ENERGY EFFICIENCY AND CONSERVATION

Citrus Heights has a substantial opportunity to reduce communitywide GHG emissions related to energy use in residential and commercial buildings. According to the GHG baseline inventory, energy used in homes and businesses (for heating, cooling, lighting, and to power appliances) comprises a similar amount of emissions as transportation. Residential energy use comprises 29.6% of total energy use, whereas commercial energy use comprises 11.5%.

Compared to other California jurisdictions, Citrus Heights is nearly built out, and a substantial number of residents work in adjacent cities. Therefore, the potential to achieve reduced emissions through land use and transportation change is limited. However, the majority of the City's commercial uses and homes were built before California's Title 24 energy efficiency standards took effect. Retrofitting commercial buildings and homes to meet current energy efficiency standards thus offers greater potential to achieve emission reductions compared to other GGRP strategies.

Emissions produced due to building energy use vary depending on how the energy is generated, and the type of energy used (i.e., electricity or natural gas). Most energy-related GHG emissions are created by burning fossil fuels. Thus, finding clean burning alternative fuel sources is a critical step to reduce emissions. For example, natural gas is a cleaner fuel than electricity generated at a coal-fired power plant. However, they both contribute to GHG emissions. A better option would be to seek energy produced from renewable sources, which have negligible GHG emissions. To achieve State-mandated Renewable Portfolio Standards, the City of Citrus Heights should collaborate with local utility companies (e.g., SMUD and PG&E) to identify ways to minimize energy consumption and maximize use of renewable energy sources.

Measure 4-1.A: Implement Construction Air Quality Mitigation Plan protocols and Best Management Practices set forth by the Sacramento Metropolitan Air Quality Management District (SMAQMD).

either the Air Resources Board (ARB) or Sacramento Metropolitan Air Quality Management District (SMAQMD) have yet proposed any GHG emissions mitigation measures directly related to construction activity. However, SMAQMD has adopted protocols for mitigation if a proposed project's construction emissions exceed the threshold of significance for NOx emissions, and has developed recommended measures for reducing GHG emissions from construction activities. The City will use this guidance to evaluate construction related GHG emissions. In most cases, reducing NOx emissions and controlling emissions from off-road construction equipment will also indirectly reduce GHG emissions related to construction.

During the GGRP plan period, most construction in the City will be related to future land uses and construction in road rights-of-way to implement complete streets policies. To reduce the effect of the future construction emissions, the City will require Construction Air Quality Mitigation Plans (CAQMP) for construction projects exceeding the SMAQMD NOx threshold of significance (85 pounds/day). The City will also require incorporation of SMAQMD-recommended Best Management Practices (BMPs) for these projects to reduce GHG emissions.

GHG Reduction Potential:

Supporting measure

Community Co-Benefits:

Improve air quality

Cost to City

Medium

Cost to resident/ business owner

NA

Savings to resident/ business owner

NA

Construction Air Quality Mitigation Plans will be required for new construction projects.

Did you know?

COOL TIP

The California Air Resources Board estimates that the mandatory provisions in the California Green Building Code will reduce greenhouse gas emissions by 3 million metric tons in 2020. Additionally, the provisions will reduce water use by 20% and divert 50% of construction waste from landfills.

Actions	Implementation Target	Responsible Party
A. Require submission of a Construction Air Quality Mitigation Plan for future projects exceeding the SMAQMD NOx threshold of significance (85 pounds/day).	Ongoing	Community and Economic Development; General Services
B. In CAQMPs prepared for future projects, require incorporation of applicable SMAQMD-recommended Best Management Practices for construction.	Ongoing	Community and Economic Development; General Services
C. Offer selection preference for contractors who use low-emission equipment and low-carbon fuels in their equipment when bidding on City contracts.	December 31, 2012	Community and Economic Development; General Services

Related General Plan policies: Policy 40.1, Policy 40.2, Policy 49.4, Policy 53.1

ENERGY EFFICIENCY AND CONSERVATION: NEW CONSTRUCTION

Measure 4-1.B: Modify City codes to require new buildings to maximize solar access to promote passive solar energy design, natural ventilation, effective use of daylight, and on-site solar generation.

The City will conduct an audit of current codes and regulations (CHMC Chapters 106.30, 106.31.030, 106.31.040, and 106.34) and update to incorporate specific requirements that promote passive and active solar design, natural ventilation and effective use of daylight within new construction. As we continue to tighten and seal our buildings, the ability to use free light and air diminishes. Careful planning and design during building siting can maximize the use of natural sun and air, and reduce energy bills for heating, cooling and lighting.

