

Northwest California Sustainable Energy and Water Conservation Outreach

Report to West Coast Watershed

This agreement facilitated work with the NCIRWMG in developing a regional approach to achieve goals of reducing northern CA greenhouse gas emissions from energy use, transportation, human based land use activities and other controllable sources. The project demonstrates the link between sustainable energy and water conservation. The grant included the opportunity to: bring local energy leaders together; identify existing sustainable energy sources, programs and projects; pursue new sustainable energy programs and projects; and identify demonstration projects to build local, regional and national support to reduce greenhouse gas emissions and recover energy. The project encouraged the development of micro energy project demonstration concepts that individuals and small businesses can consider in reducing their greenhouse gas emissions. This report presents background information on energy use in the region along with a description of sustainable energy project concepts.

Background

In September 2006, California Governor Arnold Schwarzenegger signed into law AB 32 the “Global Warming Solutions Act of 2006”. The law requires that by 2020 the state's greenhouse gas emissions be reduced to 1990 levels, a roughly 25% reduction from 2006 emissions. As defined in the bill, “greenhouse gases” (GHG) include carbon dioxide (CO²), methane (CH⁴), nitrous oxide (N²O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF⁶). At the same time that California set out to reduce GHG levels, the NCIRWMG and individual member organizations set even stricter goals to reduce GHG levels faster than the state requirements. The NCIRWMG also felt that the link between climate change, water resources and fisheries species conservation needed to be further developed in order to meet human water needs and protect threatened fish stocks.

National Energy Use: The world uses approximately 400 quadrillion BTU's of energy per year. The United States represents 4.5% of the world's populationⁱ but uses approximately 22% of energy produced in the world. Of the 101.4 quadrillion BTU's per year produced in supplying US energy, 93.3% comes from petroleum, natural gas, coal and nuclear power sources (Figure 1). Approximately 6.7% comes from sustainable energy sources including biomass, hydroelectric, geothermal, wind, and solar (Table 1)ⁱⁱ.

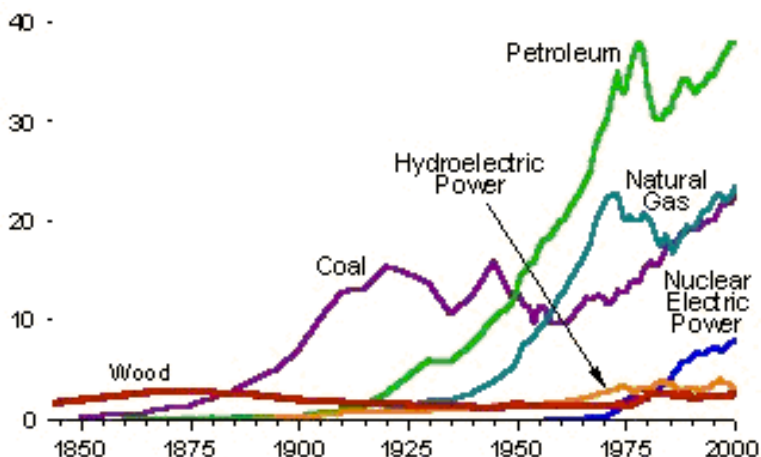


Figure 1: US energy consumption, by source, 1850-2000. Vertical axis is in [quadrillion BTU](#) ⁱⁱⁱ

Human related greenhouse gas emissions from hydrocarbon and coal energy plants and transportation uses have been cited as significant contributors to changes in climate conditions worldwide (Figure 2).

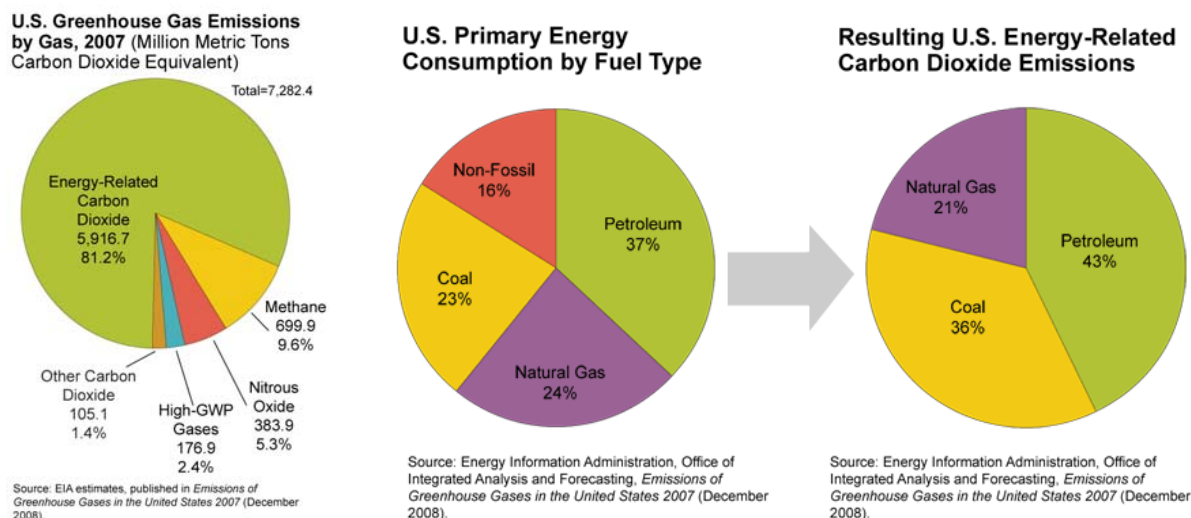


Figure 2: US Greenhouse Gas Emissions (Source: US Energy Information Administration)^{iv}

