SUSTAINABLE CITIES

Local governments — improving budgets, advancing sustainability.
The Bay Area Climate Collaborative is an initiative launched by the mayors of San Francisco, San Jose, and Oakland to accelerate the clean energy economy and make the Bay Area a national model.

With its ambitious 10-point action plan, the BACC brings together the region’s expertise and is supporting local governments to drive innovation in energy efficiency, green building, solar power and electric vehicles.

Among recent initiatives is an exciting $5 million project to bring more than 100 electric vehicles to municipal fleets in a national demonstration project.

A public–private initiative, the BACC includes major partners Bank of America, Pacific Gas & Electric, the Environmental Defense Fund and local governments representing more than 50 percent of the Bay Area’s population.

For local governments, the BACC brings expertise, facilitates funding and drives action in support of city and county clean energy goals at no cost. By participating, municipalities can build prosperity, reduce costs and receive critical support.

For businesses, the BACC brings visibility, connections to decision–makers and a regional voice. By participating, businesses can shape the market, build reputation and deliver results.
Welcome and thank you for joining us at Sustainable Cities 2010.

The clean energy economy provides great promise for creating prosperity, improving our national security and safeguarding our resources from climate change — especially in the Bay Area.

The Bay Area has long been a region of visionaries and problem solvers who have developed inspired ideas and made them real through innovative action.

This is truer today than ever. Challenged by the largest economic downturn in several generations, leaders throughout the region are applying creative solutions to improve budgets, deliver services and foster a sustainable future.

The rate of innovation — not just technologies, but practices — is moving at an astonishing pace. This is why we are pleased to bring to you this guide full of the latest information for you to use in your organization. New financing options that remove upfront costs, technologies that reduce operating expenses and practices that reduce staff time are all here. These strategies and tools can empower your organization and community to accelerate clean energy and harness its benefits.

We are grateful for the support of our Sustainable Cities anchor sponsor Technology Credit Union, with its long and distinguished record of service in the community. We also thank Solar City, Philips Lumileds, Green Machine Light Engine and Xeralux, whose innovative technologies and services are driving the clean energy economy in the Bay Area and beyond.

Thank you for joining us at Sustainable Cities. Through your leadership, we are making the clean energy economy real.

Rafael Reyes
Director, Bay Area Climate Collaborative
CLEAN ENERGY GENERATION AND ENERGY EFFICIENCY ARE WIDELY VIEWED AS BENEFICIAL FOR THEIR COST SAVINGS, JOB CREATION AND ENVIRONMENTAL BENEFITS

While these opportunities typically have offered strong financial benefits over the life of the installations, they often have been held back by what have tended to be significant upfront costs for deployment.

This situation has changed substantially as innovative financial solutions are increasingly becoming available to lower or eliminate the upfront costs or provide creative income. These financial solutions include new financing tools that allow the amortization of the initial investments over the life of the solution, new income stream generation from energy savings, and service models that pay for clean energy upgrades out of the savings they produce. Below is just a sampling of options available now or coming soon.

Performance Contracting

Energy service companies (ESCOs) are working with local governments to design and build a broad spectrum of clean energy and environmental solutions tailored to meet the government’s specific needs. As part of these services, many ESCOs provide “performance–based contracts” where the savings are guaranteed.

In a performance contract, the ESCO will do a detailed audit, identify and evaluate energy–saving opportunities, and then recommend a package of improvements to be paid for through savings. These solutions may include energy improvements such as lighting, heating, cooling, system controls, high efficiency motors, weather proofing, water heaters, pumps, water conservation measures and renewable energy production such as solar, wind and biogas. The ESCO will guarantee that savings meet or exceed annual payments to cover all project costs — usually over a contract term of seven to 10 years.

Monitoring and verification of the performance of the installations is included, and if the project does not result in the expected savings the ESCO pays the difference. To ensure savings, the ESCO offers staff training and long–term maintenance services. Research has shown the average energy savings of projects is 20 percent.

Performance contracts generally focus on large, capital–intensive projects — typically $2 million or more. The larger the annual energy costs and the potential for savings, the greater the opportunity for both the local government and the ESCO to benefit from energy performance contracting. As a result, there is generally an emphasis on comprehensive or very high–value projects such as heating and cooling systems. Often, projects can even be structured to provide an immediate positive cash flow. Performance contracting enables local governments to see tangible energy cost savings as it stimulates the local economy through the hiring of local contractors to perform the work.

