What is Energy Efficiency?

Energy efficiency is about using less energy to perform the same tasks. It helps reduce energy waste, lower utility bills, and minimize environmental impact by decreasing greenhouse gas emissions.

Key Benefits of Energy Efficiency:

- **Cost savings on energy bills**: Energy efficiency measures lead to lower energy consumption, significantly decreasing monthly utility expenses. For instance, the average cost of saving electricity through efficiency programs is around 2.4 to 3 cents per kilowatt-hour (kWh), making it a cost-effective resource compared to traditional energy sources, which can range from 3 to 12 cents per kWh.[1]
- **Environmental Impact:** Implementing energy-efficient practices reduces carbon emissions, contributing to a smaller carbon footprint. For example, the ENERGY STAR program has helped avoid nearly 170 million metric tons of emissions annually through efficiency improvements in commercial buildings.[2]
- **Energy Security:** By decreasing overall energy demand, energy efficiency lessens reliance on fossil fuels. This shift not only stabilizes energy supplies but also supports the transition towards renewable energy sources.[3]
- **Comfort & Health:** Energy-efficient appliances and buildings often improve temperature regulation and comfort levels. Efficient systems can also enhance indoor air quality by ensuring better ventilation and reducing pollutants, leading to healthier living and working environments.[4]

Common Energy Efficiency Measures:

Lighting

- Switch to LED Bulbs: LED bulbs use up to 90% less energy than incandescent bulbs and 60% less than old fluorescent lighting. They can last up to 25 times longer than traditional incandescent bulbs.[5]
- Smart Lighting Controls: Implement timers, dimmers, or motion sensors to reduce unnecessary energy use.[6]

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[1] Frick et al.,"https://emp.lbl.gov/news/still-one-new-study-finds-efficiency-remains"
[2] Energy Star.,"https://www.energystar.gov/buildings/about-us/facts-and-stats."
[3] Cohn., "aceee.org/topic-brief/2021/06/cost-saving-electricity-largest-us-utilities-ratepayer-funded-efficiency.'
[4] US Environmental Protection Agency., "https://www.epa.gov/sites/default/files/2016-03/documents/table_rules_of_thumb.pdf."
[5] LED Lighting Supply., "https://www.ledlightingsupply.com/blog/led-lighting-statistics-to-know-in-2022."
[6] US Department of Energy., "https://www.energy.gov/energysaver/why-energy-efficiency-matters."

Appliances

- Energy Star Appliances: Look for the ENERGY STAR label, which indicates that the product meets energy efficiency guidelines set by the U.S. Environmental Protection Agency.[6]
- Efficient Refrigerators, Dishwashers, and Washers: These use less electricity and water, offering substantial savings over time.

Heating, Ventilation, and Air Conditioning (HVAC)

- Smart Thermostats: Can reduce heating and cooling bills by more than 8% and save about $50 a year on average.[6.]
- Regular Maintenance: Ensures your HVAC system runs efficiently, saving energy and prolonging its life.[6.]
- Insulation and Weatherization: Properly insulating your home and sealing leaks can save 5% to 30% on energy bills annually.[6.]

Water Heating

- Efficient Water Heaters: Consider energy-efficient tank water heaters or on-demand tankless water heaters.[6]
- Low-Flow Fixtures: Use water-efficient showerheads and faucets to reduce hot water use.[6]

Building Efficiency

- Insulation: Properly insulating walls, roofs, and floors can cut energy bills by up to 20%.
- Windows: Energy-efficient windows with double or triple glazing help prevent heat loss.[6] Storm windows can reduce heat loss through windows by 25% to 50%.[6]

Energy Efficiency in California

According to the US Energy Information Administration,[7] California is the second-largest total energy consumer among U.S. states, after Texas. This high consumption is primarily due to:

- The largest population in the nation
- The largest economy of any state (fifth-largest in the world)
- Significant energy use in the transportation sector

[7] U.S. Energy Information Administration, https://www.eia.gov/beta/states/states/ca/overview.

Key Policies and Players

California has implemented several significant legislative measures to improve energy efficiency and reduce greenhouse gas emissions:

- **SB 350 (Senate Bill 350)**[8], also known as the Clean Energy and Pollution Reduction Act of 2015, set ambitious energy efficiency goals for California. The bill requires the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction, aiming to achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses by January 1, 2030. This legislation mandates utilities to submit energy savings goals and requires the Public Utilities Commission (PUC) to establish efficiency targets for electric and gas corporations consistent with this goal.