California Energy Use: California with approximately 12% of the nation's population annually consumes 8.4% of the national energy production^v and represents about 2% of the world's energy consumption. Although California is a leader in the energy-intensive chemical, forest products, glass, and petroleum industries, the State has the second lowest per capita energy consumption rate in the country. The transportation sector is the State's largest energy consumer and California's 30,902,225 registered cars and trucks represent the highest number of vehicles per capita in the nation. California's vehicles produce several greenhouse gases (GHGs) including carbon dioxide, methane (CH₄), nitrous oxide (N₂O) and hydrofluorocarbons (HFC). In 2007, approximately 15.5 billion gallons of taxable gasoline and diesel were purchased in the state producing approximately 1.6 billion metric tons of carbon dioxide and 84.5 million tons of the other GHGs. The State Alternative Fuels Plan (Assembly Bill 1007) presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The development of electric and plug-in hybrid vehicles as an alternative fuel source is key to meeting the plan targets.

California is the second largest producer of sustainable energy behind Washington, but power generation, especially hydroelectric power, has been cited as a contributor to declining wild salmon and steelhead fish stocks in northwest California and the Pacific Northwest. While Washington and California produce the largest hydroelectric power in the U.S. California leads the nation in electricity generation from non-hydroelectric renewable energy sources including wind, geothermal, solar, fuel wood, and municipal solid waste/landfill gas. It is the top producer of geothermal energy in the Nation with over 2,500 megawatts of capacity. California is also a leading producer of wind energy and holds nearly 10 percent of the nation's capacity.^{vi}

Due to high electricity demand, California imports more electricity than any other State. Pacific northwest states deliver power to California markets primarily from hydroelectric sources, while desert southwest states deliver power primarily from coal-fired sources. California restricts the

use of coal-fired generation within its boundaries.^{vii} Hydroelectric power comes to California primarily through the Western USA interconnection, which runs from northern Oregon to southern California. The system, also known as the Pacific Intertie, is the largest single electricity transmission program in the United States. Although the Pacific Intertie was originally designed to transmit electricity south during California's peak summer demand season, flow is sometimes reversed overnight and has occasionally been reversed during periods of reduced hydroelectric generation in the Northwest.

NCIRWMP Seven Counties Area: The seven counties that form the North Coast IRWMP (Del Norte, Humboldt, Mendocino, Modoc, Siskiyou, Sonoma, and Trinity) encompass approximately 15% of the state area with approximately 800,000 people^{viii} (2% of the state population). The region is famous for its natural resources, forests, wildlife and fisheries, agriculture, and more recently its sustainable and renewable energy opportunities. Currently the region has the capacity to generate a peak output of 1.7 gigawatts of sustainable power from existing power plants^{ix}. This total does not include sustainable power production from individual homes, businesses or other sources. The major sustainable energy sources within the North Coast region are geothermal, hydroelectric, biomass, and biogas (refer to Figure 3). Individual and small, on-site photovoltaic, wind, and other sustainable energy systems are used within the region but currently are not large, commercial scale systems.

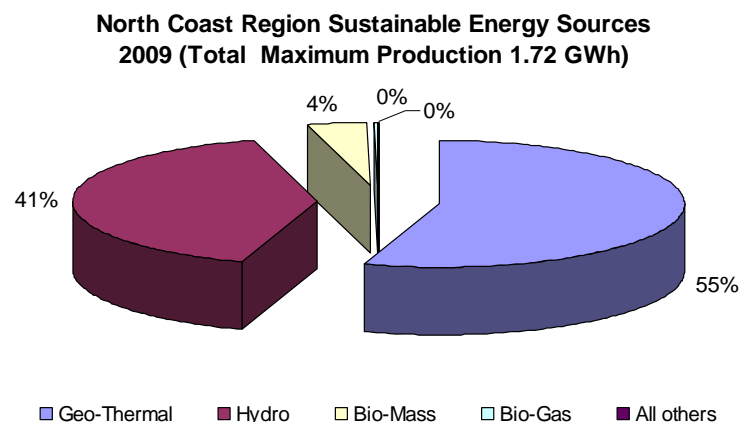


Figure 3: Existing North Coast Sustainable Power Sources

Geothermal Energy: “The Geysers,” located within the Mayacamas Mountains (Sonoma County), is the largest complex of geothermal power plants in the world, with more than 700 megawatts of installed capacity (Photo 1). Small scale geothermal plants for heating are located in Alturas and Canby in Modoc County and the use of geothermal heat pump or ground source heat pump systems to heat and cool individual homes and buildings is increasing. Geothermal electric and thermal energy use could continue to grow, but environmental concerns and regulatory hurdles will slow large scale projects and could discourage some small ones^x.



