a picture of what the prospects are for powering the City. Whether that will be contained in this report, or offered as a recommendation of work that the City should undertake has not yet been determined.)*

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<sup>10</sup> US Dept. of Energy, The Smart Grid: An Introduction  
[http://www.oe.energy.gov/DocumentsandMedia/DOE\\_SG\\_Book\\_Single\\_Pages.pdf](http://www.oe.energy.gov/DocumentsandMedia/DOE_SG_Book_Single_Pages.pdf)

<sup>11</sup> Resolution 081562: [http://muni.sfgov.org/site/bdsupvrs\\_page.asp?id=94692](http://muni.sfgov.org/site/bdsupvrs_page.asp?id=94692)



As with demand management, a trained workforce will be needed to do the work of installing new cleaner, renewable energy infrastructure (see rec. H).

### **Community Choice Aggregation (CCA)**

CCA is a program enabled under state law that allows the City to become an electricity purchaser for residents and businesses currently served by Pacific Gas & Electric (PG&E). Ratepayers are able to opt-out and remain full customers of PG&E if they prefer, and PG&E may continue to provide electricity transmission, distribution, meter reading and billing services under the CCA program. The main advantage of CCA relative to peak oil & gas is that the City has the ability to choose non-fossil primary energy sources, and is not at the mercy of PG&E, which is a private corporation, for decision-making in this regard (see recommendation B in this section).

[More?]

### **Feed-in Tariffs**

A feed-in tariff is a mechanism that allows small renewable generators to sell their power to utilities at predefined terms and conditions. In early 2008 the California Public Utilities Commission (CPUC) made new feed-in tariffs available for the purchase of up to 480 MW of renewable generating capacity from small facilities.<sup>12</sup> Pursuant to this, effective February 2008, PG&E will purchase power from our customers who install eligible renewable generation up to 1.5 MW in size.<sup>13</sup>

### **Renewable Energy Plan**

Currently, no comprehensive plan exists that would result in the City ceasing its dependence on fossil fuels. The City - SFE, SFPUC - should produce a plan that would do so, combining robust energy demand reduction with aggressively increased cleaner renewable energy infrastructure investments. Such a plan should have near 100% clean renewable energy as its objective.  
*(Combine with the revised ERP?)*

### **Renewable Energy Infrastructure Implementation** (see recommendation E in this section)

The key to risk mitigation in this arena is diversification. There is no single energy source currently known that can replace petroleum or natural gas. It is also unlikely that any combination of known non-fossil, non-nuclear alternatives will be able to meet current or projected demand. However, some combination of all non-fossil alternatives combined with robust programs of conservation, energy efficiency, and localization, may be the best way to approach mitigation. An aggressive program, whether in the context of CCA or not, will be an inevitable key to transitioning out of the fossil fuel era.

### **Solar**

- Solar Photovoltaic (PV)

Solar PV refers to technologies that convert solar photons directly into electrical current. The most common types are silicon crystal-based panels, but many other types of products are coming on line, such as “thin-film” solar cells made from materials other than silicon. This is a rapidly growing technology both in the economic sense and as it pertains to the technology

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<sup>12</sup> CPUC Press Release 2/14/08: [http://docs.cpuc.ca.gov/PUBLISHED/NEWS\\_RELEASE/78824.htm](http://docs.cpuc.ca.gov/PUBLISHED/NEWS_RELEASE/78824.htm)

<sup>13</sup> PG&E Feed-in Tariff FAQ:

[http://www.pge.com/includes/docs/pdfs/b2b/wholesaleelectricssolicitation/Feedin\\_Tariffs\\_FAQs.pdf](http://www.pge.com/includes/docs/pdfs/b2b/wholesaleelectricssolicitation/Feedin_Tariffs_FAQs.pdf)

itself. State and local incentives exist to assist home owners and businesses to install PV systems. One concern raised in the Task Force proceedings is that the manufacture of solar panels themselves is a very energy intensive endeavor that currently requires fossil fuel inputs. This is true of virtually every “alternative” energy technology. Ultimately, it is estimated that about \_\_\_\_ MW of total power may be derived by solar PV. Currently there are about 924 solar PV installations in the City totaling about 6.5MW as of November 2008.<sup>14</sup> So there is a lot of potential in this arena.

