

MARIN

COUNTYWIDE PLAN



ADOPTED NOVEMBER 6, 2007

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3.6 Energy and Green Building

Background

Energy is essential to every sector of the economy and community, and the design of the built environment determines how much energy is used. The way energy is obtained and produced has significant impacts on individual and environmental health. Energy generation from fossil fuels (coal, oil, natural gas) is the single largest contributor to greenhouse gas emissions.



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Energy efficiency is doing the same or more work with less energy. Examples include energy efficient lights, motors, and refrigerators that use less energy for the same or greater output.

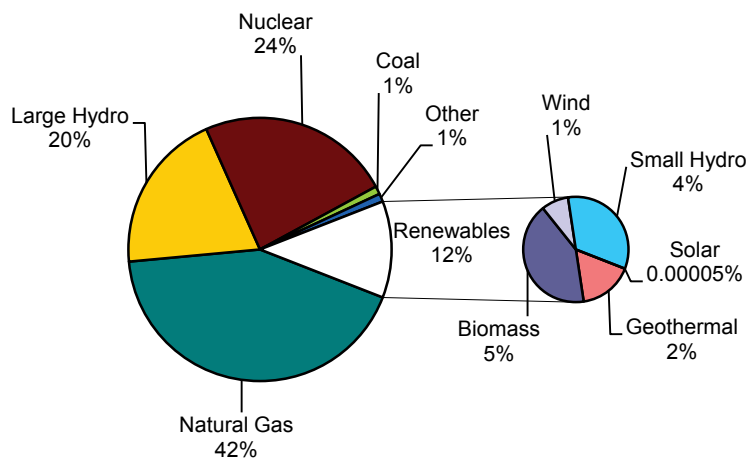
Energy conservation means reducing energy waste. Examples include turning lights, heating, and motors off when not needed.

Most energy in the county and state is imported, and Pacific Gas and Electric (PG&E) is the sole distributor of electricity and natural gas locally. Marin is therefore vulnerable to supply disruptions and price increases like the 2000–2001 spike that cost local residents and businesses about \$60 million more than in previous years. Investing in energy efficiency, renewable energy, and green building will reduce our ecological footprint, minimize our emission of greenhouse gases, reduce impacts on health and the environment, increase the reliability of our energy supply, reduce water use, stabilize prices, create high-quality jobs, and help keep millions of dollars annually in our local economy.

Local government policies and programs can contribute to a more sustainable future by

- ◆ increasing energy efficiency and conservation;
- ◆ prioritizing renewable resources and local production; and
- ◆ promoting green building design and materials.

Figure 3-11 PG&E Electricity Sources, 2005¹



Source: 2006 California Energy Commission.

¹ This graph is for PG&E's entire service territory, which includes 13 million customers. Much of Marin's electricity comes from geothermal plants in the nearby Geysers region.

Green building is a whole-systems approach to design and construction that seeks to protect the environment, conserve resources, create healthier air quality, and save money. Green building practices



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include better siting and design that take advantage of passive solar, cross ventilation, energy and water efficiency, renewable energy, recycling and reusing building materials, and using materials that protect natural resources. Green buildings also save money by reducing energy and water costs, increasing worker productivity, and providing healthier indoor air.

Key Trends and Issues

Is local energy demand increasing?

Marin residents are using more energy. Marin community-wide electricity use increased 18% from 1991 to 2000, with only about a 5% increase in customers. Natural gas use increased about 6% during the same period. Customers responded to the energy crisis by reducing community-wide electricity use 11% between 2000 and 2002. However, California set new peak demand records in the summer of 2004.

Homes in Marin are getting larger. While the Marin population is expected to grow at less than 1% per year, the increasing size of new and remodeled homes, and building in warmer areas (that require cooling), are adding to rising local energy demand. Homes consume about half the electricity and most of the natural gas in Marin (see Figures 3-12 and 3-13). By 2020, most energy demand will continue to come from buildings that exist today. Thus, significant reductions in energy use must come from the existing built environment. Forty-four percent of the CO₂ emissions in Marin are from energy use in buildings.

Pumping and treating water is energy intensive. Marin Municipal Water District (MMWD) is the largest electricity user in the county, using about 26 million kWh in fiscal 2004, or about 2% of the countywide load. North Marin Water District (NMWD) accounts for .02% of the countywide energy use.

MMWD is considering building a desalination plant to meet water demand that exceeds local supply and Russian River allocations. At the maximum estimated output (15 million gallons per day), the desalination plant could use up to 98 million kWh annually, more than tripling MMWD's current load and increasing countywide electricity use by 7%.

San Quentin prison is also a large energy user. In fiscal year 2002-03, the prison's usage was 11.8 million kWh, with a demand of 2.6 MW. The projected load of the proposed Condemned Inmate Complex is 7.7 MW, tripling the current load.

Is the cost of energy increasing?