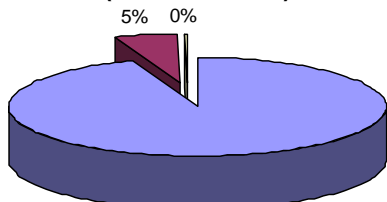
(Photo: National Renewable Energy Laboratory)

Photo 1: Geothermal plant at the Geysers, Sonoma County

Hydroelectric Energy: Peak hydroelectric power output in the region is 705 megawatts but the output is seasonally and annually variable and depends on climatic conditions. The Trinity River division of the Federal Central Valley Project is a major hydroelectric power producer, while dams on the Klamath River are the next largest (Figures 4 and 5). There are several small hydroelectric plants (~30 kWh - 1 MWh) in the region selling power. There are an unknown number of micro hydroelectric turbines providing power to individual homes.

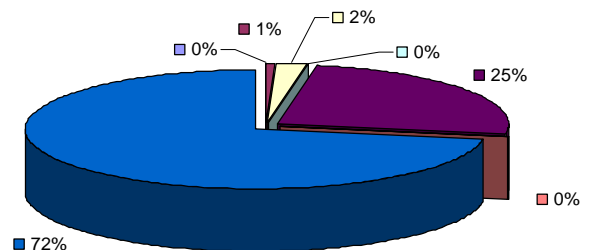
Figures 4 & 5: Hydro-electric power production within the North Coast Region.

**North Coast Region Hydroelectric Power
Maximum Generation (2009)
(Total 705 MWh)**



■ Large (>10 MWh) ■ Mid Scale (1-10 MWh) ■ Small (<1 MWh)

**North Coast Region Hydroelectric Power
Maximum Generation (2009)
(Total 705 MWh)**



■ Del Norte ■ Humboldt ■ Mendocino ■ Modoc ■ Siskiyou ■ Sonoma ■ Trinity

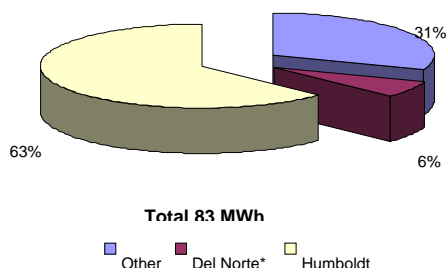


Photo: Josh Allen

Photo 2: Trinity Lake and Dam and one of four hydroelectric generation stations associated with the Trinity River diversion to the Sacramento River

Biomass Energy: The NCIRWMG region and its energy partners in Oregon, potentially produce feed stock for 14 existing biomass electric generation plants capable of producing approximately 250 MWh. These plants are located in Humboldt (Photo 3), Shasta, and Lassen Counties in California and Jackson County¹ Oregon (Figure 6).

Figure 6: North Coast Region Biomass Production by County (2009)



The expansion of biomass energy production facilities is being reviewed in nearly all of the NCIRWMG counties as well as in Southern Oregon counties. Biomass electric growth potential within the region is significant but unstable. While expansion is being considered, several existing biomass plants are not operating at capacity due in part to declining economical fuel supplies. An existing 12 megawatt power plant in Blue Lake (Humboldt County) is not currently operating and a proposed 10 megawatt plant in Weed (Siskiyou County) is under court review. Large portions of the region lack power generation capability but have significant feed stock. In these areas the distance to a biomass plant makes it uneconomical to deliver woody biomass to the plants.



www.msei-marubeni.com

Photo 3: Fairhaven Biomass Power Plant (Humboldt County)

Biomass power faces several major constraints to expansion including under-utilization of existing capacity, difficulty in permitting new facilities, potential for other energy production technologies to make biomass economically uncompetitive, concern regarding stability of long term tax and incentive support, and regulatory issues.

¹ Power plants in Lassen, Plumas, and Shasta Counties and Jackson and Douglas Counties in Oregon, while not within the NCIRWMP region, could receive fuel stock from forests, mills and other sources in Del Norte, Modoc, Siskiyou, and Trinity Counties as well as areas outside of the NCIRWMP area.

While there are constraints to expansion of biomass power plants there is also an emerging understanding of the need to counteract the forest fuel build up that has occurred over the past 100 years from highly effective federal/state fire suppression programs. Fire specialists, ecologists and many others are now recognizing that reducing forest stand stocking levels of some forest stands is beneficial for reducing wildland fire intensity and behavior, which in turn can reduce catastrophic stand, wildlife habitat and property losses (Photo 4). In addition the rapid increase in wildland fire sizes over the past 20 years has increased concerns regarding smoke (Photo 5), greenhouse gases and fine particulates. The benefits of restoring more natural stand conditions, including cost savings from wildland fire suppression, should ensure continued state/federal investment in biomass utilization for the foreseeable future.



