Greener Parking

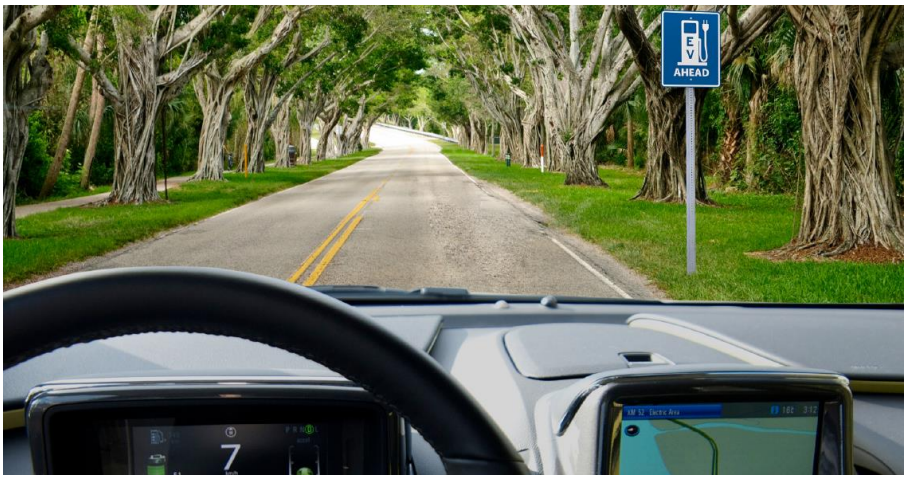
12 Tips
for Greener Parking in 2013

The Green Parking Council has issued 12 tips for sustainable parking practices in 2013, including recommendations and green conversion tips for facilities and garage operators.

The tips highlight best practices for those who want to improve their parking facilities by making them more energy efficient and environmentally sustainable with the added gift of reducing the operating costs.

1. **Install energy efficient lighting and lighting control devices.** Operators can achieve a considerable reduction in carbon emissions by upgrading their lighting systems to high efficiency technology, including LED, fluorescent and induction. Using timers, dimmers, motion sensors, daylight sensors or a combination of these reduces the amount of energy used in a given facility.
2. **Provide electric vehicle charging stations.** With more than one million electric vehicles expected to be on the road by 2015, installing EV charging stations helps support the overall effort of EV adoption.
3. **Support sustainable power.** Increase the use of alternative energy sources, including wind, solar, geothermal and other renewable energy sources. This can be implemented onsite with renewable power sources or by buying renewable energy from your electricity provider.
4. **Implement wayfinding** to make it easy for drivers to identify a parking location and make a parking reservation via telematics services. Guiding customers to a reserved parking space saves time and fuel, and decreases the driver's carbon footprint.
5. **Install mechanical systems controls.** According to the EPA, replacing components of a less efficient HVAC system cuts energy costs by about 20 percent.
6. **Join a transportation management association.** These groups offer parking facility operators the opportunity to integrate with alternative forms of transportation such as carpooling, biking, public transit, and walking; helping to lower both congestion and emissions.
7. **Promote recycling.** Collection of used bottles, cans, newspapers, batteries and other materials through parking facility collection containers can contribute to a host of financial, environmental, and social returns.
8. **Placemaking** is the multifaceted approach to the planning, design and management of public spaces. As a gateway, the garage can serve as a hub for additional services, information, and promotional programs for surrounding businesses.
9. **Establish a bicycle-sharing program.** Bike sharing programs provide an alternative to motorized public transportation and can reduce greenhouse gas emissions, traffic congestion, and noise pollution as well as improving public health through exercise.
10. **Install a solar roofing system.** This is a good way to optimize the roof space and reduce the heat island effect. Because solar panels convert a portion of solar energy into electricity they retain less heat than traditional roofs.
11. **Install water efficient landscaping.** By eliminating the use of potable water for watering and maintenance of plants, trees, shrubs and grasses within the entire property line, water resources can be conserved for higher and better uses.
12. **Execute a building systems commissioning.** A system commissioning will gauge the amount of energy that your equipment is actually consuming; ensuring that your mechanical, plumbing and electric systems are running as efficiently as intended.

For more information, go to **www.greenparkingcouncil.org.** ■



Strategy to Implement Policy 19.2.5 of the Broward County Comprehensive Plan Climate Change Element

Goal: To expand the use of alternative fuels and infrastructure

April 28 ▪ 2014

Includes Model Ordinances for Local Governments

BROWARD COUNTY FLORIDA

PLANNING AND REDEVELOPMENT DIVISION

Acknowledgments

The development of this strategy was led by staff from the Broward County Environmental Protection and Growth Management Department, Planning and Redevelopment Division with support provided by the Southeast Florida Clean Cities Coalition and Florida Power & Light.

Author

Maribel Feliciano, Planning Administrator: Planning and Redevelopment Division

Co-Authors

Anne-Louise Seabury, Electric Vehicle Program Manager: Florida Power & Light
Christine Heshmati, Clean Cities Coordinator: Southeast Florida Clean Cities Coalition

Contributors

Henry Sniezek, Director: Planning and Redevelopment Division
Gregor Senger, Florida Department of Transportation
Andrew Meyer, College Intern: Planning and Redevelopment Division

Reviewers

Debbie Griner: City of Fort Lauderdale
Sarah Olexsak, U.S. Department of Energy Workplace Charging Challenge
Cindy Corbett-Elder, Broward County Transit
Michael Ronskavitz, Broward Metropolitan Planning Organization
Carrie Kashar, Broward County Energy and Sustainability Program
Kevin Fischer, Planning and Redevelopment Division

Technical Data, Maps and Photos Provided by

Andrew Meyer, College Intern: Planning and Redevelopment Division
Clean Cities Community Readiness and Planning for Electric Vehicles and Charging Infrastructure Plan for Southeast Florida

More Information

For information about the technical aspects of the strategy, contact Maribel Feliciano, Planning and Redevelopment Division, Environmental Protection and Growth Management Department at mfeliciano@broward.org

Table of Contents

Executive Summary

In February 2013, the Broward County Board of County Commissioners adopted the Climate Change Element as part of the County's Comprehensive Plan, and the County's Land Use Plan with a climate amendment. This report provides a strategy for the implementation of one of the policies of the Climate Change Element (Policy 19.2.5) that seeks to expand infrastructure for plug-in electric vehicles (PEV), diversify fuel options for transit and large fleets with the use of alternative fuels, and incentivize parking for alternative fuel vehicles.

The strategy outlines a general approach for implementation and introduces a streamlined template (Appendix A) to identify key stakeholders and partners; tactics; performance indicators; timeline for completion; trends; challenges; and a recommendation for periodic status reports, in lieu of the Evaluation and Appraisal Report. The strategy serves as a framework for the effective implementation of other policies within the Comprehensive Plan. It provides a detailed overview of alternative fuels available for transit and public or private fleets, and infrastructure needs. Recommendations from the U.S. DOE-funded EV Community Readiness Plan for Southeast Florida and feedback received from PEV infrastructure companies and installers, vehicle owners, transit and fleet managers, local governments and utilities were used as the foundation to develop the strategy of action for Broward County (Appendix B). The County will reconvene all partners and interested stakeholders to initiate implementation and track progress.

Broward County plays a critical role in sustainability leadership regionally, nationally and abroad through its participation in the White House Task Force on Climate Preparedness and Resilience, the Southeast Florida Regional Climate Change Compact, and Seven50. The County is also an active member of the recently created Drive Electric Florida state group (formerly Florida PEV Stakeholder Group) that is working to:

- Identify statewide priorities to expand PEV infrastructure and vehicles.
- Educate and increase awareness of the advantages of PEVs.
- Propose policy recommendations and incentives.
- Implement short- and long-term initiatives to increase adoption of PEVs in the State of Florida.

The County is partnering with the Southeast Florida Clean Cities Coalition, Florida Power & Light, Florida Department of Transportation, Zero Emission Market Acceleration Partnership, the Department of Energy's Workplace Charging Challenge and other stakeholders to advance the DOE-funded EV Community Readiness Plan for Southeast Florida from a vision into a reality in Broward County.

Disclaimer: This is a high-level strategic document providing a framework for teams to consider when developing specific implementation tasks. Key decisions and execution should not be made exclusively with the information provided.

Introduction

In February 2013, the Broward County Board of County Commissioners adopted the Climate Change Element as part of the County's Comprehensive Plan, and the County's Land Use Plan with a climate amendment. The Element contains a broad range of policies that aim at protecting residents, businesses, property, natural resources, and key infrastructure from extreme weather and rising sea levels. The policies are designed to institutionalize these considerations as part of the capital improvement, planning and design processes in the areas of transportation, buildings and infrastructure to increase energy efficiency and reduce greenhouse gas emissions. This report provides a strategy for the implementation of one of the policies of the Climate Change Element (Policy 19.2.5) that seeks to expand infrastructure for plug-in electric vehicles (PEV), diversify fuel options for transit, and incentivize parking for alternative fuel vehicles. The strategy also serves as a framework for the effective implementation of other policies within the Comprehensive Plan.

➲ POLICY 19.2.5 BROWARD COUNTY SHALL CONTINUE TO WORK WITH THE DEPARTMENT OF ENERGY'S SOUTHEAST FLORIDA CLEAN CITIES COALITION TO:

1. Diversify fuel options for public transit and fleet vehicles
2. Expand infrastructure for charging Plug-in electric vehicles
3. Incentivize parking for alternative fuel vehicles

In January 2014, Broward County's Environmental Protection and Growth Management Department received the **National Planning Excellence Award for Environmental Planning** for the adoption of the Climate Change Element in the Comprehensive Plan and in 2013 the County was also recognized by the Florida Chapter of the American Planning Association with the Award of Merit.

➲ Comprehensive <-> Sustainable Planning

Broward County's Comprehensive Plan is a vision of what Broward County strives to be in the future. The process of developing the Plan is a community-wide effort. The first phase of the process is to collect all available data that is pertinent to the Element. The second phase is to solicit input from the community. After analyzing all existing data, Goals Objectives, and Policies are developed. The Goals comprise recommended actions, the Objectives describe the strategies to address each Goal and the Policies represent choices made to carry out the Goal. The Plan is a policy document that provides a coordinated approach to making decisions regarding land use development, zoning, the placement of facilities, and other infrastructure. The last phase is the monitoring and evaluation of implementation strategies.

BROWARD'S COMPREHENSIVE PLANNING PROCESS

Phase 1	➲ Data Gathering
Phase 2	➲ Community Input
Phase 3	➲ Policy Development Goals and Objectives
Phase 4	➲ Implementation through the Land Development Regulations, Land Use Plan and Zoning Codes
Phase 5	➲ Monitoring and Evaluation

Broward County's Climate Change Element

The Climate Change Element of the Broward County, Florida Comprehensive Plan adopted in February 2013 provides a visionary and innovative planning instrument for integrating the economic, environmental, and social factors of climate change. As a comprehensive framework to achieve a sustainable, climate-resilient community, the Element addresses the broad variety of impacts climate change will have on the people, businesses, property, and environment of Broward County. The Element's 82 polices include: energy efficiency and greenhouse gas reduction strategies; protection and adaptation of public infrastructure and services; climate change impacts on natural resources; coordination and collaboration; and ongoing monitoring to identify the changing needs and conditions of the community. Broward County has and will continue to work with municipal, regional, state and federal partners to implement the goals, objectives and policies presented in the Element. An example of this collaboration is a pilot project with the Florida Department of Economic Opportunity, the South Florida Regional Planning Council, and the City of Fort Lauderdale to implement Adaptation Actions Areas (AAAs). This is a new tool in the Florida planning framework, and through the Element and the ongoing partnership among agencies, Broward County is providing leadership in developing recommendations on the incorporation of AAAs into the comprehensive and strategic planning efforts of coastal communities across the state. Furthermore, Broward County staff is working with the Department of Energy's Southeast Florida Clean Cities Coalition, Florida Power & Light Company and electric vehicle stakeholders to expand PEV adoption and infrastructure development in Broward County.

➲ Department of Energy's Clean Cities Community Readiness and Planning for Electric Vehicles and Charging Infrastructure Grant

The Southeast Florida Electric Vehicle and Infrastructure Alliance (Alliance) came together under the "Clean Cities Community Readiness and Planning for Electric Vehicles and Charging Infrastructure Grant." Awarded by the U. S. Department of Energy (DOE), to develop plans addressing the institutional, technological and market barriers to accelerate PEV adoption in Southeast Florida – including Monroe, Miami-Dade, Broward, Palm Beach, Martin, St. Lucie, and Indian River Counties.

THE GOAL OF THE CLIMATE CHANGE ELEMENT IS TO ACHIEVE A SUSTAINABLE, CLIMATE RESILIENT COMMUNITY BY:

Promoting energy efficiency and greenhouse gas reduction strategies;

Protecting and adapting public infrastructure, services, natural systems and resources from climate change impacts; and

Coordinating and communicating locally and regionally to monitor and address the changing needs and conditions of the community.

The Alliance is a public/private partnership, including the South Florida Regional Planning Council and its Southeast Florida Clean Cities Coalition, Florida Power & Light Company (FPL), local governments, private companies, and individuals, who worked collaboratively to develop a Southeast Florida PEV Readiness Plan for the Region. Broward County is one of the local governments that participated in the development of the plan that was used as a framework for the preparation of this implementation strategy.

The Southeast Florida region has an above average number of residents with daily travel distances of less than 40 miles, which is well within the range of commercially available PEVs. Moreover, the demographic profile of Southeast Florida residents indicates a solid percentage of likely "early adopters" – people with a tendency to purchase new technologies ahead of the general population. The Plan's vision is to promote strategically placed public and workplace charging infrastructure in adequate quantities; implement supportive codes, policies, incentives, and ordinances; promote PEV infrastructure availability in new multifamily home construction and existing multifamily dwellings; encourage fleet managers to replace vehicles with comparable PEVs; and educate residents about the benefits of PEVs and PEV charging infrastructure.

The County is also an active member of the recently created Drive Electric Florida State Group (formerly Florida PEV Stakeholder Group) that is working to:

- Identify PEV-related statewide priorities.
- Educate and increase awareness of the advantages of PEVs.
- Propose policy recommendations and incentives.
- Implement short- and long-term initiatives to increase adoption of PEVs in the State of Florida.

The purpose of this strategy is to establish actionable tactics and steps to make various components of this vision a reality in Broward County.

SOUTHEAST FLORIDA PLUG-IN ELECTRIC VEHICLE READINESS PLAN INCLUDED SIX STRATEGIES:

1. Identify financial and non-financial incentives

2. Make it easier to install a public and private charging infrastructure with supportive codes, policies and zoning.

3. Facilitate fleet purchases of PEVs to jumpstart the market and ultimately help drive down costs.

4. Identify options for public and private infrastructure deployment.

5. Create education and outreach opportunities for stakeholders, including the region's community and business leaders and residents.

6. Develop a master plan for a transit-linked, PEV car-sharing demonstration project along US-

Broward County's Comprehensive Plan Climate Change Element: From Adoption to Implementation

POLICY 19.2.5: SUPPORT INITIATIVES WHICH SEEK TO DIVERSIFY FUEL OPTIONS FOR PUBLIC TRANSIT AND FLEET VEHICLES, EXPAND INFRASTRUCTURE FOR CHARGING ELECTRIC AND PLUG IN ELECTRIC VEHICLES, AND INCENTIVIZE PARKING FOR ALTERNATIVE FUEL VEHICLES.

Adoption of the Comprehensive Plan Elements is followed by the implementation of the policies within the Plan through multi-agency coordination by the Planning and Redevelopment Division of the Environmental Protection and Growth Management Department. A lead agency is identified to facilitate the organization of stakeholders, implementation steps, timeline and funding needs. Historically, the Evaluation and Appraisal Report (EAR) served as the planning tool to evaluate progress and monitor the implementation of the policies in the comprehensive plan. Effective June 2, 2011, the State changed the EAR requirement and provided local governments the discretion to determine if updates to the comprehensive plan are necesarry. This strategy outlines a general approach for the implementation of Policy 19.2.5 of the Climate Change Element and introduces a streamlined template (Appendix A) to identify key stakeholders and partners; tactics; performance indicators; timeline for completion; trends; challenges; and a recommendation for periodic status reports, in lieu of the EAR. This template can be used for the implementation of other policies in the Comprehensive Plan.