The City will also develop a Solar Access ordinance to reduce conflicts among adjacent properties regarding placement of solar panels. A Solar Access ordinance would help balance community priorities regarding mature tree preservation and shade considerations relative to solar equipment (based on guidance in CHMC Chapter 106.39.070 and California Green Building Code Section 504.5). While landscaping can improve air quality, reduce heat island effects and promote passive solar heating and ventilation, it can also inadvertently shade areas conducive to active solar systems. Since the city is nearly built out and there is limited opportunity to reorient existing buildings for better solar access and vegetative cover, the Solar Access ordinance may give precedence to the needs of mature tree preservation within residential neighborhoods over shade considerations for solar equipments on a property as a more cost-effective way of reducing building energy need and emissions.

GHG Reduction Potential:

Supporting measure

Community Co-Benefits:

Lower energy bills

Cost to City

Very Low

Cost to resident/ business owner

Medium – High

Savings to resident/ business owner

Medium – High

Design considerations that allow natural ventilation and daylighting can reduce energy costs.

Did you know?
COOL SAVINGS

Drying laundry on a clothesline can reduce carbon dioxide by up to 90%. You can save 700 pounds of carbon dioxide when you air dry your clothes for six months out of the year.

Actions	Implementation Target	Responsible Party
A. Explore creation of a solar access ordinance.	Before December 31, 2012	Community and Economic Development
B. Conduct public workshops to promote the health and economic benefits of passive solar design, natural ventilation and daylighting.	Ongoing	Community and Economic Development

Related General Plan policies: Policy 40.1, Policy 40.2, Policy 41.2

ENERGY EFFICIENCY AND CONSERVATION: NEW CONSTRUCTION

Measure 4-1.C: Require use of recycled content building materials in new construction projects.

GHG emissions occur within the total lifecycle of building materials, from resource extraction or excavation, through the production process, transportation, use of finished products, and disposal. By instituting a recycled materials requirement, the City can ensure that the building community is using best-available green building products during construction. This promotes good construction management practices by encouraging recycling of building materials, reusing salvaged products after demolition and using locally available and durable materials.

GHG Reduction Potential:

Supporting measure

Community Co-Benefits:

Reduce waste, create local jobs

Cost to City

Very Low

Cost to resident/ business owner

High

Savings to resident/ business owner

NA

Reusing salvaged construction materials reduces energy used to produce new materials.

Did you know?

COOL CHALLENGE

Buy durable goods. As much as possible, buy items that will last instead of buying the same item several times in a decade. Reusing, repairing, or refurbishing surplus office furniture and equipment is less expensive than purchasing new materials.

Actions	Implementation Target	Responsible Party
A. Amend the Building Code and inspection procedures to require use of recycled materials.	Before December 31, 2012	Community and Economic Development
B. Create a directory of locally available construction materials (within a 500-mile radius) that can be used for new construction and substantial renovations.	Before June 30, 2012	Community and Economic Development

Notes and References

This is a supporting measure to provide the full benefit of green building design techniques in new construction. Though the measure cannot be individually quantified, it provides an additional opportunity to positively affect design, construction and demolition practices, creating a cumulative GHG reduction over the implementation period.

Related General Plan policy: Policy 41.3

ENERGY EFFICIENCY AND CONSERVATION: FINANCIAL INCENTIVES

Measure 4-2.A: Develop a Solar Buying Assistance program to provide zero-interest loans to homeowners who purchase grid-tie solar power systems.

In September 2008, the California legislature enacted AB 811 to assist municipalities to achieve residential and commercial property retrofits. AB 811 provides for low-interest loans to support renewable and energy-efficient retrofits (permanently fixed to the property) that are paid for using tax assessments.

Citrus Heights has joined with other California jurisdictions in the CaliforniaFIRST program. Participating in this program provides Citrus Heights residents an opportunity to participate in a Solar Buying Assistance program to offset the high up-front costs of solar installation. Although solar systems provide high savings over time, the initial cost to purchase and install these systems has often discouraged participation.

By developing a Solar Buying Assistance program with a variety of financing options, the City can promote higher community participation and maximize renewable energy generation. In partnership with utility companies, the City can also estimate a building's energy needs and propose the appropriate system size for individual buildings.

Based on solar-energy capacity required, the City can determine various financing options for the assistance program such as on-bill financing, revolving low interest loans, and energy-efficient mortgages.