Property Assessed Clean Energy (PACE)

The Property Assessed Clean Energy (PACE) program enables local governments to create an “Improvement District” or “Energy Financing District,” where a bond is secured against real property in that district. The proceeds raised from the bond are then used to provide loans to the homeowners for retrofitting their property with solar panels and energy efficiency and water conservation products. The cost of the retrofit is repaid by the owner of the property to the local government by means of a special tax or assessment on the property tax bill of those property owners who participated in the program. The green technology and debt remain with the property and are transferred over to the new owners if the property is sold.

Initiated in Berkeley in 2007, the program has quickly gained momentum. Within the short span of just three years, 23 states have passed laws removing any legal barriers that would prevent local governments from adopting the program. Already, hundreds of cities and counties have their own version of PACE or are in the process of developing one. It is estimated that a widespread introduction of PACE would create more than 160,000 long–term green collar jobs across the U.S. In California, the statewide PACE program under development is called CaliforniaFIRST.

However, PACE programs recently hit a stumbling block when the Federal Housing Finance Agency (FHFA) expressed concern that residential properties with PACE liens may pose a risk to lenders as the PACE liens are superior to the property mortgage and would therefore receive first consideration in the event of a default. As a consequence of this position, Fanny Mae and Freddie Mac (who are responsible for more than 50 percent of all mortgages in the U.S.) have refused to purchase mortgages with PACE liens.

Proponents of PACE argue that the liens are very small and the reduced energy costs actually improve the homeowner’s financial
position, making them less likely to default. FHFA’s position is now being challenged in a lawsuit by the California Attorney General, and Congress is also considering legislation to address the problem. PACE programs focused on commercial properties are unaffected by FHFA’s position and are proceeding.

**Power Purchase Agreements (PPAs)**

Another financing approach enjoying success is the Power Purchase Agreement (PPA), whereby solar companies lease solar panels to private and commercial property owners. With no upfront costs to consumers, the solar company pays for the installation, maintenance and repair of the panels and charges the property owner a monthly fee for using the energy produced by the installation. The monthly fee is typically less than the property owner would pay on their electricity bill, offering savings and helping to mitigate the fluctuating energy costs associated with fossil fuel–produced electricity. Many solar companies now offer PPAs.

Through its Climate Protection Taskforce, Joint Venture Silicon Valley Network has been working with local governments to find ways to create regional collaboration for PPA programs with aggregated procurement to lower costs. The task force is currently working with local governments to identify potential sites for renewable energy use on government land and facilities. A preliminary assessment of eight Santa Clara County sites suggests the county can save over $2.8 million in utility costs over the next 20 years with a PPA for solar power.

The benefits of such a program are multifold: it helps the county comply with its AB 32 obligations, creates local jobs, lowers the county’s carbon footprint and reduces its reliance on fossil fuels. In addition, the savings associated with going solar are set to rise each year as energy costs increase.

**Renewable Energy Credits (RECs)**

Renewable Energy Credits (RECs) are tradable commodities that were developed to place a value on clean, renewable sources of energy. These are available in many states and are under development at the California Public Utilities Commission. Through the compliance markets, these credits are sold to utility companies who need to meet their mandatory renewable energy standards. In addition, RECs can be sold in voluntary markets to companies looking to meet their renewable energy goals.

Producers of solar energy are credited with one REC for every 1,000 kilowatt–hour of energy produced. The price that these credits can be sold for varies, depending on the location of the facility and existing supply and demand. For example, prices in July of 2010 ranged from $255 per REC in Delaware to as high as $665 per REC in New Jersey. Any local government that installs solar panels in their district would be able to sell their RECs as an extra source of revenue.

**Demand Response**

“Demand response” programs pay customers to reduce their electrical loads at specific times. In other words, institutions are paid to not use power for select peak periods, triggered either by a grid reliability problem or high electricity prices.

Lower electricity use during peak periods reduces the amount of generation and transmission a utility is required to deliver for electric service, saving money and ensuring power flows smoothly to avert outages. In the longer term, this reduces the need for construction of expensive power plants. The demand response institution becomes a “virtual power plant” that is called upon when needed for limited periods, one to four hours perhaps on a given day and a few times a month.