- Solar Thermal

Solar thermal refers to technologies that take direct advantage of the heat energy from the sun. A very common and tested solar thermal technology is solar water heating. In 2007 AB 1437 passed which authorizes the CPUC to create a \$250 million program with the goal to install 200,000 solar water heating systems throughout the state. The program is expected to be in place by 2010.<sup>15</sup> There will be a lot of new activity in this arena in the City by 2010 and forward. In addition, a new pre-market analysis coming on-line about solar hot water.<sup>16</sup> The City should promote solar thermal to offset the (x%) natural gas used to heat water.

- Distributed Solar

Distributed generation (DG) refers to electrical generation systems that are typically smaller than conventional power plants and are “distributed” over a given geographical area. Small-scale solar, such as residential roof-top, is a good example of this. DG theoretically offers several advantages over the conventional monolithic power generation paradigm in that it reduces risk of black outs, offers opportunities to increase efficiency, allows for more renewable energy systems, and minimizes risk of catastrophic accident or effective terrorist attack.

- Concentrated Solar Power (CSP)

Several types of concentrated solar power systems have been proven. [more]

## **Marine-Based Power Generation**

- Ocean Wave Energy Conversion

Ocean wave power generation is possible in places where enough strong, constant wind results in waves that have enough kinetic energy – a high vertical trough-to-peak differential – to allow specially designed buoys to take advantage of the differential and produce electricity. The nearest locations where this is the case, in close enough proximity to San Francisco, are off the coasts of Mendocino and Humboldt counties. Currently, PG&E is investigating the possibility of securing electricity from projects for which permits are pending. The current maximum generation estimate from the Mendocino project is 40MW. Another pending project in Humboldt County may produce up to 100MW. The total amount of electrical generation possible via this type of system is estimated by the California Energy Commission to be about 8GW, so there is a lot of potential.

- Tidal Power

Between 2001 and 2008 the CITY investigated the possibility of harnessing the power of the tidal current flowing through the Golden Gate into and out of the San Francisco Bay. Currently the investigation is on indefinite hold.<sup>16</sup> In 2006 the Electric Power Research

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<sup>14</sup> Phone conversation with SF Dept. of Environment staff, Johanna Partin 1/5/09

<sup>15</sup> CPUC Solar Hot Water Program: [http://www.cpuc.ca.gov/PUC/energy/Solar/080220\\_SD\\_SolarPilot.htm](http://www.cpuc.ca.gov/PUC/energy/Solar/080220_SD_SolarPilot.htm)

<sup>16</sup> Phone conversation with SF Dept. of Environment staff, Cal Broomhead 12/8/08

Institute (EPRI), conducted a study that initially stated that about 35 MW of electricity could be generated from the Golden Gate tidal current. However, SFPUC conducted its own feasibility study and determined that only about 10MW of extractable power exists.<sup>17</sup> Currently URS Corporation is carrying out another study. It remains to be seen whether this will be an option for powering the City. And even under the most ideal scenario, only about one fifth of the City's current demand can be fulfilled via this potential power source.

- Marine Current

### **Wind Power**

- Urban (land-based) Wind Power

A California Energy Commission study in 2004 that looked at wind energy resource in SF found not much large scale potential due to the lack of available undeveloped land. However, there may be some potential for smaller scale wind power installations on rooftops. The SF Urban Wind Power Task Force is investigating this prospect and a report is expected in March 2009. One of the things the City might be able to do in this arena is to provide information on wind generation to residents and businesses. SFE is currently investigating where some demonstration projects might be installed. See: Blue Green Pacific. SFPUC is looking into potential for wind along Hetch Hetchy corridor. Much of the state's best wind resource is already "locked up."<sup>18</sup>

- Offshore Wind

The City is currently investigating the potential for offshore wind power. SFE is working with Stanford students, but the process has just started. Offshore wind is about four times more expensive than land-based wind.<sup>19</sup> An April 2008 Stanford University study found that somewhere between 63 to 86% of California's electricity needs can be met with offshore wind energy alone.<sup>20</sup>

### **Geothermal**

- Conventional
- Enhanced

### **Biomass**

### **Combustion Turbines**

### **Cogeneration**

### **Exotic Technologies**

*This section will touch on the various unproven technologies that are either newly emerging or have been around for a while but are, as yet, unproven on a large scale.*

### **What Not To Do**

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<sup>17</sup> SF Bay Guardian 6/27/07

<sup>18</sup> Phone conversation with SF Dept. of Env. staff Johanna Partin 1/05/09

<sup>19</sup> *ibid.*

<sup>20</sup> Assessing California's Offshore Wind Potential, Dvorak, et al, April 2008:  
<http://www.image.ucar.edu/public/TOY/2008/focus4/Presentations/TALKDvorak.pdf>

The Task Force is unanimous in opposition to nuclear fission power as a mitigation strategy for addressing peak oil & gas. Once these plants are decommissioned, new sources must emerge to take their place.

