

Renewable Energy
and Energy Efficiency
Regulatory and Policy Guide
for Humboldt County Local
and Tribal Governments

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Prepared by



SCHATZ
ENERGY
RESEARCH
CENTER

for



REDWOOD COAST
EnergyAuthority

as part of the **RePower Humboldt** project

FOREWORD

This Regulatory and Policy Guide on Renewable Energy and Energy Efficiency for Humboldt County Local and Tribal Governments was made possible by funding from the California Energy Commission in the form of a Renewable Energy Secure Communities (RESCO) grant awarded to the Redwood Coast Energy Authority. Humboldt County's RESCO project is known as RePower Humboldt.

The material in this guide is largely of local origin; however, input from individuals and other existing guides and publications from far and wide informed its production. The Redwood Coast Energy Authority and Schatz Energy Research Center acknowledge Sheri Woo, P.E. of H.T. Harvey and Associates for her helpful review of and contributions to this guide.

Note: The energy industry and energy policy at state and national levels are evolving rapidly. The information in this booklet is intended to be an accurate snapshot of policy options available in Humboldt County at the time of publication. Note that information about specific policies, opportunities, and challenges in this publication may quickly become obsolete. Please check with the Redwood Coast Energy Authority, other relevant agencies, or utility representatives to get up-to-date information.

DISCLAIMER

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CONTENTS

I. Introduction	1
II. How to Use This Guide	1
III. Background	2
The Redwood Coast Energy Authority – Our Local Energy Office	2
The RePower Humboldt Project	3
The Energy Industry: A Quick Overview	3
State Energy Policy	6
Energy and Humboldt County	7
The Players in Local Energy	8
IV. Taking Action - A Role for Local and Tribal Governments	13
<i>Organizational Capacity Building</i>	
1. Building organizational capacity	15
<i>Leading by Example with Municipal Energy Projects</i>	
2. Energy efficiency and renewable energy	18
3. Green fleets / alternative fuel vehicles	24
4. Financial benefits of generating your own electricity	29
5. Funding opportunities	34
6. Energy purchase and price options and information on energy use	40
<i>Incentives and Programs to Reduce Implementation Barriers</i>	
7. Renewable energy and energy efficiency incentives	44
8. Financing programs, bulk purchasing and other financial interventions	48
<i>Planning, Permitting and Regulation</i>	
9. Planning and regulation	53
10. Permitting	59
11. Providing a public forum	65
12. The climate change energy nexus	68
<i>Community Power</i>	
13. Planning and implementation of energy efficiency programs	70
14. Generation, distribution and/or sale of electrical power	72
<i>Education and Outreach</i>	
15. Education and outreach	75
V. Appendices	
Additional information resources	78
State energy policy documents	79
Energy and power units	80
Energy glossary	80

I. Introduction

The RePower Humboldt project is a planning study intended to evaluate opportunities and plan for renewable energy development in Humboldt County, California. The stated goal of the RePower Humboldt project is to develop a strategic action plan for Humboldt County to efficiently and successfully develop its local renewable energy resources to meet 75 to 100 percent of local electricity demand as well as a significant fraction of heating and transportation energy needs. A full range of resources and technologies has been considered that can meet the county's energy needs while providing environmental, economic, and social benefits.

This regulatory and policy guide is one of several documents being developed as part of the RePower Humboldt study. The purpose of this guide is to provide local policy makers with information and guidance on how you can help the county meet its RePower Humboldt goal of greatly increased local use and production of renewable energy. **The main question addressed in this guide is: “How can local and Tribal government officials play a role in Humboldt’s sustainable energy development?”**

There are many ways that local and Tribal governments can influence energy use and renewable energy development. These include direct energy-related policy actions such as expedited permitting of renewable energy projects, providing direct incentives for energy efficiency and renewable energy investments, or installing energy efficient equipment in government buildings. In keeping with the scope of the RePower Humboldt project as a whole, this guide addresses such direct policy options but does not consider broader policies that can have important, albeit indirect, energy impacts, such as land use planning and community development aimed in part at reducing vehicle miles traveled. Fortunately, many of these indirect impacts and associated policy options are already being addressed locally in county- and city-level general plan updates.

II. How To Use This Guide

This is an action-oriented guide that provides local policy makers with resources and tools they can use to increase energy sustainability in their communities. The background section provides useful information about the energy industry, state energy policy and the local energy scene. This sets a context for the action areas that follow.

The **Taking Action** section presents fifteen action areas. For each action area we describe *The Opportunity* (background information and notes on the role local government can play), *The Local Angle* (what's already happening in Humboldt County, emphasizing unique local aspects), *Examples from Elsewhere* (brief case studies from outside the county), and *Resources* (where to get more information).

Much work has already been done by local governments in our region and elsewhere that can be drawn upon for setting energy policy. We have noted in the **Resources** sections and in **Additional information resources** at the end of the guide some of the documents and websites we found most informative. We also strongly recommend reading other information about RePower Humboldt available on the project website, especially *RePower Humboldt - A Strategic Plan for Renewable Energy Security and Prosperity*. See: www.redwoodenergy.org/programs/repower. A list of important **State energy policy documents** is presented in the appendix, as is an **Energy glossary** that explains special terminology used throughout this guide.

III. Background

THE REDWOOD COAST ENERGY AUTHORITY – OUR LOCAL ENERGY OFFICE

Among the many effective strategies recommended by experts for a local or Tribal government response to the clean energy challenge, a key one is the creation of a dedicated office focused on energy issues. Fortunately, Humboldt County took this step many years ago with the creation of the Redwood Coast Energy Authority. The RCEA was formed in 2003 to develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region. The RCEA is a Joint Powers Authority whose members include the County of Humboldt; the Cities of Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad; and the Humboldt Bay Municipal Water District. The RCEA is the lead agency implementing the RePower Humboldt study.

The RCEA offers assistance to Humboldt County local governments in meeting their energy needs. Available help includes utility cost tracking, greenhouse gas inventoring, and more. For more information, visit www.redwoodenergy.org. All of RCEA's funding comes from contracts and grants, bringing resources to Humboldt County that would not otherwise be available. Projected lifetime savings from RCEA's energy efficiency activities completed to date total approximately \$10 million, providing a two-to-one return on cumulative operating costs.

One of RCEA's first activities was working with the County to develop and implement an Energy Element for the County's General Plan Update. This work included preparation of a background technical report that documented the county's energy use characteristics and briefly explored opportunities for energy efficiency improvement and renewable energy development. The draft Energy Element itself lays out goals, policies, standards and implementation measures. It was completed in 2005 and is currently before the County Board of Supervisors as they finalize the General Plan Update.

THE REPOWER HUMBOLDT PROJECT

As a natural follow-on to the Energy Element, the RCEA applied for funding in 2008 from the California Energy Commission's Renewable Energy Secure Community (RESCO) program. The purpose of the RePower Humboldt study funded by the Energy Commission is to conduct a more thorough analysis of the technical and economic implications of renewable energy development in Humboldt County. The RePower Humboldt team developed a strategic plan, which we recommend reading for a concise overview of the RePower Humboldt vision for renewable energy development in Humboldt County.

THE ENERGY INDUSTRY: A QUICK OVERVIEW

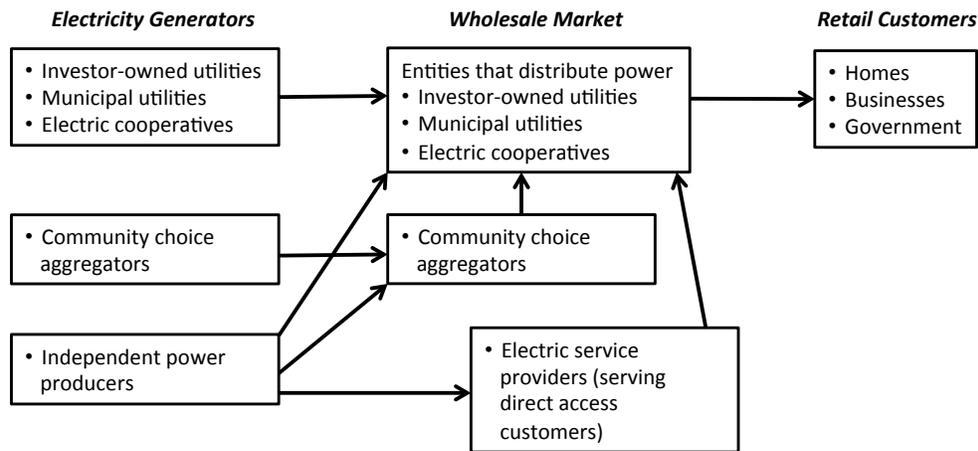
Humboldt County gets the majority of its energy from outside the county, in the form of natural gas that is piped in and transportation fuels that are barged into Humboldt Bay. Even energy that is local in origin, such as electricity generated from local forest biomass, must pass through the hands of the regional utility corporation, PG&E, on its way to the consumer. Humboldt County is part, both as producer and consumer, of an energy industry with state, regional, national, and even global connections. So it makes sense to take a brief look at that larger industry before we delve into local details.

Electricity

The electric power system has historically been built around central power plants and is considered to consist of three components: generation, transmission, and distribution. Electrical power is typically generated at large power plants powered by natural gas, coal, nuclear, geothermal heat, biomass, or other fuels. These power plants can also consist of large hydro dams or large wind or solar farms. Once power is generated at a central power plant it is typically transmitted over large distances. Because it is more efficient, this is done at very high electrical voltages. When power nears the end use customers, the voltage is reduced at an electrical substation. From there the power is distributed over low voltage distribution lines to the end use customers. In recent decades, distributed generation at or near the end-user site has become an important fourth component of the power network.

Today's electrical market is complex, and so are the business, policy, and regulatory frameworks in which this system operates. Figure 1 shows connections among some of the key players, categorized as producers, wholesalers, and retailers. See the glossary for explanations of the different entities shown in the figure. In Humboldt electricity producers include PG&E's Humboldt Bay Generating Station and a number of independent power producers. PG&E distributes the power generated in Humboldt to end use customers. In addition, they import some power from out of the area when it is more economical to do so. There are also some larger electricity customers in Humboldt, like Humboldt State University, who purchase power from direct access providers. This power is also distributed through PG&E's lines. Currently there are no community choice aggregators (CCAs) in the Humboldt area; however, various municipalities are considering joining or forming a CCA.

Figure 1. Key Players in the Electric Power Market



Natural gas

Natural gas is an enormously important fuel in California, not only for direct use to heat homes and drive industrial processes, but also for generation of 53% of the electric power generated in the state. California produces only 13% of the gas used in-state, with the rest coming from other western states and Canada. A new liquefied natural gas (LNG) terminal in Baja California, Mexico, is now supplying California and other southwestern states with gas shipped in from Indonesia and other Pacific Rim locations. According to the Energy Information Administration, 95% of the natural gas consumed in the US in 2011 was produced domestically and about a third of it came from shale gas production. In the last decade shale gas production in the US has grown dramatically, and that growth is projected to continue. However, there are numerous environmental concerns associated with shale gas production, which requires the controversial hydraulic fracturing or “fracking” process that requires large amounts of water and can contaminate land and ground water.

Like the electric grid, the natural gas network also includes transmission and distribution infrastructure. In this case transmission systems are defined by higher pressures rather than higher voltages. The main high pressure transmission line in California is referred to as the “backbone.” It connects production wells, local distribution lines, and storage facilities used to buffer seasonal fluctuations in supply and demand. Low pressure distribution lines supply gas to customers. The 2010 natural gas line explosion in San Bruno brought increased attention to the safety of PG&E’s natural gas transmission and distribution network.

Buying and selling energy

The California Public Utilities Commission regulates the retail sale of electricity and natural gas in California. Utilities sell electricity and natural gas to residential, commercial, industrial, agricultural, and institutional customers according to various tariffs or rates charged to each type of customer. Rates are regulated to reflect the average cost of service across the utility’s service territory, and may also reflect the State’s public policy goals, such as resource conservation,

climate protection, and concern for low-income consumers. All natural gas customers have the option of buying gas from unregulated natural gas marketers, but most small commercial and residential gas customers choose to purchase from their regulated utility. However, most large natural gas customers purchase gas from unregulated marketers. On the electric side, retail customers have less choice. Most retail electricity customers purchase power from their local electric utility, which is either a regulated investor-owned utility or an unregulated, not-for-profit municipal utility depending on location. A number of California communities, however, are now switching to the CCA model, with Marin being the first and only community to complete the process. Finally, there are a small number of direct access customers who purchase power from unregulated electric service providers, or marketers.

The wholesale trading of electricity and natural gas are unregulated, and therefore are subject to competitive market forces. Selling energy to a utility is generally not as straightforward as purchasing energy. In some cases, the utility itself is not the buyer but instead acts as an intermediary providing the infrastructure through which the transaction takes place. In recent years, net metering has been implemented to allow utility customers with their own on-site renewable generating equipment to essentially sell their surplus electricity back to the utility for the same price they buy power, a very favorable arrangement for small scale renewable energy generators. Larger scale energy producers that wish to put their power on the grid need to either execute a power purchase agreement with the local utility, or sell the power to a direct access consumer, community choice aggregator or out-of-area electric utility and then pay to “wheel” the power through the grid.

Transportation fuels

Today transportation fuels consist mainly of gasoline and diesel, both refined from petroleum. These fuels have been one of the main drivers of spectacular economic growth over the past century, but continued reliance on petroleum is problematic. Burning fossil fuels puts large amounts of greenhouse gases into the atmosphere; much of the world’s petroleum is imported from countries that are unstable or unfriendly to the West; and extraction of these fuels has greater environmental impact as we need to drill deeper to access more remote deposits or work harder to access reserves that are bound up in oil shale and tar sand deposits. However, finding a clean and economic substitute for fossil fuels is also a challenge.

In the past decade there have been calls to increase the use of biomass-derived transportation fuels. While this approach has gained substantial market share, it is not without its own challenges and problems. There are many different biomass fuel options and pathways, and the level of sustainability can vary dramatically between them. Some fare better than our conventional petroleum fuels, and others fare worse. As of 2011, enough ethanol was being blended into gasoline to displace about 10% of U.S. gasoline use. At this blend level, engines do not need to be modified. Widely available “flex-fuel” vehicles can operate on up to 85% ethanol. Biodiesel derived from “virgin” plant sources or recycled oils from restaurants can likewise be used as a fuel substitute in unmodified diesel vehicles. Vehicles can also be fueled with electricity, either entirely as in battery electric vehicles or in combination with traditional fuels, as in hybrids and plug-in hybrids. Major car makers have recently entered the all-electric

car market with the Nissan Leaf and others. As we increase the portion of the grid's electric mix that comes from renewable sources, the use of plug-in electric vehicles becomes a better environmental choice.

STATE ENERGY POLICY

State energy policy is an important driver for what happens locally. California has some of the most progressive energy policies in the nation and is regularly on the leading edge when it comes to developing and implementing sustainable energy policy. Currently, key goals include:

- Reduced energy demand through increased efficiency and demand response,
- Increased electric supply from renewable energy resources,
- Increased electric supply from distributed generation and combined heat and power systems,
- Increased use of alternative and renewable transportation fuels and vehicle technologies, including zero emission vehicles,
- Expanded and upgraded electric transmission and distribution system to improve access to renewable resources, maintain or improve reliability, and implement smart grid technologies.
- Reduction of greenhouse gas emissions,
- Development of bioenergy resources, and
- Creation of clean energy jobs.

A set of state policy documents describe these goals and lay out plans for implementation. A list of documents is presented in the Appendix under "state energy policy documents." The Renewables Portfolio Standard (RPS) and AB32, California's Global Warming Solutions Act, and the Low Carbon Fuel Standard (LCFS) are three especially important policies. The RPS requires all utilities operating in the state to increase their procurement or generation of renewable electricity, up to 33% of their total portfolios by 2020. AB32 directs the state's Air Resources Board (ARB) to oversee reduction of statewide greenhouse gas emissions to 1990 levels by 2020. AB 32 will impose greenhouse gas emission caps on selected industries, including electric utilities beginning in 2013 and natural gas and transportation fuel distributors starting in 2015. The LCFS calls for a reduction of at least 10% in the carbon intensity of California's transportation fuels by 2020. Not surprisingly, these policies and others are pushing energy companies and their customers to use more renewable energy, to reduce emissions related to nonrenewable energy use, and to increase energy end use efficiency.

Another important policy choice in California is the decision to implement decoupling of electric and natural gas rates for regulated, investor-owned utilities. Decoupling separates a utility's profit from its sale of electricity or natural gas, and thereby helps promote energy efficiency and conservation. A revenue target is set for the utility and electricity and natural gas rates are regularly fine-tuned to meet that target. This is all done with the approval and oversight of the California Public Utilities Commission. Without decoupling, reductions in energy use will

decrease a utility's profits, creating a clear disincentive for energy conservation and efficiency efforts.

In an effort to promote renewable distributed generation and combined heat and power, also known as cogeneration, the state is also working to restructure the electricity market in other ways. They have created market structures that allow alternative energy resources to compete more readily with central power plants, such as the feed-in tariff. They have also worked to create more customer choice and allow for greater local control in the electricity market through policies like direct access and community choice aggregation. Finally, electricity pricing options, such as time-of-use and peak day pricing, are being used to make prices more transparent and dynamic so that customers better see the true cost of the resource, including its temporal and locational variations.

ENERGY AND HUMBOLDT COUNTY

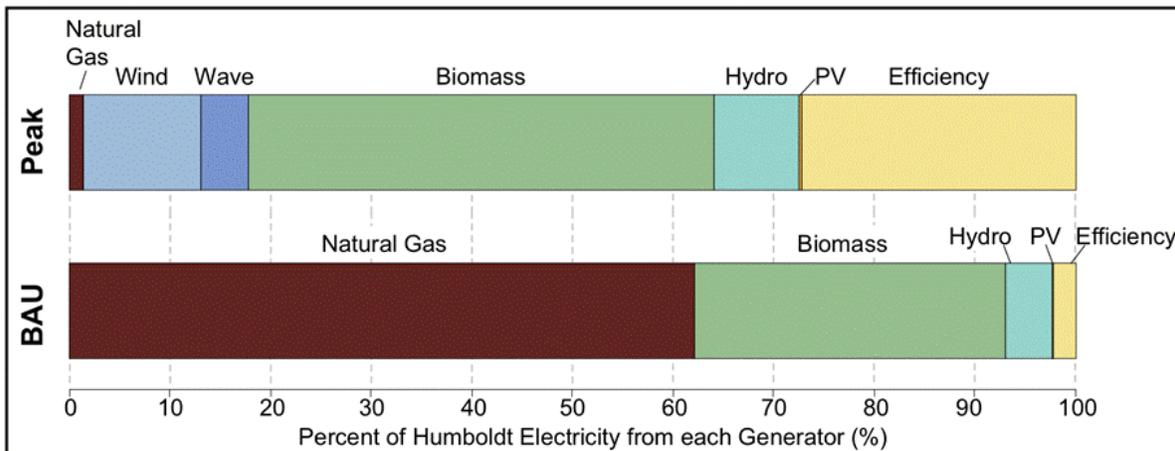
In energy terms, Humboldt County has many characteristics that set it apart from the rest of California. We are isolated from the rest of the state by geography and capacity-limited energy infrastructure. Our total energy demand is relatively small, while we are blessed with abundant renewable energy resources. One of these resources, forest biomass, is already being used to generate about a quarter of our electricity.

As part of the RePower Humboldt project, we have developed ambitious but realistic projections of what our local electric power portfolio could look like in 2030 if we choose as a community to pursue a renewable energy pathway. Biomass and hydroelectric energy could further increase their contributions to the mix, and wind and wave energy could become important components, while natural gas would come to play a minor, yet critical, role in electric power generation. Natural gas generating *capacity* would continue to be substantial, with the Humboldt Bay PG&E plant kept in operation for the foreseeable future, but the plant would be relegated to an important backup role when renewable resources are temporarily in short supply. The recent repowering of the Humboldt Bay plant supports this future role, as the large number of relatively small turbines at the plant allows it to readily change its power output as needed.

The RePower Humboldt study compares today's local energy picture with three future scenarios for 2030. As one example, figure 2 compares our 2010 mix of electric energy with the most ambitious scenario (called "Peak") modeled for 2030. The study also considers a scenario where no major changes are made to our energy mix ("Business as Usual").

In the future energy scenarios, total *energy* use in the county is projected to be less than current energy use because of energy efficiency gains. However, total *electricity* use is projected to increase as we shift more of the loads currently met by other fuels (vehicles powered by gasoline and diesel, homes heated with natural gas) over to renewable electric power (through increased use of electric vehicles and efficient residential electric heat pumps).

Figure 2. Humboldt County Electricity Supply in 2030 – “Business as Usual” (BAU) Scenario Compared with RePower Humboldt “Peak” Scenario



Source: SERC staff, 2012

THE PLAYERS IN LOCAL ENERGY

The Redwood Coast Energy Authority is but one of several key stakeholders in Humboldt County energy production, consumption, and related governance issues. Other important players are described here.

PG&E

Prior to state-level wholesale electric deregulation, which began in earnest in 1996, the state’s investor owned utilities (IOUs), including PG&E, were vertically integrated companies that owned their own generation facilities and all transmission and distribution infrastructure. In recent years, the IOU’s role has been redefined as primarily an electric and natural gas distributor. Some generation, such as the Humboldt Bay power plant, is still owned and operated by the utilities, but statewide most of the power generation facilities are now owned by third parties. PG&E owns, operates and maintains the electric and natural gas transmission and distribution infrastructure that serves Humboldt County, and provides metering, billing and other customer service functions to its customers. In addition, PG&E provides energy efficiency services, though most of these services are provided through RCEA, with PG&E administering the funding. Another service PG&E provides that is of value to local governments is professional training on energy topics through its Stockton Training Center, the Pacific Energy Center in San Francisco, and occasional trainings offered here in Humboldt County (see **Additional Information Resources** at end of this guide). These professional development opportunities are usually free.

Non-utility generators

Several large biomass-fired electric generating plants using timber industry waste as feedstock are operating or have recently operated in Humboldt County. These include plants at Fairhaven, Blue Lake, and Scotia. The Fairhaven biomass power plant is owned by EWP Renewable Corporation, and the Blue Lake biomass power plant belongs to Renewable Energy Providers, Inc. Fairhaven sells their power to PG&E, while Blue Lake sells their power to San Diego Gas and Electric Company (SDG&E). Electric power from the Blue Lake plant is used locally, but contractually it belongs to SDG&E. The Scotia plant is currently shut down with no publicly announced plans known for reopening. Six hydroelectric plants with a total capacity of 11.5 MW also feed power into the grid, selling to PG&E via long-term contracts. These local power producers are considered independent power producers.

Distributed generation, or generation located at the point of use and sized to meet some or all on-site loads, is also scattered around the county in various forms. Local examples of renewable distributed generation include photovoltaic solar systems ranging from the single-family household scale up to commercial and multifamily residential systems on the order of 100 kW, such as those at the United Indian Health Services Potawot Health Village and the Parkway apartment complex, both located in Arcata, and at the CalTrans facility in Eureka. Another example of distributed generation is the Eureka wastewater treatment plant, where a biogas digester powers a generator that produces approximately half of the electric energy used on-site.

Natural gas production

As of March 2011, there were 40 active natural gas wells in the Eel River basin, Humboldt County's only natural gas reservoir. The resource has declined by about 75% to 80% since its peak in the mid- to late-1980's. In recent years the wells have produced about a tenth of the county's natural gas demand.