THE STRATEGY IS DIVIDED INTO THREE FOCUS AREAS:

1. Diversify fuel options for public transit and fleet vehicles
2. Expand infrastructure for charging Plug-in electric vehicles
3. Incentivize parking for alternative fuel vehicles

Focus Area 1 ▪ Diversify Fuel Options for Public Transit and Fleet Vehicles

➲ Overview:

Public and private vehicle fleets play a key role in influencing consumers about mobility choices. As people learn about and consider new vehicle models that are cleaner and reduce petroleum usage, it can be reassuring to observe increasing numbers of PEVs traversing local roads and major arterials. Many large companies and government agencies are stepping up the portions of their fleets that are alternatively-fueled, and private consumers take notice.

While fleet managers generally see the value of communicating their organization's values to the public and realize that fleet vehicles can be moving marketing tools that relay environmentally-friendly policies, they are also continuously aware of the need to make cost effective choices in vehicle purchases. The U.S. Department of Energy has a website that offers descriptions of various alternative fuels, lists of alternative fuel vehicles that are light-, medium-, and heavy-duty, a vehicle cost calculator that provides guidance on vehicle life cycle costs rather than upfront costs, and more: www.afdc.energy.gov Fleet managers can compare the vehicles in their fleets with other models and evaluate costs and emissions savings. More than 35 percent of U.S. public transit buses use alternative fuels or hybrid technology. In Broward County, over 25 percent of the Broward County Transit (BCT) fleet is diesel hybrid-electric.

FIGURE 1: ARTICULATED DIESEL HYBRID-ELECTRIC BUS USED FOR THE I-95 EXPRESS SERVICE TO MIAMI BY BROWARD COUNTY TRANSIT.

➲ Benefits of Alternative Fuel Vehicles

Alternative fuel vehicles (AFV) use forms of energy other than conventional gasoline and diesel fuel. Some alternative fuels include: pure methanol, ethanol, and other alcohols; blends of 85 percent or more of alcohol with gasoline; natural gas and liquid fuels domestically produced from natural gas; liquefied petroleum gas (propane); hydrogen; electricity; pure biodiesel (B100); and P-Series fuels. In addition, the U.S. Department of Energy may designate other fuels as alternative fuels, provided that the fuel is substantially nonpetroleum, yields substantial energy security benefits, and offers significant environmental benefits.

One of the first steps in selecting an alternative fuel is to recognize the importance of selecting the right fuel for the right application, that is, understanding which alternative fuel works best for a given fleet, dependent upon factors like the type of equipment, miles driven annually (such as locally or inter-state), terrain, and access to appropriate fueling stations.

THE ENERGY POLICY ACT OF 1992 DEFINES AN ALTERNATIVE FUEL AS:

- Biodiesel (B100)
- Natural gas
- Propane (liquefied petroleum gas)
- Electricity
- Hydrogen
- Blends of 85% or more of methanol, ethanol, and other alcohols
- Methanol, ethanol, and other alcohols
- Coal-derived, liquid fuels
- Fuels (other than alcohol) derived from biological materials
- P-Series fuels

➲ Natural Gas

Natural gas is a domestically produced gaseous fuel, readily available through the utility infrastructure. This clean-burning alternative fuel can be used in vehicles as either compressed natural gas (CNG), liquefied natural gas (LNG) or liquefied petroleum gas (LPG or propane). In 2012, the Florida Legislature passed natural gas incentives for fleets. Beginning in January 2014, the State established a five-year moratorium on natural gas taxes which is helpful for private fleets using natural gas. Additionally, there is a $30 million rebate on natural gas purchases and conversions over the five-year period. The rebate is split into $6 million annually and offered to qualified applicants on a first come, first served basis with 40 percent set aside for public fleets and 60 percent for private fleets. Each fleet is limited to $25,000 per vehicle and a total rebate of $250,000 in a given year.

FIGURE 2: BROWARD COUNTY'S NATURAL GAS FUELING STATION IN THE GOVERNMENT CENTER, DOWNTOWN FORT LAUDERDALE

➲ CNG and LNG

While LNG is not widely used in Florida, fleet conversions from traditional diesel fuel to CNG in heavy-duty vehicles are expanding. Although the United States has an extensive natural gas distribution system in place, vehicle fueling infrastructure is limited in some locations. There are two types of CNG stations: fast-fill and time-fill. The type of station needed is dependent on the application. Typically, retail stations use fast-fill and fleets that have central refueling and the ability to fill overnight use time-fill. Costs of installing natural gas infrastructure varies based on size, capacity, and the type of natural gas (LNG, CNG, or both) it dispenses. It also varies in the way the natural gas is dispensed (fast-fill, time-fill). According to a 2010 report published by Pacific Northwest National Laboratory for the U.S. Department of Energy, costs for installing a CNG fueling station can range up to $2 million depending on the size and application. Smaller fueling units average $10,000, including installation. To explore whether natural gas makes sense for a specific fleet, review Business Case for Compressed Natural Gas in Municipal Fleets, which discusses the various applications where CNG can be a successful replacement to conventional fuel and the accompanying Clean Cities Vehicle and Infrastructure Cash-Flow Evaluation (VICE) Model to evaluate the return on investment and payback period for natural gas vehicles and fueling infrastructure. In the early 1990's, Broward County installed CNG infrastructure and the County currently maintains and operates two slow fill and two fast fill stations CNG stations that are used for 19 CNG vehicles. Because mass transit buses and disposal trucks generally idle a great deal and are on the road for long periods of time each day, they may be good candidates for CNG.

COMPARED WITH VEHICLES FUELED BY CONVENTIONAL DIESEL AND GASOLINE, NATURAL GAS VEHICLES CAN PRODUCE LOWER LEVELS OF SOME EMISSIONS. AND BECAUSE CNG FUEL SYSTEMS ARE COMPLETELY SEALED, CNG VEHICLES PRODUCE MINIMAL EVAPORATIVE EMISSIONS

➲ Propane

Also known as liquefied petroleum gas (LPG), propane is a domestically produced, well-established, cleaner burning fuel. Using propane as a vehicle fuel increases energy security, provides convenience and performance benefits, and improves public health and the environment. Propane fuel can be ideal for medium-duty vehicles like pick-up trucks and passengers vans that experience high mileage and heavy idling. For example, vans providing paratransit and medical transportation can run cleaner and less expensively using propane as can police cars and various other light-duty vehicles. Typically in fleet applications, propane costs less than gasoline and offers a comparable driving range to conventional fuel. Lower maintenance costs are a prime reason behind propane's popularity for high-mileage vehicles. Many suppliers offer an inexpensive lease of the tank, pump, and dispensing equipment in return for a multi-year fuel supply contract. In these cases the station owner or fleet is only responsible for the cost of infrastructure that cannot be removed from the site when the fuel contract is completed, such as the electricity line or the concrete pad for the storage tank. This can make the upfront cost of propane infrastructure very affordable. The cost of establishing private infrastructure includes purchasing and installing the necessary equipment for dispensing propane and typically runs from $37,000 to $175,000, but varies based on situation and need. Propane's high octane and low-carbon and oil-contamination characteristics have resulted in greater engine life than conventional gasoline engines. Because the fuel's mixture of propane and air is completely gaseous, cold start problems associated with liquid fuel are reduced. Broward County Transit is initiating the procurement of 183 propane vehicles for the Paratransit service that will reduce greenhouse gas emissions by replacing the use of 700,000 gallons of gasoline with a cleaner burning fuel.

PROPANE IS A CLEANER BURNING FUEL THAN CONVENTIONAL GASOLINE AND DIESEL DUE TO ITS LOWER CARBON CONTENT. WHEN USED IN VEHICLES, PROPANE OFFERS LIFE CYCLE GREENHOUSE (GHG) EMISSIONS BENEFITS OVER CONVENTIONAL FUELS

BROWARD COUNTY PUBLIC SCHOOLS PURCHASED 98 PROPANE SCHOOL BUSES IN APRIL 2014. THIS IS THE NATION'S LARGEST SINGLE ORDER OF PROPANE AUTOGAS FUELED BUSES BY A SCHOOL DISTRICT.

FIGURE 3: THE WAVE IS AN ELECTRIC STREETCAR SYSTEM PROPOSED FOR DOWNTOWN FORT LAUDERDALE.

➲Electric Vehicles

Electric vehicles have four primary benefits: they are powered by domestically produced electricity – reducing the country's dependence on foreign oil; they emit zero tailpipe emissions and are 70 percent cleaner than gas powered vehicles when considering upstream emissions produced at the power plant. Electric vehicles offer significantly less maintenance and are significantly less expensive to operate over their lifetime (80 percent lower fuel costs, 35 percent lower maintenance costs and 30 percent lower repair costs). In addition, since most homes and businesses are already connected to the electric grid, installing PEV charging infrastructure can be as low as several hundred dollars to $10,000 or more, depending upon the site, charging level, and infrastructure needs. Federal tax credits are available to offset the cost of installing PEV chargers.

Quick Guide to PEV Types

PEV Plug-in electric vehicles get all or part of their power from the electric grid and include BEVs, PHEVs and EREVs.	**BEV** Battery-electric vehicles (BEV) run entirely on grid-charged batteries.	**PHEV** Plug-in hybrid electric vehicles have batteries recharged from the electric grid and also contain internal combustion engines fueled by gasoline.	**EREV** Extended-range electric vehicles (EREVs) also have a gas engine that powers an electric generator for several hundred additional miles after the car's battery is fully discharged

PEVs can be ideal vehicles for employee motor pools. Plug-in Hybrid Electric Vehicles (PHEVs) which contain both batteries and gas tanks provide an unlimited driving range since these cars automatically switch over to gasoline when the battery charges are empty. With continual technological advancements, batteries are becoming smaller, more powerful, and less expensive over time. Plug-in electric pick-up trucks and larger electric vehicles including mass transit buses are coming onto the market now. Hybrid electric and fully electric buses are viable alternatives to diesel-fueled buses. The Wave is a 2.7 mile electric streetcar system that will serve as a local circulator in Downtown Fort Lauderdale and will be operated by Broward County Transit (BCT) starting in -late 2017. It will have 14 stations reflective of the character of the area, which will be solar powered and will feature real time information and informational kiosks displaying destinations and attractions in the downtown, as well as upcoming community events. The Florida Turnpike already installed basic infrastructure at the Snapper Creek, Pompano Beach, West Palm Beach, Fort Drum and Turkey Lake Service Plazas for level two and fast chargers. The Snapper Creek service plaza has four PEV charging spaces and Pompano Beach eight. The Turnpike is also considering partnering with vehicle manufacturers to install superchargers.

➲ Biodiesel

Biodiesel is a domestically produced, renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled restaurant grease for use in diesel vehicles. Biodiesel's physical properties are similar to those of petroleum diesel, but it is a cleaner-burning, domestically produced alternative. Using biodiesel in place of petroleum diesel, especially in older vehicles, can reduce emissions. Blends of 20 percent biodiesel with 80 percent petroleum diesel (B20) can be used in nearly all diesel equipment and are compatible with most storage and distribution equipment. These low-level blends generally do not require any engine modifications; however, users should consult their original equipment manufacturer and engine warranty statement. Higher blends, even pure biodiesel (100% biodiesel, or B100), may be able to be used in some engines (built since 1994) with little or no modification. However, engine manufacturers are concerned about the impact of B100 on engine durability. An important consideration is to ensure that the biodiesel mix is of high quality and that the fuel does not exceed its shelf life. Biodiesel fuel is yet another option for mass transit buses and large vehicles. Since March 2006, the Broward County Fort Lauderdale-Hollywood International Airport has been using biodiesel hybrid electric shuttles primarily on the Airport's remote parking route and intra-terminal loop. The Broward County Fleet Services Division has been using B20 since 2006. The County uses approximately 350,000 gallons of B20 per year. Tri-Rail commuter-rail trains also operate on biodiesel since 2008. Their goal is to use mostly B99 from palm or soy oil, depending on availability.

COMPARED WITH USING PETROLEUM DIESEL, USING BIODIESEL IN A CONVENTIONAL PETROLEUM DIESEL ENGINE SUBSTANTIALLY REDUCES TAILPIPE EMISSIONS OF UNBURNED HYDROCARBONS, CARBON MONOXIDE, SULFATES, NITRATED POLYCYCLIC AROMATIC HYDROCARBONS, AND PARTICULATE MATTER.

FIGURE 4: TRI-RAIL IS A COMMUTER RAIL LINE LINKING MIAMI, BROWARD AND PALM BEACH THAT STARTED USING BIODIESEL IN 2008.

➲ Ethanol

Ethanol is a renewable fuel made from corn and other plant materials. The use of ethanol is widespread—almost all gasoline in the U.S. contains ethanol in a low-level blend. Ethanol is also available as E85—a high-level ethanol blend—for use in flexible fuel vehicles. A gallon of ethanol contains less energy than a gallon of gasoline. The result is lower fuel economy than a gallon of gasoline. The amount of energy difference varies depending on the blend. For example, E85 has about 27 percent less energy per gallon than gasoline (mileage penalty lessens as ethanol content decreases). However, because ethanol is a high-octane fuel, it offers increased vehicle power and performance. More than 95 percent of the gasoline sold in the United States contains low levels of ethanol. Low-level blends require no special fueling equipment, and they can be used in any conventional gasoline vehicle. The equipment used to store and dispense ethanol blends above E10 is the same equipment used for gasoline with modifications to some materials. All equipment used in the handling, storing, and dispensing of these blends must be designed specifically for such use. Broward County currently has eight E85 public fueling stations in Cooper City, Southwest Ranches, Pompano Beach, Fort Lauderdale, Coral Springs, Deerfield Beach, and Lighthouse Point.

FIGURE 5: CANYON COUNTY'S FLEET IN IDAHO, NOW USES E85 THAT IS DOMESTICALLY PRODUCED FOR THEIR FORD FUSIONS AND CROWN VICTORIA POLICE CRUISERS.

➲ Hydrogen

Hydrogen is a potentially emissions-free alternative fuel that can be produced from diverse domestic energy sources. Research is under way to make hydrogen vehicles practical for widespread use.

IN 2009 DUKE ENERGY HOSTED TWO PILOT HYDROGEN FUELING STATIONS IN FLORIDA, ONE NEAR THE ORLANDO AIRPORT THAT FUELED AIRPORT SHUTTLE BUSES AND ANOTHER AT AN OPERATIONS CENTER THAT FUELED FORD FOCUS FCVS. STATION COMPLETED MORE THAN 3,200 FILL UPS.

➲ Tactical Approach for Diversifying Clean Fuel Options for Fleets

In October 2013, Broward County hosted a workshop with other regional partners and interested members of both public and private sectors to brainstorm challenges and solutions in the expansion of PEV deployment. Many of these strategies extend beyond electric and are applicable to all alternative fuel challenges and potential solutions. Recommendations that Broward County might consider include:

- Encouraging cities in Broward County to adopt resolutions to promote alternative fuels within their jurisdictions.
- Providing tax incentives for businesses that have large fleets.
- Waiving or discounting permitting and impact fees.
- Encouraging fleet managers to consider life cycle costs rather than initial costs of alternative fuel fleet conversions.
- Establishing a mandate for a certain percentage of the fleet to be AFV.
- Recommending that vehicle procurement lists that public fleet managers use are updated at least once per year to reflect new models that manufacturers are bringing to the market.
- Considering the establishment of a purchasing coop between public and private fleets that will allow collaboration and "purchasing power" with vehicle manufacturers.
- Providing additional credit in RFP language for use of alternative fuels for services involving vehicles (like waste collection) that are contracted out.
- Strengthening anti-idling policies and explore idle reduction technologies that may be used by other large public and private fleets.