Institutions work with an energy company’s demand response program by selecting specific facilities where predetermined, non–critical electrical usage is curtailed when needed. This might include turning off some non–essential lighting, adjusting thermostat settings, idling unnecessary equipment or delaying energy–intensive processes until after a demand response event has passed. Water treatment plants, for example, which are highly energy intensive, might turn off aerator blowers, pumps, facility HVAC systems or slow pump speeds. By participating in demand response programs, a single facility might generate tens of thousands of dollars in income.

**Powerful Financial Tools**

These financial tools provide a growing array of powerful options for local governments to advance clean energy and more are on the way. Governments can implement energy efficiency and renewable energy with immediate financial benefit, removing the upfront costs that have otherwise slowed adoption. With cost barriers removed, local governments not only improve budgets but also stimulate the clean energy economy and safeguard natural resources from the impacts of climate change.

Further reading: “Guide to energy efficiency and renewable energy financing districts for local governments” RAEL, University Berkeley (2009)
BEING ECO–CONSCIOUS MAY BE THE RIGHT THING TO DO, BUT IT ISN’T ALWAYS THE EASIEST — ESPECIALLY DURING TOUGH ECONOMIC TIMES

The financial barriers and upfront costs people face when trying to make their home or business greener can be daunting. It’s also costly and difficult to finance green projects with cash or credit cards alone. A few financial institutions though, such as Bay Area-based Technology Credit Union (Tech CU), are addressing this issue head on by offering a new class of loan products: green loans.

Green loans were created for the specific purpose of helping people pay for energy-efficient improvements to their home or business, or, to buy an energy efficient vehicle. Tech CU offers two types of green loans: a Living $mart Home Equity Loan that was launched in 2009 and offers low interest rates on loans up to $50,000 and a Fuel $mart Loan that gives an interest rate discount up to 0.55 percent to consumers who purchase a hybrid vehicle (or one that gets 30 mpg).

“Financing is so important to the adoption of sustainable practices within the residential community and small or medium-sized businesses,” says Tech CU President and CEO Barbara Kamm. “Tax incentives are a great start, but most consumers still need a little extra help in defraying their out-of-pocket costs over time — that’s where financial institutions can really serve the market.”

Tech CU’s Living $mart loan provides homeowners or businesses an affordable way to buy ENERGY STAR® appliances or “green” equipment or to retro-fit their home or business with energy-efficient upgrades. These upgrades could include things like replacing existing windows with super-insulating windows, installing solar water heaters, improving heating, ventilation and air conditioning, or installing renewable energy sources such as solar panels.

According to the U.S. Department of Energy, the average energy bill for a typical single family home in the U.S is approximately $1,900 per year, with more than half of the cost going to heating and cooling systems (space heating, 31 percent; space cooling, 12 percent; water heating, 12 percent).* PG&E reports that small to medium-sized businesses consume roughly 18 percent of all commercial energy in California, much of which is wasted through the use of inefficient equipment and lighting.

Green improvements can significantly reduce high-energy bills in the long-term, increase the overall value of a home or commercial space, make a living/working space more comfortable and reduce the carbon footprint of a family or business.

For example, installing super-insulated windows and glass on a commercial building can pay back in less than five years (and in many cases, as little as one to two). This also contributes to significant LEED points, and, when properly considered as part of thermal efficiency design, can greatly simplify the design and load of mechanical systems and ongoing HVAC maintenance costs.

Consumers may double their savings by taking advantage of the Federal Tax Credit for Energy Efficiency, which can defray up to 30 percent of a project’s cost. Full details and qualifying home improvement projects can be found at: www.energystar.gov/taxcredits.

“We need to educate people about the overall financial benefits of going green and the real return on investment for energy saving improvements,” says Kamm. “Change doesn’t come easily for most, especially when jobs are scarce and the financial future is insecure. But perhaps if we can show people they have options and that the financing won’t break the bank, then all of a sudden, it makes more sense for them.”

Tech CU’s commitment to sustainability goes beyond its green loan program. In 2009, the credit union earned a Santa Clara County Green Business Certification, distinguishing it as a company that adheres to a higher standard of environmental performance. Tech CU is also implementing greener business practices within its corporate culture, including aggressively encouraging the use of electronic statements, wireless and mobile banking, remote deposit and paperless documentation for mortgage loans. By making these simple changes, Tech CU has significantly cut down on paper, fuel and energy waste.