Top energy users

While we do not have access to billing data for specific customers, we can use data from different sources to draw some conclusions about energy end use in Humboldt County. Data specific to Humboldt County from the California Energy Commission break down overall energy use by four broad categories (agriculture and water pumping, commercial, industrial, and residential) as well as by more specific North American Industry Classification System (NAICS) codes. Table 1 shows the distribution of energy use in 2008 among the major categories. Looking at the data grouped by NAICS codes, wood product manufacturing and nondurable goods manufacturing are the two largest electricity users other than the residential sector. For natural gas, educational and health services and nondurable goods manufacturing are the two largest users other than the residential sector. For both electricity and natural gas, no NAICS category other than those already mentioned makes up more than 5% of total county energy use.

Table 1. Percent of electric and natural gas use in Humboldt County by sector, 2008

Sector	Electric use	Natural gas use
Agriculture and water pumping	3%	5%
Commercial	22%	22%
Industrial	36%	17%
Residential	39%	56%

North Coast Prosperity data offer another perspective, showing that government, health services, and forestry and logging are the largest contributors to the local economy. One might expect these would also be among our biggest energy users.

In the commercial sector, energy intensity is usually considered on a per-square-foot basis. The U.S. Energy Information Administration's (EIA) Commercial Buildings Energy Consumption Study shows average energy use per square foot in all U.S. commercial buildings to be 90,000 BTU per square foot per year. Health care facilities consumed considerably more, 190,000 BTU/ft²/yr, while offices (which presumably make up most of the square footage in the "government" sector) were near the average intensity, at 93,000 BTU /ft²/yr. This suggests that health care, while one of the largest of Humboldt's industry clusters, is probably also one of its more energy-intensive.

In the industrial sector, it is more meaningful to consider energy use intensity in terms of value generated. According to the EIA Manufacturing Energy Consumption Study, average U.S. manufacturing energy intensity in economic terms is 6,900 BTU for every dollar of value added. By comparison, the forest products industry has a higher overall energy intensity (10,400 BTU/\$), while the dairy industry has significantly lower energy intensity (4,300 BTU/\$). It is noteworthy that Humboldt County's manufacturing economy is most reliant on the more energy-intensive of these industry sectors.

One special aspect of energy use in Humboldt County is not highlighted in these official reports. A 2010 study by Schatz Energy Research Center showed that Humboldt County's per capita residential electric use has risen sharply since 2000, while in the rest of the state only a modest increase has taken place. The study attributes this difference to energy-intensive local indoor marijuana production. This problem appears to have been exacerbated by marijuana producers taking advantage of CARE energy discounts intended for low-income households. Policy makers, researchers, and utility representatives have been grappling with these problems. Recent state legislation passed in 2012, SB 1207, will now require that CARE program participants who use excessive amounts of electricity, greater than 400% to 600% of the baseline quantity, provide proof of income and participate in an energy savings assistance program. Customers who exceed 600% of baseline could be removed from the program. In addition, the City of Arcata passed an excessive residential electricity users tax in 2012 that will impose a 45% tax on electric bills of customers whose usage exceeds 600% of baseline.

Regional, state and federal agencies

What local government can do to promote energy sustainability is in some important ways constrained by the powers vested in state and federal agencies. Even where local government is at liberty to set policy, it is useful to have a firm grasp of the role that state and federal agencies play.

- The North Coast Unified Air Quality Management District is a regional environmental regulatory agency which has jurisdiction over Humboldt, Del Norte, and Trinity counties. The District's primary responsibility is controlling air pollution from stationary sources, including power plants and larger boilers. They also regulate controlled burns such as those used to reduce wildfire hazards.
- The California Public Utilities Commission (CPUC) regulates the state's investor-owned electric and gas utilities, including PG&E. The CPUC ensures that consumers have "safe, reliable utility service at reasonable rates." The CPUC oversees utility energy tariffs (rates) and ratepayer-funded utility programs promoting energy efficiency and renewable energy.
- The California Energy Commission (CEC) is responsible for state-level energy planning, sets state appliance and building efficiency standards, and has licensing authority over thermal power plants of 50MW or larger. The CEC is playing a key role in helping the state meet its goal of generating one-third of electric power in California using renewable energy by 2020. The CEC funds extensive energy research and development in California, including the RePower Humboldt study.
- The California Air Resources Board (ARB) is responsible for implementation of AB32, the Global Warming Solutions Act, which calls for reduction of greenhouse gas emissions and thus has major implications for energy generation and use in the state.
- The California Independent System Operator (ISO) is a non-profit public-benefit corporation charged with operating the state's wholesale electric power system. The ISO manages the flow of electricity across the high-voltage transmission lines that carry electric power throughout the state. The ISO also plays an important role in planning power transmission and enabling new power producers to connect to the state's electric grid. The ISO is an important resource for detailed information on Humboldt County's electric transmission and distribution infrastructure.
- The Federal Energy Regulatory Commission (FERC) is responsible for licensing of most hydropower dams, and for the licensing and permitting of hydrokinetic projects that generate electricity from waves, or ocean tides or currents. FERC also has ultimate regulatory authority over electric transmission, natural gas and oil pipelines, and wholesale pricing of energy commodities sold through these networks. FERC's authority as a federal agency ostensibly applies only to "interstate" commerce, but in practice they also have jurisdiction over in-state transactions, the rationale being that these transactions take place on interstate energy networks. Another important FERC role is certification of Qualifying Facilities (QFs), renewable or cogenerating power plants that have special status under the Public Utilities Regulatory Policy Act (PURPA).
- Many other state and federal agencies may be involved in permitting and environmental review activities associated with the development of any large power plant facility.

These will likely include the US Fish and Wildlife Service and the California Department of Fish and Game, as well as numerous other agencies. The Energy Aware Facility Siting and Permitting Guide, prepared for the CEC, does a great job of covering permitting and licensing processes and the role that local government can play. For more discussion of environmental regulation and review, see sections 9 and 10 of this guide, “Planning and regulation” and “Permitting.”

IV. Taking Action – A Role for Local & Tribal Governments

The remainder of this guide discusses specific actions local leaders can take to help bring to fruition the RePower Humboldt vision of a renewable energy secure Humboldt County. Fifteen action areas are organized into six broad categories as outlined below.

Organizational Capacity Building. Since energy supply and demand are not areas that municipalities have traditionally dealt with, they must first build some internal organizational capacity in order to effectively address these topics.

1. Building organizational capacity

Leading by Example with Municipal Energy Projects. One effective way municipalities can make a difference is to lead by example by installing energy efficiency and renewable energy technologies in municipal facilities. In addition to setting a good example, these projects can save communities money and provide them with more stable energy costs over the long term.

2. Energy efficiency and renewable energy
3. Green fleets / alternative fuel vehicles
4. Financial benefits of generating your own electricity
5. Funding opportunities
6. Energy purchase and price options and information on energy use

Incentives and Programs to Reduce Implementation Barriers. Municipalities can develop programs and incentives to encourage sustainable energy projects in the private sector. This can include financing and bulk purchase programs, among other options.

7. Renewable energy and energy efficiency incentives
8. Financing programs, bulk purchasing and other financial interventions

Planning, Permitting and Regulation. Local governments can help plan for future energy projects, and if projects are proposed they can be involved in the permitting and regulation of these facilities.

9. Planning and regulation
10. Permitting
11. Providing a public forum
12. The climate change energy nexus

Community Power. Local government can also get involved in the generation, purchase, and sale of electricity, or help develop programs that allow for community-based power and energy efficiency projects.

13. Planning and implementation of energy efficiency programs
14. Generation, distribution and/or sale of electrical power

Education and Outreach. Local government can create dialog and help educate their communities about the opportunities and benefits associated with local sustainable energy projects.

15. Education and outreach

1. BUILDING ORGANIZATIONAL CAPACITY

The Opportunity

One important, overarching strategy local and Tribal governments can use to achieve their energy goals is to dedicate resources specifically to energy issues on a sustained basis. A study of local government energy policy by the IBM Center for the Business of Government concludes that cities should “establish a dedicated sustainability office with appropriate funding” as one of the study’s key recommended strategies.

Enterprise funds (funds that support municipal services such as water, sewer, trash disposal/recycling, etc.) are the most common way to fund municipal energy programs. In order to use these funds the energy programs must link to the enterprise activities that provide the funds. Energy can be identified and used as the unifying component in almost every program. Use of enterprise funds allow the office or programs to escape general fund budget negotiations each year.

With a city-based program, the City Council takes on the decision-making role. Most city programs have a relationship with a citizen's energy task force or committee. Regional energy offices are another option. A regional approach may be more fitting for small rural communities that cannot afford to support individual energy programs in each municipality. Regional offices can be formed as Joint Powers Authorities or Community Energy Authorities. Nonprofit energy offices are another alternative and can often work in cooperation with local governments.

Regardless of where it is located, a local energy office can only be successful when it can secure funding to support its efforts. In addition, energy offices must garner political support from local elected officials and create strong local constituencies in support of their mission, goals and strategies. The more that the community understands how the organization helps them, the better, as grassroots support drives political support.

The Local Angle

The Cities of Arcata and Eureka each maintain an energy committee on which citizens serve on a volunteer basis, keeping costs to a minimum. These seven-member committees provide recommendations on energy policy to their respective city councils. Naturally, maintaining some level of paid staff tasked with energy management and energy policy is critical for successful implementation of energy committee recommendations.

For smaller municipalities it may be difficult to justify a full-time energy staff position. An alternate approach that can be effective is to combine energy related responsibilities with climate action planning and/or other environmental program responsibilities. The City of Arcata’s environmental programs manager in the Department of Environmental Services manages the City’s energy projects and facilitates the energy committee. (In addition, the environmental programs manager’s duties also include management of solid waste, stormwater, wetlands and creeks, and the community forest, as well as environmental review of community projects.) The

position is supported financially by enterprise funds from solid waste and stormwater management fees, as well as grant funds.

North Coast Tribes, including the Yurok and Karuk, have been awarded U.S. Department of Energy funding in the past decade for “human capacity building.” These funds have been used to fund energy coordinator positions and to train Tribal staff and community members in energy efficiency and renewable energy topics.

Formed in 2003, the Redwood Coast Energy Authority is a joint powers agency (JPA) representing the County of Humboldt, the cities of Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Trinidad, and Rio Dell, and the Humboldt Bay Municipal Water District. As a JPA, the Energy Authority is governed by a board composed of a representative from each jurisdiction. The purpose of the Energy Authority is to serve as a regional energy authority that develops and implements sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region. To further that purpose, the Energy Authority works toward the following goals:

1. To lead, coordinate and integrate regional efforts that advance secure, sustainable, clean and affordable energy resources.
2. To develop a long-term sustainable energy strategy and implementation plan.
3. To increase awareness of, and enhance access to, energy conservation, energy efficiency, and renewable energy opportunities available to the region.
4. To add value to, but not duplicate, energy services offered by utilities and others serving the region.
5. To keep key decision makers and stakeholders informed of policy, regulatory, and market changes that are likely to impact the region.
6. To support research, development, demonstration, innovation, and commercialization of sustainable energy technologies by public and private entities operating in Humboldt County.
7. To develop regional capabilities to respond to energy emergencies and short-term disruptions in energy supply, infrastructure, or markets that could adversely affect Humboldt residents and businesses.

The Energy Authority has adopted a Comprehensive Action Plan for Energy to support achieving these goals through strategies that specifically address: Regional Energy Planning & Coordination, Energy Reliability & Security, Economic Development, Built Environment Efficiency, Education, Water & Waste, Transportation, and Energy Generation & Utility Services. The regional energy authority model has proven to be a successful approach for effectively delivering energy services, particularly in a rural setting by providing a regional economy of scale that might not otherwise be available to small communities.

It is also important for local energy staff to keep abreast of current happenings in the energy field. This includes new funding opportunities, current legislation and/or regulatory proceedings, technology developments, project opportunities, innovative new policies and more. A good way to stay connected to these topics is to participate in local government energy program networking meetings, associated webinars and conference calls, and related conferences and workshops. The resources listed below include statewide energy collaboratives.

Examples from Elsewhere

A number of communities in California have established their own municipal energy offices. These range from large cities such as San José and Santa Monica to smaller communities including El Cerrito and Palm Desert. County-level energy offices have been established by the counties of Alameda, Riverside, and others. Activities can include public education and implementation of energy efficiency programs, often in collaboration with utilities. Staffing levels can range from one part-time position to an entire dedicated office with executive positions, specialists, and support staff. Cities such as Los Angeles and Palo Alto that operate municipal utilities naturally have large staffs dedicated to energy management as an integral part of utility operations, with a dedicated revenue stream to support them. Cities that do not have such revenue sources to support energy activities need to think creatively about funding. Local government energy offices within the service territories of investor-owned utilities such as PG&E may be funded in part, as the RCEA is, by ratepayer funds administered by the California Public Utilities Commission.

Regional energy authorities – San Diego Regional Energy Office

Non-profit energy offices – Community Energy Services Corporation of Berkeley

Resources

Key Links:

Redwood Coast Energy Authority, <http://www.redwoodenergy.org/>

Statewide Energy Efficiency Collaborative, <http://www.lgc.org/SEEC/index.html>

Local Government Sustainable Energy Coalition, <http://www.lgsec.org/>

U.S. Department of Energy Tribal Energy Program, <http://apps1.eere.energy.gov/tribalenergy/> includes descriptions of specific projects for which funding was provided to North Coast Tribes

Local Government Commission, Energy Resources and Publications, <http://www.lgc.org/freepub/energy/index.html>

Additional Links:

The California Air Resources Board's <http://www.coolcalifornia.org> (includes a useful “funding wizard,” a searchable database of climate change-related funding opportunities)

CA Energy Commission Local Government Assistance, <http://www.energy.ca.gov/localgovernment/>

Local Government Commission, Action Plan for CA Local Energy Programs, http://www.lgc.org/freepub/energy/guides/action_plan.html

The California Plug-In Electric Vehicle (PEV) Collaborative, <http://www.evcollaborative.org/>

The (California) Institute for Local Government, <http://www.ca-ilg.org/>

2. ENERGY EFFICIENCY AND RENEWABLE ENERGY

The Opportunity

County, municipal, and Tribal governments have a great opportunity to lead the way to energy sustainability on multiple fronts, as described throughout this document. First and foremost, local governments can set an example for the community and help stimulate the local market for green energy products and services by installing and operating high-profile demonstrations of energy-saving technologies and renewables in their own facilities.

Energy efficiency projects

Many options for improving energy efficiency can make sense in community facilities. Listed below are just a few.

Efficient buildings. Building energy use can be reduced by addressing the several factors that drive it:

- The building's outer surfaces, or envelope. The materials that make up the building envelope determine how much heat will enter and leave the building. Weatherization retrofits such as adding insulation or improving seals at doors and windows can make buildings more efficient at modest cost. For inland buildings, consider re-roofing with light colored materials to reduce summer cooling costs.
- The building's heating, cooling, and ventilation equipment. Upgrading old HVAC equipment can often be cost-effective. Where obsolete equipment is already scheduled for replacement, the extra investment to specify new equipment that exceeds energy code efficiency requirements usually offers a fast payback.
- The building's internal loads, including lights and plug-in equipment. Many low-cost approaches can be used to reduce the energy costs of these loads. Lighting upgrades are among the most cost-effective and easy-to-implement energy saving measures. Even buildings already lit with fluorescent lighting can upgrade to newer, more efficient fluorescent or light-emitting diode (LED) lighting. Office equipment such as computers, printers, and copiers include energy-saving features, but in many cases these features are not enabled.
- Decisions about how and when equipment is used. Scheduling of equipment reduces costs by avoiding unnecessary operation or taking advantage of off-peak power pricing in facilities that are on time-of-use electric rates. Scheduling can be implemented manually, but is more reliable when done with automated controls. Such controls can range from individual motion-sensing light switches to computerized, building-wide energy management systems.

Water and wastewater. For municipal governments and water districts, energy use in water and wastewater operations is a major expense – bringing with it big opportunities for energy savings or distributed generation. Nationally, treatment plants consume about 1,400 kWh per million gallons of surface water treated and 2,500 kWh per million gallons of wastewater treated. Water and wastewater operations are often the single largest category of electricity use for local governments.

Street and parking lot lighting. High pressure sodium (HPS) and metal halide (MH) lighting have long been the energy efficient standards for general-purpose outdoor illumination. Newer technologies such as LED and induction lighting are can be even more efficient, last longer between re-lamping (reducing maintenance costs), and unlike HPS and MH are compatible with dimming or bi-level operation, a big savings opportunity. Using motion sensing switches, bi-level illumination in parking lots and outdoor pedestrian areas can allow light levels to be reduced when no one is around, then immediately brought up to full brightness when needed.

Energy generation projects

Renewable energy is already being used at a number of public facilities in Humboldt County, but the potential for growth in this sector is enormous. Opportunities for combined heat and power (CHP) systems are also widespread.

Solar electric systems. Solar energy can be converted directly into electric energy using photovoltaic (PV) technology. The good news in the last couple of years is that PV prices have come down dramatically. In spite of this, PV is still the most expensive of commercial renewable energy technologies. Several local firms offer solar electric system sales and installation. As a rule of thumb, you can expect to generate approximately 15 to 20 kWh per square foot of solar array per year, assuming an unshaded, flat or south-facing roof. Many commercial and office buildings are able to offset a large portion of their electric use by covering their entire rooftop with a PV system.

Solar thermal systems. Solar thermal systems can be used to provide heat for domestic hot water, swimming pools, and in more limited cases, space heating. Several local companies offer solar thermal system sales, installation, and maintenance. Solar thermal systems are more economically attractive when they supplant propane or electric heat, as these options are more expensive to heat with than natural gas.

Biomass energy. Biomass energy is a natural choice for Humboldt County, where waste from the forest products industry and various land management practices generate a lot of woody material. Conventional biomass systems typically burn biomass to heat a boiler, which can either provide heat for buildings and industrial processes, or power a steam turbine to generate electric power. As noted earlier, biomass energy in central plants already accounts for a large fraction of power generation in the county, but there are opportunities to use biomass for distributed generation as well. A 2007 study by the Schatz Energy Research Center found that, based on systems commercially available at that time, an automated biomass heating system for a building would need to have a minimum capacity of approximately 1 million BTU per hour to be cost-effective. This implies a building of at least 20,000 square feet, based on a rule of thumb value of 50 BTU per hour heating capacity per square foot for residential and commercial buildings in cool climates. Combined heat and power systems using biomass would need to be even larger to justify their capital and operating costs. Newer emerging technologies such as gasification offer higher efficiency and lower emissions, but are not yet widely commercialized.

Other forms of “biogenic” energy may be viable at specific types of public facilities. Landfill gas is considered renewable by the state and can be captured and used to generate heat and/or

electric power. Other bioenergy resources include digester gas collected at wastewater treatment plants, food waste from the solid waste stream, and manure from dairy farms.

Other renewable energy technologies. Wind and hydroelectric power can both play important roles in Humboldt County's energy future. However, wind and water are highly site-specific resources that can only be exploited economically in a relatively small number of locations in the county. Furthermore, permitting processes for even small hydropower facilities can be daunting and time-consuming. If you think you have a site with wind or hydropower potential, consult with RCEA staff or a trusted renewable energy developer to get advice on performing a detailed resource assessment.

Combined heat and power. Combined heat and power, or cogeneration, refers to energy systems that generate on-site electrical power and also make use of the waste heat from a combustion process or other high temperature process. CHP systems can utilize renewable energy resources, like biomass, or can utilize fossil fuels like natural gas. In either case, CHP systems offer advantages due to their increased efficiency and cost savings potential. CHP systems are often sized to meet a facilities heating load, and the generated electrical power is used on-site, or if necessary can be sold back to the grid. Systems that are sized so that most or all of the waste heat is utilized can reach efficiencies of 70% to 80%. Electrical generators that can be used in CHP systems include internal combustion engines, gas turbines, microturbines, steam power plants and fuel cell generators.

Bundling Projects for Bigger Savings

Some energy projects, such as solar electric systems, may not be economically attractive on their own but can benefit local government in other ways, such as helping reduce carbon emissions or demonstrating clean energy technologies in a high-visibility location. Local leaders sometimes justify such projects by bundling them into a single large project, combining them with other opportunities that have quick energy savings paybacks, such as efficient lighting upgrades or building weatherization.

The Local Angle

A study of water and wastewater facilities operated by Humboldt County's city governments and community service districts found much aging infrastructure in need of replacement; replacing pumps and blowers with newer, energy efficient models and adding variable frequency drives to the motors driving these devices where appropriate can provide great cost savings (see ***Resources*** below).

Local public-sector buildings using PV in Humboldt County include Arcata City Hall, Humboldt State University, CalTrans, and numerous local schools. A one-time PG&E program brought 1-kW grid-tied PV systems to several rural schools, while a number of county schools (including Green Point Elementary, Arcata High, Equinox Center for Education, Freshwater, Garfield, and Jacoby Creek) have independently come up with resources to install significantly larger systems. The largest public-sector solar electric projects in Humboldt County that have received state rebates to date are on three CalTrans facilities in Eureka.

Solar thermal systems for domestic hot water have been used in many residential and small commercial buildings in Humboldt County. Systems on public buildings are relatively few, but one visible example is Redwood National and State Parks' Kuchel Visitor Center near Orick. This system provides hot water for the public and staff restrooms and has been operating since 2002. The system was designed and installed by Humboldt State University engineering students and funded by the University-National Park Energy Partnership Program (UNPEPP).

The City of Arcata recently demonstrated the project "bundling" approach with a set of projects funded by an Energy Efficiency and Conservation Block Grant (EECBG) from the U.S. Department of Energy. The bundle included: heating system upgrades in two city buildings, replacement of street lights with energy saving LED lights, air conditioning upgrades for police and information technology facilities, efficient indoor lighting retrofits, and controls that will limit runtime for pumps in wastewater aeration ponds. Not all of these projects would generate high economic returns on their own, but the bundle as a whole passed the city's return on investment criteria. They also bundled a rooftop solar electric system for City Hall along with quick payback efficiency measures in a previous project.

The City of Arcata also promotes energy efficiency through policies incorporated in both the General Plan (section RC-8b) and the Land Use Code (section 9.54.030). These policies require, among other things, energy performance exceeding state Title 24 requirements by at least 15% in "all City construction projects and all construction projects assisted by grants for which the City is an applicant" (language from General Plan). Fortuna goes a step farther, requiring energy efficiency levels exceeding Title 24 by 20% in large developments, as well as calling for proper building orientation and incorporation of wiring and plumbing stub-outs in new construction to make buildings "renewable ready."

The Yurok Tribe has also used EECBG for its tribal facilities in Humboldt County. In 2011 they completed energy efficiency upgrades and installation of a solar photovoltaic system on their Weitchpec tribal office funded by a one-time EECBG grant of approximately \$150,000.

At present, the Cummings Road landfill outside Eureka is equipped with a gas collection system as required by law, but the gas is simply being flared. Collecting the gas in landfills above a designated size is required by the U.S. EPA's Landfill Rule, originally promulgated under the Clean Air Act in 1996. Methane, the main constituent of landfill gas, is a far more potent greenhouse gas than the carbon dioxide to which the methane is converted by combustion. Several options have been explored for converting the landfill gas from the Cummings Road facility to a marketable energy product. As the landfill is currently undergoing earthworks operations as part of the final closure process with expected completion by the end of 2013, energy development is temporarily on hold. Humboldt Waste Management Authority (HWMA) will perform monitoring to determine post closure gas production rates and will analyze the technical and economic feasibility of energy project development.

The Eureka wastewater treatment plant (WWTP) has used anaerobic digester gas recovered from wastewater treatment processes to self-generate a significant portion of onsite electric use since the plant was built in 1984. Arcata's wastewater plant also uses digester gas as an energy

source, not for electric power generation but for heat to enhance and accelerate treatment processes. See the Background Technical Report for the Energy Element from the County General Plan Update for estimates of energy generation potential at other Humboldt County wastewater treatment plants.