- **Title 24**, part of the California Building Standards Code, includes the Building Energy Efficiency Standards. The 2022 Title 24 requirements went into effect on January 1, 2023, setting new standards for energy efficiency in commercial buildings[9]. These standards aim to reduce energy consumption, as businesses and homes in California are responsible for almost 70% of the state's electricity use and 25% of its greenhouse gas emissions.

Key Players and Their Roles in EE

California Energy Commission

The CEC is the state's primary energy policy and planning agency[10]. Its responsibilities include:

- Administering the state's renewable portfolio standard
- Adopting building and appliance energy savings standards
- Providing funding for energy innovation research and development
- Investing in low-carbon fuels and developing electric vehicle fueling infrastructure
- Ensuring energy facilities are located, constructed, and decommissioned in an environmentally and public health-conscious manner

The CEC also develops and releases the California Energy Efficiency Action Plan, which charts progress toward doubling energy efficiency by 2030 and provides recommendations for achieving the state's goals[10].

California Public Utilities Commission

The CPUC is a regulatory agency that oversees privately owned public utilities in California, including electric and gas utilities[11]. Its roles includes:

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[8] American Council for an Energy-Efficient Economy, "https://database.aceee.org/state/energy-efficiency-resource-standards".
[9] California Energy Commission, "https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards".
[10] California Energy Commission,https://www.energy.ca.gov/about/core-responsibility-fact-sheets.
[11] California Public Utilities Commission, https://www.cpuc.ca.gov/-/media/cpuc-website/about-cpuc/documents/transparency-and-reporting/fact_sheets/cpuc_overview_english_030122.pdf.

- Regulating investor-owned electric and gas utilities
- Establishing service standards and safety rules
- Authorizing utility rate changes
- Overseeing markets to inhibit anti-competitive activity
- Implementing energy efficiency and conservation programs
- Enforcing the California Environmental Quality Act for utility construction

The CPUC is governed by five commissioners, each serving staggered six-year terms. These commissioners are appointed by the governor and must be confirmed by the California State Senate[11].

Investor-Owned Utilities
The CPUC works closely with these IOUs, other program administrators, and vendors to develop programs and measures that aim to transform technology markets within California using ratepayer funds. This collaborative effort is crucial for achieving the state's ambitious energy efficiency and carbon reduction goals.

The SoCalREN is funded by ratepayer dollars from customers served by two major utilities in the region:

- Southern California Edison (SCE): Delivers power across a vast service area of approximately 50,000 square miles. This area encompasses central, coastal, and southern California, including over 180 incorporated cities and 15 counties. SCE serves about 15 million people[12].

- Southern California Gas Company (SoCalGas): A natural gas utility that provides service across a 24,000 square mile territory throughout central and southern California[13].

These IOUs, along with Pacific Gas & Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E), are required to implement energy efficiency programs and meet specific energy efficiency targets set by the CPUC.

Community Choice Aggregations
Community Choice Aggregation (CCA), also known as Community Choice Energy, is an alternative energy supply model that allows local governments to procure electricity on behalf of their residents, businesses, and municipal accounts. CCAs aim to provide communities with more control over their energy future while often focusing on increasing the use of renewable energy and reducing costs for consumers[14]. There are currently 25 operational CCA programs in California. These programs serve over 14 million customers in more than 200 cities and counties throughout the state[14].

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[12] California Edison Company, https://www.sce.com/about-us.
[13] Southern California Gas Company, https://www.socalgas.com/about-us.
[14] California Community Choice Association, "Community Choice Aggregation (CCA): What is it?," Cal-CCA, n.d., https://cal-cca.org/powered/.

Regional Energy Networks (RENs)
Regional Energy Networks (RENs) are authorized by the California Public Utilities Commission to serve as program administrators and deliver energy programs to local communities. RENs work collaboratively, leveraging local knowledge to develop comprehensive approaches for administering energy-saving programs[15].

Currently, there are several operational RENs in California, including:

- Bay Area Regional Energy Network (BayREN)
- Southern California Regional Energy Network (SoCalREN)
- Tri-County Regional Energy Network (3C-REN)
- Inland Regional Energy Network (I-REN)
- Rural Regional Energy Network (Rural REN)
- Central California Rural Regional Energy Network has been approved to begin operations in 2025
- San Diego Regional Energy Network approved to begin operations in 2025

Another organization worth noting is California Regional Networks (CalREN), a statewide collaborative for California RENs to work together, leverage each other's local knowledge, and develop holistic approaches to administering energy-saving programs[16].