GHG Reduction Potential:

(Included in Energy Efficiency and Conservation Measure 4.2.B)

Community Co-Benefits:

Increased energy independence

Cost to City

Low

Cost to resident/ business owner

High

Savings to resident/ business owner

High

As a participant in CaliforniaFIRST, Citrus Heights can develop a Solar Buying Assistance program.

Did you know?
COOL TIP

CFLs use 75 percent less energy than incandescent. Unlike incandescent bulbs CFLs have the distinct advantage of being designed in a way that their mercury can be collected and recycled at the end of their average seven to twelve year life cycle.

Actions	Implementation Target	Responsible Party
A. Continue to participate in CaliforniaFIRST or similar program to provide outreach, financial incentives and other technical assistance to home and business owners.	Ongoing	Community and Economic Development

Notes and References

In December 2009, Citrus Heights City Council adopted a resolution to join CaliforniaFIRST, The CaliforniaFIRST program, developed by the California Statewide Communities Development Authority, provides financing to property owners for energy and water efficiency improvements as well as solar installations on their property.

Related General Plan policies: Policy 41.2, Policy 55.1

ENERGY EFFICIENCY AND CONSERVATION: FINANCIAL INCENTIVES

Measure 4-2.B: Collaborate with utility companies to provide financial incentives/rebates for residential and commercial buildings to upgrade from inefficient water heaters to solar water heaters.

The high capital cost of water heater upgrades can pose a financial burden to building owners. However, studies show that solar water heaters can reduce energy-related GHG emissions.

Citrus Heights will collaborate with SMUD, PG&E and other non-profit organizations to identify various local, state or national financing options for residents and businesses to voluntarily replace inefficient water heating systems with solar water heaters. A number of financing options may be offered to reduce up-front costs, such as on-bill financing, low-interest loans, and revolving loans under AB 811 and the CaliforniaFIRST program.

The City, in partnership with utilities, will actively promote and facilitate the installation of 5 Watt-hour (Wh) systems on commercial and residential buildings. The City will also create outreach programs to provide information about the benefits of solar heaters and installation and maintenance assistance to maximize community participation.

GHG Reduction Potential:

7,480 MT CO_2e/yr (residential)

1,190 MT CO_2e/yr (commercial)

Community Co-Benefits:

Create local green jobs, increase home equity

Cost to City

Very Low

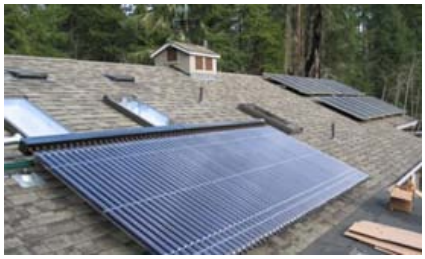
Cost to resident/ business owner

High (one time)

Savings to resident/ business owner

Very Low – Low

(recurring savings)



Solar water heaters can considerably reduce energy-related GHG emissions.

Did you know?
COOL SAVINGS

Solar water heaters avoid a portion of the greenhouse gas emissions associated with electricity production. During a 20-year period, one solar water heater can avoid more than 50 tons of carbon dioxide emissions.
- U.S Department of Energy

Actions	Implementation Target	Responsible Party
A. Develop a resident outreach program, remove code barriers, and implement permit streamlining for solar water heater installation on residential buildings.	Before December 31, 2012	Community and Economic Development
B. Develop a business outreach program, remove code barriers, and implement permit streamlining for solar water heater installation on commercial buildings.	Before December 31, 2012	Community and Economic Development
C. Collaborate with utilities to offer low-interest loans for homeowners with swimming pools to switch to solar water heating systems.	Before June 30, 2013	Community and Economic Development
D. Collaborate with utilities and other agencies to provide public information about local, regional, state and national funding sources and financial incentives to support installation and maintenance of solar water heaters.	Ongoing	Community and Economic Development; General Services

Notes and References

A number of statewide funding programs (including $358.3 million from the California Public Utility Commission, and the $305.8 million California Solar Initiative) have been made available since January 2010 to provide incentives for market development and installation of 5Wh solar thermal systems (including solar hot water systems, photovoltaic etc). The approximate cost of a solar water heater is $5,000 (based on 2010 national average costs).

Related General Plan policies: Policy 41.2, Policy 55.1

ENERGY EFFICIENCY AND CONSERVATION: FINANCIAL INCENTIVES

Measure 4-2.C: Create a community-wide Solar Power program and remove physical and code barriers to support installation of solar panels in commercial and residential districts.

The City will partner with SMUD and businesses offering solar panel leases (such as Solar City) to create a community-wide Solar Power program. Maximizing performance depends on proper siting, design, installation, quality and maintenance of the solar systems.