Another innovative means of converting biomass to energy is through anaerobic digestion of food waste to produce energy-rich methane. HWMA has been investigating this technology and developing a pilot project since 2009. Such a project could potentially generate multiple forms of revenue through sale of renewable energy, soil amendments, and carbon offset credits. A request for proposals for the development, installation, start-up and commissioning of an anaerobic digestion system was released by HWMA in September 2012, and the agency began a pilot food waste collection program in October 2012.

Local government can also promote energy efficiency and renewable energy via its own procurement policies. The City of Arcata in 2006 adopted an “environmentally preferable purchasing policy” (www.yellowstonebusiness.org/datafiles/City_of_Arcata_GPP.docx) that encourages, among other things, purchasing of Energy Star labeled office equipment.

Humboldt State has two natural gas-fired cogeneration systems on campus. A 350-kW unit has been providing reliable electric and heat service to the cafeteria and dormitories since 1987, though its heat output appears to be significantly under-utilized. Campus personnel are currently investigating ways to make better use of the heat output. A second unit rated at 750 kW, located adjacent to the campus athletic complex, has been problematic in operation and is currently off-line, but it is undergoing upgrades and is expected to be re-activated in the near future.

Examples from Elsewhere

The Sonoma County Water Agency, the largest energy user in that county, has launched a Carbon Free Water by 2015 initiative. SCWA is implementing a wide array of programs and projects to meet this ambitious goal of making all its operations carbon neutral on a fast timeline. The agency has installed 2 MW of solar photovoltaic systems at its administration building and wastewater treatment plants. It has installed 13 electric vehicle charging stations and replaced 22% of its fleet with hybrid and plug-in hybrid vehicles. SCWA is also pursuing legislative and policy measures to advance its carbon-free goal and has forged partnerships with 35 public and private entities to leverage their assistance.

Resources

Sonoma County Water Agency’s “Carbon Free Water by 2015” initiative
www.scwa.ca.gov/carbon-free-water

Energy Efficiency:

Redwood Coast Energy Authority Energy Watch Program,
<http://www.redwoodenergy.org/service/business>

PG&E Save Energy and Money: <http://www.pge.com/mybusiness/energysavingsrebates/>

American Council for an Energy Efficient Economy, Local Energy Efficiency Policy

<http://www.aceee.org/portal/local-policy>

<http://www.aceee.org/portal/commercial>

<http://www.aceee.org/portal/residential>

Institute for Local Government, Energy Efficiency and Conservation

<http://www.ca-ilg.org/energy-efficiency-conservation>

RCEA's 2004 workshop on water, wastewater, and energy in Humboldt County

<http://redwoodenergy.org/resources/document-archive> (scroll down to "Water Pumping and Wastewater Treatment Efficiency" for a set of presentations)

CEC Process Energy - Water/Wastewater Efficiency web page:

http://www.energy.ca.gov/process/water/eff_water.html

City of Arcata Resolution No. 056-46 Adopting an Environmentally Preferable Purchasing Policy:

www.yellowstonebusiness.org/datafiles/City_of_Arcata_GPP.docx

Energy Generation:

Renewable Energy Assistance Packet: A Compendium of Resources for Local Governments, Third Edition, Jan. 2003, prepared by the Local Government Commission:

http://www.lgc.org/services/docs/spire/spire_reap_3rd_edition.pdf

California Solar Initiative, <http://www.gosolarcalifornia.ca.gov/csi/index.php>

California Solar Initiative Solar Water Heating Program,

<http://www.gosolarcalifornia.ca.gov/solarwater/index.php> or

<https://energycenter.org/index.php/incentive-programs/solar-water-heating>

Wood-Chip Heating Systems: A Guide For Institutional and Commercial Biomass Installations, Biomass Energy Resource Center, <http://www.biomasscenter.org/pdfs/Wood-Chip-Heating-Guide.pdf>

EPA Combined Heat and Power Partnership, <http://www.epa.gov/chp/>

Regional group purchase program for municipal solar PV projects in Napa/Sonoma/Marin Counties: <http://www.solarroadmap.com/seed/>

3. GREEN FLEETS / ALTERNATIVE FUEL VEHICLES

The Opportunity

Transportation accounts for nearly half of Humboldt County's energy end use, with virtually all of this energy imported from outside the county in the form of refined gasoline and diesel fuel barged or trucked into the county. Local governments can help the region move toward more sustainable transportation options by promoting the use of alternative transportation fuels, especially local and renewable fuels. This can include purchasing alternative fuel vehicles for municipal fleets, promoting and/or installing infrastructure to support alternative fuel vehicles (e.g., electric vehicle charging stations), and providing incentives, like free parking for electric vehicles. Municipalities can also work to streamline permitting and adopt zoning that is friendly to the installation of electric vehicle charging infrastructure.

Alternative fuel vehicles are a broad category of vehicles that includes those that run on renewable fuels, electricity (which can of course be generated renewably), or non-renewable fuels that burn cleaner than gasoline or diesel, such as natural gas or propane. We focus here on renewable fuels and electricity.

Propulsion technologies that can make use of renewable energy include:

- biofuel powertrains that can run on ethanol or biodiesel, or blends of these biofuels with conventional fuels
- all-electric vehicles
- standard hybrid vehicles
- plug-in hybrid vehicles
- hydrogen vehicles

Biofuels

The most widely used biofuels are ethanol and biodiesel. Most ethanol sold in the U.S. is derived from corn, and it is mostly sold as an E85 blend, or 85% ethanol mixed with 15% gasoline. Vehicles must be "flex fuel" rated to use this blend. Blends with lower ethanol levels, such as E15, can be operated in unmodified gasoline engines. There has been considerable controversy among scientists, environmentalists, and ethanol producers over the environmental benefits of corn-based ethanol. Some research has suggested that, gallon for gallon, corn ethanol may produce net carbon emissions as high as or, in some cases, even higher than those of gasoline. Current research on ethanol is focused on production methods that can provide greater environmental benefits, with one major emphasis being the development of cost-effective methods of producing ethanol from cellulosic feedstock, rather than the sugars or starches derived from feedstocks such as corn. In Humboldt County, the forest products industry and fuel reduction efforts in public forestlands could provide ample supplies of such cellulosic feedstock.

Plant-derived biodiesel can be used as a substitute for petroleum diesel. It is intended for use in unmodified engines, though there may be problems using biodiesel at or near freezing temperatures. Some local producers of biodiesel have specialized in recycling used fryer fat

from restaurants to produce fuel. This offers a fuel with a very small environmental footprint; however, the availability of such used oil is not sufficient to replace more than a small fraction of the diesel fuel currently in use for transportation.

Electric Vehicles and Hybrids

All-electric vehicles (i.e., battery-electric vehicles) do not directly emit air pollution; however, when they are charged from the electric grid emissions are often generated at the power plant. However, except in areas of the country dominated by coal-fired power generation the use of electric vehicles results in a reduction in air pollution and greenhouse gas emissions. In a location like Humboldt County, where a large portion of the locally generated power comes from renewable energy sources, the benefits are even greater, and as the grid gets “greener” the electric vehicles get “greener” as well. The cost of energy per mile is a fraction of the fuel cost for a comparably sized gasoline vehicle. However, today’s electric vehicles are generally restricted to a range of 50 to 100 miles between battery charges, and the charges can take several hours. Despite this limitation, battery electric vehicles are a great choice for vehicles dedicated for local use.

Light-duty hybrid passenger vehicles have become popular over the past decade. They include a downsized internal combustion engine and improve overall vehicle efficiency by supplementing the engine with an electric motor. A large battery stores energy for the motor, and regenerative braking captures energy normally dissipated as heat to help recharge the battery. A number of different drive configurations used by auto manufacturers determine how the engine and electric motor work together to power the vehicle. Hybrid drive systems have also been introduced in the bus and large truck markets to improve efficiency of these vehicles and reduce emissions.

Plug-in hybrid electric vehicles, or PHEVs, improve on the hybrid paradigm by allowing the vehicles to be driven in a clean, all-electric mode. By plugging in the vehicle whenever it’s not in use, the driver can take advantage of enlarged battery capacity to make relatively short commute trips entirely in electric mode. This allows the vehicle to enjoy the same environmental benefits of battery-electric vehicles, while preserving the valuable ability to make long trips of hundreds of miles between refuelings using the gasoline engine in normal hybrid mode.

Hydrogen Fuel Cell Vehicles

Hydrogen fuel is another emerging transportation energy option. Fuel cell vehicles are highly efficient and emit no pollutants (though the hydrogen production process may produce emissions, depending on the technology used). While all-electric vehicles are range-limited by current battery technology, fuel cell cars being road-tested today are capable of traveling well over 300 miles between refuelings. Fuel cell vehicles are very close to commercial deployment, with Toyota planning to offer its FCHV-adv for sale by 2015 and other car makers close behind. Honda’s FCX Clarity is already available for lease on a limited basis in the Los Angeles area. Fuel cell vehicles are also being used in public transportation, including a fleet of fuel cell buses operated by AC Transit in the San Francisco Bay Area.

The State of California maintains a database of incentives for light-duty alternative fueled vehicles (see [Resources](#) below). The California Air Resources Board (ARB) operates a Clean Vehicle Rebate Project offering consumer rebates of up to \$2,500 for purchase of zero emission and plug-in hybrid vehicles.

The federal government also offers incentives in the form of tax credits for purchase of fuel efficient vehicles. Plug-in hybrids and battery electric vehicles listed as eligible qualify for a \$7,500 tax credit (see [Resources](#) below).

For heavy vehicles, the ARB sponsors a Hybrid Truck and Bus Voucher Incentive Program (HVIP). This program offers incentives of up to \$30,000 per vehicle for fleet operators that purchase eligible vehicles. The vouchers are intended to offset approximately half of the price premium associated with choosing a fuel-saving hybrid vehicle over an equivalent standard vehicle (see [Resources](#) below).

The Local Angle

The City of Arcata includes several hybrid and flex-fuel vehicles in its municipal fleet. Arcata institutionalized its municipal commitment to clean and efficient transportation by adopting Resolution 078-14, a “green fleet” policy. The policy states that “[f]uel efficiency shall be a top priority in the procurement of vehicles,” encouraging the City to procure energy-efficient vehicles and clean fuels. The Redwood Transit Authority includes three diesel-electric hybrid buses (acquired in 2007) in its fleet of 19 revenue vehicles.

The Humboldt Bay Harbor Commission has operated a fleet of four GEMS electric cars for the past ten years that are used in the harbor area by the Woodley Island Maintenance department and security guards 24 hours a day, seven days a week. The cars are GEM (Global Electric Motorcar) brand and represent 40% of the fleet for the Harbor District. The Harbor District has been satisfied with these vehicles and is currently seeking funds to replace them with new electric vehicles as they reach the end of their useful lives.

The RePower Humboldt strategic plan calls for widespread adoption of plug-in vehicles, both all-electric and plug-in hybrid. The RCEA, the Schatz Energy Research Center and GHD are currently developing a plug-in electric vehicle readiness plan for the North Coast. Outcomes from this study will include a plan for deploying electric vehicle charging stations in the region, guidelines for streamlining the permitting of electric, plans to accelerate adoption of electric fleet vehicles, and education and outreach efforts to the community. The results of this study are expected to become available by March of 2014. Additional information can be found at <http://www.redwoodenergy.org/programs/electric-vehicles>.

The Blue Lake Rancheria is in the process of developing an onsite biodiesel fuel production system. The process will utilize waste oil from the Tribe's commercial kitchens to create biodiesel fuel, which will be used to run the Blue Lake Rancheria Transit System (BLRTS) buses. The facility is expected to be operational in 2014. The estimated production is 7,500 gallons of biodiesel fuel per year. Primary beneficial results of using biodiesel are reduced fuel costs, estimated at \$3,500 in annual savings, and reduced greenhouse gas emissions.

(estimated reductions are 100 tons per year) to help mitigate climate change. Fuel cost savings will be used to maintain and expand transit service.

Regarding fuel cell vehicles, an important hurdle to clear for widespread adoption is the need for fueling infrastructure. Humboldt State University and the Schatz Energy Research Center have operated a hydrogen fueling station and a small fleet of hydrogen vehicles at the HSU campus since 2008, one of some two dozen that currently make up the state's nascent "Hydrogen Highway" network.

Examples from Elsewhere

Since 2008, an annual "Government Green Fleets" competition has been organized by the U.S. Department of Energy's Clean Cities coalitions and sponsored by *Government Green Fleet* magazine. 40 fleets received awards in 2012, with three California fleets scoring in the top ten:

- City of Riverside (first place nationally)
- City of Sacramento
- County of Sonoma

Criteria for selecting Green Fleets winners include:

- fleet composition, the mix of conventional fueled, hybrid, electric, and alternative fueled vehicles
- fuel and emissions, encompassing use of renewable and alternative sources of energy and measures taken to clean up diesel emissions
- policy and planning, including commitment to and budget for future green vehicle purchases
- fleet utilization, which considers assignment of appropriately sized vehicles for specific uses and programs such as car sharing
- education, including efforts made by fleet managers to stay up-to-date on new and emerging technologies
- executive and employee involvement, efforts made by the fleet manager to keep management and staff informed about and committed to green fleet objectives

Resources

US DOE Alternative Fuels Data Center: <http://www.afdc.energy.gov/>

California's Alternative and Renewable Fuel and Vehicle Technology Program: <http://www.energy.ca.gov/drive/>

Clean Cities Program: <http://www1.eere.energy.gov/cleancities/>

Government Green Fleet Award: http://www.the100bestfleets.com/gf_about.htm

CA Plug-in Electric Vehicle Collaborative: <http://www.evcollaborative.org/>

The Humboldt State University Hydrogen Fueling Station: <http://www.schatzlab.org/projects/hydrogen/h2stn.html>

Vehicle Buyers Guides:

US EPA Green Vehicle Guide: <http://www.epa.gov/greenvehicles/Index.do>

Clean Cities Vehicle Buyers Guide: <http://www.afdc.energy.gov/pdfs/51785.pdf>

CA Drive Clean Buying Guide: <http://www.driveclean.ca.gov/>

Incentives:

California Air Resources Board's database of incentives for light-duty alternative fueled vehicles
www.driveclean.ca.gov

California Air Resources Board Hybrid Truck and Bus Voucher Incentive Program (HVIP)
www.californiahvip.org/

U.S. Department of Energy information on tax credits for purchase of fuel efficient vehicles
www.fueleconomy.gov/feg/taxcenter.shtml

4. FINANCIAL BENEFITS OF GENERATING YOUR OWN ELECTRICITY

The Opportunity

There are a number of options whereby local and Tribal governments can realize financial benefits from renewable energy generation. These options can include using the energy on-site in lieu of purchasing energy, selling the energy, receiving a utility credit for energy generation that partially offsets purchased energy, or even selling credits for the environmental benefits associated with the renewable energy separately from the energy itself.

First, a word about **off-grid power**. Until about the turn of the new century, this was the only option for using renewable electricity generated on-site without going through the arduous process of becoming FERC-certified as a Qualifying Facility (see discussion below). With the advent of grid-intertie equipment, utility interconnection agreements, and net metering laws, it now makes much more economic and practical sense to connect your facility's renewable energy generating system to the grid than to maintain an off-grid system. Off-grid power requires costly, high-maintenance batteries and careful energy budgeting to avoid depleting the batteries. Only in rare instances where a remote facility such as a telecommunications repeater or water storage tank is located far from existing power lines is it cost-effective for local government to invest in an off-grid system.

Net metering is a straightforward system for crediting grid-connected renewable energy generation at metered utility customer sites. Under net metering, renewable power fed to the grid by the customer is credited to the customer's account at the same rate per kWh as the customer pays the utility for energy consumed. Customers can produce excess power during some billing periods and use those credits during other periods. The utility trues-up bills on an annual basis. If an annual excess of electricity is produced the customer can be compensated at the utility's net surplus electricity compensation rate, which over the last couple of years has been 3¢ to 4¢ per kWh. Net metering in California applies to individual systems of up to 1 MW, and state law requires utilities to accommodate net metering until the aggregate capacity of the net metered systems constitute 5% of the utility's peak demand.

Recent modifications to California's net metering law make all renewable energy technologies in the state's Renewables Portfolio Standard eligible for net metering and permit "virtual net metering" for customers with multiple meters. This includes multi-family residential accounts, where renewable energy fed to the grid through one meter can be credited to other meters on the same multi-family service. More recently virtual net metering has been expanded to include any customer who wants to aggregate multiple meters provided the meters are on contiguous or adjacent properties and the properties are owned, leased or rented by the customer.

Most grid-connected rooftop solar photovoltaic energy systems around Humboldt County are net metered. Even many larger systems, such as the 100 kW system at the Potawat Health Village in Arcata use net metering arrangements. Based on California Energy Commission data, it is estimated that there is approximately 2 MW of net metered rooftop solar capacity in Humboldt County.

The **Renewable Energy Self-Generation Bill Credit Transfer or RES-BCT** is a new program that may be a useful mechanism to help local governments meet their energy needs using renewable power. According to the California Public Utilities Commission, “RES-BCT tariffs allow local governments to generate electricity at one account and transfer any available excess bill credits (in dollars) to another account owned by the same local government.” However, the RES-BCT program is not net metering, as only the generation component of the bill is counted toward the bill credit. This makes this program much less attractive compared to net metering. Consequently, as of the 2nd quarter of 2012 there were no participants in PG&E’s RES-BCT program (which started in about 2009). Local governments that are PG&E customers can apply for the RES-BCT tariff for facilities that receive bundled time-of-use electric service. The generating facility must be an eligible renewable generator as defined by the state and cannot exceed 5MW capacity. The tariff is only available until PG&E reaches a cap of 105.25 MW generating capacity across its service territory. The local government retains ownership of the Renewable Energy Credits (RECs) associated with the energy.

Feed-in tariffs are a way of compensating renewable energy generators that originated in Europe and have recently begun to be adopted in some states in the U.S. The National Renewable Energy Laboratory defines feed-in tariffs broadly as “a publicly available, legal document, promulgated by a state utility regulatory commission or through legislation, which obligates an electric distribution utility to purchase electricity from an eligible renewable energy seller at specified prices (set sufficiently high to attract to the state the types and quantities of renewable energy desired by the state) for a specified duration; and which, conversely, entitles the seller to sell to the utility, at those prices for that duration, without the seller needing to obtain additional regulatory permission.” Feed-in tariffs are essentially standardized power purchase agreements (PPAs), and are intended to make it easier for small power producers and distributed generators to sell electric power on the grid.

Feed-in tariffs are generally not as lucrative on a per-kWh basis as the full retail rates at which net metering arrangements compensate power producers, but they need to be well above the “avoided cost” rates applicable to Qualifying Facilities in order to meet the “attractiveness” criterion described above. Feed-in tariffs are intended for generators who expect to produce a net surplus of energy beyond their own facilities’ needs. A recent report by NREL points out that states face the challenge of designing feed-in tariffs in a way that avoids conflict with federal laws, specifically PURPA and the Federal Power Act.

As of February 2012, PG&E lists 97 feed-in tariff contracts in its service territory, including solar photovoltaic, geothermal, digester gas, landfill gas, and small hydro projects ranging from 38 kW to 1,500 kW (the maximum allowed under PG&E’s feed-in tariff). None of them are in Humboldt County. At the time of publication, all of PG&E’s state-mandated capacity under their E-SRG feed-in tariff (104.6 MW) has been allocated, and PG&E is not executing new contracts. There is just over 100 MW of available feed-in tariff capacity under PG&E’s E-PWF feed-in tariff. The E-PWF electric schedule is only available to public water and wastewater facilities. Also, there is currently a CPUC rule making underway that will modify the feed-in tariff program and allow some additional capacity (see:

<http://www.cpuc.ca.gov/PUC/energy/Renewables/hot/feedintariffs.htm>). Additional standardized power purchase agreements are available from PG&E under their AB 1613 CHP and their Qualifying Facility and CHP procurement programs.

California's **Renewables Portfolio Standard** (RPS) was established in 2002 requiring utilities to meet stipulated minimum levels of renewable energy in their procurement portfolios. Senate Bill 2, implemented in 2011, requires California's investor-owned utilities, including PG&E, to procure at least 33% of their electricity from renewable sources by 2020. The RPS is administered jointly by the California Public Utilities Commission and the California Energy Commission. Generators of renewable energy must complete a process of certification by the state in order for energy they sell to PG&E or other California utilities to be counted toward the utility's RPS goal (see **Resources** below).

Note that RPS certification is not in itself a mechanism for selling power to a utility. It is, however, a critical step for a renewable generator that hopes to sell bulk power to a utility; without RPS certification, the energy is worth less to the utility as it does not help the utility meet its RPS mandate.

To meet customer load, utilities regularly purchase wholesale electric energy and capacity from generators and suppliers. These competitive transactions are often facilitated via solicitations and requests for offers (RFOs). For example, PG&E has RFOs available for purchasing combined heat and power, solar PV and other RPS eligible power. These competitive transactions are typically more complicated and therefore less well suited to smaller generators, however, some of these competitive solicitations are eligible to generators as small as 1 MW.

As of February 2012, the California Energy Commission's database of RPS-eligible projects lists 1,846 projects, though many of these are listed as "pre-certified." In Humboldt County, the database lists the operating wood waste-fired plants at Scotia, Fairhaven, and Blue Lake and a few small hydroelectric plants.

The Public Utility Regulatory Policy Act of 1978 defines the concept of **Qualifying Facilities** that cogenerate and/or produce electricity from renewable resources. Utilities are obligated to purchase this energy at their "avoided cost" rate, i.e., what it would cost the utility to self-generate the energy or otherwise procure it. This results in a guaranteed market for QF energy, but at a lower selling price than those available through newer mechanisms such as net metering or feed-in tariffs. PURPA has become less relevant in recent years as old QF contracts expire and other mechanisms for selling renewable energy have emerged. As of January 2013, there are four QFs operating in Humboldt County: the Fairhaven biomass power plant (17,250 kW), and three hydropower plants of 25 kW, 995 kW, and 1,500 kW capacity.

Table 2 summarizes the options available to renewable power generators in PG&E territory to be compensated for energy they feed to the grid.

Table 2. Contracting Options for Renewable Generators via PG&E (based on PG&E and CPUC information)

Option	Technology Type	Generator Size Limit	Value of energy used onsite	Value of exported energy	Availability (as of Jan. 2013)
Self-generation with no export	All	No energy export	Retail rate	No energy export	Yes
Net Metering	All RPS eligible renewables	≤ 1 MW	Retail rate	Retail rate up to annual consumption, market wholesale rate for incidental excess (~4¢/kWh)	Until 5% of aggregate customer peak demand is reached
Local Government Renewable Energy Self-Generation Bill Credit Transfer Program (RES-BCT)	All RPS eligible renewables	≤ 5 MW	Retail rate	Retail rate for generation component of energy charges only applied to designated eligible benefiting accounts	Until 105 MW reached
Feed-In Tariff (E-SRG/E-PWF, etc.)	All RPS eligible renewables	≤ 3 MW (per SB 32)	Retail rate	Wholesale rate based on market price	E-SRG closed, E-PWF until 102 MW reached, additional capacity also being added
AB 1613 CHP Program	CHP only, >62% total efficiency	≤ 20 MW	Retail rate	Wholesale rate based on market price	Yes, no cap
QF and CHP Procurement Program	QF eligible renewables/ CHP	≤ 80 MW for renewables, no restriction for CHP	Retail rate	Wholesale rate based on short run avoided cost and fixed capacity price	PG&E procurement target is 1,387 MW
Renewable Auction Mechanism (RAM)	All RPS eligible renewables	3 to 20 MW	Retail rate	Competitive, negotiated price	Periodic RFOs
Combined Heat and Power RFO	CHP only	> 5 MW	Retail rate	Competitive, negotiated price	Periodic RFOs
Renewables RFO	All RPS eligible renewables	> 1.5 MW	N/A	Competitive, negotiated price	Periodic RFOs
Solar PV PPA RFO	Solar PV	1 to 20 MW	N/A	Competitive, negotiated price	Periodic RFOs

Examples from Elsewhere

Alameda County was able to leverage \$28 million in incentives and rebates to offset more than half the cost of its \$50 million in capital energy projects implemented during 1987-2012 (see link to presentation in ***Resources*** below). Projects installed have included twelve solar power systems totaling 3.7 MW, a fuel cell cogeneration system, and a net-zero-energy public library building. In Alameda County's case, the energy generation projects profiled in the presentation, including a large hybrid solar photovoltaic/fuel cell system at the Santa Rita County Jail are sized to meet onsite electric (and in some cases, heat) needs and thus make use of net metering arrangements.