“Being socially and environmentally responsible is very important to us,” says Kamm, “but these practices are also smart business policies because they reduce costs, which ultimately helps our bottom line.”

*Source: 2007 Buildings Energy Data Book, Table 4.2.1, 2005 Energy Cost Data

Helping Consumers Finance Energy Efficiency Projects
Xeralux upgrades Nikon’s entire campus with UltraMarathon™ Light Engines

In early 2010, Xeralux approached Nikon Precision with a compelling value proposition - upgrade all of Nikon’s campus lighting from traditional Metal Halide (MH) to LED technology using Xeralux UMLE, and they can:

- improve the quality of their lighting
- save energy and associated costs
- eliminate monthly bulb and ballast replacement costs
- reduce carbon and mercury footprint
- preserve their existing fixtures

Xeralux installed a free demo unit so Nikon could see the light quality and distribution, and presented Nikon with a detailed spreadsheet that calculated the benefits (see Nikon Precision Quick Facts, below).

The results speak for themselves...

Nikon's front lot. Xeralux replaced existing 175W lamps (215W fixtures) with 93W, saving 57% on energy while providing better lighting. Notice the unnatural color and poor color rendering of the high pressure sodium lights in the background.

Xeralux UMLE 112B bollard upgrade, replacing 100W MH lamp (128W fixture) with just 23W.

Xeralux UMLE 212 upgrades replaced 150W MH lamps (190W fixtures) with 46W, saving over 75%.

NIKON PRECISION QUICK FACTS

LUMINAIRES (82)
- 39 parking lot shoeboxes, including 3 different models from Sterner and McGraw-Edison, at lamp wattages from 175W-250W
- 18 wallpacks in 4 models by Cooper and Hubbell (100W to 150W)
- 10 custom Poulson post-top units (100W)
- 9 Sterner bollards (100W)
- 4 Sterner flood lights (150W)
- 2 in-ground Greenlee flag pole floods (150W)

FINANCIAL RESULTS (10 YRS)
- 2.98-year simple payback
- 49% IRR

ENVIRONMENTAL RESULTS
- 67% energy savings
- 709,398 lbs of CO₂ avoided from energy generation
- 2,784 lbs of SO₂ and 1,367 lbs of NO₂
- 10,595 mg of Hg avoided from energy production
- 2,460 mg Hg avoided from bulbs

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COMMUNITY SOLAR PROGRAMS ENCOURAGE HOMEOWNERS AND BUSINESSES TO GO SOLAR COLLECTIVELY

Many early solar power adopters were environmentalists or rugged individualists who wanted to get off the grid. Not anymore. Solar is gaining broader acceptance as more homeowners and businesses recognize the need to cut energy costs and use cleaner, more sustainable power sources.

Communities, in particular, are increasingly seeking ways to make solar more affordable and educate local residents and businesses on its benefits to increase adoption. As its name implies, SolarCity was founded in part to address this need. The company has introduced a range of community solar programs that offer a unique public–private partnership model.

SolarCity launched its first community program in 2006 in the California town of Portola Valley. Championed by Mayor Ted Driscoll as the first program of its kind, “Solar Portola” resulted in 30 solar homes at a 30 percent discount on a solar cash purchase. Although small, Portola Valley now has as many solar installations per capita as any other town in the U.S.—at least one in every 17 Portola Valley households uses solar power.

As it would turn out, the early success of the Portola Valley program would not be an isolated event. SolarCity has launched 40 more community programs in California, Arizona and Oregon since that first one. Today SolarCity has more than 8,500 customers, and one out of every seven adopted solar via a community program.

More Solar for Less Money

Just as mass production made the automobile affordable for the working classes, community solar programs can leverage economies of scale to make renewable energy more affordable. Homeowners and businesses are closely watching their spending, and banding together to save money makes economic sense.

Community programs can use a range of financing approaches to make solar more affordable. Early programs leveraged the cash discount to reward homeowners for going solar en masse, and cash discounts are still a prominent feature of most community programs. New programs are using financing approaches that can eliminate the upfront cost of solar.

Property Assessed Clean Energy (PACE) is one of the most talked-about solar financing options in the nation, and seemingly a natural fit for community programs. PACE loans give cities a method to finance solar systems directly by providing loans to homeowners that can then be paid back over time via property tax bills. The Federal Housing Finance Agency (FHFA) has recently expressed concern that some PACE loans may pose a risk to lenders, and made recommendations that have put many PACE programs on hold. However, lawmakers and clean energy advocates have fought back aggressively against the FHFA stance and it seems likely that PACE programs will be an effective solar financing tool in the future.