By creating a Solar Power program, the City can identify the best available locations for solar installations in the community. The location and weather pattern (including incoming solar insolation) in Citrus Heights is generally conducive to solar power generation. Larger systems provide higher return on investment for both power generation and payback time. Citrus Heights has a great opportunity to use large, unshaded roofs and parking surfaces within its extensive commercial corridors for this purpose. The City will also encourage appropriate residential-scale solar installations, especially in areas with large lots or large multi-family buildings.

The intent of establishing a Solar Power program for large-scale (commercial) and small-scale (residential) power systems is to accelerate solar panel installation, operation and maintenance by connecting owners to information, products, and local companies. Through a streamlined permitting and installation process, the City can further incentivize solar power.

GHG Reduction Potential:

2,400 MT CO_2e/yr (500,000 sq.ft of commercial)

9,300 MT CO_2e/yr (10% of total residential rooftops)

Community Co-Benefits:

Create local green jobs, increase commercial rental space by including roof as leasing space

Cost to City

Low – Medium

Cost to resident/ business owner

Very Low – Low

Savings to resident/ business owner

Medium – High

Unshaded roof surfaces on large commercial buildings provide ample space for leased or owned solar panels.

Did you know?
COOL FACT

In 2008, 7% of total energy produced in U.S was from renewable sources. 1% of total renewable energy produced was solar.

Actions	Implementation Target	Responsible Party
A. Partner with SMUD, businesses offering solar panel leases, and other relevant organizations to identify appropriate locations for solar installations within Citrus Heights.	Before December 31, 2013	Community and Economic Development
B. Work with businesses and home owners who do not have suitable solar access on their property to participate in SMUD's Solar Shares program (utility-scale solar system) in exchange for offsets on their electricity bill.	Before June 30, 2012	Community and Economic Development
C. Develop an outreach program, remove code barriers, and implement permit streamlining for photovoltaic panel installation on residential and commercial buildings.	Before December 31, 2012	Community and Economic Development

Notes and References

Several businesses provide full-service solar power system design, financing, installation and monitoring services and lease solar power systems to homeowners, businesses and government organizations in the region.

Related General Plan policies: Policy 41.2, Policy 55.1

ENERGY EFFICIENCY AND CONSERVATION: BUILDING RETROFITS

Measure 4-3.A: Develop a Residential Energy Benchmark program to assist homeowners to identify voluntary retrofit opportunities and funding options to increase building energy performance by 30% from baseline.

Most homes in Citrus Heights were constructed during the 1960s and 1970s. About 60% of the City's housing stock was built prior to Title 24. The community can reduce GHG emissions by retrofitting older homes to comply with Title 24 standards. Title 24 energy efficiency standards for new construction have also improved over the years so that buildings constructed in the last 15 years, in particular, perform much better than buildings constructed 15 to 30 years ago. There may also be a significant opportunity for buildings constructed between 1980 and the mid-1990s to significantly improve energy efficiency by following an Energy Benchmarking program.

By customizing a Citrus Heights specific Residential Energy Benchmark program based on the Title 24 standards, the City can provide flexibility in the program while outlining measures to reduce GHG emissions, increase household energy efficiency, and decrease energy bills. Measures will include sealing building envelopes through insulation and weatherization, and replacing older windows with modern energy efficient windows. The City will partner with utility companies, to provide residential energy audits to determine baseline energy use, then guide homeowners regarding how best to reduce building energy consumption by 40% from the established baseline by 2020.

GHG Reduction Potential:

5,730 MT CO_2e/yr

Community Co-Benefits:

Reduced energy bills, increased home equity

Cost to City

Low – Medium

Cost to resident/ business owner

High

Savings to resident/ business owner

Medium

An Energy Benchmark system develops grades to describe the energy performance of a building.

Did you know?

COOL TIP

A programmable thermostat can automatically coordinate the indoor climate with your daily and weekend activity patterns to reduce cooling bills by up to 10%. EPA estimates proper use of pre-programmed settings on a programmable thermostat can yield yearly savings of about $150 in energy costs.