Photo: Mark Lancaster

Photo 4: Oregon Fire in Weaverville CA, August 2001 burned 1,700 acres and 13 homes.



Photo: NASA

Photo 5: The Pigeon Fire (a Bar Complex fire) of 2006, burned 100,000+ acres in Trinity County and produced smoke columns that traveled as far south as San Francisco.

New approaches to biomass utilization are being explored by entities within the NCIRWMG region. The Watershed Research and Training Center in Hayfork CA is studying the use of mobile small scale power plants that can process and pelletize excess woody material to produce between 0.5MWh to 2 MWh of energy. These facilities use advanced hydraulics to turn turbines in lieu of the traditional water and steam processes used in most stationary plants. Advance air pollution control systems on the plants significantly reduce emissions. The mobility of the plants may make this approach highly effective in targeting high priority treatment sites that are uneconomical to haul to existing facilities.



Photo 6: Hambro Products uses biomass waste in the manufacture of its flooring products (left).



Photo 7: Tom Jopson of Cal Forest Nursery demonstrates the wood chips.



Photo 8: Wood gasification plant used to run the greenhouses at the nursery.

A number of businesses converting forest biomass into mulch and compost have become established in response to rapidly growing compost demand. Many private landowners within the rural portions of the NCIRWM region burn their yard and compostable waste. In some areas such as Trinity County, there is a conflict between this type of open burning and air board rules and requirements.

Biogas Energy:

Biogas is produced from anaerobic digestion of organic materials with landfills, sewage plants, and concentrated animal waste being the largest anthropogenic sources of the gas. Biogas energy currently is a very minor power producer, but given that methane gas is 21 times more potent a greenhouse gas as carbon dioxide, the capture of biogas (methane) represents a significant benefit to meeting California's power needs and GHG reductions. Methane is responsible for 10.6% of global warming damage from human-sources in the U.S, 35.8% of which is from landfill gas. Thus, 3.8% of U.S. global warming damage is from methane in landfill gas. Landfill gas is similar to other decomposition gases except it may contain higher levels of NMOC's². New regulations adopted by the California Air Resources Board (CARB) in June 2009 require all landfills throughout the state to capture methane gas. However, CARB estimates that 218 of the state's 367 landfills may be subjected to the new regulations. New gas collection and control systems will need to be installed at 14 uncontrolled municipal solid waste landfills by 2012, according to CARB. The regulations are also designed to reduce emissions at landfills with existing collection and control systems. Once implemented, however, the regulations are estimated to reduce 1.5 million metric tons of greenhouse gas emissions in the state, according to CARB.^{xi} Landfill gas is considered a renewable green energy source but its designation as such is controversial because its combustion emissions can create toxic compounds.

There are numerous landfill gas power plants state-wide. Sonoma County's Central Landfill Plant, which produces 2 megawatts, is the only one in northwest California. Landfill gas power plants are more common than plants burning sewage or animal wastes but emerging financial incentives for dairy farmers and carbon credits may increase the feasibility of additional power plant development. Where gas production is limited, methane gas is normally flared (burned) to reduce its explosion potential and to convert it to water vapor and CO₂.

² Inorganic contaminants like mercury are also known to be present in landfill gas. NMOCs usually make up less than 1% of landfill gas. EPA identifies 94 NMOCs in their 1991 report, "Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Guidelines." Including benzene, toluene, chloroform, vinyl chloride, carbon tetrachloride, and 1,1,1 trichloroethane.

Regional Energy Outreach and Demonstration Projects

As part of this agreement the Five Counties and Northwest Resource Conservation & Development Council identified a series of short term demonstration and conservation projects with measureable outcomes that are intended to demonstrate the relative ease at which small scale sustainable energy and water projects can be undertaken. Several such projects are described below.

Northern California Regional Rural Electric Vehicle Network

The Trinity Public Utilities District (PUD) was pursuing infrastructure consisting of an electric vehicle charging station network along the Highway 299 corridor, with connectivity to Redding, as well as vehicles. 5C staff coordinated with PUD consultant Jeff Morris on the EV concept and pursued ways to extend the PUD's concept network to a larger regional scale. The existing EV infrastructure within the NCIRWM region was also researched. While very rural, the Hwy 299 corridor provides the critical missing east-west link between the Central Valley and the north coast. Staff assisted Morris in drafting a concept proposal to the CA Energy Commission for the first phase of a regional project that would consist of developing infrastructure within Trinity County connectivity to Chico. Specifically it would: develop land use policies such as EV fueling station ordinances to facilitate the placement and operation of EV charging stations; place between 15 and 30 EV charging stations strategically at various locations between Redding and Arcata; acquire a minimum of 15 electric vehicles that would be made available to local public agencies to serve as demonstration vehicles and increase consumer confidence in the reliability of the technology in mountainous, steep terrain; develop a cost share or other incentive program in partnership with local utilities and an EV manufacturing partner to assist the public with the purchase or acquisition of EVs; and conduct public education and outreach on EV technology and benefits and regional information to facilitate trip planning for prospective EV owners; and provide training for local mechanics and interested members of the public on the maintenance and repair required by EVs. A full proposal was not pursued though PUD may do so at a later time.