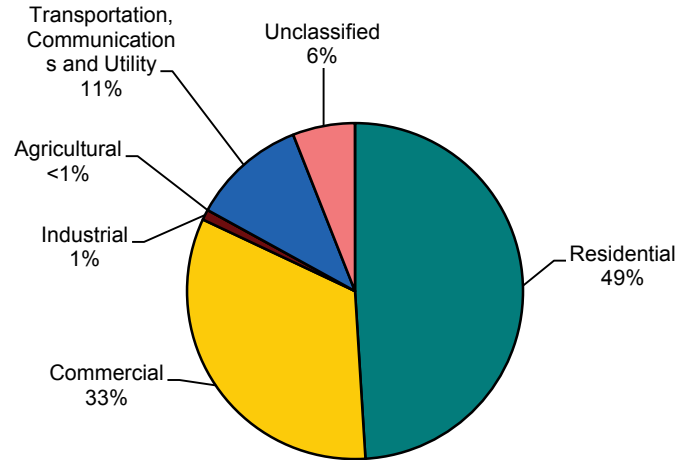
While imported energy prices are increasing, the costs of new energy efficiency and renewable technologies are falling. Investment in energy efficiency and renewables will keep millions of dollars in the local economy.



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How is energy used in Marin?

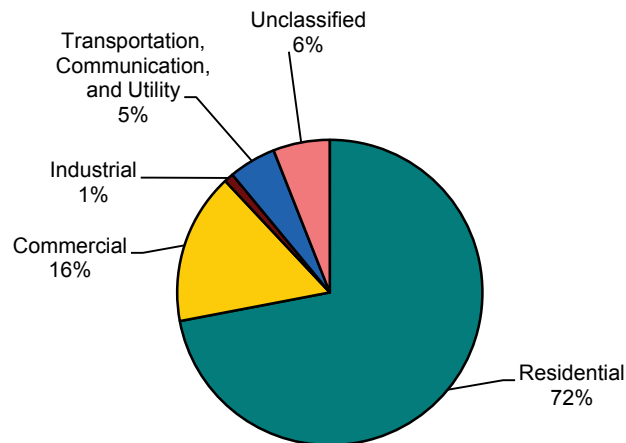
Figure 3-12 Marin Electricity Use, 2000



Source: 2000 Pacific Gas and Electric.

As this figure shows, approximately one-half of all electricity use is in homes, and one-third is in commercial buildings.

Figure 3-13 Marin Natural Gas Use, 2000



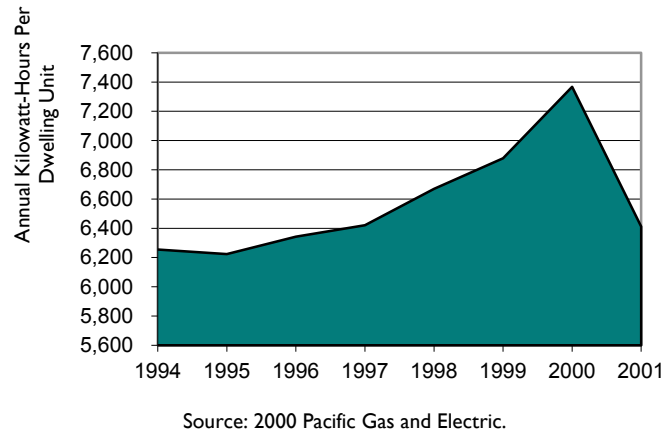
Source: 2000 California Energy Commission.

As the figure indicates, 72% of Marin's natural gas use is in homes. There is a significant opportunity to reduce this gas use through simple weatherization measures and advanced measures such as window retrofits and replacing old furnaces with high-efficiency ones.



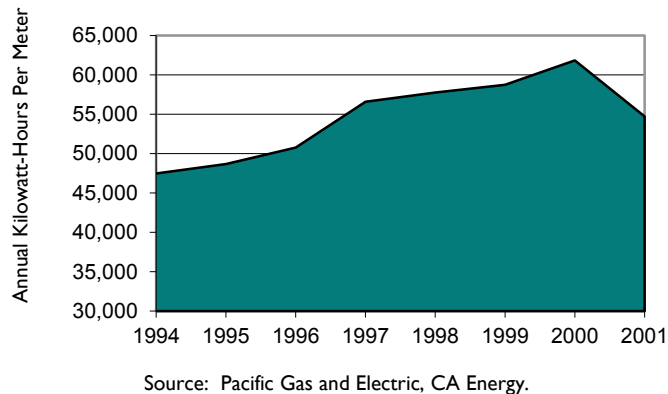
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Figure 3-14 Marin Residential Electricity Consumption, 1994–2001



Per-customer residential electricity use increased by approximately 11% between 1995 and 2000. However, per-customer use dropped about 8% between 2000 and 2002, largely in response to the energy crisis.

Figure 3-15 Marin Nonresidential Electricity Consumption, 1994–2001



Nonresidential electricity use (including all commercial, industrial, and agricultural customers) increased 15% from 1995 to 2000 but retreated about 6% between 2000 and 2002 in response to the energy crisis. The number of nonresidential meters decreased from 13,608 in 1994 to 13,469 in 2001.