Actions	Implementation Target	Responsible Party
A. Partner with SMUD and PG&E (or other related organizations such as Flex Your Power) to organize public outreach programs to promote building envelope-related energy efficiency upgrades (such as windows, attic insulation) in residential buildings.	Ongoing	Community and Economic Development
B. Provide information and technical assistance through the City's Building Green web link about retrofitting homes with energy-efficient measures.	Ongoing	Community and Economic Development
C. Collaborate with local financing companies and real estate agencies to promote Energy Efficient Mortgages.	Before December 31, 2012	Community and Economic Development

Related General Plan policies: Policy 41.2, Policy 41.3, Policy 55.1

ENERGY EFFICIENCY AND CONSERVATION: BUILDING RETROFITS

Measure 4-3.B: Develop a Commercial Energy Benchmark program to assist business owners to identify voluntary retrofit opportunities and funding options to increase building energy performance by 30% from baseline.

The Citrus Heights community has a strong commercial base. The City's commercial districts extend along major travel corridors such as Greenback Lane, Sunrise Boulevard, and Auburn Boulevard. Most commercial buildings were built prior to Title 24 energy efficiency standards.

Similar to the aging residential stock, Citrus Heights' commercial and office buildings provide great opportunity to reduce GHG emissions through building envelope upgrades. By developing an Energy Benchmark program, the City will encourage higher levels of voluntary participation and acceptance of the program. Measures will include sealing building envelopes through insulation and weatherization, replacing old windows with modern energy efficient windows, and converting older inefficient boilers with new Energy Star models. The City will partner with utility companies to provide energy audits for commercial and office buildings to determine their baseline energy use, then guide business owners regarding how best to reduce building energy consumption by 30% from the established baseline by 2020. As Title 24 standards have also improved over the past 30 years, even buildings built after Title 24 implementation can be significantly upgraded to meet current standards.

GHG Reduction Potential:

1,490 MT CO_2e/yr

Community Co-Benefits:

Reduced energy bills, increased rental space equity

Cost to City

Low – Medium

Cost to resident/ business owner

High

Savings to resident/ business owner

High

An energy-efficient office space with natural daylighting.

Did you know?

Upgrading from a T-8 to T-5 ballast will save 34 to 56% energy and payback occurs within 2 years (less than 12 months for high usage applications). T-5 ballasts last approximately 20,000 hours, reducing maintenance costs by halving relamping requirements.

Actions	Implementation Target	Responsible Party
A. Partner with SMUD and PG&E (or other related organizations such as Flex Your Power) to organize public outreach programs to promote building envelope-related energy efficiency upgrades in commercial and office buildings.	Ongoing	Community and Economic Development
B. Promote building re-commissioning (e.g. checking, repairing, and adjusting the HVAC, lighting, and hot water systems) prior to tenant improvement approval by providing a database for commissioning companies.	Before December 31, 2015	Community and Economic Development
C. Collaborate with SMUD and PG&E (or other energy service companies) to offer free energy audits to residents and life-cycle Investment Grade Audits (IGAs) for business owners	Before December 31, 2012	Community and Economic Development

Related General Plan policies: Policy 41.2, Policy 41.3 , Policy 55.1

ENERGY EFFICIENCY AND CONSERVATION: BUILDING RETROFITS

Measure 4-3.C: Develop a Multi-family Energy Efficiency program to provide comprehensive, performance-based energy testing and installation of energy saving improvements for qualified multi-family residents.

Energy conservation is especially challenging in the residential rental sector because typically the party financing the renovation is not the beneficiary of the investment. The landlord is typically responsible for financing an energy efficiency improvement but does not directly benefit from resulting utility cost savings. Individual meters in multi-family buildings provide tenants incentives to conserve energy as they are billed for energy use on a per unit basis, rather than a flat-rate based on the average energy consumption of other tenants.

Citrus Heights has a large multi-family rental housing stock. Many rental units are occupied by low-income families. By developing a Multi-family Energy Efficiency program, the City can influence energy efficiency improvements in this sector. Partnering with utility companies, the City will actively seek funding to provide information to landlords and renters and to provide financial incentives to complete voluntary energy efficiency improvements.

GHG Reduction Potential:

(Included in Energy Efficiency and Conservation Measure 4.2.D)

Community Co-Benefits:

Improved quality of life, reduced energy bills, increased equity in rental space

Cost to City

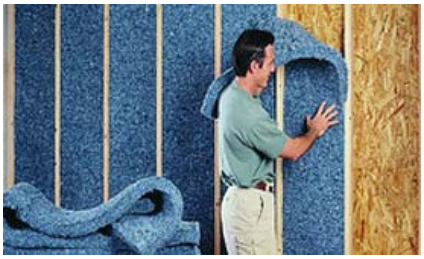
Medium

Cost to resident/ business owner

Low – Medium

Savings to resident/ business owner

High



Proper insulation and weatherization of buildings can reduce energy loss due to infiltration.