SoCalREN Focus Areas for Impact

Public Agency Sector

SoCalREN's Public Agency Sector services local government agencies, including cities, counties, water agencies, school districts, special districts, community colleges, universities, and state and federal government facilities. SoCalREN makes it easier for public agencies to take action to save energy. Services include high-level technical assistance, objective third-party expertise, access to project funding and financing, and project management for all stages of an energy efficiency project, all at no cost

Residential Sector

Multifamily Program

The SoCalREN Multifamily Program provides two ways to residents upgrade their properties:

- Technical Assistance: An energy and green building consultant will work with property owners to identify cost-effective upgrade measures and connect them to applicable incentive programs.

[15] California Public Utilities Commission, "Proposed Decision of ALJs Fitch and Kao Addressing Motion for Authorization of San Diego Regional Energy Network," Rulemaking 13-11-005, June 20, 2024, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M534/K105/534105566.PDF.
[16] California Regional Energy Networks, "Introducing CalREN," CalREN, n.d., https://californiaregionalenergynetworks.org/. .

- Incentives: Improvement incentives help offset the cost of purchasing and installing energy conservation measures, such as upgrades to lighting, water heating, and HVAC systems.

Opportunities for improvements can range from system replacement to full rehabilitation. The Program design is based on an analysis of how a property uses energy as a whole and encourages full-building, integrated upgrades rather than individual measures.

WE&T Sector

Workforce development and education programs that help underrepresented populations and communities pursue energy and water efficiency careers.

Green Career Pathways

SoCalREN's Green Path Careers (GPC) Program is a no-cost pathway from training to employment in the growing green economy. GPC participants can become certified as Energy Auditors, Residential Trainees, Residential Installers, Residential Service Technicians, Construction Consultants, and Energy Efficiency Technical Specialists.

WET Contractor program

The E-Contractor Program provides licensed contractors with comprehensive support and resources to excel in the public and private contracting arena and successfully execute energy efficiency retrofit projects.

- Offers no-cost support and guidance to enrolled contractors, including participation in a multi-week training academy and one-day workshops on critical topics such as bidding, estimating, and access to construction bonding.
- Provides one-on-one technical assistance to contractors seeking support with business development, certifications, marketing, bid/RFP review, and referrals to resources and project opportunities.
- Facilitates access to retrofits through the SoCalREN Multifamily and Public Agency Programs, enhancing contractors' opportunities for project involvement and growth.
- Empowers contractors to enhance their capabilities and competitiveness in the energy efficiency sector, ultimately contributing to the advancement of sustainable practices and the reduction of energy consumption.

Architecture, Construction, Engineering Students Pathway Program

The Architecture, Construction and Engineering Students (ACES) Pathway Program is designed to encourage high school students to explore careers in science, technology, engineering, arts, and mathematics (STEAM).

Program Benefits

- Earn college credits for UC or Cal State universities.
- Access to paid summer internships and well-paid green career jobs.
- Get hands-on training to prepare for your future career.

- Support through professional mentorships.
- Financial help to cover the costs of gear, plus training and enrollment fees.
- Work readiness and financial literacy training.

Financing Sector

The **SoCalREN Revolving Savings Fund (RSF)** supports energy efficiency upgrades of public agency facilities by providing the financing an agency needs to initiate projects. Loans can provide upfront construction financing to enable a project to move forward immediately, unlocking energy cost savings. It can also serve to bridge the delay between construction and On-Bill Financing (OBF) from the utility after project completion or during agency budget allocation.

By choosing the Revolving Savings Fund, an agency can participate in a virtuous cycle with fellow public agencies enrolled in SoCalREN. Repaid loans from other agencies working on energy efficiency help to make a project's financing a reality, and when an agency repays its loan, it pays it forward for the next agency seeking to improve its community by saving energy.