Marin also has a relatively consistent peak load throughout the year, compared with the rest of California. The peak load for Marin County was 306 MW in 2000, 267 MW in 2001, 266 MW in 2002, and 284 MW in 2003. These peak times occurred in July. The base load for Marin is 100 MW.



Peak load is the maximum energy demand per hour over a defined high-use time period.



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The Public Utilities Commission has set a goal to save more than 23,000,000 MWh per year by 2013. This is the energy equivalent of 10 giant power plants and equal to the electricity needs of 1.3 million customers.

What is the potential for energy efficiency?

Marin can decrease energy use with efficiency. A 2001 Kema-Xnergy study titled *California's Secret Energy Surplus* projects that current Public Goods Charge-funded energy efficiency programs can reduce energy peak demand by 3% through 2011 over a "no program" scenario. A doubling of funding for energy efficiency programs would reduce peak demand by 5%-6%, and a tripling of current funding would reduce peak demand by 9%.



Imported energy sources are approximately 15% efficient due to losses of energy in the excavation, production, and transportation processes.

Renewable energy technologies are becoming more available and less costly.

Marin has significant renewable resources, including solar, wind, micro-hydro, biogas, and tidal power. Wind electric generation is cost competitive with natural-gas-fired power plants today. Solar electric technologies that can be installed at the point of use are widely available and becoming more competitive. Solar electric installations per year in unincorporated Marin County increased from 6 in 2000 to 44 in 2001, 47 in 2002, and 74 in 2003. As of February 2007, there were 797 installed solar electric systems countywide, which are producing a total of 5.2 MW of power. Solar water heating has tremendous potential to offset natural gas use. Additionally, communities have the power to substantially increase generation from renewable energy through Community Choice Aggregation (AB 117). This bill allows communities to become energy providers and choose to increase the use of renewable energy.



Renewable energy means energy from sources that regenerate and are less damaging to the environment, such as solar, wind, biomass, and small-scale hydroelectric power.

What are the impacts of buildings on the environment and human health?

Buildings have a significant impact on the environment.

They account for approximately 40% of total energy use, 71% of electricity use, and 33% of all CO₂ emissions in the United States. Buildings also account for 40% of all materials and wood use and 25% of all water use in the United States. Construction and demolition waste is 12% of

Marin's waste stream, with an average of 12.91 tons of waste created from the construction of a new 2,000-square-foot home. About 75% of energy used in buildings is wasted due to poor design and construction and inefficient appliances.

The built environment contributes approximately 44% of the CO₂ produced countywide, and the unincorporated areas contribute about 17%. Dairies and ranches, located predominantly in the unincorporated area, account for only 6% of the CO₂ countywide but 29% in the unincorporated areas.



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Buildings may also have unsafe levels of toxins. The U.S. Environmental Protection Agency reports that the air in new homes can be 10 times more polluted than outdoor air due to the off-gassing of finishes and furnishings. Americans spend approximately 90% of their time inside buildings.

How is green building being implemented?

Green building rating systems provide credible guidelines for green projects. The U.S. Green Building Council (USGBC) has developed the Leadership in Energy and Environmental Design (LEED) rating system to assist building professionals and the public with designing and building green buildings. LEED rates buildings using five categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Indoor Air Quality, and Materials and Resources (see the sidebar). Marin County utilizes green building guidelines for single-family homes largely developed by the Alameda County Waste Management Authority.

The number of State and local governments developing green building programs is growing rapidly. Santa Monica, San Jose, San Francisco, Berkeley, and Alameda County; Boulder, Colorado; Austin, Texas; and now Marin County have developed green building programs. The State of California requires all new and renovated state-owned facilities to meet LEED Silver or higher certification.

What are the costs of green building?

Building green is a sound financial choice. Investments in green buildings pay for themselves 10 times over, according to a new study for 40 California agencies. This study, drawing on national data for 33 green buildings and an in-depth review of several hundred existing studies, found that sustainable buildings are a very cost-effective investment. The report concluded that financial benefits of green design are between \$50 and \$70 per square foot in a LEED building, over 10 times the additional cost associated with building green.

Homeowners are increasingly supportive of green building. In a survey conducted in 2000, 36% of respondents were willing to pay up to \$5,000 more for green building options, and 20% were willing to pay up to \$10,000 more. While building green doesn't have to cost more, many people are willing to pay more for the benefits.



CDA's Energy Efficiency and Green Building Program includes the following:

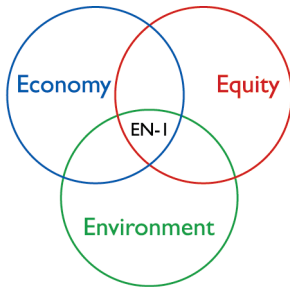
- ◆ Fast-track permitting and waived energy fees currently for projects that
 - a. exceed Title 24 by 20%
 - b. install a solar system that meets 75% of project's energy needs
 - c. meet the Green Building checklist requirements
- ◆ Technical Assistance
- ◆ Green Building Resource Library
- ◆ Trainings for County staff, building professionals, and the public
- ◆ Coordination with other municipalities



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What Are the Desired Outcomes?