Did you know?
COOL FACT

Plugging appliances (like TVs) which use standby settings into powerstrips and turning them off can save almost $23 per year.
- Chicago Climate Action Plan

Actions	Implementation Target	Responsible Party
A. Collaborate with utility companies and require that all new multi-tenant buildings be sub-metered to allow each tenant the ability to monitor their own energy use.	Before December 31, 2012	Community and Economic Development
B. Continue to use existing City rehabilitation programs to provide weatherization improvements in low-income units.	Ongoing	Community and Economic Development
C. Collaborate with utility companies to provide financial incentives for energy improvements and appliance upgrades.	Before June 30, 2013	Community and Economic Development

Related General Plan policies: Policy 40.1, Policy 41.1, Policy 41.2, Policy 41.3

ENERGY EFFICIENCY AND CONSERVATION: BUILDING RETROFITS

Measure 4-3.D: Develop an Energy Efficient Upgrade program for residents and business owners to promote upgrades from inefficient appliances, lighting and roofing to Energy Star certified systems.

This is one of the most critical measures recommended in the plan. It is based on voluntary community participation to gradually upgrade home and business appliances, lighting and roofing to Energy Star models. Successful implementation of this measure relies on a robust public outreach program to increase community awareness regarding building appliance choices.

Modern technology has contributed to the development of high-quality and energy-efficient appliances. The Energy Star rating is an internationally recognized standard for energy efficient consumer products. By promoting Energy Star-rated home and business appliances, the City can help to reduce GHG emissions related to the use of lighting, refrigerators, dishwashers, clothes washers, wall air conditioning units, computer monitors, copy machines, and exit signs. The City will also promote use of Energy-Star rated cool roofs when new roofs are installed on existing buildings.

The City will partner with utilities and other relevant organizations to seek funding strategies and financial incentives to support appliance replacements.

GHG Reduction Potential:

12,340 MT CO_2e/yr

Community Co-Benefits:

Reduced energy bills

Cost to City

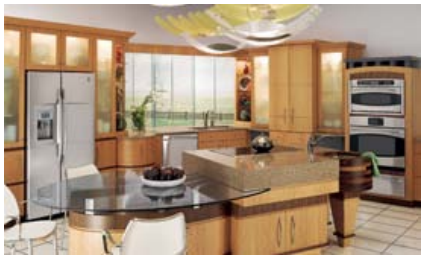
Medium

Cost to resident/ business owner

Medium – High

Savings to resident/ business owner

Low – Medium



Upgrading home and business appliances to Energy Star-rated appliances lowers energy bills.

Did you know?
COOL FACT

Refrigerators are usually the single biggest energy user in a typical home. Energy Star refrigerators are 50% more efficient than those made before 1993, 40% more efficient than those made in 2001 and 15% more efficient than those required by federal regulation in 2007.

Actions	Implementation Target	Responsible Party
A. Collaborate with utility companies and other non-profit agencies to develop a comprehensive outreach and financial incentives program to encourage voluntary replacement of inefficient appliances with new Energy Star appliances.	Before December 31, 2012	Community and Economic Development

Notes and References

The GHG reduction potential of this measure is based on the Climate and Air Pollution Planning Assistant model developed by ICLEI - Local Governments for Sustainability. Performance indicators and assumptions for this measure are outlined in Chapter 4.

Related General Plan policies: Policy 40.1, Policy 41.1, Policy 41.2, Policy 41.3

ENERGY EFFICIENCY AND CONSERVATION: BUILDING RETROFITS

Measure 4-3.E: Collaborate with local utility companies and adjacent cities to accelerate smart-grid integration in the community.

The smart grid is an emerging energy management system which combines information technology with renewable energy to significantly improve how electricity is generated, delivered, and consumed.

In 2008, SMUD and its regional partners won federal grants to accelerate integration of the smart-grid program. SMUD's first smart-grid phase to be completed by 2012 includes installation of smart meters. PG&E has installed nearly 28,000 smart meters in Citrus Heights. Smart meters provide utility customers with access to detailed energy use and cost information, new dynamic pricing programs based on peak-energy demand, and the ability to program home appliances and devices to respond to energy use preferences based on cost, comfort and convenience. The true value of the smart grid program will be fully realized when community residents and businesses begin making more informed energy use decisions based on the two-way communication enabled by smart meters, such as when a homeowner is able to program their washing machine to run when energy is cheapest to obtain.

When estimating the potential GHG emission reductions associated with implementation of the smart grid, the City included the energy efficiency improvements gained from integrating smart grid energy management systems for control lighting, heating, ventilation, and air conditioning and other major appliances in residential and commercial buildings.