SolarCity has also introduced its own financing options to make solar affordable for more homeowners. The company’s solar leasing option, introduced in April 2008, allows customers to install solar with no upfront cost. SolarCity’s lease customers can start saving money immediately, since their electricity bills are typically reduced by a greater amount than they pay in lease payments. SolarCity’s lease programs do not require city funds, which make them particularly attractive as community program financing options at a time when many local governments are tightening their budgets.

Many community program participants still choose to pay cash for their solar systems, but new financing makes community programs more inclusive by introducing options that more potential participants can afford. Lease and purchase options are an excellent combination that, when reunited with PACE programs, will provide at least one option that most homeowners can be comfortable with.
A Model for Promoting Green Power Nationwide

New community programs are popping up everywhere, and the model continues to evolve. On July 12, 2010, the Southern California city of Lancaster announced one of the most ambitious community programs ever undertaken, including options for residents, businesses and non-profit organizations — and even the city itself. Lancaster is installing solar on six different city sites, including City Hall, and Mayor R. Rex Parris has signed on to become the program’s first residential customer. To help the city promote green jobs, SolarCity will help create a local solar training program in partnership with Antelope Valley College.

“The best thing about our program is that everyone benefits from going solar,” Mayor Parris said recently. “Every resident benefits from better air quality, homeowners and businesses benefit from cost savings, and job seekers have an opportunity to go green in their career.”

Solar Phoenix, launched earlier this year, is another community program designed to help homeowners adopt solar power for zero net cost. The program is made possible by $25 million in financing from National Bank of Arizona, headquartered in Phoenix, and includes options for low and moderate-income homeowners. Like other community programs, Solar Phoenix allows qualifying Phoenix homeowners to install solar systems with no upfront investment and a small monthly payment that is typically lower than their previous electricity bills.

Solar Phoenix incorporates incentives from Arizona’s largest and longest-serving electric utility, APS (Arizona Public Service), and its Solar and Renewable Energy Incentive Program, which was approved by the Arizona Corporation Commission and funded by APS customers. Solar Phoenix is part of Phoenix Mayor Phil Gordon’s 17-point Green Phoenix plan, and he lauded the program for its benefits to citizens and to the local economy in his March 9, 2010, State of the City address.

“The concept is simple,” said Gordon. “Without putting down a single dollar, residents in every income group can qualify for rooftop solar systems guaranteed to lower their utility bills. Just yesterday, SolarCity opened a new office in Phoenix. They’re hiring two-dozen more installers. That’s 24 more families earning a paycheck.”

Community programs offer a practical and affordable way for homeowners, businesses and organizations to adopt solar power. They will continue to evolve, and provide a blueprint for communities across the nation to use cleaner power, save money on energy costs, and create more jobs in the process.
LED TECHNOLOGY SUPPORTS ENVIRONMENTAL OBJECTIVES AND REDUCES OPERATING COSTS

Municipalities throughout the state and nation are simultaneously struggling with woefully inadequate budgets while trying to transition to a more sustainable, energy efficient infrastructure that addresses green agendas, reduces long-term operating costs, and maintains and improves services to residents. In municipal street and parking lot lighting, these objectives are complementary and achievable.

New street lighting solutions are being made possible through the development of highly efficient and very bright LED technology from companies like Philips Lumileds in San Jose. Power LEDs like LUXEON from Philips Lumileds contain no mercury or lead and are capable of extremely long lifetimes, often 50,000 hours or more. This reduces maintenance costs and waste material that ends up in landfills. Perhaps most important, though, is the reduction in energy consumption and related energy costs.

There are three factors that contribute to a significant reduction in energy consumption for LED lighting. First, LEDs deliver equivalent or better efficiency than conventional mercury vapor, metal halide, and sodium lamps. Second, conventional streetlights waste a significant amount of light because, unlike LED-based solutions, the light is scattered. Third, LED solutions can be controlled through the use of dimming and instant on/off functionality which saves electricity.

Traditional light source efficacy ranges from 25 lumens per watt to 150 lumens per watt. Power LEDs used in streetlights today typically deliver 90 to 130 lumens per watt and improvements continue, making LED lights an efficient source of light that lasts substantially longer and reduces maintenance costs.