GOAL EN-I



Decreased Energy Use. Reduce total and per-capita nonrenewable energy waste and peak electricity demand through energy efficiency and conservation.

Policies

EN-1.1 Adopt Energy Efficiency Standards. Integrate energy efficiency and conservation requirements that exceed State standards into the development review and building permit process.

EN-1.2 Offer Effective Incentives. Continue to offer incentives such as expedited permit processing, reduced fees, and technical assistance to encourage energy efficiency technology and practices.

EN-1.3 Provide Public Information and Education. Continue to provide information, marketing, training, and education to support energy efficiency and energy conservation.

EN-1.4 Reduce Energy Use in County Facilities. Continue to integrate energy efficiency and conservation into all County functions.

Why is this important?

In 2000, electricity production resulted in 63% of U.S. sulfur dioxide emissions that contribute to acid rain, 21% of U.S. nitrous oxide emissions that contribute to urban smog, and 40% of U.S. carbon emissions that contribute to global climate change. Reducing energy use decreases impacts on the environment and critical health problems such as asthma.

Environment: Electricity generation from fossil fuels is the single largest contributor to greenhouse gases in the world. Countywide emissions of carbon dioxide in 2005 were 3.2 million tons. The extraction, processing, transport, and generation for energy contribute to ecosystem degradation and health problems.

Economy: Total countywide electricity costs for Marin in 2005 were \$216,000,000. A dollar spent on energy



Total Energy Use. Saving energy does not necessarily mean living less well. Footprint-efficient products such as compact fluorescent light bulbs (CFLs) can reduce a room's lighting footprint by three-quarters without changing the amount of light provided. If Marin County reduced its total energy use by just 10%, the county could reduce its footprint by 63% the size of Marin County.



Housing Overlay. Smart development that reduces urban sprawl and locates housing near jobs can help to create safer and healthier communities. It can also reduce footprint. A compact, well-designed community can decrease a resident's total driving footprint by at least 10%.



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efficiency will cycle through the economy four times versus a dollar spent on an energy bill that leaves the local economy quickly. Reducing energy costs is important to a healthy local economy.

Equity: Lower income households pay a high percentage of their income on energy bills and are adversely affected by rising energy prices. Rental housing where lower income tenants live often lacks energy efficient insulation, windows, heating equipment, or appliances.

How will results be achieved?

Implementing Programs

EN-1.a ***Establish a Permanent Sustainable Energy Planning Process.*** Integrate sustainable energy resource planning and program implementation (including climate protection, water resources, and other overlapping topics) into long-range and current planning functions and other related County divisions. Establish and maintain a process to implement, evaluate, and modify existing programs. Work with PG&E and local and State agencies to estimate current and future energy demand countywide, conduct integrated resource planning, determine how energy sources and delivery systems can conserve resources and reduce demand in Marin, and promote energy conservation, efficiency, and use of renewable resources.

EN-1.b ***Adopt Energy Efficiency Standards for New and Remodeled Buildings.*** Develop and implement building standards that exceed Title 24 for residential and commercial buildings based on appropriate criteria for the county's specific climate zones, sustainability goals, and other appropriate criteria. Establish technical and financial feasibility criteria by which the standards can be periodically improved.



CDA Sustainability Programs

- ♦ Green Business
- ♦ Certification and marketing program
- ♦ Solar incentives and technical assistance
- ♦ Energy efficiency and resource efficiency
- ♦ Green building incentives
- ♦ Climate protection target and plan
- ♦ Sustainable County operations report



Energy efficiency retrofits at the Marin Civic Center have saved over \$300,000 and 1,000 tons of CO₂ per year, which is the equivalent of planting 288 acres of trees.



Exceeding the building energy-use requirements of the State Energy Code by 22% will reduce the average home energy bill by \$812/year and have a payback of 5 to 10 years.



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EN-1.c ***Implement the Single-Family Dwelling Energy Efficiency Ordinance.*** Continue to require that all new and remodeled homes larger than 3,500 square feet comply with the Marin County Single Family Dwelling Energy Efficiency Ordinance through energy efficiency techniques and/or use of renewable energy. Review and revise the standard periodically to account for changes in Title 24, and technical and financial advances in energy efficiency and renewable technologies.



Marin County current sustainability ordinances:

- ♦ Single Family Dwelling Energy Efficiency Ordinance
- ♦ Construction and Demolition Waste Recovery Ordinance
- ♦ Wood Smoke Reduction Ordinance

EN-1.d ***Explore Energy Efficiency Standards for Existing Buildings.*** Explore and, if appropriate, adopt energy efficiency standards for existing residential and commercial buildings upon substantial remodel. Consider requiring energy efficiency inspections, disclosure, and retrofits at change of ownership based on cost-effective and commercially available energy efficiency measures.