Focus Area 2 ▪ Expansion of Local Plug-in Electric Vehicle Infrastructure in Broward County

➲ Overview

In many ways, fueling an electric vehicle is simpler than fueling a conventional gasoline or diesel powered vehicle. That is because access to electricity is everywhere – just about every home and business in the U.S. is connected to the electric grid, and the most basic requirement to charge a PEV is access to a 120-volt outlet.

However, broad PEV adoption depends on having the appropriate infrastructure in place to support charging – even when far from home, or for those who do not have access to parking near an electric outlet, such as residents of multi-unit dwellings.

From 2011 to 2013, sales of PEVs more than tripled in Broward County as has been true nationally, and this adoption rate is greater than that of hybrid electric vehicles immediately following their appearance on the market. Moreover, while this County is home to 9.4% of the state population, 11.7% of Florida's PEV sales are in Broward. Clearly, many Southeast Floridians are charged up about reducing their use of gasoline and accessing the benefits of PEV ownership. Through public education about and exposure to PEVs, the number of converts should continue to grow.

This section deals with identifying options for public and private infrastructure deployment in Broward County to support broad-scale PEV adoption – with recommendations for how the County should prioritize this rollout.

➲ Benefits of PEVs

Widespread adoption of plug-in electric vehicles (PEVs) – whether they are battery-electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), or extended-range electric vehicles (EREVs) – will bring the County and its residents several key benefits, such as:

- Economic advantages, including lower fuel and operating costs for owners: Owners can expect to fuel up for 80 percent less than they'd pay at the gas pump.
- Environmental and health benefits from reduced emissions: Battery electric vehicles emit 70 percent fewer emissions than gas-powered cars, when considering upstream emissions from power plants.
- Improved energy security, due to lower reliance on foreign fuels: Less than 1 percent of the region's electricity is generated from oil.
- Better utilization of the electrical infrastructure: There is sufficient electrical capacity in the grid to support widespread adoption of PEVs in Southeast Florida.

Challenges

Whether these challenges are more rooted in reality or perception and myth, they are very real in their ability to slow market adoption. In fact, while PEV sales nationwide tripled between 2011 and 2012, the market has still experienced slower-than-initially-predicted PEV market growth globally. This plan considers the following PEV challenges:

- Limited range compared to gasoline vehicles: While the range of commercially available PEVs on the road today exceeds the average U.S. daily commute, a lack of familiarity with PEV technology can lead to feelings of "range anxiety" among drivers.

- Limited public/semi-public charging infrastructure: While most PEV owners will charge at home, regions with high penetrations of multi-unit dwellings (i.e. apartments and condominiums) – like Southeast Florida – will rely more on public and semi-public workplace charging infrastructure to support vehicle charging.

- Higher upfront cost: The purchase prices of today's PEVs are higher than comparable gas-powered cars. Fortunately, when lifetime operating costs are considered, most PEVs have a lower total cost of ownership than gas-powered cars. Additionally, federal tax incentives and attractive lease options exist to help lower the cost barrier.

- Long charge times: Charge times can take six to eight hours or more on a 120-volt, AC Level-1 charge. Fortunately, this is more than adequate for most PEV owners, who will charge overnight. For other PEV owners, an investment in a faster charging station is an option – but more expensive.

- Limited styling: Today's PEVs are offered in fewer body styles than traditional gas-powered cars and are predominantly offered in the styling of more traditional sedans.

- Lack of technology familiarity: People lack familiarity with reliability features, range, general capabilities, and charging requirements of PEVs. For these reasons, it is important to bridge that gap in technology understanding with education and PEV access.

➲ Overcoming Challenges

The major barriers as they exist today can lead to a lack of broad appeal. Increased awareness and interest will perhaps be most dependent on improved customer education and outreach, as a number of these barriers result from misconceptions and "myths" about PEV range, charge times, safety, impact on electric bills, and overall performance.

Even with information and access to electric vehicles, PEVs are certainly not for everybody. However, the "playing field" is currently stacked in favor of gas- and diesel-powered cars – with an abundance of gas stations available to drivers, compared to a relatively small number of charging stations. Supporting current and future PEV owners with adequate public and semi-public charging infrastructure will require an additional collaborative effort among public and private entities in the region and beyond. This collaborative effort is needed – and is currently underway – to: ensure adequate public and private charging infrastructure exists; help make the installation of electric vehicle supply equipment (EVSE) a smooth process with supportive codes, policies, permitting, and zoning; help jumpstart the market – and public acceptance – of PEVs by supporting the conversion of gas fleets to electric fleets and by sharing with other Broward County municipalities and regional partners the planning and regulatory tools to expand PEV infrastructure across jurisdictions.

➲ Selecting and Siting Charging Equipment

A number of decisions must be made when selecting charging equipment – based on the charging level required, the type of location in which the charging will be installed, and an understanding of the users' driving patterns, preferences, and behaviors. This section details types of charging available today – including charging levels and various feature options that will be important to understand when reading through the remainder of this report's infrastructure section.

The categories of PEV charging available today are detailed in Table 1. PEV owners (for fleet and residential applications) and site hosts (for workplace charging and public applications) should consider the characteristics of the site, their budget, and the expected usage patterns (mileage and parking duration) of the user(s) before deciding which level of charging is most applicable.

TABLE 1: CATEGORIES OF PEV CHARGING

	AC Charging Home, Fleet and Public Use		DC Fast Charging Public and Large Fleet Use	
Type	Level-1	Level-2	Level-1	Level-2
Power	120V, 1.4 kW @ 12 amp 120V, 1.9 kW @ 16 amp	240V, up to 19.2 kW (80 amp)	200 – 500V, up to 40 kW (80 amp)	200 – 500V – up to 100 kW (200 amp)
Charge Time (Miles of range per hour of charge)	3 to 5 miles	3.3 kW – 10 to 14 miles 6.6 kW – 20 to 25 miles 9.6 kW – 40 to 45 miles 19.2 kW – up to 60 miles	40 kW – up to 120 miles	100 kW – up to 300 miles

It is most prudent to match charging speed/charging level with expected mileage and parking duration of most users. Relatively low mileage, and/or long parking durations are suitable for AC Level-1 charging. AC Level-2 charging should be matched with shorter parking durations of one to four hours and/or longer mileage, and DC-Fast Charging belong with high expected mileage and very short parking durations – such as along major highway corridors or for use with some heavy-duty fleet options, such as an electric bus. Given the higher installation cost, higher electric demand requirements, and monthly costs of DC-Fast Charging, it is most cost-effective to select locations where there is a high volume of expected usage.

Charging stations come with many features and options depending upon the needs and requirements of the site. Basic, lower-cost equipment can be purchased for most charging scenarios – particularly for residential and fleet needs. More specialized and often networked charging equipment, with enhanced features such as cord management systems, digital screens that display advertising, payment systems, reservation features, can be purchased if the policies of the site/location require it. These feature-rich stations are mostly found at public venues.

Because each site is unique, site hosts should consult with experienced, licensed contractors to develop site plans. This can lower cost, improve usability, and reduce potential safety hazards. The contractor will consider a number of factors including connecting the charging equipment to a power source, ensuring available electrical capacity, integrating into existing site structures, among others (such as adequate lighting, visibility, parking space size, protective barriers, ADA accessibility, signage, state 'methods of sale' requirements, cord safety, etc.) The contractor and site host should also ensure it meets applicable state and local codes and standards.

More information on siting and selecting charging equipment can be found in the Southeast Florida PEV Readiness Plan.

➲ Priorities for Deployment of Charging Infrastructure

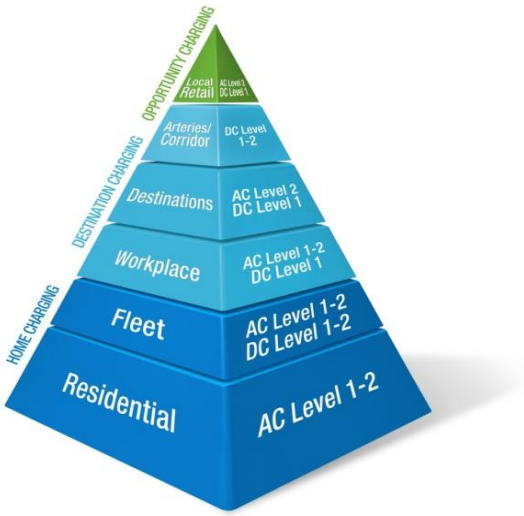


FIGURE 6: PRIORITY ORDER FOR IMPLEMENTATION OF INFRASTRUCTURE

The modern day national rollout of electric vehicles began in 2011, and has provided three full years of data and real world experience. Broward County can benefit from learning other regions' best practices. Figure 6 details the priority order for implementation of infrastructure based on these learnings – beginning with residential and fleet charging and ending with some selective, well-placed public charging.

Evidence is showing that the need for widespread public infrastructure has been over-blown. While some well-placed public-infrastructure is certainly necessary, many public charging stations remain under-utilized – even in areas with high adoption of PEVs.

Instead, the vast majority – 90 percent or more - of charging happens at home. Even as additional public and semi-public charging (i.e. workplace) stations become available; it is very likely that home charging will continue to prevail as the preferred location for PEV owners. That is because charging at home offers convenience, and low residential electricity rates. In addition, cars tend to remain parked for long durations overnight, providing ample opportunity to fully recharge using AC Level-1 or AC Level-2 EVSE.

Unfortunately, residents of multi-unit dwellings, such as apartments and condominiums face added challenges associated with charging at home due to more complicated installations, additional stakeholder involvement, complex physical structures with unique parking considerations and potentially constrictive homeowner association bylaws. This is a particularly high hurdle in Broward County, since 44 percent of occupied dwellings are considered multi-unit – and addressing this challenge will thus be a tactical focus area of this strategy.

Fleet charging is similar to home charging – particularly for fleets with predictable, local routes, returning to a "home" base each day or evening. The benefits are similar – private firms and public agencies enjoy the convenience and low cost, stable electricity rates (often leveraging time of use rates, fueling their vehicles during low peak electricity times – paying lower rates).

Next to residential and fleet charging, workplace charging is an important location for infrastructure development. That is because the workplace often serves as one of the longer daily trip distances, and the cars are parked for considerable durations, allowing time for adequate charging at lower levels (i.e. level 1 charging).

For those with limited electric range, PHEVs in particular, workplace charging can maximize the number of electric-only miles, which allows full realization of the myriad of benefits of electric transportation. For employees who live in multi-unit dwellings and are unable to charge at home, workplace charging can serve as their primary charging location, allowing them to purchase a PEV when it might not have been practical otherwise. Broward County is a ***Partner*** in the Department of Energy's Workplace Charging Challenge. As part of this program DOE is calling on America's employers to sign the Workplace Charging Challenge Pledge as "Partners" to make a bold commitment to provide PEV charging access to their workforce. The Pledge also enlists stakeholder organizations as "Ambassadors" to promote and facilitate workplace charging. DOE offers a number of resources to employers that include: EV 101, guidance on infrastructure selection, outreach toolkit, webinars, Clean Cities University online classes, case studies and technical assistance.

BROWARD COUNTY IS A PARTNER IN THE DEPARTMENT OF ENERGY'S WORKPLACE CHARGING CHALLENGE. BROWARD IS THE FIRST COUNTY GOVERNMENT IN THE NATION TO JOIN AND THE THIRD PARTNER IN THE STATE OF FLORIDA, ALONG WITH METLIFE, INC. IN TAMPA AND SIEMENS IN ORLANDO.

Partners who sign the Workplace Charging Pledge will:

- Commit to assessing employee charging demand and developing a plan to install charging stations. Partner plans will include milestones for charging infrastructure installation with a minimum goal of provision of charging for a portion of PEV-driving employees at one or more major employer worksites, and a best practice goal of assessing and meeting all PEV-driving employee demand.
- Take action by implementing a plan to install charging stations for their employees.
- Share progress on achieving plan milestones over time, as well as best practices.

Finally, some strategically placed public charging can contribute to the long-term commercial success of PEVs. Well-placed public charging can:

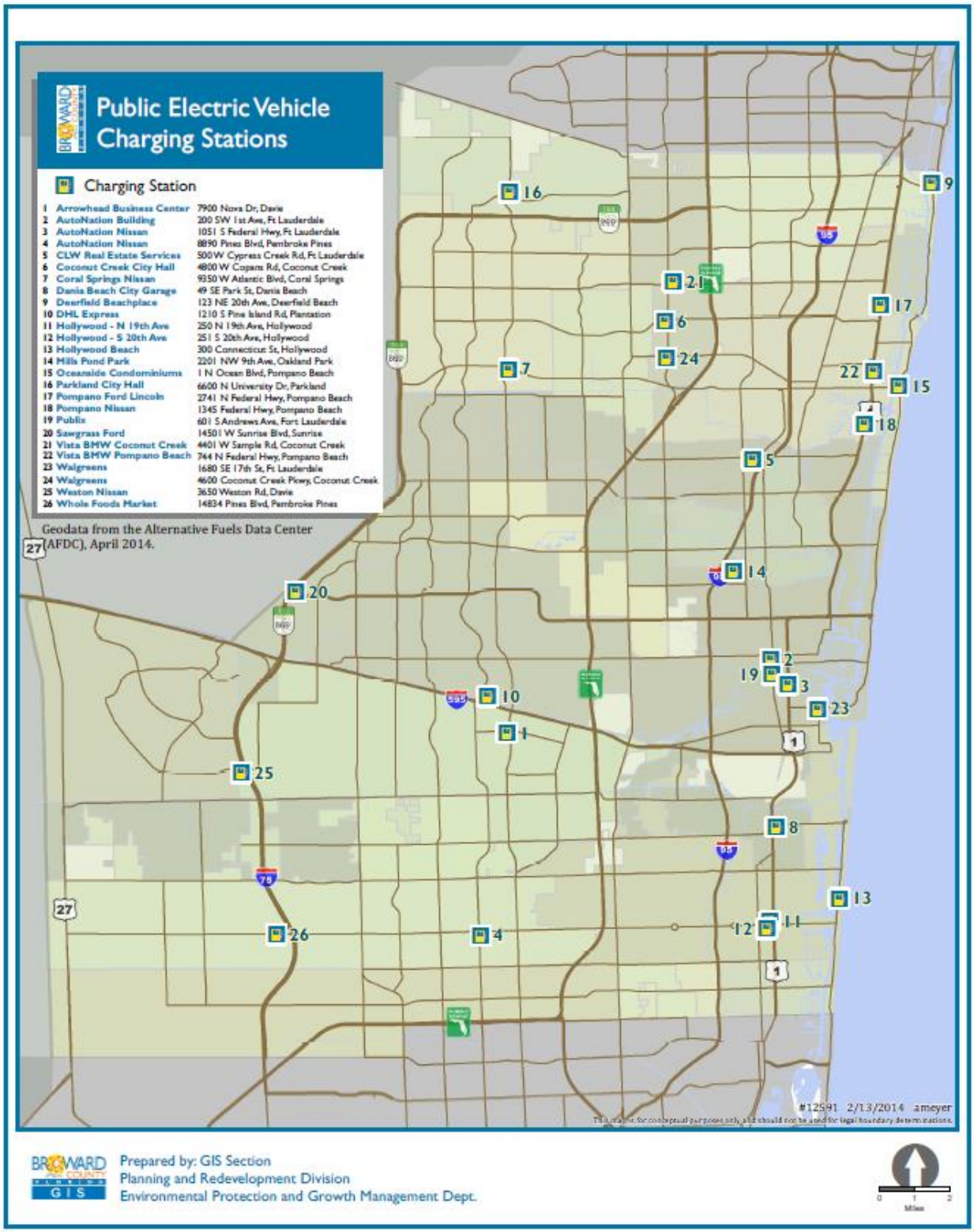
- Increase the visibility of PEVs among the general public.
- Allow drivers of PHEVs and EREVs to maximize the number of electric-only miles, reducing gasoline consumption.
- Allow BEV drivers to travel beyond their standard range.
- Provide a primary charging location for multi-unit dwelling residents who may be unable to charge at home or at work.