Resources

PG&E's California Solar Initiative (CSI) page www.pge.com/csi/

Self-Generation Incentive Program

<http://www.pge.com/mybusiness/energysavingsrebates/selfgenerationincentive/>

List of energy technologies and resource types eligible for California RPS

<http://www.cpuc.ca.gov/PUC/energy/Renewables/FAQs/01REandRPSeligibility.htm>

PG&E's Net Energy Metering web page

<http://www.pge.com/mybusiness/customerservice/nonpgeutility/generateownpower/netenergymetering/>

PG&E Feed-in Tariffs

<http://www.pge.com/b2b/energysupply/wholesaleelectricssolicitation/standardcontractsforpurchase/>

CPUC Feed-in Tariff web page

<http://www.cpuc.ca.gov/PUC/energy/Renewables/hot/feedintariffs.htm>

PG&E RES-BCT Tariff

<http://www.pge.com/mybusiness/customerservice/nonpgeutility/generateownpower/ab2466/>
http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_RES-BCT.pdf

Presentation on Alameda County's energy management program

www.lgc.org/events/docs/seec/seec_webinar11_muniz_041912.pdf

5. FUNDING OPPORTUNITIES

The Opportunity

As described earlier, there are many opportunities for local and Tribal governments to lead by example in the community, incorporating sustainable energy projects in their buildings and vehicle fleets. Of course, in these times of public sector austerity, this is easier said than done. Nonetheless, there are a number of ways municipalities can overcome the cost barrier to implementing such projects:

- **Municipal bonds.** These are essentially a loan from the private-sector purchaser(s) of the bond, with the interest (typically tax-free) repaid over time and the principal repaid at the bond's maturity date. Bonds are usually seen as a "safe" financing mechanism. However, some types of bonds have come under recent scrutiny for unattractive terms that require public agencies to pay what cumulatively comes to several times the principal amount.
- **Performance contracting.** Under this mechanism, private energy service companies (ESCOs) provide financing and installation of energy projects, making their return on investment through shared savings with the client.
- **Grants** from federal, state, and private sources. The obvious appeal of grants is that they do not require repayment. However, competition for grants is stiff, and funders like to see their support used for high profile projects that can be emulated elsewhere, leveraging the funder's limited funds.
- **Rebates and cash incentives.** Rebates and incentives can come from utilities, equipment manufacturers, and in some cases state and federal government (as in the California Air Resources Board-funded Clean Vehicle Rebate Project) as a mechanism to steer local government toward cleaner technologies.
- **Loans.** Access to credit became more difficult in the wake of the recent recession. However, there are still options for local government. The California Energy Commission offers 1% interest loans of up to \$3 million to public agencies for energy efficiency and energy generation projects.
- **Enterprise funds.** Some government programs are self-funded through an enterprise fund; for example, a program providing bulk purchase of solar equipment for residential or commercial users might be set up in a way that avoids directly or indirectly subsidizing individual citizens or businesses at public expense. Participation costs would in this case be set to cover all agency costs including personnel, facilities, insurance, etc. Sometimes enterprise fund revenues generated through energy-related activities, such as permitting fees for energy infrastructure, are used to support staffing costs for a permanent municipal energy program or office.
- **Surcharge on departmental energy bills and/or reinvestment of energy dollar savings/revenues.** These are two creative mechanisms that can be used to redirect local government dollars between departments to ensure the agency gives energy efficiency high priority. (See *Examples from Elsewhere* below).
- **Revenue from special-purpose taxes.** Where local government assesses a tax as a disincentive to behavior deemed opposed to the public interest, such revenues might be

put to a related use that promotes the public interest in the same arena. Tobacco taxes used to provide anti-smoking public education are one such example. Locally implemented carbon taxes and high energy use taxes bring this idea into the energy realm.

Tribal governments can look to the Department of Energy's Tribal Energy Program as an excellent resource for information on funding opportunities for which Tribes are eligible to apply (see [Resources](#) below).

The California Statewide Communities Development Authority (CSCDA) operates an Energy Finance Program for local governments and non-profit organizations, which includes two main components. One is a Sustainable Energy Bond Program, which provides tax exempt bonds for a variety of energy upgrades (see [Resources](#) below). The other is CaliforniaFIRST, a multi-jurisdiction Property Assessed Clean Energy (PACE) program (see Section 8 for details).

The California Energy Commission's Public Programs Office operates programs focused on providing technical assistance to local governments. Services available from this office include the Bright Schools Program and the Energy Partnership Program.

PG&E offers its business and government customers an On-Bill Financing Program, through which customers can pay for qualifying energy upgrades interest free via a line item on their bill. Loans can be paid off over a period of up to 60 months. Maximum loans are \$100,000 for business customers and \$250,000 for government agencies.

Opportunities exist for up-front rebates or incentives to offset part of the capital costs of energy projects at the time of construction. Rebates for solar photovoltaic systems on commercial buildings (including government buildings) in California fall under the California Solar Initiative (CSI) program. PG&E serves as administrator for the CSI program in its service territory. To be eligible, projects must be grid-connected and use equipment approved by the California Energy Commission. Other rebates may be available for energy efficiency measures such as motor and pump replacements. Rebate offers from utilities and equipment manufacturers change frequently, so staff should inquire about what is currently available.

Note that the long-term trend appears to be away from up-front, capacity-based incentives (i.e., payment based on kW size of the system) toward production-based incentives that more accurately compensate project owners based on the real, site-specific performance of an energy system. This trend has been enabled in part by technology advances that make it easier to track and share energy production data.

The Local Angle

Municipal bonds have been used locally to pay for energy efficiency and renewable energy projects. Measure Q, approved by nearly 60% of voters in November 2010, authorized the Northern Humboldt Union High School District to issue and sell bonds up to a maximum of \$25.8 million, to provide financing for a number of school infrastructure improvements at Arcata and McKinleyville High Schools, including installation of energy efficient windows, replacement of outdated heating, ventilation, air conditioning systems, and lighting systems to be more

energy efficient, and unspecified “green” building projects and sustainable building practices, including solar energy.

A number of local public-sector energy projects were enabled by one-time funding from the American Recovery and Reinvestment Act (ARRA) via Energy Efficiency and Conservation Block Grants (EECBG) from the U.S. Department of Energy. In addition to the City of Arcata’s and the Yurok Tribe’s EECBG-funded projects mentioned earlier, other local governments performed EECBG projects (see [Resources](#) below). Future availability of EECBG grants is not known at this time.

Energy Conservation Assistance Act (ECAA) Program Loans with a 1% interest rate are available from the California Energy Commission. According to the program website, only one loan has been issued in Humboldt County in the past three years, to the McKinleyville Community Services District for a pump upgrade (see [Resources](#) below).

Examples from Elsewhere

Alameda County has used innovative mechanisms to fund its energy projects. For one, in 1995 they implemented a utility surcharge on county facilities. The surcharge has varied over time from 8-11% and is applied to all electric, natural gas, water/sewage, refuse, and energy loan debt service charges. This surcharge was approved by the County’s CAO and Auditor and was established to fund salaries and benefits for the County’s Energy Program staff. The surcharge is justified by overall annual energy savings that have been achieved from energy efficiency and distributed generation projects that the program staff implement. Staff time is charged against this surcharge fund rather than directly to any given project, which makes it easier to keep individual project budgets in line. In addition, the County created an Energy Fund in 2003, which is used to fully fund small projects or partially fund large projects. This fund pools incentives, rebates, and refunds received from PG&E for various projects (see [Resources](#) below).

Boulder, CO has made an end-run in 2006 around years of debate on whether to establish national or state carbon taxes by implementing their own municipal carbon tax, said to be the first in the nation. Specifically, the City collects about \$2 million a year in taxes on electricity use, using the revenues to pay for energy efficiency and renewable energy programs. In 2012, 82% of Boulder voters chose to keep the program in place for another five years.

One specific example of an entity created specifically to establish bond financing for clean energy projects is the Sonoma County Efficiency Financing (SCEF) Program, launched by the Sonoma County Water Agency. SCEF has pre-qualified a number of Energy Service Companies (ESCOs) to implement projects financed by SCEF. Schools, government agencies, and non-profit organizations are eligible to receive energy upgrades through the program.

The City of San José established a revolving Energy Fund, with energy cost savings from projects used to replenish the fund. A valuable lesson learned from San José’s experience is that, though they originally intended to use monitoring to measure actual energy savings, they determined this would be very challenging given extraneous variables such as weather and unrelated changes in building equipment and occupancy. For the time being, they have decided

to instead use a third-party energy auditor's estimate of savings to determine how much money to direct back to the fund (see *Resources* below).

Resources

General Resources:

CoolCalifornia.org, Funding Wizard for finding grants, incentives and rebates for sustainable projects

<http://www.coolcalifornia.org/funding-wizard-home>

Local Government Commission, Energy Funding Opportunities

<http://www.lgc.org/freepub/energy/funding.html>

CEC report "How to Finance Public Sector Energy Efficiency Projects"

http://www.energy.ca.gov/reports/efficiency_handbooks/400-00-001A.PDF

Statewide Energy Efficiency Collaborative, "Best Practices" for program funding

<http://californiaseec.org/documents/best-practices/best-practices-for-energy-managers>

<http://californiaseec.org/documents/best-practices/best-practices-alameda-county-ac-fund>

<http://californiaseec.org/documents/best-practices/city-of-san-jose-santa-clara-county>

Renewable Energy Assistance Packet: A Compendium of Resources for Local Governments, Third Edition, Jan. 2003, prepared by the Local Government Commission

http://www.lgc.org/services/docs/spire/spire_reap_3rd_edition.pdf

California Financial Opportunities Roundtable, *Access to Capital*, August 2012

<http://www.rurdev.usda.gov/Reports/CA-CalFOR.pdf>

Specific Programs:

PG&E's California Solar Initiative (CSI) page www.pge.com/csi/

PG&E Energy Efficiency Rebates

<http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/>

PG&E On-Bill Financing Program

<http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/taxcredit/onbillfinancing/>

Self-Generation Incentive Program

<http://www.pge.com/mybusiness/energysavingsrebates/selfgenerationincentive/>

California Energy Commission's 1% interest energy efficiency/energy generation loan program

<http://www.energy.ca.gov/efficiency/financing/>

California School Boards Association FlexFund Program (financing program)

<http://www.csba.org/Services/Services/FinancialServices/FlexFund.aspx>

California Statewide Communities Development Authority Energy Finance Programs
<http://www.cacommunities.org/energy-finance-programs/>

California Statewide Communities Development Authority Energy Finance Program
<http://www.cacommunities.org/energy-finance-programs/>

California Alternative Energy and Advanced Transportation Financing Authority
<http://www.treasurer.ca.gov/caeatfa/>

Energy Conservation Assistance Act (ECAA) Program Loans
<http://www.energy.ca.gov/efficiency/financing/calmap/county/> and
<http://www.energy.ca.gov/efficiency/financing/calmap/county/counties/humboldt.pdf>

California Energy Commission's Public Programs Office (Energy Partnership & Bright Schools Programs) http://www.energy.ca.gov/efficiency/public_programs.html

DOE Tribal Energy Program
http://apps1.eere.energy.gov/tribalenergy/financial_opportunities.cfm

Case Studies/Examples:

Presentation on Alameda County's energy management program
www.lgc.org/events/docs/seec/seec_webinar11_muniz_041912.pdf

City of San Jose's Energy Fund
http://www.lgc.org/freepub/docs/energy/case_studies/SanJose_EnergyFund.pdf

Measure Q (Northern Humboldt Union High School District)
www.smartvoter.org/2010/11/02/ca/hm/meas/Q/

Regional group purchase program for municipal solar PV projects in Napa/Sonoma/Marin Counties <http://www.solarroadmap.com/seed/>

List of Humboldt County projects supported by U.S. Department of Energy ARRA funds, 2009
<http://projects.propublica.org/recovery/locale/california/humboldt/dept/8900>

Sonoma County Efficiency Financing (SCEF) Program
<http://www.scwa.ca.gov/scef/>

Energy Service Companies (ESCOs):

National Association of Energy Service Companies (NAESCO) <http://www.naesco.org/>

California Department of General Services list of ESCOs
<http://www.dgs.ca.gov/resd/Programs/greenbuilding.aspx>

Alternative Fuel Vehicle Incentives:

California Air Resources Board's database of incentives for light-duty alternative fueled vehicles
www.driveclean.ca.gov

California Air Resources Board Hybrid Truck and Bus Voucher Incentive Program (HVIP)
www.californiahvip.org/

U.S. Department of Energy information on tax credits for purchase of fuel efficient vehicles
www.fueleconomy.gov/feg/taxcenter.shtml

6. ENERGY PURCHASE AND PRICE OPTIONS AND INFORMATION ON ENERGY USE

The Opportunity

As energy consumers local municipalities have numerous choices regarding how they purchase their energy, what utility programs they participate in, and what information they choose to receive. A change that has gradually been taking place in the electricity industry over the last couple of decades is that utilities are moving toward time-varying pricing schemes that more accurately reflect the true cost of providing electricity as it varies by time-of-day and season. This creates an incentive for customers to lower their usage during periods when power is more expensive, and consequently can drive the overall average cost of power production down. Regulatory agencies, rate advocates and environmental advocates support these efforts because they result in benefits to ratepayers and the environment.

In California the CPUC has mandated that all investor-owned utilities pursue **time varying pricing**, and PG&E is in the process of transitioning all non-residential customers to time varying rates. The two rates that PG&E is employing are called time-of-use (TOU) rates and peak day pricing. With a TOU rate, different electricity prices are established for different periods of the year (usually winter and summer) and different time-of-day periods. High demand periods, when prices are highest, are typically weekdays May through October between noon and 6 PM. According to PG&E, “Customers who participate in Peak Day Pricing will experience between 9 and 15 Peak Day Pricing Event Days annually in addition to time-of-use pricing. On Peak Day Pricing Event Days, a surcharge is added to a portion of the peak period (i.e. from 2 p.m. to 6 p.m.) which customers will pay in addition to their regular peak electric rate.” Customers who conserve electricity during high demand hours and Peak Day Pricing Event hours can save money on their overall electric bills. Table 3 outlines PG&E’s scheduled transition to time varying pricing. More information can be found on PG&E’s website (see [Resources](#) below), including on-demand webinars, workshops, on-line rate analysis tool, information on rebates and energy assessments, energy saving tips, and contact information for personalized assistance.

Table 3. PG&E’s Time Varying Pricing Implementation Schedule

Customer Class	Schedule	
Small and Medium Business	Beginning November 2012 transition to TOU rate, can opt for Peak Day Pricing	Beginning November 2014, transition to Peak Day Pricing
Large Commercial and Industrial Business	Beginning May 2010 transition to Peak Day Pricing, can opt for alternative TOU rate	
Small and Medium Agriculture	Beginning March 2013 transition to TOU rate, can opt for Peak Day Pricing	
Large Agriculture	Beginning February 2011 transition to Peak Day Pricing, can opt for alternative TOU rate	

Note that residential customers are also eligible for optional time-of-use rate options.

As customers are transitioned to time varying pricing, it will be important for them to be well informed and prepared to take action when needed. For example, if customers do not pay attention to peak day pricing events, it could result in substantial cost increases. Typical options for addressing this include load reduction efforts through energy efficiency and conservation, and load shifting to off-peak hours.

There are numerous other optional programs that PG&E customers can take part in. These include demand response programs, direct access electricity purchase, core gas aggregation service, and various information services. These services are briefly described here; see the [Resources](#) section below for more information.

Demand response programs are designed to enable customers to contribute to energy load reduction during times of peak demand and in return receive financial rewards. Customers typically receive notification by email, phone, text or fax when load curtailment is needed. PG&E’s demand response program options include the Base Interruptible Program, Demand Bidding Program and Scheduled Load Reduction Program. See PG&E’s demand response page for more information (see [Resources](#) below).

Direct access allows eligible customers to purchase their electricity directly from a third party energy service provider (ESP). Direct access in California was started in 1998, enabled by the passage of Assembly Bill 1890. However, when wholesale electricity prices spiked due to California’s electricity crisis of 2000-2001, direct access was suspended. Some customers who were participating in direct access at the time were “grandfathered” in and allowed to stay on the program. More recently, direct access has been once again opened up in California, albeit only to non-residential customers and only on a very limited basis.

The retail side of the natural gas industry in California was deregulated many years ago and does provide all customers with the option of either buying natural gas from their local utility or from a third party marketer. This program is called the **Core Gas Aggregation Service**. As it stands, most small commercial and residential gas customers choose to purchase from their regulated utility, while most large natural gas customers purchase gas from unregulated marketers.

Knowledge is power. Hence, the trend in the electricity industry is to provide customers with more information and give them the proper price signals in the hope that they will use energy more efficiently. Smart meters and the information they can provide are one piece of this effort. Another new service being offered is called benchmarking. Benchmarking allows you to track the energy performance of your facility and compare it with other similar facilities. Another energy information service that PG&E recently started offering is called the Green Button. Using the Green Button customers can download their personal energy usage data and can share it with third parties who can provide additional information and services aimed at saving energy.

The Local Angle

Humboldt State University has been a direct access customer for many years as part of a larger California State University/University of California power purchase agreement. Currently they purchase their electric power from Shell Energy North America. The primary purpose of the direct access agreement is

to reduce electricity costs and price volatility. The power that Shell provides meets the same Renewable Portfolio Standard (RPS) requirements that PG&E's power mix must comply with.

The Blue Lake Rancheria participates in Pacific Gas & Electric (PG&E) demand response programs (base interruptible and demand bidding programs). The Tribe has a 1MW diesel generator, which is used to provide emergency power. In addition, when PG&E requests it, the generator is used as primary power to reduce or eliminate the electric demand on PG&E's grid. PG&E provides incentive payments for participation in these programs, which creates savings for the Rancheria and benefits PG&E and all of its ratepayers. The Rancheria has been pleased with these programs, and has achieved over \$25,000 in annual savings.

Examples from Elsewhere

PG&E has posted numerous demand response case studies on its website, focusing on commercial and institutional customers(see [Resources](#) below). For example, one case study shows how a commercial food processor served by PG&E created a demand response plan in cooperation with utility staff, agreeing to shed lighting, HVAC, and non-critical process loads during high electric demand periods. The business qualified for financial incentives from PG&E, with no negative impact on operations, according to a company spokesperson.

Since 2007, California has required disclosure of energy benchmarking data on non-residential buildings in commercial real estate transactions under Assembly Bill 1103. Such data allow building owners or operators to track energy use over time and compare their buildings' energy intensity (measured in units such as BTU per square foot per year) with energy intensity of

similar buildings in similar climates. AB 1103 requires that data released as part of a building sale be formatted for compatibility with the U.S. EPA's Energy Star Portfolio Manager building energy and water use tracking software. Some utilities, including Southern California Edison, offer their commercial customers an automated benchmarking service at no charge, importing utility data into Portfolio Manager or other third-party benchmarking software.

The California State University, which includes Humboldt State University and 22 other sister campuses, testifies to the value of direct access in meeting the CSU's goals for both clean energy and cost savings. According to Len Pettis, CSU's Chief of Plant Energy and Utilities, "It has been critical for us to have access to competitive suppliers. We have campuses throughout the state, connected to all three of the state's investor owned utilities. Our Energy Service Provider (ESP) offers diversity of energy supply resources enabling CSU to meet our renewable energy goals ahead of current public policy requirements. Direct Access has afforded CSU a portfolio of energy supply options and cost certainty not available from the utilities. CSU's participation in DA over the past eight years has generated over \$30 million in avoided costs. We hope that all schools and government agencies will soon have these important options." (source: <http://www.retailenergymarkets.com/testimonials.htm>)

Resources

PG&E time varying pricing

<http://www.pge.com/mybusiness/energysavingsrebates/timevaryingpricing/>

PG&E demand response programs

<http://www.pge.com/mybusiness/energysavingsrebates/demandresponse/>

PG&E demand response case studies

<http://www.pge.com/mybusiness/energysavingsrebates/demandresponse/cs/>

Direct access electricity

<http://www.pge.com/mybusiness/customerservice/energychoice/directaccesselectricity/index.shtml>

Core gas aggregation

<http://www.pge.com/mybusiness/customerservice/energychoice/coregasaggregation/>

PG&E energy use information <http://www.pge.com/myhome/myaccount/welcome/>,

<http://www.pge.com/myhome/myaccount/using/thegreenbutton/>

Benchmarking <http://www.pge.com/mybusiness/energysavingsrebates/analyzer/benchmarking/>

SMART METERS <HTTP://WWW.PGE.COM/SMARTMETER/>

7. RENEWABLE ENERGY AND ENERGY EFFICIENCY INCENTIVES

The Opportunity

There are numerous incentive approaches that local jurisdictions can use to encourage the installation of energy efficiency and renewable energy generation equipment. These include:

- Rebates
- Free energy audits and services
- Discretionary project development allowances (e.g., density bonuses)
- Reduced fees
- Accelerated review and permitting
- Property and/or sales tax exemptions
- Recognition via awards and/or certifications

Rebates are cash incentives that can be paid to a project developer pending completion of a desired project. Rebates are often provided by the utility or the state, but they are also sometimes offered by local jurisdictions. For example, Marin County offers rebates for solar water heating and solar electric systems. Similarly, the City of San Francisco offers rebates for solar electric systems, as well as for energy efficiency measures. Locally, the Redwood Coast Energy Authority (RCEA) offers energy efficiency rebates through their Energy Watch program, in partnership with PG&E.

Free energy audits and services can also be provided. In addition to the rebates mentioned above, RCEA's Energy Watch program offers a complete turnkey program to help businesses reduce energy costs. Services include energy audits, technical assistance, access to pre-approved contractors, project management and verification services, and assistance with paperwork. These services can overcome not only the financial barriers that business owners face, but also the barriers associated with limited time resources and technical knowledge. RCEA's Energy Watch services provide start-to-finish assistance so that the business owner doesn't need to be bothered with a energy project on the side and instead can focus on running their business.

Development incentives. When a project developer proposes a new project to a local jurisdiction they must go through the sometimes arduous task of project review, approval and permitting with local code and planning officials. This effort and the time it takes can pose a substantial cost to project developers. Making this process quicker, easier, cheaper and perhaps more flexible can be a significant incentive for a project developer to "do the right thing" and include features in the project (e.g., energy efficiency measures or on-site renewable energy generation) that help achieve local policy and planning goals. These incentives can include reduced fees for permit applications, accelerated plan review, priority inspections, streamlined permitting and design assistance. Also, approval bodies (e.g., the planning commission) can allow some flexibility in their discretionary approval process. For example, if a developer agrees to provide optional but desirable sustainable energy or green building features in their project, the approving body could allow them a density bonus, height bonus, or reduced parking requirement in return.