EN-1.e ***Offer Information, Technical Assistance, Training, and Incentives.*** Continue to expand energy efficiency information, marketing, training, and technical assistance to property owners, development professionals, schools, and special districts. Review and revise, as needed, existing incentives for incorporating energy-

reducing practices in remodels and new development, including fee reductions and expedited processing.

EN-1.f ***Explore Regional Collaboration, Financing, and Other Incentives.*** Explore regional and countywide collaborations among local governments, special districts, and other public organizations to share resources, achieve economies of scale, and develop plans and programs that are optimized on a regional scale. Evaluate and implement opportunities for supporting new programs and promoting sustainable energy practices through financing mechanisms (e.g., pooled project financing, low-interest loans, Community Choice Aggregation, other local government joint ventures, and State funds earmarked for energy efficiency and renewables).

EN-1.g ***Support Key Legislation.*** Monitor and support State and federal legislation that promotes energy efficiency and renewable energy sources.

EN-1.h ***Support Low Income Weatherization.*** Review and ensure that adequate low income weatherization programs are being implemented in Marin, and all available State and federal funds and programs are being used to the fullest extent possible. Provide information, training, and technical assistance to owners and tenants who may have incentives for implementing energy efficiency in low income rental properties.

EN-1.i ***Reduce Energy Use in Processing Operations.*** Work with local commercial, industrial, and agricultural operations to identify opportunities for energy efficiency in the storage, transport, refrigeration, and other processing of commodities, and require such



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operations to provide energy efficiency analyses in conjunction with required County approvals.

- EN 1.j ***Reduce Energy Use in County Facilities.*** Continue to reduce energy in County facilities, utilize innovative energy efficiency technologies, and provide leadership and technical assistance to other agencies.

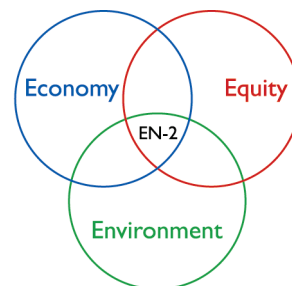
What Are the Desired Outcomes?

GOAL EN-2

Increased Renewable Resource Use. Utilize local renewable energy resources, and shift imported energy to renewable resources.

Policies

- EN-2.1 **Protect Local Renewable Resources.** Preserve opportunities for development of renewable energy resources.
- EN-2.2 **Adopt Renewable Energy Building Standards.** Integrate technically and financially feasible renewable energy requirements into development and building standards.
- EN-2.3 **Promote Renewable Energy.** Facilitate renewable technologies through streamlined planning and development rules, codes, processing, and other incentives.
- EN-2.4 **Provide Public Information and Education.** Provide information, marketing, training, and education to support renewable resource use.



Why is this important?

Buildings account for most electricity and natural gas consumption in the county. Incorporating solar (electric and both passive and active space and water heating) in new design and retrofitting of existing buildings offers the greatest opportunity for using local renewable resources.

Energy mix. Burning fossil fuels to produce electricity is responsible for a large portion of CO₂ emissions in Marin County. Switching to renewable energy sources such as solar can result in significant footprint savings. Increasing the share of renewably generated electricity in Marin's energy mix to 40% in 2015 will decrease the county's footprint by 1.8 Marin counties each year.



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Installed photovoltaic systems in Marin reduce CO₂ emissions by 1,427 tons CO₂ avoided per year.



Photovoltaic systems have a payback of 8 to 15 years.

Environment: The amount of land required for photovoltaic (PV) cells to produce enough electricity to meet all U.S. power needs is estimated at less than 60,000 square kilometers, or roughly 20% of the area of Arizona. Renewable energy generation options such as solar, wind, biogas, and tidal power increase the reliability of our supply and reduce our dependence on imported energy. Both local and imported renewable energy reduce greenhouse gas emissions.

Economy: Increasing renewable electricity use from 2.5% today to 20% by 2020 would reduce natural gas use by 6% and save consumers nearly \$27 billion. Using locally produced renewable energy can provide price stability and keep more money in the local economy through lower energy bills and job creation. The solar industry generates around nine jobs per megawatt installed, whereas traditional fossil fuel generates one job per

megawatt installed.

Equity: The United States is home to only 3% of the world's known oil reserves. Renewable energy at the source of use, such as solar electric generation, can provide greater control over cost and reliability. However, initial capital cost and lack of financing can make it unaffordable to lower income residents.

Figure 3-16 Renewable Energy

Biogas energy is recovered methane from landfills or agricultural operations used to power an engine or a turbine.

Micro-hydro turbines use the energy of falling water to create electricity. MMWD and NMWD have hydro-power potential at their reservoirs.

Solar energy uses the sun's energy to provide heat, light, hot water, and electricity for homes, businesses, and industry.

Tidal energy systems use the energy of waves, rising/falling tides, or the flow of water through a venturi to power a turbine. San Francisco is pursuing a tidal energy system, and Marin is exploring the idea with it.

Wind generators are turbines that use the energy in the motion of the wind to make mechanical energy, which is then converted to electrical energy. Wind is the least expensive method of generating electricity, and there is enough potential wind energy in the United States to power the entire country. National Renewable Energy Laboratory (NREL).