Public charging locations (in priority order) include: major destinations and attractions, major transportation corridors and intercity routes, public lots and garages, and local retail establishments. There are currently 22 public charging stations in Broward County[1], serving 635 locally-owned PEVs and the 1,300 visiting PEVs from neighboring Palm Beach and Miami-Dade Counties.[2] See Figure 7 for a map of available public charging in Broward County.

[1] Source: Alternative Fuels Data Center

[2] Source: Florida Dept. of Highway Safety and Motor Vehicles – query October 7, 2013

FIGURE 7: BROWARD COUNTY'S PUBLIC ELECTRIC VEHICLE CHARGING



Payment Models

Depending upon the location of the charging equipment, site hosts should consider the various user payment models and determine what makes sense for them. For some public station hosts – such as restaurant and retail venues (local box stores, malls, grocery stores, etc.), it makes sense to offer free charging. The stations are meant to attract and retain customers, and therefore the initial and ongoing costs are seen as marketing expenses and gladly absorbed. After all, most PEV drivers do not travel far for the typical shopping or dining experience and therefore do not necessarily need to charge their vehicle. However, they may actively choose to shop/dine at a venue simply because charging is available for them. Evidence shows that charging infrastructure at local / retail locations remains underutilized if hosts impose a fee on users. The early phases of infrastructure expansion are teachable moments for the PEV owners – a point to place educational kiosks about the benefits of PEVs. It may be possible to establish public-private partnerships to install solar charging/pay stations.

Other site hosts impose a fee for charging to recoup their initial investment and ongoing costs, and/or to help manage charging station usage and encourage vehicle turnover. This is especially important in locations with long parking durations, but short charging durations – resulting in cars sitting at charging stations for considerably longer than required for charging. If the charging station has a time-based fee attached to it (rather than by kWh usage alone), drivers will most likely move the car when fully charged – or pay for the service the entire time parked. Site hosts imposing a fee should consider the fact that a sizable portion of the PEV market (60 percent today – though this is changing) are PHEVs and EREVs, not BEVS. These owners will have the choice to plug in to maximize their electric miles or to drive home on gasoline when their electric range is spent. Therefore a good rule of thumb is to keep the cost of public charging on par with – or less than – the equivalent cost of gasoline (Table 2). If the cost is too high, the stations will be underutilized.

TABLE 2: GUIDELINES FOR SELECTING CHARGING FEES BASED ON PRICE OF GAS

	AC Level-1	AC Level-2 @ 3.3 kW	AC Level-2 @ 6.6 kW
Miles gained per hour of charging a PEV	3 to 5 miles	10 to 14 miles	20 to 25 miles
Gasoline Equivalent* per Hour of Charge	$0.43	$1.29	$2.36
Cost of Electricity** per Hour of Charge	$0.17	$0.30	$0.59
Fee Target	**Less than $0.43 per hour or $0.11 per 15 minutes**	**Less than $1.29 per hour or $0.32 per 15 minutes**	**Less than $2.36 per hour Or $0.59 per 15 minutes**

**Assumes gasoline price of $3.75 per gallon and 35 miles per gallon fuel efficiency for a PHEV or EREV running on gasoline*
***Assumes electricity rate of $.09 per kilowatt-hour, with no impact to demand charges*

Homeowners' associations at multi-unit dwellings – as well as employers for workplace charging may also decide to impose user fees for charging, depending upon their respective policies.

There is no "one-size-fits-all" approach for charging equipment selection, siting, and payment models. This is one of the biggest challenges the market faces. Continued education and outreach can help potential site hosts make informed decisions for their facilities.

➲ Tactical Approach for Expanding PEV Charging Infrastructure in Broward County

General

a. Land-development regulations should allow AC Level 1, AC Level 2 and DC Fast charging be considered an outright permitted use in commercial, industrial and institutional zoning districts and as accessory uses in low-density residential districts. Zoning ordinances can be amended to define where charging stations are permitted, whether the nature of the permit is outright or conditional, what charging power levels are allowed in which locations, how charging stations are sited, and if new buildings and parking facilities are required to pre-wire for or install charging stations (Santa Clara, CA). Clearly specifying which zoning districts permit charging station installation and at what power level can reduce confusion for property owners and public officials and foster deployment (City of Bellevue, WA). Site design guidelines and standards can also be codified in zoning ordinances to ensure that charging stations are designed to be functional, safe, accessible, low-cost, and efficient. Zoning ordinances can specify criteria for charging station size, accessibility, maintenance, lighting, signage, and other site design elements in different zoning districts or in public places (Clark County, WA). Zoning ordinances can also be amended to establish incentives or requirements for charging station installation. Zoning codes can include charging stations in the calculation for minimum required parking spaces pursuant to established zoning ordinances or provide density bonuses for installation of charging stations. Zoning ordinances can also require that a percentage of parking spaces be outfitted with or prewired for charging stations in new multi-unit residential, commercial, industrial, or large parking lot construction (Kent, WA).

b. Select or modify a streamlined and standardized model (i.e. online or over-the-counter) for permitting and inspection of residential and commercial installation of PEV charging infrastructure (Douglas County, WA).

    i. Leverage templates and processes published by the Department of Energy's Clean Cities Coalition and those successfully implemented by other PEV-ready regions across the U.S. (PEV Collaborative, CA).

    ii. Consider implementing a similar streamlined online approval process as the "Broward Go Solar" project.

c. Establish consistency across Broward County on the permitting and inspection process for residential and commercial installation of charging equipment.

d. Implement a Broward County electrical contractor certification process to help residents select qualified professionals.

Residential Charging

a. Provide best practice resources for multi-unit dwelling residents, HOAs, and building managers about the various options they can select for implementing charging policies and processes for residents and guests.

    i. Leverage fact sheets developed under the DOE's Southeast Florida PEV Readiness Plan.

    ii. Host and promote regular workshops to multi-unit dwellings. This could include collaboration with FPL. They have a workshop format already developed and available to the County.

    iii. Implement networking group of "mentors" who have successfully implemented charging in their buildings and who are available to help others navigate the process.

b. Consider implementing a policy which requires new construction of multi-unit dwellings – or existing multi-unit dwellings which are undergoing major renovations – to plan for charging infrastructure (conduit, electrical capacity, charging spaces only).

Fleet Charging

a. Ensure adequate charging infrastructure at Broward County government buildings to support the acquisition of PEV fleet vehicles (see Focus Area 1).
b. Work with municipal fleets to promote the expansion of PEV infrastructure.

Workplace Charging

a. Support the Department of Energy's "Workplace Charging Challenge" and establish a workplace charging policy for Broward County employees.

b. Serve as a local **Partner** of the "Workplace Charging Challenge" and promote workplace charging to other municipalities and government agencies in Broward County as well as the private sector – targeting the roughly 2,100 businesses in the county with 50 or more employees each.

c. Provide incentives to business to provide workplace charging.

Public Charging

a. Expand the quantity of public charging stations as demand for them increases – a phased growth, depending upon increasing numbers of PEVs and charging needs. Focus on high priority locations first – including destination locations, major corridors, places of worship, municipal parking garages, and downtown areas.

   i. Identify targeted locations for charging infrastructure.

      1. Destination locations, where people travel from afar and stay several hours – such as major commuter universities, major museums, culture and wildlife centers, major sporting arenas, major parks and other attractions (convention centers, etc.)

      2. Major intercity roadway corridors – Target rest areas, restaurants and other services geared toward travelers.

      3. Major transportation hubs – such as airport, seaport, intercity rail service, park and ride facilities.

   ii. Develop outreach plan to engage decision-makers at these high-priority locations.

   iii. Work with decision-makers to identify potential sources of infrastructure funding, including grants, use of Electric Vehicle Service Providers, PACE funding, and others to help site operators implement charging plans.

   iv. Provide preferred parking locations for PEVs.

The Southeast Florida PEV Readiness Plan identified destination locations where access to public charging should be considered and evaluated against ideal siting criteria.

Major Transportation Hubs in Broward County

- Ft. Lauderdale International Airport
- Port Everglades (including cruise lines)
- Tri-County Commuter Rail Stations - connecting Miami-Dade, Broward, and Palm Beach Counties
- All Aboard Florida Rail Station – Express Commuter Rail connecting Miami and Orlando (Coming Soon!)

Major Highways and Railways in Broward County

- Interstate 95 (SR 9)
- Interstate 595
- A1A Scenic Highway
- CSX Rail Corridor
- Interstate 75 (SR 93)
- Sawgrass Expressway (SR 869)
- U.S. 1
- FEC Rail Corridor
- Florida's Turnpike
- Homestead Extension (SR 821)
- U.S. 27

Universities in Broward County

- The Art Institute of Fort Lauderdale
- Nova Southeastern University
- Keiser University
- University of Phoenix
- DeVry University
- Broward College
- Technological University of America

Culture and Wildlife

- Fern Forest Nature Center
- Broward Center for the Performing Arts
- Secret Woods Nature Center
- Flamingo Gardens
- Anne Kolb Nature Center

Sporting Arenas in Broward County

- BB&T Center (formerly Bank Atlantic Center)
- Ansin Sports Complex
- Fort Lauderdale Aquatic Complex
- Sun Life Stadium
- Broward Table Tennis Club
- Tennis Center of Coral Springs
- Fort Lauderdale Stadium
- International Swimming Hall of Fame
- Incredible Ice
- Dania Jai Lai
- Jimmy Evert Tennis Center

Other Locations in Broward County

- Broward County Convention Center
- Seminole Hard Rock Gambling Hotel and Casino
- Gulfstream Park Racing & Casino
- Las Olas Boulevard
- Mardi Gras Casino
- Sawgrass Mills Mall
- War Memorial Auditorium
- Isle Casino Racing Pompano Park
- Hospitals
- Swap Shop
- Local Beaches

Parks in Broward County

- Boaters
- Central Broward Regional
- Everglades Holiday
- Markham
- Plantation Heritage
- Tradewinds
- Brian Piccolo
- Deerfield Island
- Hollywood North Beach
- Quiet Waters
- Tree Tops
- West Lake
- C. B. Smith
- Easterlin
- Long Key
- Topeekeegee Yugnee
- Vista View

➲ Notable codes, policies, ordinances affecting PEVs, charging infrastructure in Broward County

The City of Lauderhill adopted Ordinance 120-06-119 on June 25, 2012. The ordinance requires all new single-family residential units that do not include charging infrastructure to incorporate charging equipment into the building plans.

Focus Area 3 ▪ Incentivize Parking for Alternative Fuel Vehicles

In order to help promote the use of alternative fuel vehicles many states, counties, cities and private entities across the United States have implemented financial and non-financial incentives for parking. Financial incentives may include preferential or premium parking locations, free valet parking, free parking or reduced fees for AFVs. Some non-financial incentives are AFV parking space requirements for large developments, AFV parking enforcement regulation, AFV parking spaces at park-and-ride lots, and requirements for infrastructure-ready new construction in the case of electric charging.

➲ Financial Incentives

Los Angeles, California

Los Angeles allows free meter parking for Zero Emission Vehicles and Super Ultra Low Emission Vehicles, including alternative fuel vehicles powered by electricity, compressed natural gas, and hydrogen. Specified hybrid electric vehicles are also eligible. To qualify, the vehicle must display a California Clean Air Vehicle Decal from the California Department of Motor Vehicles.

San Jose, California

The City of San Jose developed a Clean Air Vehicle Parking Program to reduce vehicle emissions, stimulate activity in the downtown, and increase sales of clean air vehicles at San Jose auto dealerships. For eligible vehicles, the program allows free parking at participating municipal off-street parking facilities, on-street meters, and regional park and recreation parking lots. Vehicles must display the Clean Air Vehicle Parking Permit, which is available for a $30 application fee. Only eligible vehicles purchased in San Jose after January 1, 2000, can obtain a permit. Zero Emission Vehicles purchased outside San Jose are also eligible to apply as long as the vehicle is registered in San Jose (City of San Jose, California, Resolution No. 74769*).*

Sacramento, California

Sacramento offers free parking to individuals or small businesses certified by the city's Office of Small Business Development that own or lease EVs with an EV parking pass in designated downtown parking garages and surface lots. Vehicles must be 100 percent electric to qualify.

New Haven, Connecticut

Free parking on all city streets for qualified AFVs and HEVs registered in New Haven, CT.

➲ Nonfinancial Incentives

Local and state governments have the ability to incentivize AFV parking programs through the use of regulatory functions (zoning, land development regulations, permitting, etc.) When formulating the parking standards, local governments should consider:

- Providing charging and parking incentives.
- Reducing parking requirements for electric vehicle charging infrastructure installation.
- Incenting charging station installations in existing parking lots.
- Enforcing hours on PEV charging.

- Considering the number of parking spaces dedicated to PEVs.
- Considering location of charging infrastructure (based on ADA accessibility and a preliminary assessment of electrical panels, breakers, and the like).

Local government land-development regulations should require that some percentage of designated parking spaces at newly constructed multi-unit dwellings be equipped with electrical infrastructure for PEV charging. Details on appropriate charging types for multi-unit dwellings are available in the Southeast Florida PEV Readiness Plan (p. 6-68).

South Florida Commuter Services (SFCS)

The South Florida Commuter Assistance Program is a one-stop shop for commuter information for programs and services in Miami-Dade, Broward, Palm Beach, Martin, and St. Lucie counties. The program is dedicated to improving traffic conditions by promoting alternatives to drive-alone commuting. By working with SFCS, employers can receive:

- Analysis of employees' commuting habits.
- Assistance in implementing employee commuter benefits.
- **Administration of commuter programs such as the Preferential Parking Program for carpools and AFVs.**
- Web-based tools to help you calculate the overall financial and environmental benefits of the commuter program.
- Innovative ideas on how to encourage employees to use alternative modes of transportation through use of incentives.
- Potential tax benefits associated with commuting options such as transit, vanpools and parking cash-out.

FIGURE 8: AFV PREFERRED PARKING AT GOVERNMENT CENTER WEST IN PLANTATION, FL SUPPORTED BY SFCS.

State of Arizona

An individual driving an AFV may park without penalty in parking areas that are designated for carpool operators provided the vehicle is using alternative fuel. Recognized alternative fuels include propane, natural gas, electricity, hydrogen, and a blend of hydrogen with propane or natural gas (Arizona Revised Statutes 28-877 and 28-4032).

State of Hawaii

Public parking systems with 100 parking spaces or more must include at least one designated parking space for PEVs and provide a PEV charging station.

State of California

The California Department of General Services and California Department of Transportation (DOT) must provide 50 or more parking spaces and park-and-ride lots owned and operated by DOT to incentivize the use of alternative fuel vehicles.

Miami-Dade, Florida

The County is considering a zoning ordinance that will create a new section in the zoning code requiring PEV charging stations in off-street parking lots.

➲ Tactical Approach to Incentivize AFV Parking

Broward County can encourage the expansion of AFV parking incentives by:

- Allowing preferred, free, or reduced parking for AFVs in county-owned facilities (airport, parks, downtown garage, convention center, BB&T Center, etc.)
- Proposing regulations to authorize enforcement for non-AFV that park in designated areas and associated penalties.
- Providing signage guidelines for AFV parking spaces.
- Developing model parking ordinances for other municipalities and regional partners' consideration.
- Partnering with South Florida Commuter Services to work with employers on preferential parking programs.
- Amending local government land-development regulations to require that some percentage of designated parking spaces at newly constructed multi-unit dwellings be equipped with electrical infrastructure for PEV charging.
- Partnering with the Florida Department of Transportation to provide AFV parking spaces at park-and-ride lots owned and operated by DOT and Turnpike service plazas to incentivize the use of alternative fuel vehicles.
- Partnering with the US Green Building Council and the Florida Green Building Coalition to promote the use of credits awarded for providing preferred or discounted parking for low-emissions vehicles, the installation of alternative-fuel fueling stations, offering building occupants access to a low emitting vehicle or fuel-efficient vehicle car-sharing programs, and more.