GHG Reduction Potential:

1,510 MT CO_2e/yr (Existing residential)

1,050 MT CO_2e/yr (Existing commercial)

600 MT CO_2e/yr (New construction)

Community Co-Benefits:

Lower utility bills

Cost to City

Low

Cost to resident/ business owner

NA

Savings to resident/ business owner

Low

Smart meters enable two-way wireless communication between utilities and consumers.

Did you know?
COOL FACT

Get a home energy audit. Many utilities offer free home energy audits to find where your home is poorly insulated or energy inefficient. You can save up to 30% off your energy bill and 1,000 lbs of carbon dioxide a year.

- http://globalwarming-facts.info/50-tips.html

Actions	Implementation Target	Responsible Party
A. Partner with SMUD and PG&E to develop a community smart grid integration plan.	Before July 30, 2013	Community and Economic Development
B. Develop an outreach program that informs property owners and businesses about benefits of smart grid and smart appliances.	Before December 31, 2013	Community and Economic Development
C. Adopt an ordinance to require smart grid energy management systems and compatible heating, ventilation, air conditioning and lighting in new construction.	Before December 31, 2015	Community and Economic Development

Notes and References

According to CISCO, full integration of the smart grid will take time to realize, but energy analysts estimate it will ultimately be capable of reducing electricity-related GHG emissions by between four and 30% below current levels.

Related General Plan policies: Policy 41.1, Policy 41.3, Policy 55.1

ENERGY EFFICIENCY AND CONSERVATION: SCHOOLS

Measure 4-4.A: Coordinate with SJUSD to create high-energy performing schools by adopting green school design principles.

Schools prepare future Citrus Heights residents to lead a sustainable life. Climate change science provides schools an opportunity to prepare our children to live more sustainably and adapt to the effects of a changing climate.

A school building should itself be an example of sustainable design and behavior. The way a building is designed can influence the student's response and life choices. For example, in an energy efficient school that uses occupancy and daylight sensors to control lighting, students learn that lights in a room should be turned off when not in use or when there is enough daylight to illuminate the room.

GHG Reduction Potential:

Supporting measure

Community Co-Benefits:

Improved quality of life

Cost to City

Very Low

Cost to resident/ business owner

NA

Savings to resident/ business owner

NA

Artist's rendering of the New San Juan High School.

Did you know?

Green schools cost less to operate, freeing up resources to truly improve students' education. If a green school saved $100,000 per year in operational costs, that's roughly enough to hire two new teachers, buy 200 new computers or purchase 5,000 new textbooks.

- U.S. Green Building Council

Actions	Implementation Target	Responsible Party
A. Encourage SJUSD to integrate best practices for energy efficiency and conservation based on the Green Schools initiative, LEED for Schools, or similar rating systems within the designs for new school buildings and administrative facilities.	Ongoing	Community and Economic Development; SJUSD

Related General Plan policy: Policy 41.4

ENERGY EFFICIENCY AND CONSERVATION: MUNICIPAL

Measure 4-5.A: Collaborate with SMUD to increase the use of green energy within City facilities.

The City will partner with SMUD and other organizations (including private businesses) to increase the ratio of renewable energy content in the energy used by public buildings and facilities. The City has already been proactive by installing solar panels on public buildings, such as on the roofs of the Community Center (65 kilowatt-hour [Kwh] panels producing 23,922 Kwh/yr) and City Hall (32Kwh panels producing 11,680 Kwh of electricity annually). However, these systems alone cannot provide for the full energy demand of the buildings. Therefore, to maximize the use of renewable energy in City operations, the City will purchase a portion of remaining energy needed from SMUD through the Greenergy program.

Pursuant to the State's Renewable Portfolio Standard requirements, SMUD purchases power generated from renewable resources, such as wind energy, solar energy and biomass. By supporting SMUD's Greenergy program, the City will reduce its GHG emissions. The City's participation in the Greenergy program also provides a leadership example for the community to follow, thereby influencing the community's overall power source choice and influence.

The City will partner with SMUD to conduct an energy audit to determine its baseline energy use and increase its purchases from SMUD's Greenergy program to the full amount of energy required that is not generated by the City's solar facilities. The City will also help SMUD identify locations within the community suitable for installation of utility-scale renewable energy generators.

GHG Reduction Potential:

10 MT CO_2e/yr
(Based on capacity of existing solar panels)

Community Co-Benefits:

Lead by example

Cost to City

Very Low

Cost to resident/ business owner

NA

Savings to resident/ business owner

NA

Installation of solar panels on General Services Department building in 2010.