Example State Energy Efficiency Programs

- TECH Clean California Rebates - TECH Clean California is a statewide initiative to accelerate the adoption of clean space and water heating technology throughout the state.
- HEERA Rebates - This home energy rebate program provides income-eligible households with up to $8,000 in rebates to upgrade to zero-emission electric appliances like heat pumps.
- Property assessed clean energy model (PACE) - The PACE programs allow a property owner to finance the up-front cost of energy or other eligible improvements on a property and then pay the costs back over time through a voluntary assessment.
- Comfortably California - The program offers resources and incentives to distributors, manufacturers, and retailers for selling high-efficiency HVAC equipment, and provides no-cost training to contractors and technicians.
- Golden State Rebates - Golden State Rebates provides instant rebate coupons for Air Conditioners, Smart Thermostats, Electric Heat Pump Water Heaters, and Gas Water Heaters. Rebate coupons can be redeemed at participating retail locations (in-store or online).
- The Switch Is On - The Switch Is On campaign provides tools and support for homeowners to electrify their homes and begin a cleaner, healthier way of powering their lives.
- California Utility Energy Rebate Programs - Many California utility companies, including SMUD, PG&E, and SCE, offer rebates and incentives for certain energy efficiency upgrades.
    - https://www.sce.com/residential/rebates-savings/rebates
    - https://www.socalgas.com/savings/rebates-and-incentives
    - https://www.pge.com/en/save-energy-and-money/rebates-and-incentives.html

Glossary

ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; mostly referred to in regards to ASHRAE standards for energy audits

- ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its members focus on building systems, energy efficiency, indoor air quality, and sustainability within the industry. Through research, standards writing, publishing, and continuing education, ASHRAE shapes tomorrow's built environment today.

- The handbook for ASHRAE energy audits can be found here.

Baseline

- Baselining is the act of measuring energy use and energy intensity at a determined level of detail to establish a benchmark for future comparison to itself. Source: Office of energy efficiency and renewable energy

Benchmarking

- Benchmarking is tracking energy performance against a standard. Under the Building Energy Benchmarking Program, calculate your energy use intensity by dividing your energy use by the square footage of your building. That number will act as a baseline to compare the efficiency of your building to that of previous years or to those of similar buildings. Source: California department of energy

BESS - Battery Energy Storage System

- Devices that enable energy from renewables, like solar and wind, to be stored and then released when the power is needed most. Source: National Grid

CEC - California Energy Commission

- As the state's primary energy policy and planning agency, the California Energy Commission plays a critical role in creating the energy system of the future—one that is clean, modern, and ensures the fifth largest economy in the world continues to thrive. Combating climate change is fundamental to maintaining California's future. The Energy Commission plays a key role in implementing and crafting policies and programs to create a low-carbon economy. Source: California Energy Commission

CPUC - California Public Utilities Commission

- A state regulatory agency with five governor-appointed members, the CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises. Source: CPUC

Demand Response

- Demand response refers to balancing the demand on power grids by encouraging customers to shift electricity demand to times when electricity is more plentiful or other demand is lower, typically through prices or monetary incentives. Along with smart grids and energy storage, demand response is an important source of flexibility for managing the impact of variable renewables and growing electricity demand on the stability and reliability of electricity grids. Source: International Energy Agency

DER - Distributed Energy Resource

- Distributed energy resources (DER) refers to a diverse category of devices and technologies that interface with the electricity system at the distribution level, either directly connected to a distribution utility's wires or on an end-use customer's premises, behind the utility meter. Examples include distributed generation and storage, electric vehicles and charging stations, grid-interactive buildings and microgrids, as well as more traditional demand response or load flexibility resources and energy efficiency strategies. Source: California Energy Commission

Deemed vs Customized

- In energy efficiency, "deemed measures" refer to pre-determined, standardized energy savings values applied to common energy efficiency upgrades, while "customized measures" are site-specific upgrades that require individual calculations to estimate energy savings based on the unique characteristics of a building or project, rather than relying on standard values; essentially, deemed measures are "off-the-shelf" savings estimates, while customized measures are tailored to specific situations.
    - Source: California Public Utilities Commission Custom Projects Review Guidance Documents and Ex Ante Review

Department of Energy (US DOE)

- A federal agency of the United States Government. The mission of the Energy Department is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. Department of energy

Energy Use Intensity (EUI)