From Comprehensive Planning to Implementation

Broward County plays a critical role in sustainability leadership regionally, nationally and abroad through its participation in the White House Task Force on Climate Preparedness and Resilience, the Southeast Florida Regional Climate Change Compact, and Seven50. The County is partnering with the Southeast Florida Clean Cities Coalition, Florida Power & Light, Florida Department of Transportation, Zero Emission Market Acceleration Partnership and other stakeholders to advance the DOE-funded EV Community Readiness Plan for Southeast Florida from a vision into a reality in Broward County. The County manages over 300 buildings and facilities that provide services to 1.76 million residents and over 11 million annual visitors. Approximately two thirds of the county is conservation land and the remaining one third is almost built out, driving a change in the planning paradigm that local governments have traditionally used for redevelopment. It is the County's goal to work with municipalities and regional partners to promote enacting policies that support sustainable development and energy diversification.

Broward County is partnering with the Zero Emission Market Acceleration Partnership (MAP) from the UC Davis Policy Institute for Energy, Environment and the Economy to receive technical assistance in the implementation of this strategy and to expand PEV infrastructure regionally. The County is also an active member of the recently created Drive Electric Florida State Group (formerly Florida PEV Stakeholder Group) that is working to:

- identify statewide priorities,
- educate and increase awareness of the advantages of PEVs,
- propose policy recommendations and incentives, and
- implement short- and long-term initiatives to increase adoption of PEVs in the State of Florida.

UC DAVIS BRINGS 25 YEARS OF EXPERIENCE WITH ZEV MARKETS, TECHNOLOGY AND POLICY

ZERO EMISSION MAP COLLABORATES WITH AGENCIES, NON-GOVERNMENTAL ORGANIZATIONS, AUTOMAKERS AND PARTNER INSTITUTIONS IN THREE AREAS:

1. PROVIDES LEADING-EDGE YET ACCESIBLE ANALYTICAL RESOURCES TO HELP CREATE AND IMPLEMENT MARKET DEVELOPMENT STRATEGIES

2. PROVIDES SCIENCE-BASED INFORMATION ABOUT THE TECHNOLOGICAL AND SOCIETAL VALUE OF ZEVS

3. ASSISTS ALL STAKEHOLDERS IN DEVELOPING CREDIBLE ZEV EDUCATION AND OUTREACH STRATEGIES

As a Partner in the Department of Energy's Workplace Charging Challenge, the County has made a commitment to install workplace charging for employees. South Florida Commuter Services is collaborating with the County to encourage other employers to promote alternative fuel vehicles, EV charging stations and alternative commuting options for their employees.

The Strategy

Policy Information

ELEMENT	Climate Change
GOAL	19.0 Achieve a sustainable, climate resilient community by: promoting energy efficiency and greenhouse gas reduction strategies; protecting and adapting public infrastructure, services, natural systems and resources from climate change impacts; and continuing to coordinate and communicate locally and regionally to monitor and address the changing needs and conditions of the community.
OBJECTIVE	19.2. Advance transportation and land-use choices that: reduce fossil fuel use and vehicle miles travelled; improve the mobility of people, goods and services; provide a diverse, efficient and equitable choice of transportation options; and increase the County's resiliency to the impacts of climate change.
POLICY	19.2.5. Broward County shall continue to work with the Department of Energy Florida Gold Coast Clean Cities Coalition to support initiatives which seek to diversify fuel options for public transit and fleet vehicles, expand infrastructure for charging electric and hybrid electric vehicles, and incentivize parking for alternative fuel vehicles.
LEAD CONTACT & AGENCY	Maribel Feliciano, *Planning Administrator* Planning and Redevelopment Division
PARTNERS & CONTACTS	▪ Christine Heshmati, Southeast Florida Clean Cities Coalition ▪ Anne-Louise Seabury, Florida Power & Light ▪ Sarah Olexsak, U.S. Department of Energy Workplace Charging Challenge ▪ Gustavo Collantes, PhD., Policy Institute for Energy, Environment and Economy, University of CA ▪ Michael Ronskavitz, Deputy Director, Broward Metropolitan Planning Organization ▪ Veronica Fowler, South Florida Commuter Services ▪ Scott Campbell & Lee Marcum, Broward County Facilities Maintenance ▪ Cindy Corbett-Elder, Broward County Transit ▪ Carrie Kashar, Broward County Energy & Sustainability Program ▪ Debbie Griner, Transportation Manager, City of Fort Lauderdale ▪ Jeffrey Thompson, Broward County Construction Management ▪ Britten Cleveland, Sierra Club ▪ Gregor Senger, Florida Department of Transportation ▪ Anthony Lambkin, EV Regional Manager, East Coast, Nissan North America, Inc. ▪ PEV charging equipment installers & Consumers – Appendix B

Strategy

Recommendations from the U.S. DOE-funded EV Community Readiness Plan for Southeast Florida and feedback received from PEV infrastructure companies and installers, vehicle owners, transit and fleet managers, local governments and utilities served as a foundation to develop this plan of action for Broward County (Appendix B). Broward County will reconvene all partners and interested stakeholders to implement the strategy and track progress.

Focus Area 1: Diversification of Fuel Options for Public Transit and Fleet Vehicles		
Tactics	**Deliverables**	**Timeline**
1. Analyze current grants and sources of funding to determine if they cover alternative fuel vehicles.	List of grants Monthly report from grants office	Start May 2014 Ongoing
2. Encourage cities in Broward County to adopt resolutions to promote alternative fuels within their government fleets and jurisdictions.	Influence adoption in at least 10 Broward County municipalities	April 2015
3. Support legislation to provide tax incentives for AFV fleets.	Join and participate in Drive Electric Florida state group	Completed
	Share legislative package with Southeast Florida Clean Cities, Miami-Dade, Southeast Florida Regional Climate Change Compact, and the State Energy Office	Ongoing
4. Waive or discount permitting and impact fees for AFV fueling infrastructure.	Updated policy	April 2015
5. Encourage fleet managers to consider life cycle costs rather than initial costs of alternative fuel fleet conversions. Collaborate with Clean Cities and other partners.	Identify list of fleets	October 2014
6. Establish a goal to expand the percentage of the Broward County AFV fleet.	Goal established	October 2014
7. Collaborate with Clean Cities, DEF statewide group and the State of Florida to update vehicle procurement lists at least once per year to reflect new models that manufacturers are bringing to the market.	Updated list	Ongoing
8. Consider the establishment of a purchasing coop between public and private fleets that will allow collaboration and purchasing power with vehicle manufacturers.	Decision memo	June 2015

Focus Area 1: Diversification of Fuel Options for Public Transit and Fleet Vehicles

Tactics	Deliverables	Timeline
9. Additional suggestions that Broward County can consider include: ▪ For services involving vehicles (like waste collection) that are contracted out, provide additional credit in RFP language for use of alternative fuels ▪ Update the procurement process for vehicles to include anti-idling and electric components. ▪ Consider the economic, environmental and societal impacts by conducting a comparative pilot testing of different AFVs for transit applications.	Updated procurement language	June 2015

Focus Area 2: Expansion of Local PEV Infrastructure in Broward County

Tactics	Deliverables	Timeline
1. Land-development regulations should allow AC Level 1, AC Level 2 and DC Fast charging be considered an outright permitted use in commercial, industrial and institutional zoning districts and as accessory uses in low-density residential districts.	Land use and zoning districts updated to allow for charging infrastructure in Broward County Land Use and Zoning Plan.	October 2014
	Influence adoption in at least 10 Broward County municipalities	March 2015
2. Establish consistency across Broward County on the permitting and inspection process including waiving or discounting impact fees for residential and commercial installation of charging equipment	Consistent process adopted in Broward County	March 2015
	Influence adoption in at least 10 municipalities in Broward County	March 2015
3. Develop a policy which requires any new multi-unit dwellings – or existing multi-unit dwellings which are undergoing major renovations – to plan for charging infrastructure (designate parking spaces, lay conduit, set aside electrical panel capacity – but not necessarily install the charging equipment) in a certain percentage of parking spaces.	Policy developed in Broward County	March 2015
	Influence adoption in at least 10 Broward County municipalities	October 2015
4. Provide best practice resources (fact sheets, workshops, mentorship program) for multi-unit dwelling residents, HOAs and building managers about the various options they can select for implementing charging policies and processes for residents and guests	Fact sheets shared / distributed	June 2014
	Execute 9 workshops per year	Ongoing
	Launch HOA mentorship program	August 2015

Focus Area 2: Expansion of Local PEV Infrastructure in Broward County

Tactics	Deliverables	Timeline
5. Ensure adequate charging infrastructure at Broward County government buildings to support the acquisition of PEV fleet vehicles	Fleet requirements established	December 2014
	Short and long-term plan developed to include quantities and locations of fleet PEVs	April 2015
	Qualified equipment selected (RFP and vendor selection complete)	April 2015
6. Establish and implement a workplace charging policy for Broward County employees	Join the Department of Energy's "Workplace Charging Challenge"	Completed
	Establish WPC policy for Broward County	June 2014
	Select charging equipment (based on policy), complete vendor selection and initiate installations	November 2014
	Phased site selection and rollout plan developed and implemented	June 2015
7. Collaborate with partners to promote workplace charging to other government agencies in the County and the private sector – targeting large employers in Broward. Work with the DOE Workplace Charging team to offer webinars and workshops for employers.	Outreach plan developed	January 2015
	Begin executing plan	March 2015
8. Influence the quantity of well-placed public access charging in the county (public sector and private sector owned facilities); phased growth, focusing on high priority locations	Identify targeted locations for charging infrastructure based on priority (destination locations, etc.)	Ongoing
	Partner with car sharing programs with PEVs	December 2014
	Develop and execute outreach plans to engage private sector decision-makers at priority locations and execute policy for Broward County-owned properties suitable for public charging	Ongoing
9. Identify potential sources of infrastructure funding, including grants, Pace Funding, and others to help site operators implement charging plans (refer to FA 1.1).	List of funding sources	December 2014

Focus Area 2: Expansion of Local PEV Infrastructure in Broward County

10. Work with the Broward MPO, Florida Department of Transportation and local municipalities to integrate PEV charging infrastructure into their programs as appropriate. Some examples include: • Include PEV infrastructure as a standard consideration and allowable cost of transportation projects, i.e. parking facilities, hub facilities, and electric vehicle sharing programs and infrastructure as a component of complete streets programs, etc. • Fund studies to support strategic location of PEV infrastructure, including along mass transit corridors as a "last mile" solution • Encourage transportation entities provide workplace PEV charging access • Establish PEV charging infrastructure as a preferred strategy for obtaining green building certification or Environmental Sustainability Management System (ESMS) programs	Funding criteria developed	March 2015

Focus Area 3: Incentivize Parking for Alternative Fuel Vehicles

Tactics	Deliverables	Timeline
1. Develop policy to allow preferred, free or reduced parking for AFVs in county-owned facilities (airport, parks, downtown garage, convention center, BB&T Center, etc.)	Policy approved and executed	December 2016
	Influence adoption in at least 10 Broward County municipalities	March 2015
2. Develop regulations to authorize enforcement for non-AFV that park in designated spaces. Investigate applying fines collected to dedicated AFV funding source.	Regulation approved and implemented	December 2016
	Investigation findings	December 2016
3. Provide signage guidelines for AFV parking spaces	Signage guidelines	December 2016
4. Partner with South Florida Commuter Services to work with employers on preferential parking programs.	Develop and execute outreach	March 2015
5. Partner with the Florida Department of Transportation to provide AFV parking spaces at park-and-ride lots owned and operated by DOT to incentivize the use of alternative fuel vehicles.	Develop and execute outreach	December 2016

Trends and Challenges Ahead

Local, regional and state organizations along with vehicle manufacturers, utilities and advocacy groups are working on initiatives to expand PEV infrastructure in the State of Florida. To garner this movement in a collaborative approach will produce a larger impact statewide. Some of the organizations and plans that actively support PEV infrastructure expansion through policy recommendations include: 1) Southeast Florida Regional Climate Change Compact; 2) Seven50, 3) Broward County's Climate Change Action Plan; 4) Southeast Florida Clean Cities Coalition; 5) Florida Power & Light; 6) Drive Electric Florida; and 7) U.S. Department of Energy Workplace Charging Challenge, to name a few.

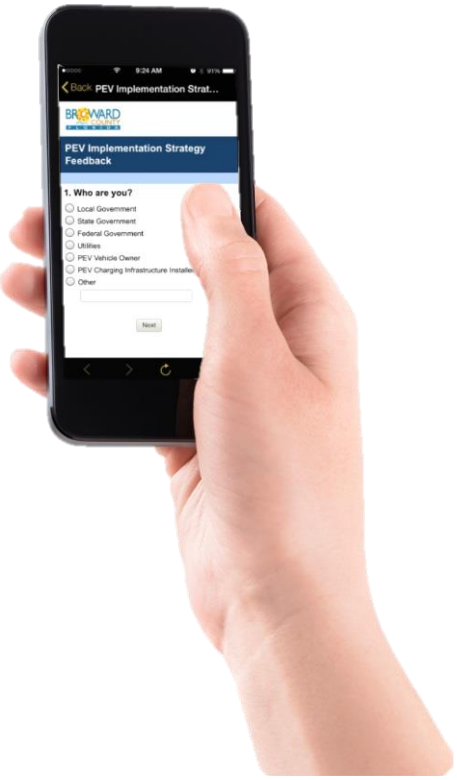
Regulatory and political uncertainty at the federal and state levels present a challenge to plan for a long term business case that allows for funding allocations, and supportive policies and mandates. It is important to target regional transportation corridors for PEV infrastructure siting, however it is challenging to determine how to best leverage resources to promote diversification of clean fuel options.

Annual Status Reports

- Annual status reports will be provided here.

We want to hear from you!
Give us your opinion on our strategy.

QR code provides access to a brief electronic survey to reap feedback from stakeholders about the strategy and possible ideas for consideration.



Appendices

APPENDIX A

Comprehensive Plan Implementation Strategy

Policy Information

ELEMENT: _____

GOAL: _____

OBJECTIVE: _____

POLICY: _____

LEAD AGENCY: _____ **LEAD CONTACT:** _____

PARTNERS & CONTACTS: _____

Strategy

Focus Areas

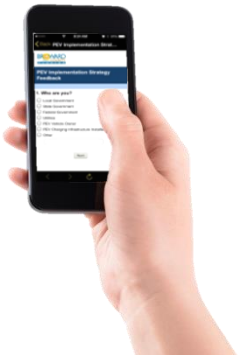
Tactics	Deliverables	Timeline
1.		
2.		

Trends and Challenges Ahead

Annual Status Report

We want to hear from you. Give us your opinion!

QR code will provide access to a brief electronic survey to reap feedback from stakeholders about the strategy and possible ideas for consideration.