Biomass Utilization and Compost

Small Scale Landfill Biomass and Compost Utilization

The North Coast Unified Air Quality Management District maintains an air quality monitor in Weaverville. Monitoring for approximately 20 years indicates that the basin is non-attainment for particulate materials less than 10 microns in diameter (PM<10), especially in winter and during wildland fires. Winter PM<10 sources come from wood stoves, vehicles, dust, woody debris burning, forestry related controlled burning. Trinity County has tipping fees for woody material and other waste which discourages some people from hauling woody waste to county solid waste facilities. Open burning of woody and organic materials are common sources of wood smoke and often these materials are burned by residents. Frequently these residential burns have incomplete combustion, which greatly increases the quantity of smoke produced per ton of material burned.



Photos 9 & 10 (above): Open burning of woody debris is common for public agencies (left) and private landowners (right). **Photos 11 & 12** (below): Burning of brush, leaves, and needles (left) can severely affect air quality in Weaverville due to inversion air layers trapping smoke. The Weaverville transfer station processes and burns 300-1,000 tons of biomass annually



The feasibility of pilot biomass and compost projects were pursued with Trinity County Solid Waste. Trinity County operates a series of seven solid waste transfer stations all of which allow residents to dispose of tree, brush, and other natural woody biomass. The County facilities receive approximately 500 - 1,500 tons of woody biomass annually at all of its transfer stations. The Weaverville transfer station alone processes and burns 300-1,000 tons of biomass annually. This burning typically occurs in late fall or winter when airborne particulate matter (PM) tends to be trapped in inversion layers, especially in the valleys of Weaverville, Hayfork and Burnt Ranch. It results in increased airborne particulate levels and released large quantities of energy and heat into the atmosphere. These facilities are not permitted to collect, store or process organic materials into compost nor to collect construction/demolition (C/D) debris. Compost (e.g., leaves, needles, lawn clippings, garden waste) and C/D materials are treated as ordinary waste and hauled to a landfill. In-situ burning at transfer stations is being phased out, largely in response to burn permit conditions. As a result of funding of this grant, the 5C was able to work with Trinity County Solid Waste, Rural Creative Reuse Project (RCRP) (a non-profit), for-profit compost operators, and biomass plants to find alternative management practices for non-food organic waste.

The first step of the biomass component was to find alternative uses for woody biomass. Initial efforts consisted of working with a biomass power plant to purchase the raw materials. The burning of woody biomass in controlled conditions of a power plant with proper filters and emission controls reduce PM_{10} , CO_2 , and other greenhouse gases. The burning of the

County transfer station biomass through a power plant would generate enough electricity to power 3 to 6 houses for a year. The costs of processing (chipping) and hauling material to a power plant and the price paid per delivered ton is marginal, but the non-economic benefits (e.g., air permit compliance and enhanced air quality) make the economically marginal project feasible.

Several meetings were held with Trinity County Solid Waste, RCRP, Trinity County Environmental Health, and interested local businesses between August and October 2009 to discuss options for diverting compostable waste from the landfill as well as from private pile burning. Discussions focused on possible collection and storage locations, maintenance of a compost program, and public outreach to encourage separation of compostable material from trash. Initially the possibility of Trinity County receiving and processing the material was discussed. Research was done on how composting programs in adjacent jurisdictions are structured and managed in order to help the County understand what would be required.



Photos 13, 14, & 15: Compost facilities at City of Redding Solid Waste (above) and Mad River Compost (left). Large areas and specialized equipment are needed for an effective operation.

Without tipping fee collection, these facilities indicated that composting activities would not be financially self-sustaining.

Due to its concerns about permitting and the availability of funding to sustain long term maintenance staff, the County does not currently want to pursue that option. RCRP is a recently formed group that is currently pursuing official non-profit status. It has expressed interest in helping to conduct public education about home composting but cannot consider managing a public compost collection program at this time. Mulch and compost producers (two local and one in Shasta County) have expressed interest in obtaining and processing compostable material from private landowners for their operations provided that it could be collected at central locations. Discussions are ongoing with Trinity County on how to best facilitate this type of collection. Composting at the County transfer stations is a more favorable option economically as the haul and processing costs would be borne by the contractor and the County can either provide the material at cost or charge on a tonnage basis. In the meantime, the County is trying to cut back on burning on-site.