- Energy use intensity (EUI) is an indicator of the energy efficiency of a building's design and/or operations. EUI can be thought of as the miles per gallon rating of the building industry. It is used in a number of different ways including to set a target for energy performance before beginning design, to benchmark a building's designed or operational performance against others of the same building type, or to evaluate compliance against energy code requirements. It is important to remember that EUI varies with building type. A hospital or laboratory will have a higher EUI than a residence or small office building. EUI is expressed as energy per square foot or meter per year. It is calculated by dividing the total energy consumed by the building in one year by the total gross floor area of the building. EUI is expressed as thousands of British thermal units used per square foot per year (kBtu/sq. ft./year) or gigajoules per square meter per year (GJ/m2/year). To calculate EUI, energy used for one year must be converted from kilowatt hours of electricity or therms of natural gas to kBtu or GJ. Source: AIA California

Energy Audit

- An energy audit is completed at a residential or commercial building to determine its energy efficiency. Source: Just Energy

Energy Efficiency Resource Standard (EERS)

- An energy efficiency resource standard (EERS) establishes specific, long-term targets for energy savings that utilities or non-utility program administrators must meet through customer energy efficiency programs. An EERS can apply to electric or natural gas utilities, or both, depending on the state, and can be adopted through legislation or regulation. An EERS is similar in concept to a renewable energy standard (RES), renewable portfolio standard, or clean electricity standard. While an RES requires that electric utilities generate a certain percentage of their electricity from renewable sources, an EERS requires that they achieve a certain amount of energy savings from energy efficiency measures. California EERS: Incremental savings targets average about 1.6% (gross) of retail sales from 2020-2025. Natural Gas: Incremental savings target of ~0.6% (gross) from 2020-2025. Source: Energy Efficiency Resource Standards

Energy Intensity

- Measured by the quantity of energy required per unit output or activity, so that using less energy to produce a product reduces the intensity. Declines in energy intensity are a proxy for efficiency improvements, provided a) energy intensity is represented at an appropriate level of disaggregation to provide meaningful interpretation, and b) other explanatory and behavioral factors are isolated and accounted for. Energy efficiency refers to the activity or product that can be produced with a given amount of energy; for example, the number of tons of steel that can be melted with a megawatt hour of electricity. Source: Department of Energy

Energy Management System (EMS)

- An energy management system is a set of processes, equipment, and technology, put in place to optimize energy usage. Effective energy management involves tracking energy consumption across facilities, identifying areas of inefficiency, and implementing strategies to minimize energy consumption without impacting production or service output. Utilizing energy management software, organizations can conduct comprehensive energy management to perform these functions in real time. Monitoring and reporting tools employ analytics that empower companies to make informed decisions on energy usage and sustainability practices and reduce overall operational costs for the organization. Source: Accruent

GHG - Greenhouse Gas

- Greenhouse gases (also known as GHGs) are gases in the earth's atmosphere that trap heat. During the day, the sun shines through the atmosphere, warming the earth's surface. At night the earth's surface cools, releasing heat back into the air. But some of the heat is trapped by the greenhouse gases in the atmosphere. That's what keeps the earth's temperature at an average 14˚C (57˚F). Examples include CO2, Methane, Nitrous Oxide, Water Vapour, Hydrofluorocarbons (HFC), Perfluorocarbons (PFC), and Sulphur Hexafluoride (SF6). Source: National Grid

HVAC - Heating, Ventilation, and Air Conditioning Systems

IAQ - Indoor Air Quality

- Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants. (Source)

kWh - Kilowatt Hours

- A kilowatt-hour, otherwise known as a kWh, is a way to measure how much energy you're using. It's not the number of kilowatts you're using in an hour - a kWh equals the amount of energy you would use by keeping a 1,000-watt appliance running for one hour. For instance, if you turned on a 100-watt bulb, it would take 10 hours to use one kilowatt-hour of energy. A 2,000-watt appliance, on the other hand, would only take half an hour. It all comes down to dividing the number of watts in an appliance into 1,000. Electricity plans

LED - Light Emitting Diode

- LED stands for light-emitting diode. LED lighting products produce light up to 90% more efficiently than incandescent light bulbs. How do they work? An electrical current passes through a microchip, which illuminates the tiny light sources we call LEDs and the result is visible light. To prevent performance issues, the heat LEDs produce is absorbed into a heat sink.
- LED lighting differs from incandescent and fluorescent in several ways. When designed well, LED lighting is more efficient, versatile, and lasts longer. LEDs are "directional" light sources, which means they emit light in a specific direction, unlike incandescent and CFL, which emit light and heat in all directions. That means LEDs are able to use light and energy more efficiently in a multitude of applications. Source: Energy Star