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How will results be achieved?

Implementing Programs

- EN-2.a** *Map Local Renewable Energy Resources, Utility Systems, and Demand Areas.* Use Geographic Information Systems (GIS) to map and assess local renewable resources, the electric and gas transmission and distribution system, community growth areas anticipated to require new energy services, and other data useful to deployment of renewable technologies.
- EN-2.b** *Protect Renewable Resources.* Identify possible sites for production of energy using local renewable resources such as solar, wind, small hydro, biogas, and tidal; evaluate potential land use, environmental, economic, and other constraints affecting their development; and adopt measures to protect those resources, such as utility easement, right-of-way, and land set-asides.
- EN-2.c** *Protect Solar Access.* Continue to require the protection of passive or active solar design elements and systems from shading by neighboring structures and trees.
- EN-2.d** *Facilitate Renewable Energy Technologies and Design.* Continue to identify and remove regulatory or procedural barriers to producing renewable energy in building and development codes, design guidelines, and zoning ordinances. Work with related agencies such as fire, water, and health that may impact the use of alternative technologies. Develop protocols for alternative energy storage such as biodiesel, hydrogen, and/or compressed air.
- EN-2.e** *Provide Incentives for Alternative Energy Production.* Continue to provide incentives such as fee reductions and expedited processing for facilities that use renewable sources for energy production. Work with State and federal agencies to secure tax exemptions, tax rebates, or other financial incentives for such facilities.
- EN-2.f** *Use Renewable Energy in County Facilities.* Continue to develop and employ renewable energy and clean generation technologies such as solar, wind, biogas, tidal, cogeneration, and fuel cells to power County facilities using tax-free low-interest loans and other available financial options. Evaluate the feasibility of purchasing renewable energy certificates to reduce Marin County government's contribution to greenhouse gas emissions.
- EN-2.g** *Explore Community Choice Aggregation.* Evaluate and pursue implementation of Community Choice Aggregation (CCA) if it proves to be a cost-effective and low-risk strategy to accelerate the use of renewable energy resources.



A study of available rooftop space in Marin determined that approximately 100 MW of photovoltaics could be installed on commercial buildings and 130 MW could be installed on residential buildings.



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Community Choice Aggregation (AB 117)

CCA permits municipalities to aggregate and provide electricity to residents, businesses, and public facilities. Investor-owned utilities (IOUs) continue to own and operate the transmission and distribution system, and provide metering, billing, and other customer service functions.

EN-2.h *Provide Information and Technical Assistance.* Offer technical assistance for renewable energy and clean distributed generation as part of the program under EN-1.e.

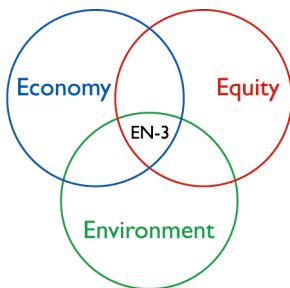
EN-2.i *Explore Renewable Energy Financing Options.* Evaluate and implement as feasible local government financing options such as low-interest loans, pooled project financing, and joint ventures with other agencies with financing authority, such as the water districts.

EN-2.j *Coordinate with the Special Districts on Energy Use.* Work with MMWD, NMWD, and sanitary and other special districts to assess and develop joint initiatives for energy and water resource planning, resource conservation, and energy development.

EN-2.k *Explore Regional Collaboration.* Explore regional collaborations among local governments, special districts, nonprofits, and other public organizations to share resources, achieve economies of scale, and develop renewable energy policies and programs that are optimized on a regional scale.

What Are the Desired Outcomes?

GOAL EN-3



Adopt Green Building Standards. Integrate green building requirements into the development review and building permit process.

Policies

EN-3.1 *Initiate Green Building Initiatives.* Encourage and over time increasingly require sustainable resource use and construction with nontoxic materials.

EN-3.2 *Offer Effective Incentives.* Continue to offer incentives that encourage green building practices.

EN-3.3 *Incorporate Green Building in County Facilities.* Integrate green building practices into all County facilities.

EN-3.4 *Provide Public Information and Education.* Continue to provide information, marketing, training, and education to support green building.



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Why is this important?

Efficient windows, appliances, and lighting can lower electricity need in a building by up to 65%. Many conventional products, such as cabinets, counter tops, shelving, and furniture, are made from particleboard that is glued together with formaldehyde, a suspected human carcinogen. Green building practices create healthier living and working conditions, protect watersheds, reduce the embodied energy of materials, reduce pressure on forest and mineral resources, and result in buildings that are less expensive to operate and often have a higher resale value.

Environment: Buildings have a significant impact on the environment. They account for approximately 40% of total energy use, 71% of electricity use, and 33% of all carbon dioxide emissions in the United States. Buildings also account for 40% of all materials and wood use, and 25% of all water use in the United States.