Property or sales tax exemptions for the purchase of sustainable energy products can also be used to incentivize a project developer. Property taxes are collected by county assessors and revenues go to support California counties, cities, schools and special districts; however, it is state law that dictates how property taxes are levied. In California there is currently a solar new construction exclusion (in effect through 2016) that specifies that the construction or addition of any active solar energy system (includes solar electric and solar water and space heating systems, but not solar swimming pool or hot tub heaters) is not subject to property taxation until the property changes ownership. In the State of New York, state law allows but does not require property tax exemptions for green buildings and solar, wind and biomass energy systems. Local jurisdictions must adopt an ordinance to implement the exemption. Similarly, the State of New York enacted a state sales tax exemption for the sale and installation of solar energy systems. The law also allows local governments to grant an exemption from local sales taxes.

Another incentive to encourage sustainable energy activities is to create a **local recognition program**. This can include design awards for exceptional sustainability features, green business awards and/or certifications for businesses that implement green business practices, and green building certifications for designs that meet or exceed minimum sustainability standards. Recognition programs provide good publicity and marketing benefits for business that wish to market their “green” attributes. These type of incentives have been most prominently established by the green building industry, with certifications such as LEED (Leadership in Energy and Environmental Design). Although LEED is an internationally recognized program, most green building and green business certification programs are employed on a local or regional basis.

The Local Angle

The Redwood Coast Energy Authority provides a range of services to businesses, non-profits, public entities and residents, including: free start-to-finish technical assistance, contractor referrals, project management support and about \$500,000/year in incentives to help reduce the cost of installing energy efficiency measures.

In 2011, the Sierra Club performed a study of permitting fees assessed by Humboldt County’s municipal governments for residential and commercial solar electric systems. The study found that residential system fees were generally fair and probably in line with actual costs to the cities. However, basing fees for commercial systems directly on system costs was found to result in excessive fees for larger systems in some jurisdictions. The authors of the study argued that permitting costs for larger systems are not proportional to these systems’ costs, and such high fees might discourage investment in solar.

Some local municipalities present design awards for building projects that meet exceptional design standards, including energy sustainability. For example, the City of Trinidad provides Quality Community Design Awards, and one aspect of these awards recognizes Outstanding Energy Efficiency Remodels. Similarly, the City of Arcata’s Design Review Commission has given Design Awards in past years that have rewarded energy efficient design practices. Green building certifications are another way providing recognition for sustainable energy practices.

Numerous local buildings have pursued the US Green Building Council's Leadership in Energy and Environmental Design (LEED) certification. Certifications have been awarded to the Fishermen's Terminal Building in Eureka, Humboldt State's Behavioral and Social Sciences Building, and the Arcata Community Recycling Center in Samoa. In addition, there are two local programs that acknowledge green business and provide support for green building. These are the Humboldt Green Business Certification Program <http://www.humboldtplanitgreen.org/green-business-program/> and the Humboldt County Green Building Program <http://www.humboldtplanitgreen.org/green-building-program/>.

Examples from Elsewhere

The City of San Diego and the City of Santa Monica each offer expedited permitting for building projects that meet "green" criteria through inclusion of features such as energy efficiency and solar photovoltaics. San Diego's expedited process aims to reduce permit processing time by 25% and requires inclusion of photovoltaics or achievement of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver rating. Santa Monica also uses LEED as a qualifying step for expedited permit processing. Santa Monica has also waived solar fees since 2002 (see ***Resources*** below).

Marin County offers a solar rebate program specifically directed at residents and businesses in unincorporated areas of the county. Such an approach might be of value in Humboldt County, where a substantial portion of the population (53%, according to U.S. Census data) lives in such unincorporated areas (see ***Resources*** below).

In addition, Santa Ana and Mission Viejo offer fee waivers on building permits and/or plan checks for solar energy installations, and Anaheim offers a permit fee waiver for commercial building owners who install qualifying energy efficient replacement building, mechanical, electrical, or plumbing equipment.

Resources

Local Programs:

RCEA Redwood Coast Energy Watch program

<http://www.redwoodenergy.org/programs/energy-watch>

Humboldt Green Business Certification Program

<http://www.humboldtplanitgreen.org/green-business-program/>

Humboldt County Green Building Program

<http://www.humboldtplanitgreen.org/green-building-program/>

General Resources:

Database of State Incentives for Renewables and Efficiency, California

<http://www.dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&state=CA>

A Step by Step Tool Kit for Local Governments to Go Solar

A good up-to-date resource covering General Plan amendments, education and outreach, incentives/rebates, PACE financing and green building programs as ways of promoting solar and energy efficiency. See:

http://www.gosolarcalifornia.org/professionals/local_government/index.php or download guide at

<http://www.energy.ca.gov/2009publications/CEC-180-2009-005/CEC-180-2009-005.PDF>

DOE's *Solar Powering Your Community: a Guide for Local Governments*

http://www4.eere.energy.gov/solar/sunshot/resource_center/sites/default/files/solar-powering-your-community-guide-for-local-governments.pdf

Permitting Incentives:

Expedited permit processing, City of San Diego

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA235F&re=0&ee=0

Expedited permit processing, City of Santa Monica

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA136F&re=0&ee=0

City of Santa Monica's fee waiver for solar

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA129F&re=0&ee=0

Marin County's solar rebates for unincorporated areas

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA01F&re=0&ee=0

Sierra Club study of solar permitting fees in Humboldt County cities

<http://lomaprietaglobalwarming.sierraclub.org/PVSurveyHumboldt.php>

8. FINANCING PROGRAMS, BULK PURCHASING AND OTHER FINANCIAL INTERVENTIONS

The Opportunity

Local and Tribal governments can play a role as information clearinghouse and resource aggregator to help stimulate investment in energy efficiency and renewable energy by all sectors of the community. Where local government transcends an information broker role and chooses to intervene directly in energy financing, there are two principal challenges: finding a source of capital (seed money to set the program in motion), and managing the finance mechanism (e.g., making loans to businesses and residents). The U.S. Environmental Protection Agency's *Clean Energy Financing Programs: A Decision Guide for States and Communities* defines nine financing mechanisms that local government can offer themselves or facilitate through third parties:

- **Rebates.** A quick and simple incentive mechanism, but often found to be unsustainable, only stimulating temporary and artificial demand that vanishes when the rebate ends.
- **Revolving loans.** Provide a self-sustaining source of funds as early borrowers repay into the loan fund, but local government is exposed to the risk of loan defaulters. Loan program can be run in-house by city staff or contracted out to a financial institution.
- **Property Assessed Clean Energy (PACE).** Creates a community-level funding source for energy improvements that is capitalized by bonds or other public funds and repaid through property tax assessments. California (enabled by AB811 in 2008) and a number of other states have authorized PACE, but at the federal level use of this mechanism for residential properties has been challenged by Fannie Mae and Freddie Mac due to concerns about seniority of PACE liens over mortgages. PACE supporters are asking Congress to adopt HR 2599 (of which Congress member Mike Thompson is a co-author), clarifying and protecting PACE's status with respect to federally backed mortgages.
- **Credit-enhanced private loans.** A public-private partnership in which private financial institutions lend directly to borrowers for energy projects. Local government intervenes to provide some degree of loan guarantee to reduce risk to the lender, in exchange for the lender offering more attractive terms (e.g., reduced interest rate)
- **HUD PowerSaver.** A two-year pilot program started by the Department of Housing and Urban Development in 2011 to provide federally guaranteed private loans for residential energy improvements. Loans are for up to \$25,000. At least two lenders participating in this national program are making loans in California.
- **On-bill repayment.** Typically operated by the utility, which provides up-front capital for a customer to make energy improvements, with the customer repaying the costs as a line item on the utility bill. Can be structured as either a loan attached to the customer or a tariff attached to the meter (which can be transferred to a new property owner).
- **Energy efficient mortgages.** These build the incremental costs of energy efficiency features into the primary mortgage on a home. Can be used to increase a homebuyer's borrowing capacity, on the grounds that future reduced energy costs will offset higher mortgage payments. Local governments can partner with lenders to subsidize the cost of

EEMs to make them more attractive to borrowers. Not available for second homes or investment properties.

- **Performance contracting.** Used in commercial buildings, where Energy Service Companies (ESCOs) finance and perform energy retrofits, making their return on investment through an agreement that guarantees them all or a portion of the utility savings over a set time period. The intent is to make the energy measures cash flow-neutral or positive for the building owner throughout the life of the project. Local government can offer subsidies to increase participation.
- **Power purchase agreements (PPAs) /solar leasing.** PPA allows a developer to site a renewable energy generation system on a host property, with the property owner paying the developer for energy generated. Under a solar lease, the property owner leases the equipment from the installer. Under either arrangement, a contract is implemented for a set time, at the end of which the property owner can renew the contract, give up the system, or purchase it from the developer. Local government can play a role by subsidizing such projects to increase participation.

Where the local government is providing the capital for these programs, several sources of funding are available to generate that seed money:

- **Loans:** Banks, credit unions, and other lenders may partner with local government.
- **Bonds:** Can include general obligation or revenue bonds. PACE bonds are a specific type of revenue bond.
- **Grants:** Generally come with restrictions on how funds can be used; in some cases, grants made to local government can be used as capital for financing programs.
- **Taxes:** Some communities have adopted taxes specifically aimed at financing energy projects. In cooperation with the utility, these taxes may be assessed through utility bills.
- **Emissions allowance revenues:** Come from revenues generated by cap and trade carbon emissions programs where these are in use. Cap and trade was introduced in California in January 2013. It has been available in the northeastern US through the Regional Greenhouse Gas Initiative (RGGI) for a few years. RGGI makes grants for clean energy projects in its region using funds raised through its carbon emissions auctions.

The EPA guide recommends four strategies local government should use to ensure success of these financing mechanisms:

- Learn from successful programs. *Clean Energy Financing Programs: A Decision Guide for States and Communities* provides numerous case studies where the types of programs described above are working.
- Provide low monthly payments. Low interest rates and longer loan terms can help achieve this; local government can help by intervening to subsidize one or both of these approaches.

- Establish broad eligibility. Since borrowers with high credit scores already have relatively easy access to capital, local government may choose to focus on improving access to credit for somewhat riskier borrowers. Public sector subsidy can be used to leverage higher debt-to-income ratios than private lenders would approve; this is justified by energy savings that will offset higher loan costs.
- Link financing to effective clean energy programs. Where local government is offering energy audits, direct installation of energy retrofits, and other services, these should be integrated with financing services to make it as easy as possible for potential clients to participate.

Bulk purchase. In theory, the economies of scale achieved with bulk purchasing of renewable energy equipment and installation services can greatly reduce the cost per kilowatt installed. In practice, this approach has proven problematic when applied to small, distributed technologies such as rooftop solar, given that every site is unique and a one-size-fits-all solution may not work well. However, there are some recent success stories in both the public and private sectors – see *Examples from Elsewhere* below. The U.S. Department of Energy and the U.S. Department of Housing and Urban Development created a Quantity Quotes program to facilitate bulk purchasing of Energy Star efficient products, but the program was terminated in 2011. Two great resources for bulk purchase program development are *The Solarize Guidebook: A community guide to collective purchasing of residential PV systems* from the U.S. Department of Energy and Joint Venture Silicon Valley’s *Purchasing Power: Best Practices Guide to Collaborative Solar Procurement* (see *Resources* below).

The Local Angle

Measure I, adopted by Arcata voters in November 2012, authorized the City to adopt a high use tax on residential electric use. The tax is intended mainly to discourage use of homes for marijuana cultivation. The city attorney’s report on the proposal estimated initial annual revenues of approximately \$1.2 million would be generated but did not discuss how this municipal income stream might be used. (Revenues would be partially offset by a one-time charge from PG&E of \$650,000 to adjust the utility’s billing system to accommodate the tax.) Using one of the financing mechanisms discussed above, revenues from such a tax could be directed to energy efficiency or renewable energy projects to mitigate the impacts of high energy use (see *Resources* below).

Examples from Elsewhere

The Sonoma County Energy Independence Program, started in 2009, is a county-level program that is one of the first and most ambitious PACE programs in the state. Energy upgrades can be for residential or commercial buildings, and financing is repaid via the property tax bill over a ten or twenty year period. SCEIP is also a vehicle for delivery of the state-level Energy Upgrade California program’s services (see *Resources* below).

The Solarize Portland program in Portland, OR brought together a number of neighborhood associations with strategic and technical assistance from the City of Portland’s Bureau of

Planning and Sustainability, Energy Trust of Oregon, and Solar Oregon to make bulk purchases of solar equipment and installation services. The project website claims this approach can reduce the costs of solar installations by as much as 75% (see **Resources** below). One private, for-profit company, One Block Off the Grid, is using bulk purchasing to make solar energy systems available nationally to consumers at reduced cost (see **Resources** below).

Resources

Clean Energy Financing Programs: A Decision Guide for States and Communities. from U.S. EPA <http://epa.gov/statelocalclimate/documents/pdf/FinancingProgramsResourceGuide.pdf>

City of Arcata staff report and city attorney's analysis of tax on high residential electric energy use

http://arcata.granicus.com/MetaViewer.php?view_id=8&event_id=14&meta_id=74572
http://www.cityofarcata.org/sites/default/files/document_center/Government/Election%202012/Measure%20I%20Impartial%20Analysis%20by%20City%20Attorney%20re%20Excessive%20Residential%20Electricity%20Users%20Tax.pdf

Regional Greenhouse Gas Initiative, serving nine northeastern states www.rggi.org

Sonoma County Energy Independence Program www.sonomacountyenergy.org

Solarize Portland www.portlandonline.com/bps/index.cfm?c=51902

Bulk Purchasing:

The Solarize Guidebook: A community guide to collective purchasing of residential PV systems. U.S. Department of Energy <http://www.nrel.gov/docs/fy12osti/54738.pdf>

Joint Venture Silicon Valley's Purchasing Power: Best Practices Guide to Collaborative Solar Procurement (2011 World Resources Institute/Joint Venture Silicon Valley)
http://www.jointventure.org/images/stories/pdf/purchasing.power_best.practices.guide.to.collaborative.solar.procurement.pdf

PACE Programs:

CaliforniaFIRST PACE finance program <https://californiafirst.org/overview>

Examples of Existing PACE programs in CA, Governor's Office of Planning and Research
http://www.opr.ca.gov/s_renewableenergy.php#E

Guide to Energy Efficiency & Renewable Energy Financing Districts For Local Governments, Renewable and Appropriate Energy Laboratory, University of California, Berkeley (PACE Program)
rael.berkeley.edu/files/berkeleysolar/HowTo.pdf

Property assessed clean energy (PACE) financing <http://ase.org/resources/property-assessed-clean-energy-financing-pace>

Statewide Energy Efficiency Collaborative, “Best Practices” for PACE programs
<http://californiaseec.org/documents/best-practices/best-practices-sonoma-county-energy-independence-program>
<http://californiaseec.org/documents/best-practices/best-practices-berkeley-first-financing-initiative-for-renewable-and-solar-technology>

A number of California counties and other jurisdictions have PACE programs or are developing them

Sonoma County <http://www.sonomacountyenergy.org/>
San Francisco (commercial only) https://commercial-pace.energyupgradeca.org/county/san_francisco/overview
Los Angeles (commercial only) https://commercial-pace.energyupgradeca.org/county/los_angeles/application_overview
HERO (Western Riverside Council of Governments, expanding across the state) <http://wrcog.herofinancing.com/>
California FIRST (also expanding across the state): <https://californiafirst.org/overview>
Placer County <http://www.mpowerplacer.org/>

9. PLANNING AND REGULATION

The Opportunity

The legal authority to plan for local energy facilities is found in California's laws, ordinances, regulations and standards. The principal way in which local government can influence siting of energy projects is through general plans and land use zoning, area and community plans, and specific plans. These mechanisms give local jurisdictions broad power, provided their actions do not conflict with state or federal authority. The California Energy Commission's *Energy Aware Facility Siting and Permitting Guide* provides an excellent discussion of how this authority can most effectively be used (see [Resources](#) below).

Local government can encourage projects that are beneficial to the community (and, when necessary, prevent or require modification of projects with unacceptable impacts) through the content of its general plan and the cost, timeliness, and simplicity of its permitting process. This section discusses the planning and regulatory roles that local government can play with regard to energy projects, and the next section discusses the permitting authority held by local governments.

General plans provide the flexibility for local governments to address energy infrastructure, either dispersed through various required general plan elements or consolidated via an optional energy element. Approximately 80 California cities and counties have adopted energy elements, and the State has been encouraging jurisdictions to do so in order to further its energy and climate protection policies. Humboldt County has drafted and is considering adoption of an energy element as part of its current General Plan Update.

One important use of a General Plan Update is as guidance for levels of significance of specific impact types in California Environmental Quality Act (CEQA) impact analyses. By providing some basis for significance levels, local government can often encourage and support private renewable energy development. Because the General Plan Update and its elements are thoroughly reviewed and discussed in the planning process, energy developers can have some assurance that the significance levels have been "vetted" by resource agencies and the public.

Of course, language in general plans does not in itself guarantee real change. General plan policies must be backed up by a commitment to action on the part of staff, elected officials, and the community at large, and there is legal precedent to support this. California Government Code stipulates that planning agencies must implement general plan policies through actions including, but not limited to, the administration of specific plans and zoning ordinances.

Specific plans, which are legally distinct from general plans, provide criteria and standards for specific development projects or areas. This can include land use guidelines for a given region, proposed locations for major infrastructure, standards and criteria for development, and a set of implementation measures necessary to carry out the plan. A specific plan can be used to establish locations for renewable energy facilities. Tulare County is considering creating a specific plan that includes zoning overlay districts for renewable energy facilities. The Westlands Water District has developed a master plan for the development of large-scale solar

projects (see <http://www.westlandssolarpark.com/>). Similarly, the County of San Diego has considered establishing renewable energy parks that designate areas targeted for development of solar, wind and geothermal energy facilities.

Development of a specific plan for locating renewable energy projects in Humboldt County would be a logical and useful next step following the development of the RePower Humboldt Strategic Plan. Prescreening of potential project areas to determine which locations are most suitable could help to build public support for future projects and potentially allow for a streamlined permitting and review process. A zoning overlay district and tiered permitting could be used to specify preferred areas for renewable energy development. In addition, development of a programmatic environmental impact report (EIR), a master EIR, or a master environmental assessment specific to renewable energy development are additional tools that could be used to help streamline the environmental review process for future renewable energy projects that meet standardized criteria. These types of local energy planning efforts can provide important guidance to energy facility developers in advance of their specific project preparations. Two excellent resources on this topic are the Governor's Office of Planning and Research listing of California counties that have developed ordinances addressing the renewable energy facility permitting and the California County Planning Directors Association's *Solar Energy Facility Permit Streamlining Guide* (see [Resources](#) below). Note that the latter document is pertinent to other renewable energy resources in addition to solar.

A **programmatic EIR** for renewable energy in Humboldt County would be an especially helpful resource for developers as they proceed through permitting at all governmental levels of regulation. Further, an existing programmatic EIR might be an advantage and reason for energy developers to site their projects in Humboldt County rather than in other locations. Two sizable renewable energy developments have proceeded part way through the CEQA process (Bear River Ridge Wind and Humboldt WaveConnect), and those draft documents (see [Resources](#) below) could be the foundations for a programmatic EIR. Funding would need to be found, but a wide range of interests within the county would be in favor of it, including economic development and resource management and protection interests.

Local government can also reach outside the county line to actively put the word out that Humboldt County welcomes responsible renewable energy development. It is a common practice for local economic development offices or chambers of commerce to reserve booth space at renewable energy conferences and trade shows or to sign on as event co-sponsors (e.g. American Wind Energy Association) to make new contacts and help spread the message.

The *City Planners' Energy Action Resource Guide* jointly published by the Statewide Energy Efficiency Collaborative and ICLEI- Local Governments for Sustainability identifies five broad energy measures for which city planners can play a constructive role (see **Additional Information Resources** at end of this guide). The three measures of local relevance are "beyond Title 24" (state energy code) building efficiency standards (also known as "reach codes"), solar water heating, and solar access protection. Title 24 is nationally recognized as a progressive and ambitious energy efficiency code, and requiring buildings to exceed the already

high bar of Title 24 has become a popular “green building” strategy. For example, both the Cities of Fortuna and Arcata have policies requiring energy performance in excess of Title 24 for certain types of new construction (see section 2 on “Energy efficiency and renewable energy”).

In one case, state government acted to limit the extent to which county governments can restrict small wind power development. AB 45, adopted into law as CA Government Code § 65893, directs counties *not* to set limits more stringent than those identified in AB 45 on aspects such as wind tower height, setbacks, and noise and visual effects. The law applies only to new ordinances adopted after January 1, 2011 and is set to sunset on January 1, 2017. AB 45, which applies only to lands outside incorporated cities, explicitly allows counties to adopt more lenient guidelines than those provided in the law.

The Local Angle

Humboldt County is creating its first-ever energy element as part of its general plan update, and cities have an opportunity to do likewise as they update their own general plans. Alternatively and likely with less effort, they can incorporate energy policy into existing elements, as the City of Fortuna does in its natural resources element, or the City of Arcata does in its resource conservation and air quality elements.

The County has also published a draft “Climate Action Plan.” This climate change policy complements energy efficiency and renewable energy policy by providing support for such projects’ California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) permitting. The plan provides greenhouse gas emission, energy supply and demand, and other information on baseline, current conditions, and predicted future conditions that are useful for describing the “No Project” alternative required by Environmental Impact Reviews and Environmental Impact Statements (EIRs and EISs). The “No Project” alternative’s significant impacts are compared with the Proposed Project’s significant impacts; in the impacts analyses of greenhouse gas emissions and of cumulative effects, a renewable energy development project should have fewer significant impacts in the long term, compared to the “No Project” alternative.

The Climate Action Plan includes a greenhouse gas emissions inventory for the county. One significant finding of this inventory is that industrial emissions for the county have declined greatly relative to the 1990 baseline. This is due to the decline in the local timber industry and associated closure of lumber and pulp mills. Over the same period, transportation-related emissions have increased. The action plan presents strategies for reducing emissions in all sectors to levels below the 1990 baseline. The plan has been incorporated as an appendix to the General Plan Update’s draft Environmental Impact Report (see ***Resources*** below).

The Natural & Cultural Resources Element of Fortuna’s general plan includes seven sections, one of which is Energy Conservation. The goal expressed in this section is actually broader than the section name implies: “To reduce consumption and reliance upon non-renewable energy sources and promote energy conservation, energy efficiency, and the use of alternative energy sources in new and existing development.” The plan lists 14 policies supporting this goal, among them a call for new construction to be pre-wired to easily accommodate future

renewable energy generation on-site, a policy that municipal operations shall make use of recycled and renewable resource-derived products, and collaboration with the Redwood Coast Energy Authority on community energy education and energy audits (see [Resources](#) below).

Arcata's resource conservation element includes Policy RC-8, Energy Resources Management, which calls for reducing greenhouse gas emissions and other impacts of energy, as well as promoting energy conservation and renewable energy. Policy RC-8 is not very detailed, being less than two pages long, but it provides an example of how local governments can directly address energy issues in a local plan update with only modest effort. (see [Resources](#) below)

The City of Trinidad has developed a draft Climate Action Plan, dated April 2010. The plan outlines a number of strategies including municipal support for energy efficiency and renewable energy. The plan also emphasizes the importance of community participation and calls for creation of a Climate Action Plan Advisory Committee (see [Resources](#) below).

Examples from Elsewhere

Local governments can look to existing energy elements as templates or guides, but an energy element should reflect local resources, needs, and community values. For example, Kern County's energy element emphasizes petroleum production, as this is an important industry for the county. The City of Richmond's energy and climate change element focuses on urban industrial and commercial energy users, which account for more than 85% of the city's greenhouse gas emissions (see [Resources](#) below).

Richmond's energy and climate change element is driven by a comprehensive 2008 greenhouse gas inventory of the city performed by ICLEI - Local Governments for Sustainability (more information on ICLEI is provided in the discussion of climate change later in this guide). The element lists a number of findings addressing Richmond's readiness to respond to climate change. The main body of the element lists goals, each supported by policies, in turn associated with specific implementing actions. A table at the end of the element lists the city department with lead responsibility for each implementing action and a time frame for carrying out each action.