Net Zero Energy (NZE)

- Zero energy buildings use a combination of energy efficiency and renewable energy to produce as much energy as they use over the course of a year. By creating their own renewable energy, zero energy buildings lower operating and maintenance costs, help the environment, and increase resiliency during power outages. Source: Department of energy

OBF - On-Bill Financing

- On-bill financing (OBF) and repayment (OBR) are financing options in which a utility or private lender supplies capital to a customer to fund energy efficiency, renewable energy, or other generation projects and is repaid through regular payments on an existing utility bill. The benefits of OBF/OBR include low-to-zero interest rates, simple contract structure, and streamlined repayment. However, OBF and OBR are only available in regions where utilities support on-bill programs. Source: Department of Energy

Payback Period

- Length of time it takes to recoup an investment.

Retrofit

- Retrofit refers to any improvement work on an existing building to improve its energy efficiency, making it easier to heat, able to retain that heat for longer, and replacing fossil fuels with renewable energy.
- Project Drawdown defines the Building Retrofitting solution as the renovation of building components (including building envelope, appliances, and controls) to include high-efficiency solutions. This replaces the conventional practice of retrofitting buildings with conventional solutions. Building retrofits can be undertaken in myriad ways, initiated by the building owner, the manager, the tenant, or an external party, and with a suite of different financing models. The most suitable measures can also vary considerably, depending on the climate and the building location, shape, and form. Most building retrofitting focuses on either passive design measures such as improving the building envelope (e.g., installing better insulation and double-pane window glazing) or active design measures to improve the efficiency of lighting; heating, ventilation, and air conditioning (HVAC); water heating; and plug loads. Source: Project Drawdown

Therm

- Natural gas is measured in therms or BTUs. A therm is a measurement of the amount of heat energy in natural gas, equal to 100,000 BTUs. A BTU, or British Thermal Unit, is the quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit.
- **T24** - Title 24 Building Standards

- Title 24 contains the regulations that govern structural safety and sustainability for California's public schools, community colleges, and state essential services buildings; sustainability for state buildings; and accessibility for public accommodations of buildings in California. Source: Division of the State Architect

Weatherization

- Weatherization refers to home improvements that reduce the energy we use to make our homes more comfortable, including moisture control, air sealing, ventilation, and upgrades to insulation, doors, and windows. Source: Climate reality project

Additional Resources

- Stanford Energy - Understand Energy Learning Hub
- ENERGY STAR
- ACEEE 2022 California State Energy Efficiency Scorecard
- EIA - US Energy Information Administration
- Greenlining Institute
- U.S. Department of Energy - Energy Saver Guide
- ENERGY STAR® Home Tips
- Residential Energy Services Network (RESNET) Energy Saving Tips
- DIY Network Energy Efficiency Tips
- Home Energy Saver™
- US EPA - Bringing the Benefits of Energy Efficiency and Renewable Energy to Low-Income Communities: Case Studies and Program Profiles

Sources

Frick et al.,"https://emp.lbl.gov/news/still-one-new-study-finds-efficiency-remains"

Energy Star.,"https://www.energystar.gov/buildings/about-us/facts-and-stats."

US Environmental Protection Agency.,
"https://www.epa.gov/sites/default/files/2016-03/documents/table_rules_of_thumb.pdf."

LED Lighting Supply.,
"https://www.ledlightingsupply.com/blog/led-lighting-statistics-to-know-in-2022."

US Department of Energy.,
"https://www.energy.gov/energysaver/why-energy-efficiency-matters."

U.S. Energy Information Administration, https://www.eia.gov/beta/states/states/ca/overview.

American Council for an Energy-Efficient Economy,
"https://database.aceee.org/state/energy-efficiency-resource-standards".

California Energy Commission,
"https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards"
California Edison Company, https://www.sce.com/about-us.

Southern California Gas Company, https://www.socalgas.com/about-us.

California Community Choice Association, "Community Choice Aggregation (CCA): What is it?," Cal-CCA, n.d., https://cal-cca.org/powered/.

California Public Utilities Commission, "Proposed Decision of ALJs Fitch and Kao Addressing Motion for Authorization of San Diego Regional Energy Network," Rulemaking 13-11-005, June 20, 2024, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M534/K105/534105566.PDF.

California Regional Energy Networks, "Introducing CalREN," CalREN, n.d.,
https://californiaregionalenergynetworks.org/.