Developing compost reduces PM₁₀. However, natural decomposition of this material still results in the release of CO₂ and other greenhouse gases emissions. In addition a portion of the woody biomass is not converted to compost and must either be burned or otherwise disposed of. Discussions with a commercial composter and a biomass power plant fuel buyer indicate that they buy excess biomass material from at least two larger compost operations. This waste diversion process may be duplicated on a limited basis, especially when costs to haul biomass materials is high and demand for mulch and compost exists.

Rapid Feasibility Assessment of Wood Biomass Heating Potential for Northwest California Public Facilities

This project is in cooperation with the Watershed Research and Training Center in Hayfork and meets the Northwest CA RC&D Council's Annual Plan of work Goal 2.B.1.

This project would focus on conducting a rapid and preliminary assessment of opportunities for heating public facilities with woody biomass in Trinity, Humboldt, and Del Norte Counties. This preliminary screening would help the project partners determine where to focus a full feasibility analysis for conversion projects at those sites that have the highest potential for success.

The assessment would involve contacting facilities managers and administrators from County, State, and Federal agencies to attain information about their current heating systems including: current fuel source; per unit costs; average annual consumption and costs; age of system; projected replacement dates; plans and projected costs; facility staffing; and facility management costs. This information would be analyzed to look at the potential costs and benefits of conversion to wood biomass.

The project is expected to start in March 2010 and continue through to September 2010, depending on the availability of funding.

Methane Demonstration Projects and Feasibility Studies

Methane (CH₄) is a greenhouse gas that remains in the atmosphere for approximately 9-15 years. Methane is over 20 times more effective in trapping heat in the atmosphere than is carbon dioxide (CO₂) over a 100-year period and is emitted from a variety of natural and human-influenced sources. Human-influenced sources include landfills, natural gas and petroleum systems, agricultural activities, coal mining, stationary and mobile combustion, wastewater treatment, and certain industrial processes.³

³ <http://www.epa.gov/methane>

Methane is formed during organic matter decomposition, which also generates several other gases. Methane typically makes up about 40-60% of the total decomposition gas volume. Other gases produced are carbon dioxide (CO₂) and small amounts of nitrogen, oxygen, water vapor, sulfur and other "non-methane organic compounds" or NMOCs. Methane when burned converts to CO₂ and water.

Del Norte County Small Dairy Farm Project

As part of this project the Del Norte Office of the USDA Natural Resources Conservation Service (NRCS) and several ranchers were identified as possible sources for identifying sustainable energy opportunities. As a result of that outreach, Andrea Souther, of NRCS, identified a small dairy farm (100 head) in Del Norte County that was already capturing dairy waste gas to heat water and dry clothes. An on-site assessment was conducted on August 11, 2009 during which it was evident that a simple gas capture and storage method can be done on-site. However, the existing system on that particular farm would not be very effective or viable over the long term. It consists of an 8 mil plastic tarp over the dairy waste reception "lagoon", an air compressor and 5 gallon storage tank, a series of plastic pipes to move the gases from the reception pit and the compressor storage tank to the end uses (dryer and water heater). Currently the reception pit's gas production greatly exceeds the storage capacity and gases must be vented to the atmosphere for safety. The dryer and heater pipe orifice diameters had to be increased to account for the high portion of CO₂ and other non-flammable gases mixed with methane gas. Carbon dioxide and other gases will continue to be released into the atmosphere in the burning process.



Photos 16, 17, 18, & 19: Decomposition gas is captured from a small dairy farm lagoon (top right) using a plastic tarp (bottom left). The methane portion of the decomposition gas is burned to heat water and dry clothes on the farm.



Based on production estimates, a properly designed and sized system for this dairy should be able to store and utilize ~1,000 ft³ - 1,500 ft³ of methane per day - enough energy to run a house⁴.

This farm can serve as a valuable demonstration project for small scale gas recovery. A series of upgrades to the system will be pursued to capture most of the decomposition gases that currently escape into the atmosphere. A thicker, stronger HDPE membrane lagoon cover would be installed with appropriate piping to the compressor and to a larger (500+ gallon) propane tank. A propane fueled generator and a power intertie with the Pacific Power grid will be installed to return excess electricity to the power grid. This project can be replicated at numerous other sites.

Small Scale Landfill Gas Capture Project



There are several small landfills, some of which are closed, in the region that do not have methane gas recovery or flaring systems. At least some landfill operators have indicated that they reviewed the feasibility of gas capture and believed that the cost of gas capture systems exceeded the benefits. The amount of gas venting did not present a significant explosion risk.

Based on the existing Dairy Farm project it is evident that even small amount of gases can be collected and stored for low grade heating or other thermal applications. This demonstration project was to find a low volume, low grade user of landfill gas. A presentation of the small scale dairy gas project seemed to increase interest in capturing landfill gas and using it for on-site heating. A combination of web-based searches and interviews with businesses were conducted to determine a number of possible users of landfill gas. For example, glass blowing businesses that

need to keep their kilns “warm” between firings are a possible candidate for landfill gas use. It would not be feasible to use landfill gas during the temperature-critical glass firing processes. There is interest in this opportunity based on initial discussions with a glass blower in the Weaverville area.