The San Diego Association of Governments (SANDAG) is composed of elected officials from the region's 19 local governments. They have prepared a long-term energy plan for their region. It identifies policies and objectives with regard to energy development, supply and use. This includes support for energy efficiency and the use of local energy resources that are cost-effective and environmentally sensitive.

Solano County has a great wind resource. Accordingly, the Solano County Energy Element includes a wind turbine siting plan. The plan encourages the siting of large-scale wind turbines, delineates favorable wind resource areas, and provides policies that will conserve wind resource areas and protect these area from non-compatible uses.

Through a strong public-private partnership the community of Fort Collins, Colorado is creating a net Zero Energy District, called FortZED. Their mission is to "transform the downtown area

and the main campus of Colorado State University into a net Zero Energy District through conservation, efficiency, renewable resources and smart technologies” (see **Resources** below).

Resources

Local Resources:

Humboldt County’s “Climate Action Plan”, Appendix U of the Draft EIR for the General Plan Update <http://co.humboldt.ca.us/gpu/eirappendices.aspx>

Arcata General Plan Update www.cityofarcata.org/departments/building-planning/regulations/general-plan-2020

Fortuna General Plan Update <http://friendlyfortuna.com/index.aspx?NID=421>
Section 5.6: Energy Conservation <http://friendlyfortuna.com/DocumentCenter/Home/View/462>

Trinidad Climate Action Plan
www.trinidad.ca.gov/phocadownload/PlanningCommission/GeneralPlanUpdate/Background/draft_cap_for_trinidad1.pdf

Resources for development of a programmatic EIR for renewable energy development in Humboldt County

PG&E WaveConnect Program Final Report
http://mhk.pnnl.gov/wiki/images/3/37/PGE_WaveConnect_Final_Report.pdf

Bear River Ridge Wind Power Project Notice of Intent to Prepare an Environmental Impact Statement
<http://www.epa.gov/region9/nepa/letters/BearRiverRidgeWindPwrProjNOI.pdf>

Richmond Energy and Climate Change Element for General Plan Update
www.ci.richmond.ca.us/index.aspx?NID=1737

General Planning Resources:

California Energy Commission Planning and Permitting Resources for Renewable Energy Systems
http://www.energy.ca.gov/localgovernment/planning_resources/index.html

California Energy Commission’s *Energy Aware Facility Siting and Permitting Guide*
<http://www.energy.ca.gov/2010publications/CEC-600-2010-007/CEC-600-2010-007.pdf>

Statewide Energy Efficiency Collaborative (SEEC). *City Planner’s Energy Action Resource Guide*. <http://californiaseec.org/tools-guidance/best-practices>

Governor’s Office of Planning and Research, Local Renewable Energy Facility Permitting
http://www.opr.ca.gov/s_renewableenergy.php#C

Governor's Office of Planning and Research, The Planners Guide to Specific Plans
opr.ca.gov/docs/specific_plans.pdf

California Energy Commission: Smart Growth & Land Use Planning
<http://www.energy.ca.gov/landuse/>

Local Government Commission guidance on local energy codes more stringent than CA Title 24
http://www.lgc.org/freepub/docs/energy/case_studies/ReachCodes.pdf

Fort Collins, CO "Fort ZED" (Zero Energy Downtown) project <http://fortzed.com/>

Solar Rights:

Solar Rights Act and Solar Shade Act

http://www.gosolarcalifornia.ca.gov/solar_basics/rights.php

A Comprehensive Review of Solar Access Law in the United States, Solar America Board for Codes and Standards

<http://www.solarabcs.org/about/publications/reports/solar-access/pdfs/Solaraccess-full.pdf>

Solar Access Laws

<http://www.dsireusa.org/solar/solarpolicyguide/?id=19>

A Step by Step Tool Kit for Local Governments to Go Solar

A good up-to-date resource covering General Plan amendments, education and outreach, incentives/rebates, PACE financing and green building programs as ways of promoting solar and energy efficiency. See:

http://www.gosolarcalifornia.org/professionals/local_government/index.php or download guide at <http://www.energy.ca.gov/2009publications/CEC-180-2009-005/CEC-180-2009-005.PDF>

10. PERMITTING

The Opportunity

Private sector renewable energy projects in Humboldt County could include large power plants (i.e., about 10 MW or larger) as well as smaller, distributed scale systems ranging from a few megawatts in size down to small rooftop solar electric systems of only a few kilowatts in capacity. This section discusses the permitting authority held by local governments with regard to energy projects. First we discuss permitting associated with large-scale projects that are likely to require full environmental review, and then for smaller, distributed scale systems that might not trigger formal environmental review procedures.

Local officials have an important role to play in approval and siting of energy facilities, including power plants and transmission infrastructure. City, county and Tribal governments are the permitting authority for land-based power plants under 50 MW and all land-based non-thermal electricity generators, except for facilities such as dams, which are under federal jurisdiction. This is particularly significant in Humboldt County where any newly proposed land-based power plants will likely be either biomass thermal based plants under 50 MW or non-thermal based generators (i.e., wind, small hydro). Local jurisdictions also have permitting authority over small, distributed scale generators such as roof-top solar and CHP systems that are located behind the meter and primarily serve customer load.

Large projects

Certain types of power projects do allow state and federal agencies to pre-empt local authority:

- Licensing of thermal power plants of 50 MW or larger is governed by the California Energy Commission.
- Hydroelectric projects are licensed by the Federal Energy Regulatory Commission (FERC).
- Offshore energy projects (governed by FERC and/or the U.S. Department of the Interior's Bureau of Ocean Energy Management)

However, even when local governments do not have jurisdictional authority, they can often play an important advisory role in the planning and permitting of energy facilities. State and federal environmental review and permitting can be time and energy intensive, depending on the type, scale, and location of the proposed renewable energy project. As an example, Table 4 shows how local, state, and federal regulatory agencies all played roles in the recently proposed Bear River Ridge wind project near Ferndale.

Local government can have a greater influence on time and schedule by becoming the Lead Agency for a project. By becoming the Lead Agency, the local agency can better control the timing of the environmental review process. In an extreme case in which state and/or federal agencies do not approve mitigations and adaptive management for the project's potential impacts, the Lead Agency and its elected officials (in the County's case, the Board of Supervisors) could allow the project to proceed by making a Statement of Overriding

Consideration (under CEQA) or a record of decision (under NEPA). These determinations are extremely rare, but are within the local government’s decision making power.

Table 4. Environmental regulatory agencies and their key permits or assessments that affected the recently proposed Bear River Ridge wind energy development in Humboldt County (Note: The developer, Shell Wind Energy, subsequently withdrew the proposed project)

Local (County, City, or Special District)	State	Federal
<ul style="list-style-type: none"> • Humboldt County: Conditional Use Permit, agricultural feasibility study, archaeological review, noise assessment, aesthetic assessment, wetlands, Phase I site assessment, septic systems and wastewater, geotechnical and seismic assessments, building permit • North Coast Unified Air Quality Management District: Permit to Construct 	<ul style="list-style-type: none"> • California Coastal Commission: Coastal Development Permit • Regional Water Quality Control Board: National Pollutant Discharge Elimination System (NPDES) and Stormwater Pollution Prevention Plan (SWPPP) • Department of Water Resources: well permits • Department of Fish and Wildlife: Streambed Alteration Agreement, and Section 2081 Consistency Determination • Caltrans: over-size legal load permit • California Energy Commission: for electric transmission lines 	<ul style="list-style-type: none"> • Army Corps of Engineers: wetlands and dredge and fill permit • Fish and Wildlife Service and National Marine Fisheries Service: Incidental Take Permit • Fish and Wildlife Service: compliance with Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act • Federal Aviation Administration: Notices of proposed and actual construction

Some projects may clearly fall outside of the local agency’s jurisdiction. For example, the recent repowering of PG&E’s Humboldt Bay Generating Station, as a thermal plant of greater than 50 MW capacity, fell under state jurisdiction. Other projects, for example the Bear River Ridge wind project, remained within local government’s purview because the County had the discretionary authority to issue a Conditional Use Permit, and it became the CEQA Lead Agency. Federal agencies, such as the U.S. Fish and Wildlife Service and the Army Corps of Engineers, were Responsible Agencies because they had discretionary authority over a portion of the project; the USFWS’s portion was the possible issuance of an Incidental Take Permit for the federally threatened marbled murrelet, under the federal Endangered Species Act. In general, local government officials have some decision making power over private sector renewable energy development projects, and they should be careful to retain such decision making power when they can.

The California Energy Commission's *Energy Aware Facility Siting and Permitting Guide* does a good job of covering the permitting and environmental review process for energy facilities. Chapter 2 discusses local governments role in the permitting process, and Appendix E provides an introduction to potential environmental impacts associated with energy projects. The role of local government in energy planning and permitting is expanding. The ability of local agencies to effectively participate in these processes can be critical to ensuring that energy facilities are built with the interests of their community in mind. In this vein, the CEC guide makes the following suggestions:

- Become familiar with energy technology
- Provide for early public involvement
- Facilitate cooperative relationships between stakeholders
- Exert local influence in state and federal permitting processes
- Provide guidance to developers (e.g., policies, standards, siting criteria, procedural requirements)
- Coordinate the permitting process across agencies and jurisdictions

Small distributed projects

Distributed energy projects can include rooftop solar PV and solar thermal systems, combined heat and power systems, fuel cell power systems, and electric vehicle charging stations, among others. Many of these projects can be unfamiliar to local permitting officials, thereby creating delays and challenges during the permitting process. In turn, these delays become a barrier to project developers. In order to encourage the deployment of community scale sustainable energy systems many communities are trying to streamline their permitting processes.

The Solar America Board for Codes and Standards has published *Expedited Permit Process for PV Systems* to help local building departments streamline their permitting processes for small-scale (less than about 15-kW) solar electric systems (see [Resources](#) below). These guidelines can help reduce the permitting time and costs for residential and small commercial scale systems. Another resource that covers the same topic is the *California Solar Permitting Guidebook* recently published by the Governor's Office of Planning and Research (see [Resources](#) below).

The Local Angle

Humboldt County government was the lead environmental review agency for the recently proposed Bear River Ridge wind power project. The proposed project, which has since been cancelled, would have required a Conditional Use Permit from Humboldt County. It also triggered the requirement for a permit from the U.S. Fish and Wildlife Service under the federal Endangered Species Act for potential 'take' of Marbled Murrelet, a bird species federally listed as threatened.

By contrast, the recent repowering of PG&E's Humboldt Bay Generating Station, as a thermal plant of greater than 50 MW capacity, fell under state jurisdiction (see [Resources](#) below), as it did not require any local agency permits.

In the fall of 2011, the Sierra Club performed a study of fees assessed by cities in Humboldt County for permitting of solar photovoltaic (PV) systems. The study concluded that, for small residential size systems (3 kW was used as a hypothetical example), all local municipalities are charging low or fair fees. However, for commercial scale systems (131 kW was used), Eureka and the county were found to charge excessive fees, while other municipalities' fees were deemed fair or in some cases too low to meet cost recovery criteria. The study argues that basing fees on equipment costs results in excessive fees for larger projects, ignoring the economies of scale that go with reviewing these larger projects. The report

recommends that “permit fees should be based on specific review times and billable hourly rates and not on PV project valuations” (see [Resources](#) below).

Examples from Elsewhere

The National Wind Coordinating Committee's 2005 report, *Wind Power Facility Siting Case Studies: Community Response* looks at nine successfully developed wind energy projects in the U.S. The study authors interviewed a variety of stakeholders to determine what worked and didn't work about the public process in each case. City and county officials were among the interviewees, and other stakeholders were asked about their experiences working with local government on the siting, permitting, and public participation processes. The projects took place in several different states including California, and the role of local government varied greatly among the projects. In some cases, the project was under state jurisdiction and local government played little if any role. In other cases, the county was the lead permitting agency. For many of the projects, local governments played a prominent role in holding town hall meetings in collaboration with the project developer to inform the public about the project and solicit public input. The report is recommended reading (see [Resources](#) below).

San Bernardino is an example of active local involvement in energy facility permitting. In 2008, the county and the Bureau of Land Management (BLM) entered into a memorandum of understanding (MOU) to ensure a cooperative environmental review and scoping process for renewable energy projects proposed in desert areas within the county. The county Community Development Department received more than 100 applications for solar and wind energy projects, and the MOU ensured that the county had a major seat at the permitting table. The County also collaborated with three neighboring counties and eleven cities to develop a habitat conservation plan for renewable energy projects on private lands.

The permitting process for the Chula Vista Energy Upgrade Project in San Diego County in 2007 is an example of the importance of local public involvement. A 100 MW peaking power plant was proposed for an existing power plant site in the city of Chula Vista's Main Street Industrial Corridor. Public involvement during the application review was extensive, with major concerns regarding inconsistencies with the city's general plan guidelines and impacts to residents and businesses. The California Energy Commission voted to deny certification of the proposed power plant, citing conflicts with the city's general plan and zoning ordinances.

The California County Planning Directors Association has worked to develop a model ordinance and permitting guide for solar energy facilities, as well as a model renewable energy combining zone. This was a collaborative effort that involved a diverse group of stakeholders that aimed to streamline permitting and regulatory processes while also accounting for key concerns. These concerns included loss of agricultural land, environmental impact, abandonment and restoration, and additional regulatory burdens. The documents they produced, while largely focusing on solar energy systems, are nonetheless very illustrative of the types of regulatory tools that can be used to facilitate effective development of renewable energy resources (see **Resources** below).

Resources

California Energy Commission's Humboldt Bay Generating Station Licensing Case site
<http://www.energy.ca.gov/sitingcases/humboldt/index.html>

California Energy Commission's *Energy Aware Facility Siting and Permitting Guide*
<http://www.energy.ca.gov/2010publications/CEC-600-2010-007/CEC-600-2010-007.pdf>

California Energy Commission Planning and Permitting Resources for Renewable Energy Systems
http://www.energy.ca.gov/localgovernment/planning_resources/index.html

Distributed Generation: CEQA Review and Permit Streamlining, CEC, December 2000
http://www.energy.ca.gov/reports/2000-12-21_700-00-019.PDF

Renewable Energy Project Permitting in the State of Hawaii. A good example of a well-organized, "one-stop" resource for local, state, and federal permit forms and instructions, available for download as permit-specific "packets"
<http://energy.hawaii.gov/developer-investor/project-permitting-assistance-and-resources/renewable-energy-project-permitting-in-the-state-of-hawaii>

Wind Energy:

Wind Power Facility Siting Case Studies: Community Response. National Wind Coordinating Committee. June 2005 www.windaction.org/documents/106

Wind Energy Guide for County Commissioners <http://www.nrel.gov/docs/fy07osti/40403.pdf>

California Small Wind Permitting Reports, CA Wind Energy Collaborative
<http://cwec.ucdavis.edu/smallwindreports/>

Solar Energy:

California Solar Permitting Guidebook,
opr.ca.gov/docs/California_Solar_Permitting_Guidebook.pdf

Brooks, Bill. *Expedited Permit Process for PV Systems: A Standardized Process for the Review of Small-Scale PV Systems*. Solar America Board for Codes and Standards
<http://www.solarabcs.org/about/publications/reports/expedited-permit/>

Sierra Club study of municipal fees assessed in Humboldt County for solar photovoltaic systems
<http://lomaprietaglobalwarming.sierraclub.org/PVSurveyHumboldt.php>

Solar Energy Facility Permit Streamlining Guide, California County Planning Directors Association <http://www.ccpda.org/solar>

Wave Energy:

Developing Wave Energy in Coastal California: Potential Socio-Economic and Environmental Effects, H. T. Harvey & Associates, prepared for the California Energy Commission and the California Ocean Protection Council. 2008.

http://www.opc.ca.gov/webmaster/ftp/project_pages/energy/CA_WEC_Effects.pdf

Siting Methodologies for Hydrokinetics, Pacific Energy Ventures on behalf of the US Department of Energy 2009 http://www1.eere.energy.gov/water/pdfs/siting_handbook_2009.pdf

11. PROVIDING A PUBLIC FORUM

The Opportunity

Renewable energy development at a community scale requires many parties with differing agendas to come together and find common ground. These parties can include outside developers most interested in the revenue a project can generate, local residents interested in both job creation and preserving quality of life, environmental groups that generally support renewable energy but may either support or oppose specific projects for a variety of reasons, local businesses and economic development offices looking for job creation opportunities, and local governments interested in tax revenues a project may bring.

County, municipal, and Tribal governments have existing protocols for reviewing project proposals in general, but it may be beneficial to develop or adopt protocols specifically designed with renewable energy development in mind. One British organization, the Centre for Sustainable Energy, has worked extensively on this problem. They have developed a set of recommended protocols intended for adoption by community stakeholders. The protocols provide a framework for engagement and call for all participants to be transparent in their actions and to strive for constructive dialogue. CSE has adapted the core protocols for use in different settings within the U.K. (see *Resources* below).

Local government can help coordinate and facilitate community dialog around the issues of local renewable energy development. Communities that have engaged in this dialog and have considered various renewable energy development opportunities are likely to be better prepared to ensure future projects are aligned with community goals and prime opportunities are not squandered. Up front community preparation can be used to help attract developers who might be interested in projects that are favored by the community, or to ward off developers who might want to pursue projects not to a communities liking. A community forum that investigates local sustainable energy options could be part of a formal process leading to a Specific Plan, a Master Plan, zoning overlays and/or a programmatic EIR, or it could be an informal process. In either case, the process should be well documented so the information collected can be used at a later date as desired.

The Local Angle

As mentioned earlier, Humboldt County government was involved in the review of Shell Wind Energy's proposed Bear River Ridge wind power project south of Ferndale. The scoping of this project was not ideal. While it did meet legal requirements, public involvement was minimal. The public was not brought into the project development process at an early stage or involved significantly. Had the development process been structured to engage the community in a meaningful dialog, the project may have had a better chance of success. Perhaps we can learn from this process and do better next time. For this to occur it is essential that both the project developer and the community be committed to a meaningful dialog.

As noted in the CEC's *Energy Aware Facility Siting and Permitting Guide*, "A major benefit of local planning is the opportunity it creates to reduce barriers through public education and

involvement in advance of actual facility permitting and development. If the public is involved in long-range planning that recognizes the necessity and benefits of reliable energy supplies, as well as local efforts to maximize the efficient use of energy, it will be more likely to accept facilities when and where they are eventually needed.” The RePower Humboldt strategic planning process provides Humboldt County with the type of long range planning process being referred to. A valuable next step in the RePower Humboldt strategic planning process would be to create an advisory committee that works to develop guidelines and standards for future energy development projects in Humboldt County. The committee would need to engage the community in a dialog that examines community desires. Specific resources (wind, wave, hydro, biomass, etc.) could be considered for particular geographic regions, siting preferences could be determined and development guidelines and standards created. In addition, the committee could explore potential options for developer agreements, sales tax agreements, public benefit programs and other potential conditions of approval for future energy development projects. This effort could draw on lessons learned for energy development projects in other communities. This preliminary work would be invaluable in helping to shape the outcome of future energy project opportunities in Humboldt County and could even be used to attract developers who are interested in working with our community. Potentially this work could also lead to the development of zoning overlays, specific plans and/or other formal planning documents.

Examples from Elsewhere

Defenders of Wildlife led a planning effort called the Central Valley Renewable Energy Project. As they articulate in their *Smart from the Start* report, they strongly support the greenhouse gas emission goals of AB 32 and corresponding development of renewable energy resources. However, they stress that it is “imperative that we strike a balance between addressing the near-term impact of industrial-scale solar development with the long-term impacts of climate change on our biological diversity, fish and wildlife habitat, natural landscapes, and productive prime agricultural lands.” Accordingly, they call for renewable energy planning that is “smart from the start.” Smart-from-the-start development aims to guide projects to low-value, low-conflict areas where impacts to wildlife, agricultural lands, and other high-value resource lands can be minimized. This approach can help protect valuable natural resources and speed up the permitting process for renewable energy projects. Many recommendations in the *Smart from the Start* report are broad based in nature and could apply in most any setting. Recommendations include:

- Establish renewable energy combining or overlay zoning districts or siting criteria to incentivize smart-from-the-start renewable energy development
- Implement tiered permitting approaches that provide for streamlined, legally minimal permitting for smart-from-the-start renewable energy projects
- Include clearly defined smart-from-the-start development standards and siting criteria in regulatory codes adopted by local jurisdictions for renewable energy projects
- Develop and implement best-practices-based model energy elements, development codes, and conditions of approval to build local jurisdictions’ capacity to review and permit renewable energy projects efficiently
- Provide funding to local jurisdictions for renewable energy planning
- Implement comprehensive regional planning and identify “energysheds”—areas at a regional or county level that have renewable energy resources and the appropriate land,

environmental characteristics and other resources with the highest potential for effective smart-from-the-start renewable energy development

- Adopt energy elements in local jurisdictions' general plans that are based on regional planning and identification of energysheds
- Plan future transmission lines and systems to serve identified energysheds, incentivizing and facilitating smart-from-the-start renewable energy siting

The *Solar Energy Facility Permit Streamlining Guide* prepared by the California County Planning Directors Association includes a number of sample documents that could be useful as part of a public dialog regarding the development of local renewable energy resources and ways of ensuring that locally affected communities have a seat at the table and are able to ensure that development projects meet community standards and sufficiently benefit local communities. Sample documents found in the appendices to this document include:

- model renewable energy combining zone
- sales tax agreement (Sonoma County)
- developer agreement (Tulare County)
- Use Permit for a 15 MW solar installation (Sacramento County)
- Public Benefit Program Resolution (Imperial County)
- Conditions of Approvals for a 250 MW solar installation (San Louis Obispo County)

See **Resources** below for access to these documents.

Resources

Centre for Sustainable Energy with BDOR and Peter Capener. *The Protocol for Public Engagement with Proposed Wind Energy Developments in England: a report for the Renewables Advisory Board and DTI*. May 2007 www.cse.org.uk/pdf/pub1079.pdf. See www.cse.org.uk/pages/resources/toolkits for more details on the Centre for Sustainable Energy's renewable energy development protocols.

Wind Power Facility Siting Case Studies: Community Response. National Wind Coordinating Committee. June 2005 www.windaction.org/documents/106

Local Government Commission, Public Participation
http://www.lgc.org/issues/energy/public_participation.html

Solar Energy Facility Permit Streamlining Guide, California County Planning Directors Association <http://www.ccpda.org/solar>

SMART FROM THE START - RESPONSIBLE RENEWABLE ENERGY DEVELOPMENT IN THE SOUTHERN SAN JOAQUIN VALLEY, DEFENDERS OF WILDLIFE
[HTTP://WWW.DEFENDERS.ORG/PUBLICATION/SMART-START-RESPONSIBLE-RENEWABLE-ENERGY-DEVELOPMENT-SOUTHERN-SAN-JOAQUIN-VALLEY](http://www.defenders.org/publication/smart-start-responsible-renewable-energy-development-southern-san-joaquin-valley)

12. THE CLIMATE CHANGE ENERGY NEXUS

The Opportunity

Energy and climate change are closely linked. The great majority of the world's energy used for power generation, transportation, industry, and buildings comes from burning fossil fuels. This combustion puts carbon dioxide and other greenhouse gases into the atmosphere, leading to long-term climate change. Replacing these fossil fuels with renewable energy and using energy efficiency to reduce our total energy demand can make a difference in global climate change.

ICLEI - Local Governments for Sustainability is an international organization that has led the movement for local government response to climate change since 1990. ICLEI members engage in joint climate change mitigation, adaptation and advocacy activities. ICLEI has over 1,220 member governments from 70 different countries representing nearly 600 million people (see [Resources](#) below).