Additional efficiency gains are made because of the directional nature of LEDs. A conventional light source is omni-directional, meaning the light is distributed in every direction (even away from the roadway or sidewalk that is being lit). LEDs, however, focus light in one direction — the direction in which they are pointed. Therefore, it takes more light from a conventional light source than from an array of LEDs to light the intended surface at the same level. A conventional light fixture using a high-pressure sodium (HPS) lamp produces 7,125 lumens. The LED solution needs only to produce 2,932 lumens to do the same job, thus saving on energy production and consumption — and ultimately costs.

In addition, conventional light sources can be turned on and off, but most can’t be dimmed. With an LED-based solution, digital control is possible, meaning that the lights can be on at different levels for sunrise, sunset, or based on the amount or type of traffic an area is receiving — pedestrian or vehicular.

These benefits are seen in the LUXEON-based lighting solutions from Green Machine Light Engine which are deployed in locations such as the Public Works Department building in Milpitas and Kirkwood Plaza in Campbell. At Kirkwood Plaza, a mall of nearly 30 tenants, 125 lighting fixtures were replaced. The new LED fixtures produce 70 percent energy savings and zero maintenance costs, providing a 2.8 year return on investment.

Today, LED-based street lights offer a more efficient and sustainable solution than conventional lighting and by reducing maintenance costs, resources can be applied to other city functions. The reductions in electrical consumption support green initiatives and help reduce CO₂ emissions. Municipalities may vary in their lighting objectives as well as the lighting needs; however, all municipalities share a desire to operate in a more sustainable fashion and LED lighting clearly provides that opportunity.
Cast a new light on efficiency with state-of-the-art technology **certified by PG&E** to conserve energy and money—while advancing your pro-environment agenda. Manufactured here in the Silicon Valley, Green Machine Light Engine solutions use Philips’ long-lasting, high-brightness LEDs to power outdoor lights in municipal environments, transportation systems, schools, hospitals, parking lots and structures, and other government facilities.

Delivering more than 60,000 hours of reliable performance, these lights outlast traditional lighting solutions by several years, reducing your outdoor energy usage by as much as 75 percent. And because there are no light bulbs or ballasts, you’ll never have to pay maintenance fees again.

Today’s leaner times demand new ways of thinking. Our dynamic LED lights answer the call. Contact us at 1 (408) 307-5293 or kferin@greenmachinelightengine.com for a free, on-site assessment to see how the right lighting solution can illuminate significant savings for you.

www.greenmachinelightengine.com
Opportunities in Transportation: Plug–In Vehicles for Fleets

PLUG–IN AND ELECTRIC VEHICLES (EV) ARE EMERGING IN THE AUTOMOTIVE INDUSTRY AS AN ALTERNATIVE TO GAS–POWERED VEHICLES

Affordable, advanced plug–in vehicles are being introduced by many major automakers this year. Nissan's battery–powered Leaf and GM's Chevy Volt will be the first. More models of plug–in cars from Ford, Toyota, Chrysler, BMW, Mitsubishi and others will follow in the next several years.

Some projections estimate that within the next ten years, the number of EVs on U.S. roads will increase from today's 100,000 to more than 2.5 million, with heavy concentration in California. This growth projection is supported by billions in federal and private investment.

EVs provide direct, measurable financial benefits and very significant indirect benefits, making them worthy of serious consideration, especially in pooled fleet applications. Fleet managers will see meaningful financial benefits arising from lower fueling and maintenance costs. They will also garner significant indirect benefits from the broader economic, national security and environmental gains arising from visible steps to reduce dependence on petroleum.

Financial Benefits

Overall, all–electric EVs can be expected to achieve the following approximate benefits over gas–powered vehicles:

- $4,000 to $8,000 overall savings in a 5–year period
- 50 percent reduction in maintenance costs
- Increasing savings as gas prices rise

The lifecycle savings on EVs are primarily attributed to the cost of fueling the vehicle. Assuming current gas prices of $3.00 per gallon at a minimum, typical passenger cars and light trucks will cost between 11 and 13 cents per mile to operate, whereas a similar model EV typically costs 2.5 to 4 cents per mile. Per mile fueling costs have been projected as low as 1.5 cents per mile for EV fleets with off–peak charging that utilizes wholesale electrical rates and fuel cells. Given current oil production and demand projections, and the petroleum volatility of 2007, it is likely that gas prices will rise soon and dramatically, driving up cost savings.