This project could be replicated at numerous other sites.

Moderate Scale Methane Feasibility Study

A potentially significant methane capture project for larger dairies in Del Norte County was identified by Andrea Souther of the NRCS. A proposal was submitted to the Northwest CA RC&D Council to assess methane production and the feasibility of on-site utilization for several dairies with 400 - ~1,000 cows. The feasibility study would look at ~3 dairies to estimate methane output, storage design needs, and energy output. Initial review of the proposal identified two options for producing power: individual on-site thermal and electric power generation; and on-site short term storage and delivery to a regional power plant. There are

⁴ 25-50% confinement and electricity yield is estimated at 21% of the BTU value of energy produced due to inefficiencies of converting gas to electricity

probable benefits with each method. The on-site systems are simpler to operate but may have higher costs overall and less effective nitrate controls. The costs of the systems may limit the number of participating dairies. The NRCS may be able to cost-share methane capture on farms. A central power plant may be more economical in the long run and able to use advanced air pollution controls, but it has more complex processes of tracking and paying for gas from individual dairies. A central power plant however, might encourage more farms to capture and sell gas.

Water Conservation Demonstration Project

A water conservation concept to demonstrate simple roof top rainwater collection, water conservation devices, drought tolerant landscaping, and other water saving practices within the central “urban” centers of Trinity County was developed. This project is designed to improve the efficiency of water usage in order to help reduce the amount of surface water withdrawals during critical low flow periods and to promote more fire safe communities. In December 2009 that concept was converted to a grant proposal to the Trinity River Restoration Program’s Watershed Program.

In an effort to assess precipitation and to help develop conservation education strategies, an assessment of local (Weaver Creek) rainfall and runoff data for the past 115 years was started. The rainfall and runoff data initial assessment indicated that the study area is generally drier than the average rainfall would indicate. Implications of that study are still being determined.

Meetings:

As part of this project, outreach and formation of groups to address sustainability were undertaken. This included working with local (Trinity County) and broader regional efforts. The following meetings were conducted or attended as part of this project:

- North Coast Integrated Regional Water Management Plan: North Coast Energy Independence Meeting, February 26, 2009, Weaverville, CA
- North Coast Integrated Regional Water Management Plan, Policy Review Panel and Technical Peer Review Committee, June 25, 2009 , Eureka, CA
- Southern Oregon Renewable Energy Project Meeting July 30, 2009, Roseburg, Oregon
- North Coast Integrated Regional Water Management Plan, Team Conference Call, July 20 & August 7, 2009
- Trinity County Biomass Coordination: Several meetings were held in August and September 2009 with Trinity County Solid Waste, Rural Creative Re-use Project, and Trinity County Environmental Health to discuss waste diversion options and biomass capture.
- *Trinity County Sustainable Energy and Climate Adaptation, October 9th, 2009, Weaverville, CA*

Agendas and sign-in sheets for most of these meetings are provided in Attachment 1.

ENDNOTES:

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- i World Bank, World Development Indicators, www.google.com/publicdata;
 - ii [History of Energy in the United States: 1635-2000](#), United States Department of Energy, [Energy Information Administration](#).
 - iii Ibid., [History of Energy in the United States: 1635-2000](#),
 - iv http://tonto.eia.doe.gov/energyexplained/index.cfm?page=environment_where_ghg_come_from
 - v US Dept of Energy, Energy Information Administration, http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CA#related_reports
 - vi Ibid, US Dept of Energy, Energy Information Administration
 - vii Ibid, US Dept of Energy, Energy Information Administration,
 - viii Source U.S. Census Bureau: State and County QuickFacts. 11/2009. <http://quickfacts.census.gov/qfd/states/06000.html>
 - ix FERC regulated plants including exempt hydroelectric plants:
<http://www.ferc.gov/industries/hydropower/gen-info/licensing/exemptions.xls>;
<http://www.calbiomass.org/profiles.htm>;
http://cbc2.ucdavis.edu/cbc/biomassResource/resource_powerGeneration.htm ;
 - x Merrick, D. 2002. Adventures In The Life Of A Small Geothermal District Heating Project
<http://geoheat.oit.edu/bulletin/bull23-3/art1.pdf>
 - xi Hook, Bran, 9/2009 California landfills now required to capture methane; in American Recycler.
<http://www.americanrecycler.com/0909/california.shtml>

Attachment 1: Meeting Agendas



DRAFT

**North Coast Energy Independence Meeting
Trinity County Library, main meeting room
351 Main St., Weaverville, CA
Thursday, February 26, 2009, 10:00-3:30**