Plug-in Electric Vehicle (PEV) Workshop

ADDRESSING THE CHALLENGES TO EXPAND ELECTRIC VEHICLE INFRASTRUCTURE IN BROWARD COUNTY, FLORIDA

October 2, 2013
South Florida Regional Planning Council

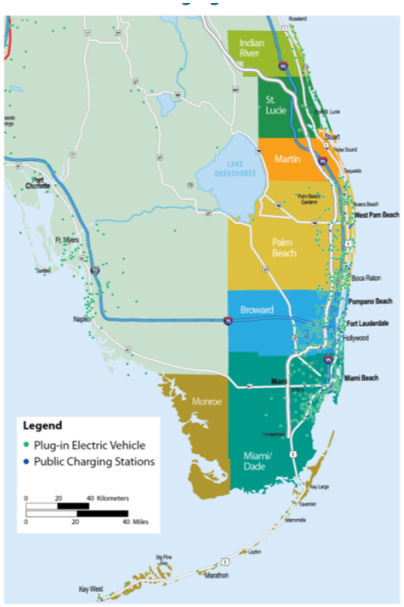
BROWARD COUNTY FLORIDA

Plug-in Electric Vehicle (PEV) Workshop

In 2011, the US Dept. of Energy, Clean Cities program initiated a planning grant to help communities overcome barriers

Southeast Florida Planning Grant

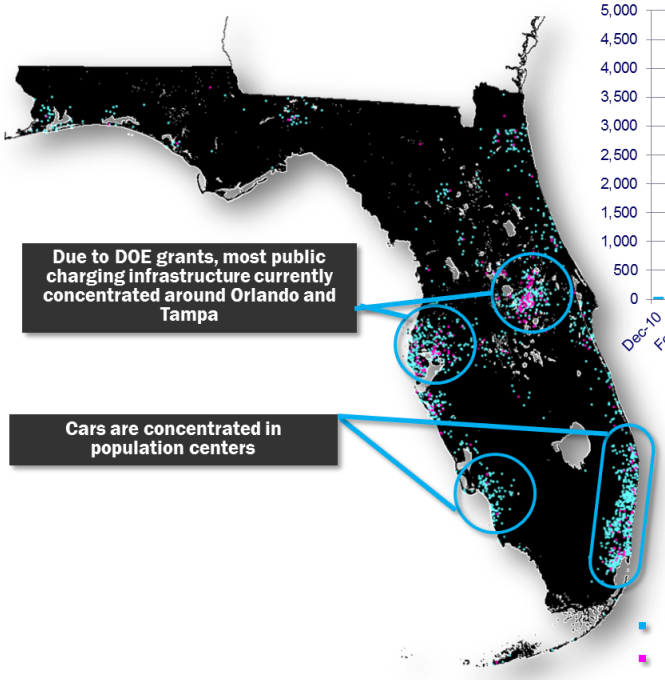
- **One of sixteen grants awarded nationwide to stimulate infrastructure planning and policy development**
- **Award of $500,000 is for a seven-county regional planning effort**
- **Teams focused on:**
  - Fleet adoption,
  - Infrastructure development,
  - Policy/permitting/codes/incentives,
  - Education & outreach,
  - U.S. 1 corridor demonstration project
- **Funding through June 2013**

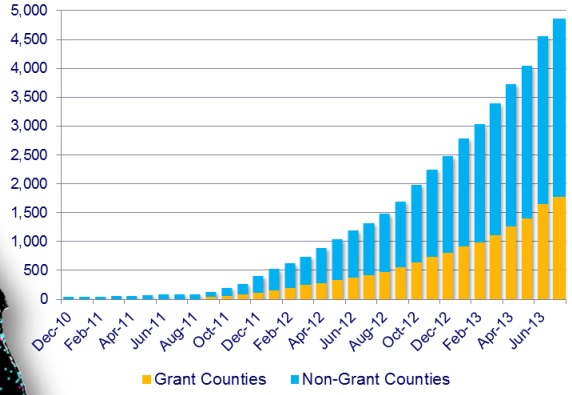


Plug-in Electric Vehicle (PEV) Workshop

Sales through July were already better than we expected – with historically high sales months yet to come

PEVs in Florida through July 2013





Did you know?

Plug-in electric vehicles are selling at more than twice the rate of hybrid vehicles during their first couple of years on the market.

Public charging supplements home charging and workplace charging; In early 2013, there were approximately 100 public charging stations in Southeast Florida

Public Charging

- **Should be prioritized where needed the most**
  - -- **Destination locations (places where people travel from afar and stay for few hours) and along major highways, rest stops**
- **Quantity of public charging should grow as demand increases; a phased growth**
- **Payment models should be fair and maximize space utilization, i.e. vehicle turnover**
- **Charging levels selected based on expected mileage and parking duration of users**

Guidelines for selecting charging fees

	AC Level-1	AC Level-2 @ 3.3 kW	AC Level-2 @ 6.6 kW
Miles gained per hour of charging a PEV	3 to 5 miles	10 to 14 miles	20 to 25 miles
Gasoline Equivalent* per Hour of Charge	$0.43	$1.29	$2.36
Cost of Electricity** per Hour of Charge	$0.17	$0.30	$0.59
Fee Target:	Less than $0.43 per hour or $0.11 per 15 minutes	Less than $1.29 per hour or $0.32 per 15 minutes	Less than $2.36 per hour or $0.59 per 15 minutes

*Assumes gasoline price of $3.75 per gallon and 35 miles per gallon fuel efficiency for a PHEV or EREV running on gasoline
**Assumes electricity rate of $0.09 per kilowatt-hour, with no impact to demand charges

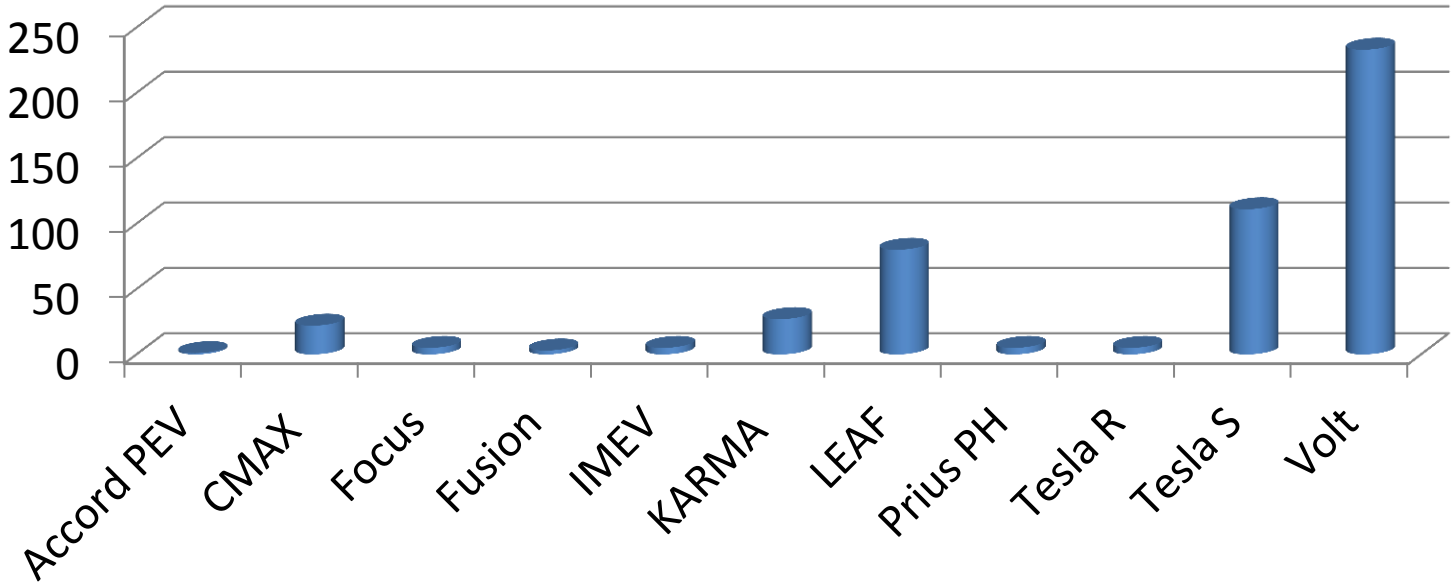
Getting Broward Plug-in Ready!

In February 12, 2013 the Broward County Board of County Commissioners adopted the Broward Comprehensive Plan Climate Change Element

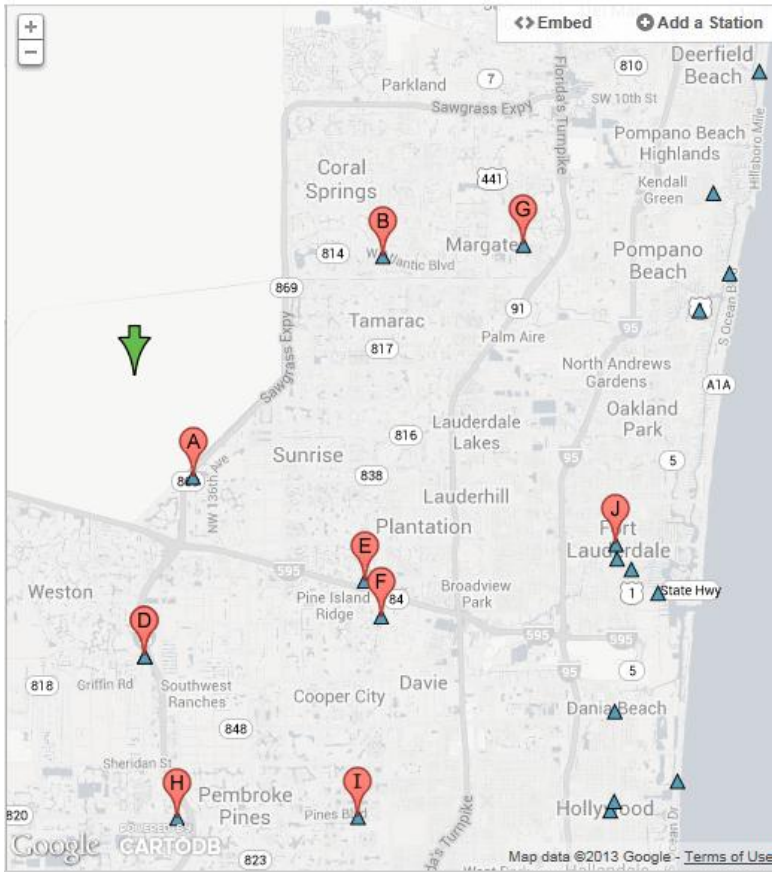
www.broward.org/planningandredevelopment/comprehensiveplanning

Policy 19.2.5: Broward County shall continue to work with the Department of Energy Florida Gold Coast Clean Cities Coalition to support initiatives which seek to diversify fuel options for public transit and fleet vehicles, expand infrastructure for charging electric and hybrid electric vehicles, and incentivize parking for alternative fuel vehicles.

Broward County PEVs as of July 2013
Total: 523



Plug-in Electric Vehicle (PEV) Workshop



- According to the DOE's Alternative Fuel Data Center Broward County has 20 charging stations.

Source: www.afdc.energy.gov/fuels/electricity_locations

Plug-in Electric Vehicle (PEV) Workshop

Broward's Think Tank

ADDRESSING THE CHALLENGES TO EXPAND ELECTRIC VEHICLE INFRASTRUCTURE IN BROWARD COUNTY, FLORIDA

Who is here today?

Construction Management
Facilities Maintenance
Environmental Protection &
Growth Management
Broward County Transit
Port Everglades

Purpose:

To increase PEV public infrastructure and vehicles in Broward County by identifying common barriers and potential solutions.

PLUG-IN ELECTRIC VEHICLE (PEV) WORKSHOP PARTICIPANTS

South Florida Regional Planning Council

October 2, 2013

Last Name	First Name	Organization
Anderson	Matthew	Broward County Air Quality
Cambric	Bob	South Florida Regional Planning Council
Cleveland	Britten	Conservation Organizer, Sierra Club
Corbett-Elder	Cindy	Broward County Transit
De Fago	Alicia M.	Electric Vehicle Institute
DeJesus	Carlos	Crown Electric
Dominguez	Rodolfo	PEV owner
Feliciano	Maribel	Broward County Planning and Redevelopment
Heshmati	Christine	Clean Cities Coordinator
Kinard	Andy	Car Charging Group
Schleyer	Mark	Senior Account Executive, Aparc Systems
Seabury	Anne-Louise	Florida Power and Light
Senger	Gregor	Florida Department of Transportation – District 4
Swanson	Scott	Apollo Sunguard - ChargePoint
Tapp	Timothy	Apollo Sunguard
Tarquine	Henry	Broward County Facilities Maintenance
Thompson	Jeffrey	Broward County Construction Management
Torchia	Frank	Super Green Solutions - Energy Efficient Products
Wheeler	Steven	Broward County Transit
Wilburn	Taylor IV	Super Green Solutions - Energy Efficient Products
Yacinthe	Natacha	Port Everglades

PLUG-IN ELECTRIC VEHICLE (PEV) WORKSHOP
THINK TANK - CHALLENGES AND SOLUTIONS

South Florida Regional Planning Council
October 2, 2013

CHALLENGES	SOLUTIONS
NEED FOR INCENTIVES:	
Negative perception	**Increase awareness and understanding of PEVs**
Need for incentives for consumers	**Incentivize audience through public relations campaigns**
Limited amount of models available in Florida	**Encourage automakers to sell more type of vehicle in the state**
Need for financial incentives	**Lower sales tax; propose state policies; point of purchase rebate; waive registration fees; provide sales incentives to dealers**
Lack of incentives for developers	**City of Palo Alta mandated that all new structures have the conduit installed during construction. Have cities put in the code that new construction residential and multi-family have EV ready conduit like the City of Coconut Creek and Lauderhill.**
Government and local municipalities do not get relief through taxes	**Incentives for local governments to purchase EVs** **Ensure local governments lead by example.**
Need of PEVs for multiple applications	**More incentives for automotive manufacturers**

PLUG-IN ELECTRIC VEHICLE (PEV) WORKSHOP
THINK TANK - CHALLENGES AND SOLUTIONS

CHALLENGES	SOLUTIONS
HOW TO DEPLOY PUBLIC AND PRIVATE INFRASTRUCTURE?	
PEVs are not easy to purchase by government entities due to premium cost	**Streamline procurement for cities and counties.** **Illustrate the lifecycle return on investment, fuel and maintenance savings.** **Provide EV for schools.**
Funding challenges	**Establish public and private partnerships.**
Too many infrastructure options and possibilities	**Need for a buying guide, EV charging stations guide with important considerations**
Incentives for multi-unit dwellings	**Build a network of associations that are EV ready.** **Talk to management companies.**
Need to plan ahead	**Build for the future (sub-meter).**
Need to consider cheaper options	**Tap off of existing building for cheaper energy rate.**
Need for guidelines on capacity	**Develop planning guidelines on capacity that is needed for specific destinations.**
Proper siting challenges	**Major attractions, main points of interest. Important to get malls and large companies on board with EV Stations.**
No workplace charging available	**Promote workplace charging at large employers.**
No enforcement of EV parking	**Put charging stations in high visibility areas and enforce preferred parking for EVs.**
No awareness of existing infrastructure	**Some dealerships have infrastructure on property to charge EVs. There is a need to promote more.**

PLUG-IN ELECTRIC VEHICLE (PEV) WORKSHOP
THINK TANK - CHALLENGES AND SOLUTIONS

CHALLENGES	SOLUTIONS
CODES, POLICIES, ORDINANCES, AND PERMITTING ISSUES	
Inconsistent permitting requirements by multiple jurisdictions	**Pre-application meetings with permitting agencies.** **Develop a checklist of requirements and promote adoption by all cities and counties.** **Basic design templates that cover the largest % of types of projects.** **One permitting system across all cities and municipalities.** **Provide contractor training and certification course by government.**
Aesthetic issues relating to zoning	**Customize the stations to match the location.** **Education of zoning officials** **Template zoning ordinances**
Need to update state policies to clearly define EV charging infrastructure and vehicles	**Building Commission review of building electric code.**

PLUG-IN ELECTRIC VEHICLE (PEV) WORKSHOP
THINK TANK - CHALLENGES AND SOLUTIONS

CHALLENGES	SOLUTIONS
FLEET ADOPTION	
Lack of EVs at city and county fleets	**Have each city/county adopt a resolution to promote EVs within their jurisdictions. Form CO-OPS.**
Product availability for heavy and medium duty vehicle	**Tax incentives for businesses that have large fleets**
Public fleets do not benefit from tax incentives	**Waive permitting fees.**
Government entities and some private companies consider the lowest bid	**Look more at the lifecycle cost versus initial cost.** **Require certain % of fleet to be EV.**
Limited vehicle options through existing procurement	**Expand the state procurement and county list to include additional vehicles.**
Business case to convince fleet managers	**EV demonstration project with one major organization to show feasibility of projects.** **Dual purpose use of existing property**

PLUG-IN ELECTRIC VEHICLE (PEV) WORKSHOP
THINK TANK - CHALLENGES AND SOLUTIONS

EDUCATION	
SOLUTIONS	
Educate consumers, elected officials, and contractors about the benefits of EVs.	EDTA coming up with marketing campaign similar to Got Milk!
Look more at total cost of ownership (less maintenance and fuel, etc.) versus initial cost.	Use targeted audience marketing.
For fleets share the cost benefit. Promote the cost to own calculators.	Focus on emotional purchase of buying vehicle.
Educational video of stations, how to use the station and benefits.	Plan events and distribute educational materials at public libraries.
Develop a resources website.	Educate kids to encourage future generations to purchase EVs.
Place message on elevators.	Use bumper stickers.
Target Realtor associations, tourist development, and chambers of commerce.	Focus on creating jobs for now and the future.
Bring all vehicles together in one location versus going from one dealership to another.	Have cars on display in public places (libraries, etc.)
Share benefits of EV charging with canopy.	Promote LEED Points for EV Charging (2-3 points). Look to get more points.
Partner with rest areas, DOT, Turnpike to have EVs educational displays.	Have cities and agencies work together on signage where the locations are located.
Use Airport and Port advertising.	Develop apps to show where stations are located for consumers.
Focus on the adoption of a new way of driving. Drive efficiently.	Be consistent in the message and branding PEV versus EV.
PSA's, Billboard. Advertise HOV pass for driving hybrid, etc.	Go to dealerships to educate the sales people on EVs. Create more of a link between dealer and infrastructure.
Host events with all stakeholders present. Dealership, financing, EV infrastructure, installers, etc.	Use social media.
Promote convenience.	