Plug–in vehicles require substantially less maintenance than gas vehicles, contributing to further savings and considerably extended vehicle life. Relative to gas vehicles, EVs are mechanically simple — they have 70 percent fewer parts, including dramatically fewer moving parts. Annual maintenance costs for EVs are estimated to be around 50 percent of gas vehicle maintenance costs, a savings upwards of $350 per vehicle per year. For fleets with onsite repairs, savings can also be assumed for training, diagnostics and tool costs. Hybrids also experience lower maintenance costs but to a lesser degree. Overall, the total cost of ownership of EVs is lower than gas vehicles even factoring in potential battery replacement after the battery warranty expires, typically at 100,000 miles.

Incentives

While the initial purchase price of a plug–in vehicle is currently higher than conventional vehicles, there are a number of incentives available. The Nissan Leaf, for example, will cost $25,280 after federal tax breaks have been applied, with fleet bulk purchases likely to be even better. This and other similar models will offer a good match for passenger–car fleets with centralized infrastructure and frequent short and medium range routes. California consumers, including government and non–profit agencies, have access to additional rebates towards the purchase of new electric vehicles.

Security, Economic and Environmental Benefits

Plug–in vehicles provide important additional benefits:

- Reduced dangerous reliance on foreign oil and associated security risks
- Investment and job creation in the U.S.
- Reduction of over 10,000 lbs of CO₂ emissions per vehicle per year for EVs
Our nation relies very heavily on foreign oil, importing more than $312 million in oil per day, much of it from unstable and hostile regions of the world. This practice has concurrent military costs and loss of potential domestic investment. As global demand increases and geologically easily extracted oil diminishes, sharp increases and extreme volatility in gas prices are likely. The price spikes of 2007 are seen by many in the petroleum industry as a scenario to be repeated with greater impact in the near future. EVs will play a critical role in reducing foreign oil dependency, related fuel and military costs, and protection of the domestic economy from price escalation and volatility.

Finally, transportation accounts for the single largest source of greenhouse gases in California, nearly 40 percent, in addition to numerous other major pollutants. The net emissions of plug-in vehicles, including centralized electric power generation emissions, are significantly lower than gas vehicles. In combination with long-term strategies such as transit-oriented development and improved transit, the near-term benefits of EVs are an essential part of a complete solution. The vehicles can play an instrumental part of the climate action plans being implemented by many local governments.

Leadership

With all factors considered, EVs offer an effective strategy for reducing an agency or company’s bottom line costs. These benefits will grow as gas prices rise and the technologies and support for EVs improves. These benefits will in turn be reflected in the prominent leadership the vehicles demonstrate. Electric vehicles, as a result of their continuous, significant public visibility on roadways — especially when visually distinguished — provide unusually high visibility opportunities to showcase leadership.

The Bay Area Climate Collaborative is supporting that leadership by local governments through an exciting $5 million project to bring more than 100 electric vehicles to municipal fleets in a national demonstration project. In addition, the BACC is engaging public works directors in the region to develop public works guidelines for the deployment of EV infrastructure.

To learn more, visit www.baclimate.org.

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Accelerating Solar & Preparing for Plug-In Vehicles: Local Government Guidelines

SOLAR ENERGY AND PLUG-IN ELECTRIC VEHICLES PROVIDE AN UNPRECEDENTED OPPORTUNITY TO IMPROVE OUR ECONOMY, STRENGTHEN NATIONAL SECURITY AND SAFEGUARD OUR RESOURCES

Solar power is experiencing tremendous growth even during the recession, and affordable, advanced plug-in vehicles are beginning to arrive in significant numbers. This presents a challenge to local governments that are faced with very difficult budgets. Moving towards consistent permitting approaches, developed by building officials in the region, provides a powerful way to further clean energy solutions while reducing costs.

Solar PV Growth

Solar photovoltaic power (PV) is experiencing dramatic growth in the Bay Area — 4,534 new systems were installed in the Bay Area in 2009. This was a 25 percent increase from the new installations in 2008 and more than double the year before. The overwhelming majority of installations were residential.