The U.S. Conference of Mayors' Climate Protection Agreement provides a mechanism whereby U.S. cities can commit to do their part to bring the U.S. into compliance with the greenhouse gas emissions reduction targets of the Kyoto Protocol on climate change. As of February 2012, 138 California cities and 1,055 U.S. cities have signed on to the Climate Protection Agreement (see [Resources](#) below).

The Local Angle

Arcata is the only current Humboldt County member of ICLEI. Arcata's principal activity as an ICLEI member has been the development and implementation of a Greenhouse Gas Reduction Plan. The plan, which was developed by the City of Arcata's Energy Committee and published in 2006, "focuses on energy efficiency, renewable energy, sustainable transportation, waste and consumption reduction, and the sequestration of carbon dioxide by trees and other vegetation. The plan breaks down what steps the city and individuals can take to implement these measures." (see [Resources](#) below)

Arcata is also the only community in Humboldt County that is a signatory to the U.S. Conference of Mayors' Climate Protection Agreement. Adding more local communities to the agreement would send a message nationally that Humboldt County is committed to addressing climate change and would provide these communities with access to a large network of other communities sharing best practices, lessons learned, and ideas on how to overcome hurdles to energy sustainability.

The County of Humboldt and the City of Trinidad have produced a draft Climate Action Plans (see [Resources](#) below). The City of Blue Lake is beginning work on a Climate Action Plan in 2013 with funding from the CA Strategic Growth Council.

The Redwood Coast Energy Authority, with support from PG&E and ICLEI, has completed greenhouse gas inventories for of the municipal operations of all Humboldt County jurisdictions, and is expanding that effort to community-wide inventories starting in 2013.

Examples from Elsewhere

Many local governments already make a strong link between climate change policy and energy policy. One important example from outside the immediate area is the City of Richmond, which has developed a draft Climate Change and Energy Element as part of their general plan update, as described earlier in this guide (see **Resources** below).

Resources

Local Resources:

Arcata Greenhouse Gas Reduction Plan <http://redwoodenergy.org/programs/public-agency-energy-initiatives/green-house-gas-reduction/arcata-ghg-plan>

Draft Trinidad Climate Action Plan

http://www.trinidad.ca.gov/phocadownload/PlanningCommission/GeneralPlanUpdate/Background/draft_cap_for_trinidad1.pdf

RCEA Climate Action Planning (page under development as this guide goes to press)

<http://www.redwoodenergy.org/programs/climate-action-planning>

General Resources:

ICLEI - Local Governments for Sustainability www.iclei.org

CA Governor's Office of Planning and Research, Climate Change Resources for Local Government http://www.opr.ca.gov/s_climatechangeresources.php

CoolCalifornia.org, Local Government Climate Action Planning Toolkit

<http://www.coolcalifornia.org/article/local-gov-toolkit>

Institute for Local Government, Climate Action and Sustainability Best Practices

<http://www.ca-ilg.org/climate-action-sustainability-best-practices-framework>

California Air Resources Board, Local Government Actions for Climate Change

<http://www.arb.ca.gov/cc/localgovernment/localgovernment.htm>

US Environmental Protection Agency State and Local Climate and Energy Program

<http://www.epa.gov/statelocalclimate/index.html>

<http://www.epa.gov/statelocalclimate/local/index.html>

U.S. Council of Mayors Climate Protection Agreement

www.usmayors.org/climateprotection/agreement.htm

Richmond Energy and Climate Change Element for General Plan Update

www.ci.richmond.ca.us/index.aspx?NID=1737

13. PLANNING AND IMPLEMENTATION OF ENERGY EFFICIENCY PROGRAMS

The Opportunity

Watt for Watt, energy efficiency typically offers much higher return on investment than building additional energy infrastructure. However, it is sometimes neglected compared to higher profile energy options, such as installing rooftop solar photovoltaics. Local government can play an important role in community energy efficiency, particularly when it leverages additional resources through partnerships with the local utility, state and federal government, and non-profits.

The Local Angle

Here is where the RCEA delivers great value to our local governments. RCEA was created specifically to take the burden of creating, funding, and managing their own energy efficiency programs off the individual cities by creating a central entity that can deliver such programs more efficiently, with staff expertise in energy and funding already in place. Efficiency programs currently offered by RCEA include:

- Redwood Coast Energy Watch, a partnership with PG&E operating since 2006. Energy Watch includes residential and small business direct install efficiency services, energy efficiency technical assistance for local governments, and other comprehensive energy services.
- Humboldt Non-Profit Energy Efficiency Program, a special campaign that matches utility incentives with funds from various foundations. Eligible Humboldt non-profit facilities can receive up to 100% of costs for their energy efficiency improvement projects.
- Humboldt Green Building Program, a joint project of RCEA and local environmental non-profit Plan It Green, is a county-wide program to offer practical design guidelines, information, and resources for home owners and builders.

RCEA is also the local partner for Energy Upgrade California, a statewide “one-stop shop” program to help consumers identify appropriate home energy efficiency upgrades, locate qualified local installers, and apply for rebates and incentives (see [Resources](#) below).

Another important player in delivering local energy efficiency services is the non-profit Redwood Community Action Agency (RCAA). Community action agencies like RCAA were set up across the U.S. decades ago to deliver low-income home weatherization and energy assistance services funded by the federal Weatherization Assistance Program (WAP) and Low Income Home Energy Assistance Program (LIHEAP). RCAA’s energy program serves Humboldt, Del Norte, Siskiyou, and Modoc Counties, offering “energy efficiency retrofits, health and safety repairs, utility and energy assistance, lead-based paint abatement, client education and advocacy” for income-qualified households (see [Resources](#) below).

In Humboldt County, the greatest value local government can give to its constituents on energy efficiency is to make appropriate referrals to RCEA and RCAA.

Examples from Elsewhere

Other jurisdictions in California have established programs similar to the RCEA, each putting their own local stamp on the concept. The California Center for Sustainable Energy, originally established as the San Diego Regional Energy Office, has expanded its geographic scope but still provides services principally in the San Diego area. Like the RCEA, they operate an energy resource center where people can attend workshops and visit a library and technology displays. They also operate programs offering rebates for purchase of low-emission vehicles by individuals, businesses, and fleet operators including those providing ground transportation to and from the San Diego Airport. Serving a large urban market, CCSE also maintains a busy training schedule; the most recent month in their online training schedule lists 18 workshops, forums, and tours (see ***Resources*** below).

Resources

Call the RCEA at (707) 269-1700, visit the Redwood Coast Energy Resource Center at 517 5th Street in Eureka, or visit redwoodenergy.org for more information on their efficiency programs.

Energy Upgrade California <https://energyupgradeca.org/overview>

Redwood Community Action Agency energy services. Val Martinez, Energy Services Director. Verlenea Freson, Energy Services Coordinator. Energy Demonstration Center: 539 T Street, Eureka, CA. 95501. Tel. (707) 444-3831 ext. 204 <http://rcaa.org/division/energy-services>

California Center for Sustainable Energy <http://energycenter.org/>

PG&E Energy Watch Partnerships <http://www.pge.com/energywatch/>

Local Ordinances Exceeding State Building Energy Efficiency Codes, Statewide Energy Efficiency Collaborative Best Practices Local Reach Codes
<http://californiaseec.org/documents/best-practices/local-reach-codes>

14. GENERATION, DISTRIBUTION & SALE OF ELECTRICAL POWER

The Opportunity

Three important concepts here are Community Solar, Community Choice Aggregation, and municipalization.

As described in the U.S. Department of Energy's *A Guide to Community Solar: Utility, Private, and Non-profit Project Development* (see [Resources](#) below), **community solar** offers economies of scale and allows citizens who for whatever reason cannot install solar on their own home to enjoy the benefits of generating renewable energy. (Most of the concepts associated with Community Solar as described by DOE could more broadly be applied to Community Renewable Energy efforts.) As described in *A Guide to Community Solar*, Community solar can be designed using different models:

- Utility-Sponsored Model, where a utility owns and/or operates a project open to voluntary ratepayer participation.
- Special Purpose Entity (SPE) Model, where individual investors participate in a private enterprise to develop a community solar project.
- Non-Profit "Buy a Brick" Model, where donors contribute to a community installation owned by a non-profit organization.

Community Choice Aggregation (CCA) is a relatively new mechanism that allows a city or county government to combine local electric loads and meet these loads through bulk energy purchase. The incumbent (existing) utility continues to act as the distributor and billing agent, but the community enjoys increased control over the source and/or cost of the energy commodity. CCAs are widely seen as a possible instrument for increasing use of renewable energy beyond the levels that the Renewable Portfolio Standard requires investor owned utilities in California to provide.

Another pending model in California for community renewable projects has been introduced into the state legislature by Senator Wolk, SB 843 – Community-Based Renewable Energy Self-Generation Program. The bill is currently inactive. SB 843 would allow the development of community renewable energy facilities that could sign agreements with utility customers to sell them renewable energy. Customers would receive credit on their bill for their share of renewable electricity delivered to the grid. Similar to the CCA program, the bill credit value would be applied to offset only the energy component of the subscriber's bill. If the bill credit exceeded the energy portion of the bill the excess credit would be carried forward.

Municipalization refers to creation of a new municipal utility, effectively withdrawing a community from participation in the existing regional utility, locally PG&E. There are 46 such "munis" in California, most of which have existed for many decades. These municipal utilities own and maintain all electric (and in some cases, natural gas) distribution infrastructure within their communities, implying a significant investment in the hardware and the human capacity to maintain it. Some munis own or co-own generation assets as well, while others purchase their power through contracts with federal power projects or on the open market. Conventional

wisdom is that creation of new municipal utilities today, within existing investor owned utility service territories, is highly problematic; hence the emerging interest in CCAs, which can offer many of the benefits of municipalization with far lower up-front costs.

The Local Angle

In Humboldt County, the City of Arcata has demonstrated the most active interest in Community Choice Aggregation. The Arcata City Council is currently weighing the options of joining the existing Marin County CCA (which purchases its energy from Shell), creating its own CCA with assistance from Local Power (a company that has been involved for some time in CCA advocacy), or maintaining the status quo. Creating a local CCA built on local power would be more in keeping with the stated RePower Humboldt goal of local renewable energy production. However, this approach is likely to incur more up-front costs and take longer to implement than joining an existing CCA. The City of Eureka is also studying the CCA option, and the members of its energy committee joined the Arcata energy committee in hosting a recent presentation on CCA by Local Power staff. RCEA is also monitoring CCA options and reporting periodically to its membership on this topic.

Humboldt State University graduate student Michael Landau studied the feasibility of adopting Community Choice Aggregation in Humboldt County and published a master's thesis on the topic (see ***Resources*** below).

Examples from Elsewhere

Sacramento Municipal Utility District operates a community solar project called SolarShares. The municipal utility contracted with a solar developer to build, operate, and maintain a 1-MW solar electric project. The developer sells this power to SMUD, which in turn sells shares of it to its customers on a voluntary basis. Individual customers can purchase shares ranging from 0.5 kW to 4 kW. Incremental cost to the customer can range from about \$5 to \$65 per month, depending on share size and energy use. Although customers pay a price premium relative to current SMUD conventional power prices, contracts lock them in at the initial price for as long as they care to subscribe to the program, which means energy cost security that most utility customers do not enjoy. The program is fully subscribed with 700 residential customers, and more on a waiting list. SMUD has near-term plans to expand the popular program to 25MW.

Marin County is the first jurisdiction in California to launch its own CCA; as mentioned previously, this CCA, Marin Clean Energy, is purchasing its energy under contract from Shell Energy North America. The City and County of San Francisco is also in the process of creating a CCA, CleanPowerSF, and is reportedly putting more emphasis on local distributed generation as a component (see ***Resources*** below).

Resources

Community Renewable Energy Programs:

A Guide to Community Solar: Utility, Private, and Non-profit Project Development. Developed for the National Renewable Energy Lab by Northwest Sustainable Energy for Economic Development, Keyes and Fox, Stoel Rives, and the Bonneville Environmental Foundation. November 2010 <http://www.nrel.gov/docs/fy11osti/49930.pdf>

Sacramento Municipal Utility District SolarShares

<https://www.smud.org/en/residential/environment/solar-for-your-home/solarshares/>

SB 43 - Shared Renewable Energy Self-Generation Program

http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB43

Community Choice Aggregation:

Landau, Michael. *Community choice aggregation: assessing the financial and political viability in Humboldt County.* Humboldt State University master's thesis <http://humboldt-dspace.calstate.edu/xmlui/handle/2148/729>

Marin Clean Energy <https://marincleanenergy.info/>

CleanPowerSF <http://cleanpowersf.org/>

City of Davis Energy Assessment, October 2012 (examines Community Choice Aggregation and municipalization): [http://city-](http://city-council.cityofdavis.org/Media/Default/Documents/PDF/CityCouncil/CouncilMeetings/Agendas/20121023/09-FY12-13-City-Energy-Assessment-Study.pdf)

[council.cityofdavis.org/Media/Default/Documents/PDF/CityCouncil/CouncilMeetings/Agendas/20121023/09-FY12-13-City-Energy-Assessment-Study.pdf](http://city-council.cityofdavis.org/Media/Default/Documents/PDF/CityCouncil/CouncilMeetings/Agendas/20121023/09-FY12-13-City-Energy-Assessment-Study.pdf)

15. EDUCATION AND OUTREACH

The Opportunity

Via education and outreach efforts, local government can encourage residents and businesses to participate in sustainable energy practices. There is a wealth of energy education material available free or at low cost, so there is no need to create everything from scratch. However, adapting or selecting from existing materials with the needs of the local community in mind makes for a much more effective outreach campaign.

The Local Angle

RCEA is the go-to agency for locally relevant energy outreach materials. RCEA has partnered with Humboldt State University to involve students in creating educational exhibits on energy themes that are on display at the Redwood Coast Energy Resource Center in downtown Eureka (see [Resources](#) below). Additional education and outreach provided by RCEA includes:

- In-home consultations provided by staff Energy Technicians, which identify opportunities for efficiency upgrades, provide information about current energy efficiency rebate programs, and educate residents about the whole-house, systems approach to building performance.
- A Lending Library containing a variety of energy related books, periodicals, videos, and energy tools, all available to be borrowed by the public for free.
- Regular workshops and professional trainings are offered throughout the year, typically free of charge.

The event now known as the “Humboldt Solar and Efficiency Tour” has been an annual tradition for the past decade. Organized in recent years by local non-profit Plan It Green and dedicated community members, the free event allows anyone interested to travel around on a self-guided tour to see solar energy and energy efficiency at work in residences and commercial and government buildings around the Humboldt Bay Area.

Fortuna’s General Plan 2030 calls for the City to cooperate actively with the RCEA in outreach and education efforts: “The City shall support the [RCEA] in its effort to provide community education on energy issues, including the benefits of reduced energy consumption and increased energy efficiency. This includes collaborating with schools and colleges on energy-related research, education, and management practices.”

Local media outlets provide a constant opportunity to keep the public informed about local governments’ energy programs and activities. The RePower Humboldt team has gotten the word about clean, renewable energy out to local residents through the “My Word” guest editorial space in the *Times-Standard*; the locally produced, four-part “Blueprint Humboldt” program on public television station KEET; and periodic radio spots. These efforts keep the RePower Humboldt vision in people’s minds, popularizing the idea that Humboldt can and should become a renewable energy-powered community. Local government leaders can likewise make use of these and other local media to make their constituents aware of what they’re doing to improve energy security for their communities.

Examples from Elsewhere

Examples developed by other communities include San José’s “Go Solar in San José!” and Mission Viejo’s “Solar Energy Education Program” on their city websites. San José’s site provides information on the benefits of solar energy, background information on the technology, financing information, guidance on hiring contractors and permitting, solar laws, workshops and training, and clean energy tours. The City of Mission Viejo has created an online “Mission Viejo Solar Energy Education Program” that combines general information about solar energy with community-specific resources like information on the City’s solar permit fee waiver and a list of local solar vendors (see **Resources** below).

Resources

Local Resources:

The RCEA provides a number of resources and tools to help the community learn about energy efficiency and renewable energy:

- Vendor database: this listing helps connect consumers with suppliers and installers of energy products and services.
- A free energy library from which anyone can borrow hundreds of books and videos on energy, green building, and sustainability topics.
- An energy tool lending library, which was recently expanded to include tools that contractors need to participate in Energy Upgrade California—which allows contractors to get started on EUC without having to invest right at the start in the thousands of dollars for the required tools.
- Displays on various energy topics.
- A venue for energy-related workshops and events, which are always free and open to the public.

Call the RCEA at (707) 269-1700, visit the Redwood Coast Energy Resource Center at 517 5th Street in Eureka, or visit redwoodenergy.org for more information.

Humboldt Solar and Efficiency Tour <http://www.humboldtplanitgreen.org/solartour/>

The “Blueprint Humboldt” series from public television station KEET
<http://www.keet.org/single.php?nav=page&id=0000000037> and
<http://youtu.be/TtUos7pH2GQ>

General Resources:

ICLEI Local Governments for Sustainability, Education and Outreach

<http://www.icleiusa.org/action-center/learn-from-others/small-communities-toolkit/education-and-outreach>

ICLEI Local Governments for Sustainability, Outreach and Communications Guide

<http://www.icleiusa.org/action-center/engaging-your-community/resolveuid/4e47bc1f1df41a2e9ccfc33b67536efc>

Go Solar in San José! <http://energy.sanjoseca.gov/solar/default.asp>

Mission Viejo Solar Energy Education Program

<http://cityofmissionviejo.org/DepartmentPage.aspx?id=3064>

A Step by Step Tool Kit for Local Governments to Go Solar

http://www.gosolarcalifornia.org/professionals/local_government/index.php and/or download guide at

<http://www.energy.ca.gov/2009publications/CEC-180-2009-005/CEC-180-2009-005.PDF>

V. Appendices

ADDITIONAL INFORMATION RESOURCES

A Guide for Local Government Executives on Energy Efficiency and Sustainability by Nathan Francis and Richard C. Feiock. IBM Center for the Business of Government. 2011. www.businessofgovernment.org. Features six recommended strategies and discussion of results from a national survey of local governments' experiences promoting energy sustainability.

City Planners' Energy Action Resource Guide jointly published by the Statewide Energy Efficiency Collaborative and ICLEI- Local Governments for Sustainability: <http://californiaseec.org/tools-guidance/best-practices>

Compendium of Best Practices: Sharing Local and State Successes in Energy Efficiency and Renewable Energy from the United States. American Council On Renewable Energy (ACORE). April 2010. www.acore.org/compendium-of-best-practices. This report uses numerous case studies to illustrate how local (and state) governments can implement energy sustainability through policies, regulation, financing, planning, and leading by example with demonstration projects.

Database of State Incentives for Renewables & Efficiency (DSIRE), www.dsireusa.org. The Database of State Incentives for Renewables & Efficiency has for years been a reliable, up-to-date, and widely cited online information resource on what specific incentives, programs, regulations, and policies are in effect in a given state, including incentives and programs offered in specific locations within the state (e.g., rebates available in a utility's service territory). We recommend consulting DSIRE for current information on incentives.

Energy Aware Facility Siting and Permitting Guide. California Energy Commission. September 2011. www.energy.ca.gov/energy_aware_guide/siting.html. Chapter Two discusses the authority local governments have to play a role in siting and permitting of energy facilities. Chapter Four provides in-depth coverage of specific regulatory processes.

Energy Aware Planning Guide. California Energy Commission. February 2011. www.energy.ca.gov/energy_aware_guide/index.html. An in-depth guide that focuses mainly on the aspects of urban planning with indirect energy impacts, including land use, transportation, and water use. It also includes chapters on buildings and community energy strategies.

PG&E Training Schedule: <http://pge.com/mybusiness/edusafety/training/>

RePower Humboldt: Documents related to the RePower Humboldt project, including the Strategic Plan, can be accessed via the RePower Humboldt web page maintained by the Redwood Coast Energy Authority: www.redwoodenergy.org/programs/repower

STATE ENERGY POLICY DOCUMENTS

2011 Integrated Energy Policy Report (<http://www.energy.ca.gov/2011publications/CEC-100-2011-001/CEC-100-2011-001-CMF.pdf>)

2012 Bioenergy Action Plan
(http://www.resources.ca.gov/docs/2012_Bioenergy_Action_Plan.pdf)

2012 ZEV Action Plan, A Roadmap toward 1.5 Million Zero-emission Vehicles on California Roadways by 2025 ([opr.ca.gov/docs/Draft2012ZEVActionPlan\(09-21-12\).pdf](opr.ca.gov/docs/Draft2012ZEVActionPlan(09-21-12).pdf))

2012-2013 Investment Plan for the Alternative And Renewable Fuel and Vehicle Technology Program, California Energy Commission Report, May 2012
(<http://www.energy.ca.gov/2012publications/CEC-600-2012-001/CEC-600-2012-001-CMF.pdf>)

Assembly Bill 32: Global Warming Solutions Act (<http://www.arb.ca.gov/cc/ab32/ab32.htm>)

California's Clean Energy Future Implementation Plan
(<http://www.cacleanenergyfuture.org/documents/CCEImplementationPlan.pdf>)

Clean Energy Jobs Plan (http://www.jerrybrown.org/sites/default/files/6-15_Clean_Energy_Plan.pdf)

Distributed Generation and Cogeneration Policy Roadmap for California, California Energy Commission Staff Report, March 2007 (<http://www.energy.ca.gov/2007publications/CEC-500-2007-021/CEC-500-2007-021.PDF>)

Implementing California's Loading Order for Electricity Resources, California Energy Commission, Staff Report, July 2005 (<http://www.energy.ca.gov/2005publications/CEC-400-2005-043/CEC-400-2005-043.PDF>)

Renewable Portfolio Standard (<http://www.cpuc.ca.gov/PUC/energy/Renewables/overview.htm>
or <http://www.energy.ca.gov/portfolio/>)

State Alternative Fuels Plan, California Energy Commission Report, December 2007
(<http://www.energy.ca.gov/2007publications/CEC-600-2007-011/CEC-600-2007-011-CMF.PDF>)

Strategic Transmission Investment Plan, California Energy Commission Report, December 2009 (<http://www.energy.ca.gov/2009publications/CEC-700-2009-011/CEC-700-2009-011-CMF.PDF>)

ENERGY AND POWER UNITS

We use an array of different units to measure energy and power. Here are a few of the most commonly used ones. Remember that power and energy are two different things. Since the two words are used interchangeably in everyday speech, many people get confused about this distinction. Power is a rate, an instantaneous value (analogous to speed); energy is a cumulative value (analogous to distance traveled).

kilowatt (kW): a power unit, equal to one thousand Watts. Electric equipment is rated by how many Watts or kW it can generate or consume (its capacity), and facilities that are charged for electric demand pay by the kW. Capacity of central power plants is typically described in megawatts (MW or millions of Watts), while regional or statewide power demand is measured in gigawatts (GW or billions of watts).

kilowatt-hour (kWh): an energy unit, equivalent to one kW being generated or consumed for one hour. Electric energy consumption is billed by the kWh. Wholesale electric transactions may be conducted in megawatt-hours (1 MWh = 1,000 kWh) or even in gigawatt-hours (one GWh = 1,000,000 kWh).

British thermal unit (BTU): an energy unit, commonly used to describe the energy values of fuels. One BTU is defined as the amount of energy needed to raise the temperature of a pound of water by one degree Fahrenheit. A wooden kitchen match gives off about one BTU of heat when burned. There are 3,413 BTUs in one kWh.

therm: an energy unit, the one by which natural gas is sold. One therm contains exactly 100,000 BTUs. A therm is approximately 100 cubic feet of natural gas at atmospheric pressure, but this is an approximate value, as the composition of natural gas (and thus its energy value) can vary by a few percent.