Economy: In 2003, the State of California commissioned a study of 35 LEED buildings. The study found that the average extra first cost was approximately \$5 to \$6/square foot (2%) more than average commercial construction costs. However, the range of benefits was approximately \$50 to \$70/square foot, with increased productivity being the largest benefit.

Equity: Up to 40% of children born today may develop respiratory problems, possibly due in part to the chemicals in their homes. Conventional buildings contain many toxins, such as formaldehyde. Green building strives to use nontoxic materials.

How will results be achieved?

Implementing Programs

- EN-3.a** ***Require Green Building Practices for Residential Development.*** Require residential development and major remodels that are subject to design review to utilize the Marin Green Building Design Guidelines (see the Introduction, “Technical Background Reports and Other Supporting Documents”) or other County-approved rating systems. Affordable housing projects are encouraged but not required to integrate the Marin Green Building Design Guidelines or other County-approved rating systems. Additional technical assistance and public funding should be provided for that purpose.
- EN-3.b** ***Require Green Building Practices for Nonresidential Development.*** Consider incentives and/or the discretionary permit process to require new nonresidential development and remodels to utilize the U.S. Green Building Council’s LEED rating system.
- EN-3.c** ***Divert Construction Waste.*** Continue to implement and improve the Construction and Demolition Waste Recovery Ordinance, requiring building projects to recycle or reuse a minimum of 50% of unused or leftover building materials.
- EN-3.d** ***Encourage Fly Ash in Concrete.*** Provide incentives and consider regulations requiring new building projects that use a substantial amount of concrete to incorporate at least



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25% fly ash to offset some of the energy use and greenhouse gas emissions associated with the manufacturing of cement.

- EN-3.e** ***Offer Information, Technical Assistance, Training, and Incentives.*** Continue to expand green building information, marketing, training, and technical assistance to property owners, development professionals, schools, and special districts. Include green building guidelines in residential design guidelines. Review and revise, as needed, existing incentives for incorporating green building practices in remodels and new development, including fee reductions and/or expedited permit processing.
- EN-3.f** ***Facilitate Green Building Practices.*** Continue to identify and remove regulatory or procedural barriers to implementing green building practices in Marin, such as updating codes, guidelines, and zoning.
- EN-3.g** ***Support Green Building Professional Certification.*** Support minimum green building certification requirements for architects, contractors, and other building professionals. Provide ongoing training to meet the minimum requirements. Maintain County membership in the United States Green Building Council.

Figure 3-17 LEED Rating System

LEED (Leadership in Energy and Environmental Design) is a rating system created by the U.S. Green Building Council that evaluates environmental performance over a building's life cycle.

LEED rates new and existing commercial, institutional, and high-rise residential buildings as follows:

<u>Rating</u>	<u>Points</u>
Certified	26–32
Silver	33–38
Gold	39–51
Platinum	52–69 (maximum measured)

Maximum rating is 69 points.

- EN-3.h** ***Adopt LEED Gold Standards for Public Buildings.*** Implement where feasible the LEED (Leadership in Energy and Environmental Design) Gold certification requirements or a higher standard for development and major remodels of new public buildings.



BUILT ENVIRONMENT ELEMENT

- EN-3.i** ***Explore Regional Collaborations.*** Explore regional collaborations among local governments, special districts, nonprofits, and other public organizations to share resources, achieve economies of scale, and develop green building policies and programs that are optimized on a regional scale.
- EN-3.j** ***Support Key Legislation and Initiatives.*** Monitor and support State and federal legislation and programs that promote green building.
- EN-3.k** ***Evaluate Carbon Neutral Building Incentives.*** Evaluate the feasibility of incentives and regulations to achieve carbon neutral buildings.



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Figure 3-18 Relationships of Goals to Guiding Principles

This figure illustrates the relationships of each goal in this section to the Guiding Principles.

Goals	Guiding Principles											
	1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
EN-1 Decreased Energy Use	•	•	•	•						•	•	•
EN-2 Increased Renewable Resource Use	•	•	•	•	•				•			•
EN-3 Adopt Green Building Standards		•		•	•				•			•



BUILT ENVIRONMENT ELEMENT

How Will Success Be Measured?

Indicator Monitoring

Nonbinding indicators, benchmarks, and targets¹ will help to measure and evaluate progress. This process will also provide a context in which to consider the need for new or revised implementation measures.

Indicators	Benchmarks	Targets
Energy use per capita countywide.	16,636 kWh unincorporated per capita in 2000.	Reduce consumption of electricity per capita 10% by 2020.
Energy use per employee in County-operated buildings.	4,852 kWh per employee in 2000.	Lower energy consumption per employee by 2020.
Total MW of photovoltaic systems installed countywide.	0.0255 MW in 2000.	15 MW by 2015 and 30 MW by 2020.
Total MW of photovoltaic systems installed by County government.	0 in 2000.	0.5 MW by 2010 and 1 MW by 2015.

¹Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.



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Program Implementation

The following table summarizes responsibilities, potential funding priorities, and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame.¹ will be dependent upon the availability of adequate funding and staff resources.