- | | |
|-------|---|
| 10:00 | Welcome and Introductions
Mark Lancaster, Trinity County |
| 10:15 | Review agenda and outcomes
Mark Lancaster |
| 10:30 | Overview of Energy Independence Legislation & Opportunities
Randy Poole, Sonoma County Water Agency <ul style="list-style-type: none">- Update on federal appropriations- Senate Energy and Water Appropriations Report- Energy Efficiency and Renewable Energy Programs Report Language- Assembly Bill 811 Contractual Assessments: Energy Efficiency Improvements, Chaptered- Sonoma County Water Agency efforts (collaboration with Joe Nation) |
| 11:00 | Roundtable: each county provides descriptions of current initiatives, potential projects, assessment and feasibility studies, data and funding gaps, relevant studies and evaluations (pre-meeting information request – see next page) |
| 12:30 | Lunch (provided on site) |
| 1:00 | Discussion: types of GHG reduction/local and regional energy generation initiatives, criteria for regional and local project evaluation, opportunities for regional impact on GHG and climate adaptation |
| 3:00 | Discussion: <ul style="list-style-type: none">• level of commitment• how to move forward• integration with the North Coast IRWMP |
| 3:30 | adjourn |



Draft Agenda

**North Coast Integrated Regional Water Management Plan
Policy Review Panel and Technical Peer Review Committee Meeting
June 25, 2009, 10:00-3:00
Humboldt County Office of Education, Sequoia Meeting Room A
901 Myrtle Avenue, Eureka, CA**

- 9:30 Coffee, Tea, Pastries, Sign-in
- 10:00 Welcome and Introductions
- 10:10 Review and Approve Agenda
- 10:15 Regional Administrator Status Updates and Response
 - Prop 50 Round 1 Implementation
 - Prop 50 Round 1 Planning
 - Prop 50 Round 2 Contracting
- 11:00 Regional Acceptance Process Update and Next Steps
- 11:15 North Coast IRWMP & Energy Independence Updates and Roundtable Discussion
 - Stakeholder Meetings
 - Webpage
 - White Paper – Nexus with North Coast IRWMP framework
 - Updates and Opportunities – legislation, project identification, evaluations, assessments and feasibility studies underway, data gaps, baseline inventories, financing North Coast projects, individual and consolidated applications
- 12:00 Lunch – provided
- 12:45 North Coast IRWMP & Energy Independence Roundtable Discussion
- 1:15 Proposition 84 Update
- 1:30 PRP Decision-Making Approach – Outline
- 1:45 Updates on Regional Master Sediment Plan Letter and Outcome of the Low-Threat Discharge Basin Plan Amendment Letter
- 2:00 Update on Status of Ongoing Project Identification Template and Timeline for Roll-Out
- 2:15 Public Comment
- 2:45 Next steps, future meeting dates and locations
- 3:00 Adjourn



AGENDA
Southern Oregon Renewable Energy Project

Meeting 3
July 30, 2009
12:00 noon - 3:00 p.m.
Roseburg, Oregon

12:00 – 12:10	Welcome & Introductions	Mike McArthur Bill Thorndike All
12:10-12:20	Check-In & Announcements	All
	<i>What has happened since last month?</i>	
	<i>Are there any announcements relevant to the group?</i>	
12:20 – 1:10	Introduction to Sonoma County Greenhouse Gas Reduction Initiative Randy Poole Energy Collaborative <i>Description of California Project</i> <i>Discussion of Common Interests</i>	
1:10 – 1:20	Power Generation & Electrical Co-ops	Dan James (PNGC)
1:20 – 1:50	Overview of Woody Biomass Feedstock	Blair Moody (BLM) John Pine (ODF)
1:50 – 2:45	Consideration & Discussion of Proposals (attached) <i>Energy Plan for Schools</i> <i>Woody Biomass Inventory</i>	Nikki Whitty Dave Toler
2:45 – 3:00	Next Steps & Other Business	All
3:00	Adjourn	

Trinity County Sustainable Energy and Climate Adaptation

Trinity County Library Board Room

October 9th, 2009 1 PM- 3PM

Draft Agenda

- 1:00- 1:15 Welcome and Introductions- *Dero Forslund***
- 1:15-1:35 Background of Current Energy Production in Trinity County and Potential Sustainable Energy Production and Conservation in Trinity County- *Mark Lancaster***
- 1:35-1:50 California Energy Commission's Energy Efficiency and Conservation Block (EECBG) Grant Program- *Kirk Girard***
The purpose of the EECBG Program is to help cities and counties implement projects and programs that reduce fossil fuel emissions and energy use, and improve energy efficiency. The CEC encouraging regional proposals and collaborative Partnerships
- 1:50-2:00 Overview of California Energy Commission's Technical Assistance Grants- *Kirk Girard***
- 2:00-2:20 State Energy Program- *Kirk Girard***
- AB 811 Programs
 - Residential Commercial Energy Conservation Program
- 2:20-2:30 The North Coast Integrated Regional Water Management Plan- *Kirk Girard/Karen Gaffney***
- Benefits to a regional application and management approach
 - Information about the North Coast Integrated Regional Water Management Plan
- 2:30-3:00 Consideration Of The Establishment Of A County/Regional Based Process To Discuss Sustainable Energy Projects, Funding Sources, Issues, Concerns And Opportunities**

Trinity County Energy

10-9-09

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