ENERGY GLOSSARY

This glossary is provided to explain terms commonly used in the energy industry. Several of the definitions are derived or adapted from existing glossaries, including those produced by the California Public Utilities Commission (www.cpuc.ca.gov/puc/glossary/), the League of Women Voters (ca.lwv.org/lwvc/edfund/citizenized/natres/energy/energystudyguide.pdf), and the Independent Energy Producers Association (www.iepa.com/Glossary.asp), among others. Direct quotes from these source glossaries are cited as CPUC, LWV, or IEPA. This glossary is generally less extensive than the source glossaries and is intended as a quick reference with minimal technical detail.

AB 32: Assembly Bill 32 is known as the Global Warming Solutions Act of 2006. It set into law California's goal of reducing greenhouse gas emissions to 1990 levels by the year 2020. AB 32 directs the state's Air Resources Board to oversee this reduction.

all-electric vehicle: an all-electric, or battery-electric vehicle is one that uses energy stored in batteries as its sole source of motive power. In contrast, some electric vehicles use fuel cells to provide electric power, or combine electric power with a combustion engine in a hybrid configuration. All-electric vehicles produce zero emissions at the tailpipe, but they are more range-limited than hybrid and fuel cell vehicles. Advances in battery technology and vehicle design are gradually increasing the range of all-electric vehicles.

ARB: Air Resources Board. ARB is part of the California Environmental Protection Agency. Their mission is to “promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state.” (ARB)

baseline quantity: “The allowance of a certain amount of the first units of gas or electricity at a reduced price to all residential customers to encourage conservation of energy.” (CPUC) PG&E uses baseline pricing for residential consumers of both electricity and natural gas. Baseline quantities vary by season and geographically, to account for climate. Humboldt County includes two baseline zones, one on the coast and the other inland. All-electric homes are eligible for larger electric baseline quantities.

(www.pge.com/myhome/customerservice/financialassistance/medicalbaseline/understand/)

bioenergy or biomass: energy derived from biological (typically plant) sources. In Humboldt County, bioenergy is associated mainly with waste biomass from forestry operations, but methane-rich biogas from wastewater treatment plants and dairy farms is also a potential bioenergy source.

bundled service: “Situation in which energy is delivered to an end-user at one inclusive price per kWh, covering generation, transmission and distribution.” (LWV) Prior to California electric utility deregulation in the 1990s, energy services were generally bundled. Deregulation was intended to increase competition and consumer choice by allowing energy customers to “shop around” for better deals on energy commodities while preserving the natural monopoly held by the local energy distributor and its delivery infrastructure.

California Independent System Operator (CAISO): “An independent, federally regulated entity that coordinates regional transmission in a non-discriminatory manner and ensures the safety and reliability of the electric system.” (CPUC)

California Alternate Rates for Energy (CARE): a state-mandated discount program offered by PG&E and other utilities. “The CARE program provides a monthly discount on energy bills for income-qualified households and housing facilities. Qualifications are based on the number of persons living in your home and your total annual household income.” (PG&E) The basic discount is 20%. As of April 2012, PG&E’s data show 40.5% of utility customers in Humboldt County are receiving the CARE discount, as compared with 29.2% in all of PG&E’s service territory.

California Energy Commission (CEC): “an agency established in 1974 to forecast energy needs, license power plants, promote energy conservation and develop alternative energy resources.” (LWV) “It is overseen by a Governor-appointed five-person board.” (CPUC) Note that the CEC’s function is primarily energy planning and policy making, as distinct from the CPUC, whose role is to regulate privately held utilities.

California Environmental Quality Act (CEQA): The state law requiring an environmental impact report (EIR) be prepared for any project falling under state jurisdiction and deemed likely to have significant environmental impacts.

California Public Utilities Commission (CPUC): “The CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CPUC serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy.” (CPUC)

cogeneration: see “combined heat and power”

combined heat and power (CHP): also known as cogeneration. “The sequential production from the same fuel source of thermal energy and electrical mechanical power, such as the generation of electricity using waste heat from an industrial process.” (CPUC) Other plants are primarily electric generating facilities that capture waste heat from generation for use in an appropriate thermal application. An example of a CHP plant in Humboldt County is the 350 kW electric generating facility on the Humboldt State University campus that also provides space and water heating for a cafeteria and dormitories.

community choice aggregation (CCA): “A community organization of electricity customers who group together to solicit bids, broker, and contract for electricity and energy services to facilitate the sale and purchase of electricity and other related services on behalf of local citizens, businesses, and itself.” (CPUC). CCAs aggregate the electrical loads of retail customers in their jurisdiction and then purchase or generate power to meet the needs of these customers. CCAs do not own transmission or distribution infrastructure. The power must be delivered via the incumbent electric utility’s distribution infrastructure. The incumbent utility also continues to provide all metering, billing, collection, and customer service functions to retail customers that participate in CCA programs. Marin County created Marin Clean Energy, the state’s first operating CCA, in 2010. Other communities are considering or are in the process of creating CCAs. The idea has been discussed for Humboldt County. The CPUC is overseeing regulatory aspects of CCAs, and current statewide information on the topic can be found at: www.cpuc.ca.gov/PUC/energy/Retail+Electric+Markets+and+Finance/070430_ccaggregation.htm

competition transition charges (CTC): “A non[by]passable charge on the bills of each customer of the distribution utility, including those who are served under contracts with non-utility suppliers, for recovery of the utility’s transition costs arising from deregulation.” (CPUC)

core gas aggregation: a CPUC-mandated option offered by the state's utilities, including PG&E, whereby natural gas customers can choose to buy their gas commodity from an alternative supplier. PG&E continues to provide natural gas distribution service to the end-use customer.

decoupling: "The separation of a utility's profit from its sales of electricity as a commodity. Instead, a utility's revenue is met by setting a revenue target, then electricity rates are regularly fine-tuned to meet that target." (<http://aceee.org/glossary/>)

demand charge: "An additional billed amount that covers the difference between the maximum power a customer may need to have available and the energy that the customer uses most of the time. Many commercial and agricultural customers' requirements vary greatly during a single day or operating cycle. Consequently they need to have substantially more power available at these peak periods than they actually use at other parts of the billing period. Demand charges, occasionally referred to as capacity charges, are typically calculated based on the difference between the customer's peak energy use during the billing period and their nominal use (normal or hour-to-hour use) during the same period. Demand charges are not a means of gouging customers by charging for unused energy. Instead they are a means of insuring that customers can have larger-than-normal supplies of energy available to them at a moment's notice." (LWV) Demand is an instantaneous value measured in kW, as opposed to energy consumption, a cumulative value, which is measured in kWh.

demand metering: facilities that pay demand charges need special metering to track peak demand (kW) as well as energy (kWh) consumption. Generally medium and large electric customers, including many commercial and most industrial accounts, are demand metered, while small commercial and residential users are not.

demand response: refers to the practice of turning down or turning off electrical loads when electricity resources are in limited supply. This can be done automatically or manually. Utilities have programs that provide financial incentives for participation in demand response programs.

departing load: customer loads that at one time were served by the utility but switch to some form of self-generation (e.g., on-site renewable energy or cogeneration). Departing loads are generally still subject to certain nonbypassable utility charges, including public purpose programs, nuclear decommissioning, and others.

direct access: "The opportunity for retail consumers to purchase electricity or services from non-utility entities, also known as Customer Choice. Direct access was suspended by the CPUC in 2001." (LWV) Direct access was originally introduced as a feature of electric deregulation in California. When the CPUC suspended direct access, a number of large customers (for example, Humboldt State University and other state university campuses) were "grandfathered in" and allowed to continue to use direct access. Direct Access for nonresidential customers in general was reinstated on a limited basis in 2010, and approximately 12% of state electric load is now met under Direct Access contracts.

distributed generation (DG): relatively small electrical generators located at end use customer sites. Distributed generation can increase electric service reliability, can increase efficiency by eliminating transmission and distribution losses, and allows customers to generate their own renewable energy on site. Distributed generators include rooftop solar electric systems, small wind or hydro turbines, small biomass/biogas fired generators, and combined heat and power systems.

end use: a term used to describe energy that is used directly by a consumer in the residential, commercial or industrial sector. Use of natural gas to drive a generator in a power plant is not an end use, but use of the resulting electricity to light a home or operate equipment in a factory would be considered end use.

energy efficient mortgage (EEM): a financing mechanism that credits home buyers for energy efficient features of a home at the time of purchase, allowing the buyer to extend his or her debt-to-income ratio for financing purposes. A variation on the EEM is the EIM, or energy improvement mortgage. An EIM allows a buyer to qualify for a larger loan to cover costs of needed energy efficiency improvements, rather than incurring these costs up-front at the time of purchase. The incremental default risks of EEMs and EIMs are typically considered minimal by lenders, as these costs are recovered over time by the homeowner through energy savings.

energy service company (ESCO): “a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities ... These services are bundled into the project's cost and are repaid through the dollar savings generated.” (National Association of Energy Service Companies, www.naesco.org)

electric heat pump: an efficient electrical heating device. A heat pump operates like an air conditioner in reverse. It moves heat from outside the house, where it is colder, to inside the house where it is warmer. A typical heat pump is 3 to 4 times more efficient than an electric resistance heater.

electric service provider (ESP): “A non-utility that provides electric service to customers within the service territory of an electric utility.” (CPUC) Utility deregulation, the resulting divestiture of generating assets by investor-owned utilities, and the introduction of direct access have greatly increased the role of ESPs in California. ESPs are required to register with the California Public Utilities Commission.

electric utility: includes investor owned utilities, municipal utilities, and federal utilities (such as Bonneville Power Administration and Tennessee Valley Authority). Electric utilities usually generate power and own transmission and distribution infrastructure, though the investor owned utilities in California have divested a large portion of their generating assets as part of state-level deregulation. Because it does not make economic sense to duplicate transmission and distribution infrastructure, a given geographic area is normally served by only one utility. Pacific Gas and Electric Company (PG&E), an investor owned utility, serves Humboldt County, where they generate power at their own Humboldt Bay Generating Station located in King Salmon. In addition, they purchase power from local generators, including the Fairhaven biomass power

plant, the Scotia biomass power plant, and a number of small, run-of-the-river hydroelectric power plants.

energy performance contracting (EPC): “a turnkey service, sometimes compared to design/build construction contracting, which provides customers with a comprehensive set of energy efficiency, renewable energy, and distributed generation measures and often is accompanied with guarantees that the savings produced by a project will be sufficient to finance the full cost of the project. A typical EPC project is delivered by an Energy Service Company (ESCO).”

www.energystar.gov/ia/partners/spp_res/Introduction_to_Performance_Contracting.pdf

Environmental Impact Report (EIR): The state-level environmental assessment required for development projects under the California Environmental Quality Act (CEQA).

Environmental Impact Statement (EIS): The federal-level environmental assessment required for development projects under the National Environmental Policy Act (NEPA).

feed-in tariff: an electric tariff based on a system developed in Europe allowing renewable energy generators to sell their power into the grid at a rate that is stable and guaranteed for a sustained period. These tariffs are designed to make it economically attractive to install systems sized to produce more energy than is needed for on-site loads, resulting in a surplus that can augment total renewable electricity available on the grid. Feed-in tariffs as implemented in California, unlike those in Europe, are market-based and do not include a built-in subsidy or incentive. For more information, see:

<http://www.cpuc.ca.gov/PUC/energy/Renewables/feedintariffssum.htm> and
<http://www.pge.com/feedintariffs/>

Federal Energy Regulatory Commission (FERC): “A Federal independent regulatory body within the Department of Energy that regulates interstate gas and electric rates and facilities, as well as hydroelectric plant licenses.” (CPUC) Note that “interstate” is broadly interpreted by FERC to give FERC jurisdiction over many in-state energy transactions, on the grounds that these transactions take place on interstate gas and electric transmission systems. Another important FERC role is certification of Qualifying Facilities (QFs), renewable or cogenerating power plants that have special status under the Public Utilities Regulatory Policy Act (PURPA).

fracking: formally known as hydraulic fracturing, a horizontal drilling technique used to increase productivity of natural gas and oil wells. Fracking has allowed increased domestic energy production in the U.S., but it has become controversial in recent years, in part because chemicals used in fracking may contribute to contamination of groundwater supplies.

fuel cell vehicle (FCV): a vehicle technology that uses a fuel cell to provide electric motive power. Fuel cells are electrochemical devices that combine hydrogen with oxygen to produce electric power with zero emissions at the point of use. Production of hydrogen for fuel cells can produce emissions depending on the technology used.

heating, ventilating, and air conditioning (HVAC): the equipment and controls used to maintain comfortable temperatures in a building. Along with lighting and plug loads, one of the main energy uses in a typical commercial building or residence.

hybrid vehicle: a technology that combines battery electric power and an internal combustion engine. Hybrids can be more fuel-efficient and produce fewer emissions compared to a conventional vehicle, without the compromise of reduced driving range found in all-electric vehicles.

independent power producer (IPP): “A non-utility power producer that operates within the franchised service territory of a host utility and sells electricity at market rates.” (CPUC) Local independent power producers include the Fairhaven, Scotia and Blue Lake biomass power plants, as well as a number of small, run-of-the-river hydroelectric power plants.

interruptible power: “power whose delivery can be curtailed by the supplier, usually under some sort of agreement by the parties involved... [interruptible rates offered by utilities] provide power at a lower rate to large industrial and commercial customers who agree to reduce their electricity use in times of peak demand.” (IEPA)

investor owned utility (IOU): “Publicly traded corporation that provides electric service for its customers and earns a profit for its shareholders. Pacific Gas and Electric, Southern California Edison and San Diego Gas and Electric are IOUs.” (CPUC)

low carbon fuel standard (LCFS): a California state policy resulting from a governor’s executive order and the Global Warming Solutions Act of 2006 (AB 32). The LCFS calls for California to transition to the use of vehicle fuels that will reduce total greenhouse gas emissions. These can include reformulated conventional fuels, as well as electricity, natural gas, hydrogen, and biofuels. The LCFS will require a 10% reduction in carbon intensity of transportation fuels by 2020.

master metered: “The system by which multi-unit buildings or mobile home parks are connected to a single meter. The master-meter holder receives a single bill from the utility and collects from tenants individually. The utility has no liability for repairs or maintenance beyond the master meter.” (IEPA) Both tenants and landlords have rights and responsibilities pertaining to master metering arrangements, as detailed by PG&E at: [\(www.pge.com/myhome/myaccount/explanationofbill/submetered/\)](http://www.pge.com/myhome/myaccount/explanationofbill/submetered/)

merchant generator: a broad term that includes all entities that sell power in California other than the municipal and investor-owned utilities that also provide distribution services. Merchant generators include in-state independent power producers, out-of-state utilities that sell power into California, and third-party power brokers. (<http://lwvea.org/files/regulation-3.pdf>)

municipal utility: “A utility owned and operated by a city or county.” (CPUC) 39 publicly owned electric utilities operate in California, providing about 25% of the state’s power. “Los Angeles Department of Water and Power (LADWP), the largest public utility, serves 3.9 million customer owners; the City of Biggs, the smallest, serves 1,800.”

(http://www.anaheim.net/utilities/anaheim_cmua.pdf) In northern California, many communities including Trinity County, Redding, and Sacramento are served by municipal utilities.

National Environmental Policy Act (NEPA): The federal law requiring an environmental impact statement (EIS) be prepared for any project falling under federal jurisdiction and deemed likely to have significant environmental impacts.

net metering: “Under net metering, when an in-house generator is producing more power than the customer needs for its own purposes, the excess power is put back into the grid, and the electric meter in effect runs backwards. When in-house output is insufficient, power will be taken off the grid to supplement it, and the meter will run forward. Over a given billing period, the customer may be paid for a net input into the system, or pay for a net withdrawal from the system—either way the customer is provided value for power produced.” (LWV) PG&E currently offers six different net metering programs corresponding to different types and sizes of generating equipment. Since 2011 PG&E net metering rules have allowed customers to be paid for annual net surplus generation subject to conditions established by PG&E in its net metering tariffs.

on-bill financing: a mechanism whereby a utility company provides 100% (after rebates and incentives), zero interest financing for energy efficiency projects at a customer site. The customer repays the loan via a line item on the customer’s utility bill. Only projects whose monthly projected savings equal or exceed the repayment line item are eligible. PG&E offers on-bill financing for non-residential electric efficiency projects via its E-OBF rate schedule. PG&E limits loans to \$100,000 (except government facilities, which qualify for loans of up to \$250,000 or under special circumstances \$1,000,000).

peak day pricing: a time-varying electricity rate being implemented by PG&E for non-residential customers. Combines a time-of-use rate with a demand response component. On nine to 15 days per year PG&E declares a peak day pricing event day. If customers reduce demand during peak hours on those days they can save money. If they do not, their electricity charges will go up.

plug-in hybrid electric vehicle (PHEV): a type of hybrid vehicle that includes additional battery capacity and the ability to connect directly to grid power to charge these batteries while the vehicle is not in use. PHEVs can make short trips entirely on battery power, greatly reducing the total amount of fuel consumed and associated emissions.

power purchase agreement (PPA): “a contract entered into by an independent power producer and an electric utility. The power purchase agreement specifies the terms and conditions under which electric power will be generated and purchased. Power purchase agreements require the independent power producer to supply power at a specified price for the life of the agreement.” (IEPA)

property assessed clean energy (PACE): “a financing structure that enables local governments to raise money through the issuance of bonds or other sources of capital to fund

energy efficiency and renewable energy projects...[It] allows a property owner to install improvements without a large up-front cash payment. The financing is repaid over a set number of years through the 'special tax' or 'assessment' only on those property owners who voluntarily choose to attach the cost of their energy improvements to their property tax bill. The financing is secured with a lien on the property and in the event of foreclosure, the energy financier is paid before other claims against the property. If the property is sold before the end of the repayment period, the new owner inherits both the remaining repayment obligation and the financed energy improvements." (www1.eere.energy.gov/wip/solutioncenter/financialproducts/PACE.html) Starting in 2010, "financial regulators including FHFA, FDIC and the OCC have expressed concerns about pilot PACE financing programs...Fannie Mae and Freddie Mac sent a letter stating that their Uniform Securities Instruments prohibit loans that have a senior lien priority to a mortgage." (www1.eere.energy.gov/wip/pace.html) Legal aspects of PACE are still being resolved.

public goods (aka public purpose or public benefits) charge: "Monies collected by the investor-owned utilities [in California] for renewable energy, research and development, public-interest research and development, and low-income energy assistance." (LWV) These funds have supported a wide variety of clean energy activities since they were first implemented. In Humboldt County, many energy efficiency programs implemented by PG&E and the Redwood Coast Energy Authority are paid for by the public goods charge. The RePower Humboldt study, of which this document is a part, was funded by the State's Public Interest Energy Research (PIER) program, which is in turn funded by the public goods charge. The California legislature allowed the electric rate-funded public goods charge legislation to expire in 2011. The CPUC is currently studying options to keep public goods charge-funded programs in operation.

qualifying facility (QF): "renewable power production or cogeneration facilities that qualify under Section 201 of Public Utility Regulators Policy Act of 1978" (IEPA). Utilities are required to pay these facilities for energy delivered to the grid at the utilities' "avoided cost" of energy production or procurement. During the 1980s and 1990s, QFs were the most economically attractive option for renewable energy production for sale to the grid. Many QFs are still in operation, but other mechanisms such as net metering, feed-in tariffs, sale of renewable energy certificates, and power purchase agreements to fulfill utility renewable portfolio standards provide alternative and sometimes more lucrative options.

renewable energy certificate or credit (REC): "A REC...represents the property rights to the environmental, social, and other nonpower qualities of renewable electricity generation. A REC, and its associated attributes and benefits, can be sold separately from the underlying physical electricity associated with a renewable-based generation source. RECs provide buyers flexibility in procuring green power across a diverse geographical area [and] in applying the renewable attributes to the electricity use at a facility of choice. This flexibility allows organizations to support renewable energy development and protect the environment when green power products are not locally available." (www.epa.gov/greenpower/gpmarket/rec.htm)

renewable portfolio standard (RPS): a law or regulation mandating what portion of electric power in a given jurisdiction (e.g., state) must be derived from renewable resources. California RPS goals have been ramped up over time and, as legislated by Senate Bill X1-2, now requires all electricity retailers in the state including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators to adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020. RPS is implemented jointly by the CPUC and the CEC in California.

self-generation: “A generation facility dedicated to serving a particular retail customer, usually located on the customer's premises. The facility may either be owned directly by the retail customer or owned by a third party with a contractual arrangement to provide electricity to meet some or all of the customer's load.” (IEPA)

smart grid: an electricity grid that utilizes meters, appliances, and generators that are capable of communicating with one and other. This allows intelligent, real-time decisions to be made regarding the control of these devices so that electrical needs can be supplied reliably and efficiently. See “smart meter.”

smart meter: a type of electric or natural gas meter that can provide real-time and cumulative data to both the customer and, via remote communications, the utility company. For the utility, the meters are an essential component of an envisioned smart grid that will allow energy companies to better match supply and demand. For customers, the smart grid will eventually allow cost savings by taking advantage of dynamic pricing tariffs where customers will be able to reduce or shift loads in response to continual changes in energy price. Smart meters also provide cost savings to utilities by eliminating labor costs associated with meter reading. Smart meters normally have a digital readout, as opposed to the rotary dials on traditional analog meters.

spot market: “A commodity market for the purchase and sale of electric energy for a short-term basis (often one day or less.)” (CPUC)

tiered rates. “Residential electric and natural gas rates are tiered by law in California to encourage energy conservation with rates increasing in each tier. Customers who use less energy will see lower bills from less usage and will pay a lower overall average rate than customers who have more usage in higher-priced tiers.”

(<http://www.pge.com/myhome/myaccount/rateinfo/howratesset/>) PG&E currently uses five tiers for non-CARE electric customers and three tiers for CARE customers. For natural gas service, both CARE and non-CARE tariffs use two tiers.

time of use (TOU): “Electricity prices that vary depending on the time periods in which the energy is consumed. In a time-of-use rate structure, higher prices are charged during utility peak-load times. Such rates can provide an incentive for consumers to curb power use during peak times.” (IEPA) Time of use rates can be very favorable for certain utility customers, such as a home with a grid-tied solar electric system that is unoccupied during the afternoon when

the solar system is producing energy and TOU rates are at their highest. Facilities that use most of their electricity during the daytime will probably pay more for electricity under TOU billing than they would using standard tariffs.

Title 24: California's energy efficiency code for buildings. Nationally recognized as the most ambitious state energy standards, the updated version of Title 24 going into effect in 2014 is projected by the State to save 180 GWh and 3.3 million therms per year, worth over \$25 million a year to consumers.

transmission and distribution system: a network of wires or pipes and associated equipment that allows the transport of electrical energy or natural gas fuel from the supply source, which is often centrally located, to the end use customer.

virtual net metering: a recently introduced net metering arrangement whereby multiple meters serving a single entity can be treated as a single meter for net metering accounting purposes. This allows, for example, a multifamily housing development served by multiple meters to install a renewable energy system feeding the grid via a single meter to offset energy use on other meters serving the same facility. For PG&E's multifamily virtual net metering tariff, see: http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_NEMVMASH.pdf

wheeling power: "The use of the transmission facilities of one system to transmit power for another system." (IEPA). Since PG&E owns the electric distribution infrastructure in Humboldt County, it wheels power for customers using direct access to buy power from an Energy Service Provider. Part of the direct access customer's electric bill pays PG&E for this wheeling service.

zero emission vehicles: vehicles that do not emit any pollutants during operation. Examples of zero emission vehicles are battery electric vehicles and hydrogen fuel cell vehicles. Although there are no direct emissions from a ZEV, there may be emissions associated with the generation of electricity used to charge a battery electric vehicle or with the generation of hydrogen fuel needed to power a fuel cell vehicle.