The Task Force urges the City to resist public policies that would facilitate increased coal use as a primary electricity generation source in nearby states and nationally. Similarly, and for identical reasons, coal-to-liquid fuel technology should not be considered as an option to mitigate declining petroleum supply.

#### IV. RECOMMENDATIONS

**A. Initiate a Formal Interagency Request for Information and Advisement.** The City should initiate a formal inquiry submitted to appropriate state, federal, and international agency/s seeking information and guidance on the issue, specifically seeking recommendations on long range risk management and advance mitigation measures. *(Perhaps pointing to information provided in the SFPOPTF Report and/or Hirsh Report and/or more recent info, and/or based on recent gas/oil price volatility, or all of the above.)*

**B. Community Choice Aggregation.** The City should reassert Community Choice Aggregation as a central organizing principle in the effort to advance the rapid implementation of sustainable renewable energy systems.

**C. Establish a “Division of Energy and Fuel Transition.”** The City should establish the “Division of Energy and Fuel Transition” (DEFT) within SFE or the SFPUC.

**D. Produce a new Electricity Resource Plan.** The City should direct SFE and SFPUC to work together to produce a new integrated long term energy/electricity resource plan that takes the downside of the peak into consideration.

**E. Renewable Energy Portfolio Diversification.** The City should adopt an approach that seeks to diversify and expand to the greatest extent possible its renewable energy portfolio.

**F. Smart Grid.** The City should embrace and embark on a program to implement Smart Grid technology.

**G. Adopt Policy of Assuming Higher Fossil Fuel Prices.** The City should adopt a general policy of erring on the side of high price estimates when conducting forecasts of the price of fossil fuels.

**H. Green Jobs Workforce Development.** The City should establish a green jobs workforce development program to train and place people in the skills required to install new, or upgrade, repair, reconstruct, replace, or expand existing energy efficiency infrastructure.

**I. Waste Inventory Program.** The City should initiate an investigation into where the greatest amounts of energy waste can be found, e.g., wasted heat from industrial processes. Restaurants may be one of the biggest opportunities for eliminating waste. *(Maybe an SF green restaurant movement of some sort)*

**J. Feed-In Tariffs.** *(Since PG&E is already doing this under AB1969 and CPUC supervision, see if there is anything the City might be able to do in this arena).*

**K. Phase-outs and Bans.** The City should consider ordinances to impose new City fees or taxes and/or take steps to ban/minimize sale and/or use of certain energy inefficient fixtures and appliances such as incandescent bulbs *(and other obsolete energy inefficient appliances - list)* in the City *(cite other City’s actions)*

**L. Localization.** *(Maybe here, maybe somewhere else in the Report, or in the overall recommendations)*

**M. Implement the Oil Depletion Protocol.** *(Also probably in the overall recommendations)*

**N. Attend CEC Emergency Planning Seminars.** The California Energy Commission offers energy emergency planning seminars for local governments. The City should ensure that elected officials are aware of this and strongly urge that they and/or their staffs attend. Appropriate City departmental staff should be required to attend.

**O. Carbon Tax?**

**P. City Ordinance Audit.** Audit the City's ordinances and make sure that none exist that prohibit residents from exercising a low carbon lifestyle. Example: ordinances in some towns prohibit growing crops on front lawns and/or using clothes lines to dry clothes.

**Q. Don't re-invent the wheel.** In the effort to "de-carbonize," make use of existing analysis that relates such as greenhouse gas accounting that has been completed under the Climate Action Plan.

**R. Impose a high ingress fee on mobile billboards entering the City, or ban them outright.**

**S. Take control of the City's electrical power utility**

**T. Peak Oil & Gas / Transition Information web page on City's website**

The following people provided valuable insight and expertise in the preparation of this section of the Report:

Cal Broomhead, SF Dept. of the Environment  
June Brashares, Green Energy Programs Director, Global Exchange