Figure 3-19
Energy Program Implementation

Program	Responsibility	Potential Funding	Priority	Time Frame
EN-1.a – Establish a Permanent Sustainable Energy Planning Process.	CDA, CEC, PG&E	Existing budget	Medium	Short term and Ongoing
EN-1.b – Adopt Energy Efficiency Standards for New and Remodeled Buildings.	CDA	Existing budget and may require additional grants or revenue ²	Medium	Med. term
EN-1.c – Implement the Single-Family Dwelling Energy Efficiency Ordinance	CDA	Existing budget and may require additional grants or revenue ²	High	Ongoing
EN-1.d – Explore Energy Efficiency Standards for Existing Buildings.	CDA	Existing budget and may require additional grants or revenue ²	Medium	Med. term
EN-1.e – Offer Information, Technical Assistance, Training, and Incentives.	CDA	Existing budget and may require additional grants or revenue ²	High	Immediate
EN-1.f – Explore Regional Collaboration, Financing, and Other Incentives.	CDA, CAO, Marin Cities and Towns	Existing budget and may require additional grants or revenue ²	High	Immediate
EN-1.g – Support Key Legislation.	CDA, CAO	Existing budget and may require additional grants or revenue ²	Medium	Immediate and Ongoing
EN-1.h – Support Low Income Weatherization.	CDA, CBO's	Will require additional grants or revenue ²	Medium	Short term
EN-1.i – Reduce Energy Use in Processing Operations.	CDA, UCCE-FA ³	Will require additional grants or revenue ²	Medium	Med. term

¹ Time frames include: Immediate (0–1 years); Short term (1–4 years); Med. term (4–7 years); Long term (over 7 years); and Ongoing (existing programs already in progress whose implementation is expected to continue into the foreseeable future).

³UCCE-FA: University of California Cooperative Extension, FA: Farm Advisor.



BUILT ENVIRONMENT ELEMENT

Program	Responsibility	Potential Funding	Priority	Time Frame
EN-1.j – Reduce Energy Use in County Facilities.	DPW	Existing budget and may require additional grants or revenue ²	High	Short term
EN-2.a – Map Local Renewable Energy Resources, Utility Systems, and Demand Areas.	CDA	Existing budget and may require additional grants or revenue ²	Medium	Short term
EN-2.b – Protect Renewable Resources.	CDA	Existing budget and may require additional grants or revenue ²	High	Short term
EN-2.c – Protect Solar Access.	CDA	Existing budget	High	Ongoing
EN-2.d – Facilitate Renewable Energy Technologies and Design.	CDA	Existing budget and may require additional grants or revenue ²	High	Short term
EN-2.e – Provide Incentives for Alternative Energy Production.	CDA	Existing budget and may require additional grants or revenue ²	High	Ongoing
EN-2.f – Use Renewable Energy in County Facilities.	DPW, CDA	Will require additional grants or revenue ²	High	Ongoing
EN-2.g – Explore Community Choice Aggregation.	CDA	Existing budget and may require additional grants or revenue ²	High	Ongoing
EN-2.h – Provide Information and Technical Assistance.	CDA	Existing budget	High	Ongoing
EN-2.i – Explore Renewable Energy Financing Options.	CDA, CAO	Existing budget and may require additional grants or revenue ²	Medium	Short Term
EN-2.j – Coordinate with the Special Districts on Energy Use.	CDA, Water and Sewer Districts	Existing budget and may require additional grants or revenue ²	Medium	Short Term
EN-2.k – Explore Regional Collaboration.	CDA, CAO, Marin Cities and Towns, Water and Sewer Districts, Schools, CBO's	Existing budget and may require additional grants or revenue ²	High	Immediate



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Program	Responsibility	Potential Funding	Priority	Time Frame
EN-3.a – Require Green Building Practices for Residential Development.	CDA	Existing budget	High	Ongoing
EN-3.b – Require Green Building Practices for Nonresidential Development.	CDA	Existing budget and may require additional grants or revenue ²	Medium	Short term
EN-3.c – Divert Construction Waste.	CDA	Existing budget	High	Ongoing
EN-3.d – Encourage Fly Ash in Concrete.	CDA	Existing budget	Medium	Short term
EN-3.e – Offer Information, Technical Assistance, Training, and Incentives.	CDA	Existing budget	High	Ongoing
EN-3.f – Facilitate Green Building Practices.	CDA	Existing budget	High	Ongoing
EN-3.g – Support Green Building Professional Certification.	CDA	Existing budget	Medium	Short term
EN-3.h – Adopt LEED Gold Standards for Public Buildings.	Board of Supervisors, DPW	Existing budget and future capital improvement budgets	High	Immediate
EN-3.i – Explore Regional Collaborations.	CDA	Existing budget and may require additional grants or revenue ²	High	Immediate
EN-3.j – Support Key Legislation and Initiatives.	Board of Supervisors CDA, County Lobbyist	Existing budget	Medium	Ongoing
EN-3.k – Evaluate Carbon Neutral Building Incentives.	CDA	Existing budget	Medium	Med. term