PLANNING AND REDEVELOPMENT DIVISION
115 S. ANDREWS AVE, RM 329K | FORT LAUDERDALE, FL 33301
Broward.org/PlanningAndRedevelopemt

DEVELOPING SYNERGIES TO TRANSITION AWAY FROM TRADITIONAL FUELS INTO ALTERNATIVE FUELS

"The Six Steps"

Written by Paul Condran
Fleet Services Manager

Executive Summary

This report is intended to serve as a reference document to be used when evaluating the transition from traditional to alternative fuels. It is not intended to ostracize any specific alternative fuel strategy, technologies, or the use of conventional fuels in the transportation industry. This is an opinion regarding developing and employing a transition plan or “synergies” to facilitate the widespread use of alternative fuels, such as natural gas, for use in a transportation environment. It is based on the point of view of an early adopter with many years of experience in the long term utilization of alternative fuels, and associated technologies, used in various applications.

The high level contents of this document will educate the reader in the process of formulating plans, ideas and synergies to ensure a seamless and successful transition to alternative fuels. I concentrate my analysis on a metered approach to developing partnerships and collaborations with numerous stake-holders, suppliers, utilities, and exterior influences within the alternative fuels arena.

The information contained in this document can be applied to almost any type of transition, from legacy and proven technologies, or to a new alternative approach by shifting the organizational paradigm. A well thought out and planned methodology to change is essential for encouraging and solidifying a high rate of success.

The transition away from traditional fossil fuels to alternative fuels (such as natural gas and others) requires a dynamic, proactive and timed approach to make the transition effective. Clearly stated goals and objectives should be precisely articulated and defined as “The Road Map.”

Alternative energy pathways are crucial to the sustained evolution away from typical fossil fuels despite the myriad challenges (both regionally and globally) to the development, analysis, and integration of non-traditional fuel applications.

Opinion

The certainty of peaking global oil production and corresponding increases in pricing will only be followed by peaks in coal extraction. In the course of human existence one thing remains certain, the need to reverse the trajectory in carbon emissions, of which alternative energy sources will be the catalyst for the future energy demands of an increasingly populated world. There has never been a better time to bring forth a change in public attitudes toward alternative fuels. Not so long ago natural gas was widely viewed as a temporary “bridge fuel” to a future of clean renewable energies. Now, amid a shale gas boom, many energy analysts regard it as a core “foundation fuel” that can power America’s economy in efficient, affordable and an environmentally responsible way for centuries to come. The fact that natural gas is a “decoupled” fuel (completely removed from traditional fuels) further solidifies its role as the new fuel standard.

Today, natural gas is by far the cleanest non-traditional fossil fuel available to date. Natural gas produces approximately 60 percent less CO2 than coal, and 40 percent less CO2 than oil, while also significantly reducing sulfur dioxide, nitrogen and nitrous oxides, and near zero levels of harmful particulate matter. The more oil or coal we offset with natural gas, the far fewer greenhouse gas emissions we put into the atmosphere.

Abundant, affordable and clean-burning natural gas presents a tremendous opportunity for America to realize an energy future using domestic resources to fuel our nation’s transportation needs. Natural Gas, while not immune to some of the effects of hydrocarbon emissions, has been developed for widespread use in homes, heating and vehicles.

Natural gas is native to the United States and requires no importation from foreign countries; which may or may not have our best interests in mind.

Its health benefits alone far outpace that of other technologies by reducing up to 85% less total hydrocarbons, carcinogenic particulate matter (PM) and its inherent ability to dramatically reduce Green House Gas emissions. Due to the abundance of domestic natural gas it dampens price fluctuations and provides for greater price stability and predictability. Typically, natural gas pricing only moves on a monthly basis.

Lastly, natural gas is not affected by swings in geo-political influences, and is virtually insulated from the effects of Middle East conflicts, OPEC policy shifts and most changes to regulatory climate laws. Plentiful, clean burning and relatively inexpensive compared to traditional fuels, makes natural gas the logical and safe choice to power the present and future transportation propulsion systems.

Successful Synergies

Developing successful synergies begins with a vision to create and assemble necessary resources, along with substantive objectives essential for a successful transition to alternative fuels. It is highly recommended you precisely follow the six step program and that no process in the step be excluded, while concurrently exploring all associated and relevant possibilities. This program has been time tested and proven to provide a systematic approach for transitioning away from traditional methods. A true “out-of-the-box” mindset must be applied to ensure the greatest impact of the program’s viability. The transition will not occur over a short trial-and-error lifecycle, to be successful this will require a long term collaborative departure from traditional values and avenues. You must also, stay the course.

The Six Steps:

1. Fact Finding
2. Develop your Plan(s)
3. Due Diligence
4. The Utilities
5. Identify Influences
6. Develop Synergies

1. Fact Finding

a.) Available fuels:

When you are considering a move to an alternative fuel and away from traditional fuels, you need to first review all of the various fuel technologies available. This review should be done with a broad overview of available sources and viable technologies. Selecting a new fuel which has common and uncommon attributes as to other fuels, there are elements to consider and recommendations with the following qualities which should include;

- commercially available
- relatively inexpensive
- is domestic produced (to the extent possible)
- unaffected by geo-political concerns
- available grant monies to help offset the initial investment of constructing a fueling station and vehicle technology
- long-term availability.

b.) Select a fuel source (CNG/LNG/EV) with the greatest advantage as the best alternative fuel(s) for the long-term operation of your fleet.

When you have selected an alternative fuel choice, it's very important to ensure the widespread availability of the fuel(s) for today and into the future. If this is your first engagement with alternative fuels, conduct a market analysis to make certain the fuel will be available for over ten to fifteen years (and perhaps beyond). This is a good reason to discuss this with the various fuel suppliers, and utilities.

c.) Available, proven technologies:

Review all of the proven technologies such as natural gas or propane when you initially move to alternative fuels. Avoid fuels that are considered "boutique" and do not have widespread commercial use. Be cautious to not become the "first" operation to use the potential technology. Equipment, vehicles and stations are likely not to be commercially available. Pioneering technology is good when you can temper this as an overlay with other established alternative fuel programs. Being exposed to different technologies will serve to expand your experience, and broaden your perspective however, there may not be funding or equipment solutions.

d.) Research alternative fuel users (fleets):

It is very important to reach out to established and experienced municipal and private fleets using the technology you are most interested in using. Speak to these duty experts and listen to their advice and viewpoints. You need to also inspect their operations. Generally, experienced users are very gracious about sharing their experiences; including trials and tribulations, successes and failures. This is an important step in the process and should not be overlooked. The experienced users of alternative fuels, so called "early adopters," are a valuable resource not to be disregarded. We share all of our experiences with others.

e.) Cost benefit analysis:

Perform a cost versus benefit analysis on the fuel to which you intend to migrate. Review all interested fuels in this analyses; initially use a graph to exhibit only the fuel cost itself. Understand that your initial capital investment will be sizable, albeit, should be considered a one-time expense. The acquisition of the fueling station typically happens only once (initially) and can be amortized or depreciated into the price of the fuel (or both or neither depending on the funding mechanism). Ongoing maintenance cost of the station, utility costs, specialized training for staff, hiring of a facility engineer (as an example), and preventative maintenance schedules should all be factored into the equation.

As far as additional staff is concerned, there are a couple of different methods to assess this cost. It's not uncommon to omit personnel costs into the fueling technology costs, or the price per-gallon. There are also various solutions to consider that make the investment "cost neutral" to the facility and the new alternative fuel program. These opportunities should not be ignored, and rather used to gauge the total cost envelope. There are real cost and maintenance savings opportunities in reviewing non-traditional operating methods.

f.) Available equipment / vehicles:

Perform a manufacturing analysis on current, future, and collaboratively developed equipment technologies. This is extremely important. Establish meetings with the Original Equipment Manufacturer(s) ("OEM") and ascertain their global perspective on current and forward-developing technologies. Oftentimes, when you produce a bid for equipment/vehicles using specific alternative fuels, your results will not produce the results you anticipated. Be courageous, bold, and don't hesitate to meet with potential proposers to discuss a "how-to" proactive meeting to develop your equipment goals. Manufacturer's will often times be poised to develop the technology with you. This is the kind of strategy and creative thinking you ought to consider, and will separate you from the "followers."

g.) Know and calculate your costs and initial emissions data beforehand to realize the greatest overall economic benefit:

It is a good idea to calculate your proposed emission benefits based on the fuel, engine and after-treatment (with some technologies) you intends on implementing to know what kind of emission reductions you stand to produce. Develop emission calculators so you can utilize solid data. State and county air districts will require you to produce this data (in some cases), plus, reducing your Green House Gases in totality is one of the greatest, political pieces of information you need to have and maintain. When the opportunity presents itself, share this information with your political leaders, and all stakeholders.

GHG reduction information is also important to ensure you meet clean air standards and related goals of your entities. This can also have an effect on funding for projects as grant applications will require you to submit this information from the engines and fuel you're using. Natural gas has great strengths in this specific area, for example.

2. Develop Your Plan(s)

a.) Create the vision for change.

A successful transition to alternative fuels requires a vision for change. Take a long term approach, and use "broad strokes" to create a high level view on your intentions. No endeavors are worth taking without projecting a positive image on how, why, and where you want to be. Incorporate your vision into your plan, and document the intended outcome.

b.) Collaborate with experts and perform site visits.

Developing relationships and a collaborative management style will serve you with the greatest strengths for success. Speak to all of the parties associated in the specific area you're interested in. Remember to bring the OEM's into the discussion, and include your directors, and other stake holders.

Relationships are an insurmountable resource of expert information and you'll project a positive, proactive and even humble appearance. This is perfectly okay. Remember your experiences and document your process.

c.) Develop the project.

Craft a draft proposal with all of the inclusions you need for the transition. Engineering, mechanical, funding, utilities and fuel supplier(s), and physical location (for the station). Create your eventual procurement document. Install your vision perspective into the body of the requirements. Review this information with an expert(s), and even potential suppliers for a broad overview. Use a step by step approach.

d.) Develop a target budget.

Once you have developed your plans and project you'll need to ascertain an estimated project budget. I highly recommend being very conservative. It is far better to have ample funding for the project at the front end, than to continually pursue approval for additional funding. The better preparation you do, the more information you have collected, the greater you're potential for budget success. The budget should include all elements of the station construction, required utility costs and even the equipment. Albeit, a good vehicle utilization program should provide for a life-cycle replacement process over the duration of the vehicle service life. Nonetheless, capital outlays are required for moving into alternatively fueled vehicles. Look at this as a one-time investment of which you will determine a great pay-back analysis, and a return on investment strategy.

e.) Develop a main resource document (for reference).

The most effective information element to a successful program transition, is the creation of a reference binder. Creating this will save you hundreds of hours in research. Organize your contacts, technical research, vendors and suppliers, utilities, engineering requirements and related pertinent information.

This is your resource reference guide. You should also do a photographic timeline during construction. This is crucial.

f.) Assemble opportunities for financial offsets (grants).

There are a lot of opportunities for applying for grant money to help offset the initial (and ongoing) capital investment of the equipment (station and vehicles). Grant money opportunities can be researched through your local air quality management districts, department of energy, state association for air resources and utility companies. There are millions of dollars available in grant funding. If you elect to use natural gas as your fuel of choice, you can also contact NGV America, they are a great resource.

The important element for success, is to remember to apply early, ensure the accuracy of your grant application and to be truthful, concise and use timelines for your project. If you have never completed a grant application before, reach out to your contacts for assistance, plus there also professional grant writers that can increase your chances for success.

g.) Include milestones on incremental goals completed.

It is very important to document your progress. Identifying the milestones you achieve will provide for excellent integrity and continuity in your ability to achieve your ultimate goals. This is an important step in your ability to review the facets of your synergies.

h.) Develop a Request for Proposal for a Design, Bid, and Build of Facilities (engineering services).

Strength in the solid development and publication of a Request for Proposal, or Invitation for Bid, sent to established companies that can guide your project, supply you with quality recommendations for the installation of equipment and provide you with utility requirements, is paramount towards a successful and cost effective project.

There are several varying approaches to performing a “request for proposal.” You can perform a “turn-key” solution which tends to be higher cost. However, the “turnkey”” solution offers no upfront capital outlay investments required by the end user, but rather paid back though a “term of agreement” from the fuel sales. The turnkey approach is all inclusive and offers (in most options) a fixed pricing structure over the terms of the agreement. Conversely, you may want to consider performing an initial bid that articulates the various requirements and specifications for your project whereby you own and operate the fueling station. The investments are larger at the front-end, however, you will have an opportunity to maintain full control over the operation. These examples really depend largely on your objectives. The point to this is to ensure your procurement is concise, conducive to your goals, timely and provides the maximum cost effectiveness in the long run.

i.) Create & develop an Action Plan Checklist.

Developing an “Action Plan” is important for you to know and retain a tracking device on the various steps achieved. Different from milestones, the action plan deals directly with the particulars of the individual task. This will provide you with a clear understanding of what was completed, and still needs to be closed out.

j.) Sales (internal & external), Marketing and Communication

I recommend that you (fleet manager, stakeholder, director) become the greatest advocate for the transition program. Advocate for the change, fuel being used, cost and emission savings and market your new program transition to all stakeholders in the organization including the elected officials. It is especially important when you expose your staff to the new alternative fuel. They will become your greatest ally and the best advocates for the change. You need to sell the concept, articulate all the benefits and then train them.

k.) Supplier / vendor resources, manufacturers (list them all out and retain for reference).

Maintain a database of all the companies you'll do business with. This is your "go-to" resource for readily available assistance should you need materials, parts, training or services. Different from a normal resource binder, this should only include the information for those vendors, suppliers and utilities you utilized within the scope of our alternative fuels project. Maintain and update these "point of contacts."

3. Due Diligence - Assemble Your Goals & Objectives

a.) Transition to alternative fuels (away from traditional fossil fuels).

Once you have selected the fuel you'll being using, perform a goals and objectives analysis for the diligent transition including the tools you will need at all levels of the project.

b.) Timeframes for implementation.

Identify the timeframes for implementation for the transition and various components necessary to achieve your milestones. Know unequivocally, the requirements of the program (users, recourses, manufacturers, utilities, and fuel suppliers). Realistic timeframes are paramount to project success. Be flexible.