Did you know?
COOL FACT

According to the California Energy Commission, "California's building efficiency standards (along with those for energy efficient appliances) have saved more than $56 billion in electricity and natural gas costs since 1978. It is estimated the standards will save an additional $23 billion by 2013."

Actions	Implementation Target	Responsible Party
A. Install cost-effective renewable energy systems on City buildings and City-funded facilities and purchase a portion of remaining electricity from SMUD's Greenergy program.	Before December 31, 2013	General Services
B. Collaborate with SMUD to determine if there is a suitable location (within or outside the City) for installation of a utility-scale solar facility.	Before December 31, 2016	General Services

Related General Plan policies: Policy 41.5

ENERGY EFFICIENCY AND CONSERVATION: MUNICIPAL

Measure 4-5.B: Reduce energy consumption in City buildings by 40% from baseline.

The City will partner with SMUD to conduct a comprehensive energy audit to determine baseline energy use in all City buildings. In collaboration with SMUD and other organizations, the City will develop a plan to reduce municipal energy consumption by 40% from the established baseline by 2020.

Citrus Heights has both old and new public buildings. An audit can help the City determine which facilities are most inefficient. Retrofitting inefficient facilities to meet modern energy efficiency standards will reduce operations and maintenance costs. This can release money from maintenance budgets to be used for other community enhancement projects.

A potential action item to achieve targeted reductions in energy use is switching from old inefficient equipment and appliances to newer Energy Star office systems. For example, if 100 computers and monitors, 20 printers, and 10 copiers used by the City are replaced with Energy Star appliances, the City could potentially save 14.1 MT CO_2e/year.

GHG Reduction Potential:

215 MT CO_2e/yr

Community Co-Benefits:

Lower municipal operating cost

Cost to City

Medium

Cost to resident/ business owner

NA

Savings to resident/ business owner

NA

The Community Center's web page tracks the hourly amount of solar energy generated from rooftop photovoltaic panels.

Did you know?
COOL FACT

Efficient computer monitors use 20-60% less energy than traditional monitors, and efficient printers use about 37% less energy than conventional printers. An Energy Star water cooler uses about half the energy of a traditional one, resulting in about $47 (hot water) and $12 (cold water) savings per year.

Actions	Implementation Target	Responsible Party
A. Conduct an Investment-Grade Audit of City buildings and facilities and employ energy conservation practices to reduce consumption.	Before December 31, 2012	General Services
B. Install building energy performance data displays in City Hall.	Before December 31, 2013	General Services
C. Upgrade office equipment and appliances to Energy Star systems.	Before December 31, 2020	General Services

Notes and References

In 2007, the City used 4,364,487 kWh of electricity and 17,583 therms of gas.

Related General Plan policy: Policy 41.5

ENERGY EFFICIENCY AND CONSERVATION: MUNICIPAL

Measure 4-5.C: Improve lighting efficiency and decrease energy consumption in public spaces.

Street lights and traffic lights are a big part of the City's operations and maintenance costs. City lights bring streets to life at night and address community safety concerns. A well-lit public street enhances the public image of the community. Functioning traffic lights are equally important to maintain smooth traffic flow within the City. Citrus Heights maintains 4,179 streetlights and 64 traffic lights. These lights use a considerable amount of energy and create GHG emissions. In 2002, the City converted all their traffic signals to LED lights.

Developing a lighting efficiency program will enable the City to reduce its GHG emissions and operating expenses. Using renewable energy sources or light-emitting diodes (LED) to replace conventional lighting promotes good practices within the community through instant, real-time applications.

GHG Reduction Potential:

544 MT CO_2e/yr (Street lights)

Community Co-Benefits:

Reduced municipal operation costs, improved public spaces

Cost to City

Low

Cost to resident/ business owner

NA

Savings to resident/ business owner

NA

Solar-powered lighting provides a renewable alternative to light City streets.

Did you know?
COOL FACT

In January 2010, the City completed the corridor of Greenback Lane project, converting 256 street lights with LED street and safety lighting. All 64 traffic signals in the City have also been converted to LED lights.

- City of Citrus Heights

Actions	Implementation Target	Responsible Party
A. Convert all street and traffic lights to LED bulbs or LED-Solar combined systems	Before December 31, 2016	General Services
B. Install high-efficiency lighting in all City-owned or funded facilities.	Before December 31, 2013	General Services

Related General Plan policy: Policy 41.5