Solar’s explosive growth is driven by several factors: declining costs with the prices of modules dropping 30 to 50 percent in the past year, more public attention to the benefits of deploying solar panels, and better and more available financing options such as power purchase agreements which reduce or eliminate the up-front costs of solar installations. This trend is going to accelerate as new programs such as CaliforniaFIRST become available and prices drop further.

Plug-In Vehicles Are Coming

Affordable plug-in electric vehicles are beginning to arrive in significant volumes to the Bay Area. Leaders throughout the region are working to ensure the Bay Area becomes the “EV Capital” of the world. These vehicles provide many benefits, including lower fueling costs, lower maintenance expenses and reduced greenhouse gases (see New Opportunities in Transportation, p. 10). However, they do require additional infrastructure in the form of chargers, or more accurately “electric vehicle supply equipment” (EVSE). Most chargers will be installed in homes and they have specific requirements, not unlike solar installations, but simpler. It is expected that vehicle purchases will likely cluster heavily and the Bay Area will be a major national cluster for the new vehicles. Cities can expect to see a rapid ramp-up of EVSE permitting requests over the next couple of years.

The Challenge

However, local governments are stretched thin, and rising demand and resulting permit applications is placing added strain on already limited staff. At the same time, varied installer training and permitting standards between municipalities is resulting in many solar permitting applications requiring multiple revisions, creating increased work load, delays and cost.

For customers and installers, the process is also challenging and time consuming, involving separate applications to the permitting agency and utility, multiple visits to permitting agencies, and multiple home visits for inspections and utility interconnections. This is true even though home installations of solar PV panels and plug-in vehicle chargers are widely considered to be very straightforward, almost on the order of appliances. For chargers, the typical times are 35 to 45 days for an installation that usually takes about 4 hours. For solar PV, the total time can be 6 to 12 weeks for an installation time of 3 days.

Not surprisingly, 62 percent of city building officials and planning staff expressed a desire for a consistent regional solar PV permitting standard in a sampled survey conducted for SolarTech this year. And as plug-in vehicle demand ramps up beginning this year, building officials will likely similarly see benefit in a consistent standard for plug-in vehicle charger permitting.

Guidelines from Building Officials

Consistent approaches to permitting will facilitate higher quality applications, reduced processing times and lower costs for deploying solar panels on residential rooftops all across the Bay Area. It is a greatly needed solution. And there is good news to report.

Building officials throughout our region have worked on permitting guidelines through the Tri-Chapter Uniform Code Council Committee (TUCC), which represents International Code Council chapters in the region. The TUCC provides exceptional interpretation on building codes, ensuring quality and safety, consistent permit procedure and guidelines and consistent local code amendments in our region.
This summer the TUCC released an important update to their home solar permitting guidelines known as Policy 11, as well as new electric vehicle charger permitting guidelines, Policy 17. The guidelines provide checklists of items or plans that must be included for a permit, as well as sample schematics and process guidance, providing a strong foundation for Bay Area–wide consistency and quality. Compliance with the guidelines will allow permit issuance over–the–counter, to eliminate the two– to four–weeks of turnaround time for plan check.

Advancing Solutions

Consistent permitting processes will enable the solar and electric vehicle industries to raise installer training standards and application quality, reducing the need for costly application revisions. They will also address a prerequisite for improved utility coordination, opening the prospect of unified municipal and utility plan checks and even potentially inspections, as is already being done in the city of Santa Clara. Numerous cities in the region, such as Santa Clara and Campbell, are already using the guidelines successfully.

The city of Santa Clara has further expedited their solar permit process and then separately apply for the inter–connectivity permit from their electric utility.

For solar PV, these steps align with efforts led by SolarTech, working with the Department of Energy, to align state and national standards. Similar efforts are underway with plug–in vehicle chargers.

The Bay Area Climate Collaborative is working with local governments and partners to garner broader feedback on the guidelines and assess local government training and support needs for adopting them. For example, there is an opportunity for local governments to further recoup costs with the support of the solar industry. While a lot of attention has gone to reducing solar permitting fees, local governments may wish to revisit fees and, where appropriate, even increase them to ensure appropriate cost capture.

Home solar and electric vehicle charger permitting guidelines provide powerful best–practices for local governments to reduce costs and increase quality, especially as demand increases. In turn, greater consistency will play an important role in accelerating the deployment of clean energy and transportation. Learn more at www.baclimate.org.
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