It is very important to not skip vital steps in the process, doing so will cause you considerable time and in some cases, funding to correct inadvertent mistakes.

c.) Financial resources required and realized.

Now that you have completed your plans and estimated budget, its time to achieve the financial goals for the project. Develop the timelines for funding, and the timeframes for receipt of the funds. If you have identified grant money, be sure to review dates of receipts and invoices. Most grants (once you achieved approval) work on a reimbursement basis. This means you will not receive the actual grant monies until after you already budgeted and expended the funds.

This is important to remember, and also to explain to your vendors and other stakeholders, City Manager, etc. It is desirable to use capital, or discretionary funding to initially pay for your project. Local budgeted money for operations can also be utilized providing you budgeted for the transition at the beginning of the fiscal year. During construction should you decide to build a fueling station, it might be more economical for you to "pay as you go" when each project section is completed, thereby staging the transition (and the costs).

Of course it's always best to perform the entire project one-time. Discuss financial strategies at the front end of your transition to avoid any surprises.

d.) Regulatory requirements.

It is very important to fully embrace the air quality regulations and reach out to your local and state regulatory agencies. These entities will respect you for being proactive and not reactionary. It's always best to be collaborative and cooperative. Embrace the challenges of alternative fuels, emissions reductions and reduced petroleum use. Phase in your approach. Discuss your plans with these entities to ensure compliance, however, be proactive and communicate your goals and objectives.

Very few public (or private) entities are first to comply, demonstrating initiative and communicate to air quality management districts. Trust me when I say, this will win you much respect and far fewer controls by the agency. I remember requesting to be scheduled at a public hearing at our local Air Quality Management District, public board/council meeting. I had five minutes to articulate our goals and objectives, and to demonstrate how we were going to not only meet our air quality requisites, but exceed the requirements by several years. We received a standing ovation and praise by all in attendance. When you accelerate your statutory requirements, and "think out of the box", being proactive, you will positively affect your program and all the stakeholders in the organization. This kind of political strength and recognition cannot be quantified.

e.) Assemble the physical & political resources, maintain a current reference list.

Just like your reference list for vendors and suppliers, maintain a reference list of your political resources. Including elected officials, stakeholders, directors, etc.

This is a great document to maintain because when you achieve your milestones, through your goals and objectives, you want to reach out to this contact list and articulate your achievements. Political leaders enjoy receiving positive news, especially as it pertains to clean air and alternative fuels, whereby they can share it with colleagues.

4. The Utilities

a.) Develop / schedule meetings and discuss plans.

As soon as possible, schedule project meetings with your utilities and develop a "Utilities Service Planning" (USP) agenda. This USP is very important. You must ascertain a clear understanding of the utility factors and requirements you will need for a successful project. The utilities need to understand the project and your plans. Don't be overly concerned at first if you receive negative information, often times this is normal until you work the through the specifics with several experts. Don't panic!!

If you are moving to natural gas, you'll need to know and understand the available pressures, the location footprint (spacing) and electrical requirements. It is very important to engage your utilities as early as possible in the project. This is where you will hone in on your ability to create synergies. As soon as you have a project plan, and/or engineering information (especially if you plan to construct a natural gas or similar fueling station) meet with your utility companies. The utilities will provide you with necessary electrical load parameters and natural gas inlet pressure(s) plus the gas volumes available between pressure(s), for your planned operation. Do not underestimate the importance of this particular step.

b.) Review the potential site for applicability of a fueling station.

It is extremely important to review your proposed site for a fueling station. You need to ensure you have enough maneuverability, station foot-print spacing, and a close proximity to the necessary hard-path to the utilities.

Perform a site analysis with your fire and code departments as well, include the proposed station provider(s) and engineering team for good applicability of the location. Document all this information.

c.) Develop a cost strategy for pay-back. Review cost neutral solutions.

Presuming you have a solid project budget, you should conduct an evaluation to review a pay-back analysis model. Several factors should go into this equation such as:

- Total station costs (using operational funds) or,
- Total portion of use with capital funds (one time funding) or,
- Projected cost of the fuel or,
- Number of vehicles for initial use, and over the life cycle of the station

Once you can project a pay-back analysis to your superiors, and elected officials you will be in a great position to understand your costs.

I would not be overly concerned with a “quick as possible pay-back,” as just knowing this information will serve you well. Another opportunity to explore is a cost neutral solution. Several high quality energy companies have proposed design, construct, own and operate stations. This is a turn-key solution to your project. Using this scenario, be mindful of your total fuel cost, per-gallon. Use a formal contract to calculate your fuel costs and indicate the duration of the program. Be sure to include all preventative maintenance, overhaul and ensure a minimum downtime for your operation, such as a four (4) or twelve (12)-hour response time requirement. If budgets are difficult, or non-existent, this is a great opportunity.

d.) Review the footprint.

It is very important to re-review your total project footprint. You need to fully understand the safety distances for sensitive equipment, detection sensors (if required) and vehicle circulation from dispensers. For example, if you have site restrictions, you may decide to specify only curb-side fueling to avoid difficult site traffic and compromising safety conditions.

I recommend taking a very broad view of this. It's very important that you plan for future growth, and not just for here and now. If you need to expand in the future, you want to try and accommodate available spacing.

5. Identify Influences

a.) Political – Meet and discuss objectives.

To create relationships which will provide you with the greatest support, begin with your elected officials. Engage elected officials early on in your process (after your plans are completed) and discuss the highlights, benefits and great exposure that moving to alternative energy will do for your organization. City councils, and/or other political leaders will advocate for the technology and they will be extremely proud to support the endeavor.

Make sure political leaders see your vision and receive the political benefits. Political buy-in is greatly important and will elevate your vision to new heights. Always remember, performance must be accountable.

b.) Provide political, cost and environmental benefits.

Every political leader, elected official, city councils, etc., will need to be provided with the anticipated, effective cost savings (estimated savings to the company) year over year. This information is vital. A more conservative approach here is best to ensure a more realistic goal achievement. Include the estimated environmental impacts / benefits (as mentioned, it's important to know what your reduced carbon footprint will look like); this is crucial.

Inform your political leaders of pertinent information regarding the reduced use of traditional fossil fuels which equates to a real cost savings.
Quantify the savings and emissions reductions year over year. Make sure to include all other efforts you are doing, like an aggressive recycling program.

c.) Provide any statutory requirements as an impetus.

One of the primary reasons for moving away from traditional fuels is federal, state, county or city mandates.

Many air quality management districts have already, or soon will adopt aggressive policies to reduce the carbon footprint and through legislation, move you away from traditional fuels. As I mentioned elsewhere, embrace these rules and changes and be proactive about the inevitability of change. Your stance should catapult you out in front of the requirements, and you need to articulate this to your political leaders. The fact that you must change dynamics / paradigms is no reason not to be the effective change in your organization. Leadership starts with you, never look in the rear view mirror. You are the catalyst and you must communicate your position to your officials. Believe me when I say, if articulated correctly, your political leaders and others in the organization will embrace your proactivity as much or more then you do. Especially when they can articulate what the organization is doing “way out in front” of any mandated legislation.

d.) Craft an internal Marketing Plan.

If there is one important lesson to change, it’s how you market it. I strongly suggest you craft an internal positive marketing plan and post this on your intranets, City websites and also in written for dissemination. You have to sell your vision. This elevates and promotes the necessary integrity to your transition (and goals).

How you project a permanent paradigm shift, culminated with new synergies, can create powerful and purposeful reallocations in resources rather than usual methods of changing. This is paramount in your ability to project positive results and moreover a successful change (transition) from the customary ways of conducting business. Sell your plan, market the positive results and embody the element of dynamic change. There will be the "naysayers" and negative influences; you have to rise above these and intently stay the course. Your greatest advocates for change will be your own staff as long as you provide them with the tools they need to become the experts, then empower them to effect the change.

Provide them with the positive accolades they will receive and the outstanding benefit to the organizational culture, today and well into the future. Providing your vision for change and having it be accepted, is the direct result of knowing your audience and giving them the resources and support they need to make it happen and become successful.

e.) Partner with the experts who can assist you

Creating effective synergies begin with relationships which can bring together the best talents and most collaborative partners necessary to develop your vision for dynamic change towards alternative fuels. It's very important to be an active listener and understand the advice of expert opinions. To fully comprehend this concept, I highly recommend initially taking that preverbal step back to review your goals, refresh your ability to openly accept new information (you will receive) and be poised in a good position to process the material. Ask questions!

I had to learn to become experienced in alternative fuels; it's not going to magically happen overnight, and that is okay. You will need to trust the information you'll receive and ensure the quality of the synergies you create. There are brilliant people around us, our job is to seek them out and emulate their positive experiences. This will make your project successful with the most concise recipe for a thriving accomplishment.

6. Develop Synergies

a.) Develop collaborations with OEM's, fuel supplier(s), drivers, utility companies, management and all stakeholders.

Successful synergies begin with professional partnerships which are collaborative, experienced and interrelated to the condition and opportunity for which they are created.

When moving to an alternative fuel, there are some common denominators which should be brought together within a presentation and the following participants:

- All primary stakeholders
- Equipment manufacturers
- Employees
- Equipment operators
- Customer departments
- Executive management

This is your opportunity to present your analysis, justifications and plan for the transition. When you communicate your plan for moving to alternative energy, it's very important that you become the duty expert, have all your facts assembled and be ready to discuss and provide comprehensive and informative reports. Discuss all of the many steps you underwent to come to the decision you have made. In other words, you have educated yourself and assembled a great team of experienced advocates. Explain the benefits and keep the meeting positive. Don't be afraid to communicate potential hurdles and challenges, but the benefits far out way any difficulties.

b.) Develop relationships with staff, superiors and customers.

As with any new endeavor, to be successful you need to solicit the support of your staff. Inform them and hold question and answer meetings as you are assembling your plan. Don't limit yourself to just your staff, reach out to all company employees to generate the greatest amount of interest.

Do this frequently. In concert, hold meetings with your key customers and superiors. Advise them of the technology, safety, and the seamless transition to them. Reaffirm you plan of action, provide them with a concise summary copy to keep them informed.

One of several elements I did, was to do hold vehicle demonstrations at my facility. This proved to be really important for your technicians and customers. We allowed them to drive the technologies we were transitioning to. This really helped to allay concerns about drivability and operational use.

c.) Craft and schedule regular Information meetings at all levels, become informative.

Continue to schedule regular progress report meetings to keep all parties informed of the transition progress. Articulate your positive results, and the challenges you may have discovered. The point of these meetings to communicate the progress. This is very important.

d.) Craft and schedule regular training meetings

Once your fueling station is operational, and perhaps you have equipment ordered, make absolutely sure to schedule a “grand opening” ceremony with all stakeholders and elected officials. Invite the local media and have the event video-taped.

It’s very important prior to delivery to begin to train your staff. Different from the training and orientation meetings you have previously held, now is the time to conduct advanced technical training. This training does not happen once, but several times over the course of the next year and beyond.

Everyone on your staff should understand how the fueling station operates (if you are using natural gas or others), and how to perform safe and reliable preventative maintenance and repairs to the advanced technology equipment.

As with any maintenance program, strictly enforce safety. Do you have a Fleet Safety Plan? If you do, be sure to amend the plan to include the advanced technologies you are using.

e.) Build teams, support networks and business units

The importance of building relationships with your peers, suppliers and creating networks is invaluable. The network of professional contemporaries will act as your sounding board, discussing problem trajectories, and a solution oriented collaborative think tank.

Creating separate business units to work with your advanced technology plan maintains accountability. This is important and moreover provides you with a clear set of solid parameters.

f.) Develop a comprehensive list of reliable industry contacts

Create a vendor and supplier resource portfolio. This is an important manual to retain and to also maintain. Every supplier, manufacturer (including part numbers and diagrams), and vendor contacts should alphabetized into a one source binder for your quick reference. Beyond the warranty periods for installed equipment, you will need quick action when something fails. This type of reference manual will save you considerable time and effort. Make additional copies for your key staff as well.

g.) Become the Duty-Expert.

Becoming the duty expert means you have taken a serious vested interest in all facets of your synergies and the technologies you employed. This is very important, as you will be called upon to respond to questions, meet with architects and engineers and become a vital, integral component of the operation and the industry at large.

You also need to embrace the technology you have transitioned to. No looking back now, only forward. We have all heard the cliché, “Walk the Walk,” Talk the Talk,” this is all so true. Your posture should always be strong and steady as it relates to the choices you made. There will be other possible alternative energies available, and competing alternate energy companies will approach you, but you have decided on the “best overall solution” for your particular entity.

Remember to stay the course. You will be called by fuel suppliers, other cities, vehicle manufacturers, private companies and interested parties who have yet to embark on an alternative fuel operation. Face these opportunities with integrity and humbleness.

Realize there is no such element as “one size fits all” as it relates to alternative energy, and there is no “silver bullet.” However, if you did your research properly, looked at the big picture and used a very board stroke, you will know undeniably, you made the correct decisions.

h.) Education.

Education will be a key element to your success. Attend seminars which will broaden your perspective on alternative fuels. Continue to educate yourself on the fuel choice you made. If it is natural gas, there are considerable valuable resources and educational associations that will keep you abreast of changing technologies, availability of the fuel, and teach you how to calculate your fuel costs properly among other fundamentals. Therms into gallons is very specific, and you must unequivocally and inherently know this information. The educational information will allow you to maintain a competitive edge over others, and provide you with a great support network.

I am convinced that technology is a lifelong educational challenge. Staying on top of your game will provide you with the best opportunities to see the future, and also to assist others. It will also prevent you from be burdened with inaccurate facts, and outlandish claims of cleaner, faster, better, cheaper, easier, etc.

Additional Objectives

1. Important to stay the course
2. Be flexible and listen attentively (occasional problems will surface)
3. Learn from mistakes and move forward
4. Communication is the key
5. Create technology partnerships with your OEM's
6. Communicate to industry peers
7. Perform a Peer Review of various fleet sites
8. Document all activities of construction

Conclusion

After we performed a fuels analysis, looking at liquefied natural gas, methanol, ethanol, propane and hythane blends, we elected to move from standard "wet" fossil fuels into natural gas, or Compressed Natural Gas (CNG). We began our alternative fuels program endeavor in 1997 with the introduction of twenty heavy-duty public transit buses. Over the years, we have worked with several equipment manufacturers to assist them in bringing to the marketplace the first of certain model vehicles operating on CNG when they stated they could not construct such a vehicle. Now in 2013, 85% of all our heavy-duty and medium-duty vehicles, along with about 20% of our light-duty vehicles operate on dedicate CNG. We never looked back!

Many entities operate more than one alternative fuel, I have found this to be somewhat ineffective in the big picture. Using an alternative fuel requires a total commitment to do it correctly (becoming the duty expert). A commitment of funding, staff time, training, parts, education and operations. It is a complete effort to become the best you can be. Operating several alternative fuels or a combination of so called "boutique" fuels, can create inefficiencies in your operations. Different handling characteristics, training, operations, parts and even fuel delivery, etc. We did not want to potentially be "held hostage" to a fuel supplier trucking in our alternative fuel. Many elements can affect that delivery.

Our use of alternative fuels has brought tremendous accolades of achievement to our division and my staff. We have been visited by many foreign country representatives who want to learn about CNG use, as well as a considerable number of domestic fleets. Our program has brought us national recognition and creates a positive image for our operation. We have had our share of challenges along the way, however, as I mentioned, staying focus on the results you want, means staying the course.

It is my sincere hope that you find this document useful information as it has all of the elements (a good recipe) that I have learned in my many years of operating alternative fuels, and the steps you should follow when you intend on affecting an organizational paradigm shift and thereby creating and developing new synergies.

I have a statement posted in my office, and I read this everyday:

> “There are no secrets to success; don’t waste time looking for them.
> Success is the result of perfection, hard work, learning from failure,
> loyalty to those for whom you work, and persistence”

I wish I was the author, however, that honor belongs to General Collin Powell

End.