

# Broward County Renewable Energy Action Plan



Environmental Planning and  
Community Resilience Division  
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## Executive Summary

The Broward County Renewable Energy Action Plan (REAP) recommends strategic actions to support increasing the use of renewable energy in county facilities and operations. The REAP outlines five pilot projects from the currently funded *Water and Wastewater Services Cogeneration* project to projects in need of funding support such as the *Lauderhill Transit Center*, the *Government Center West Solar Carport*, and the *Tradewinds Sustainable Farm*. Additionally, it outlines a pilot project partnership opportunity *FPL Community Solar Demonstrations* that will require no monetary investment from the county. The pilot projects in the REAP each showcase Broward County's leadership toward a renewable energy future and through community outreach will help increase awareness of and engagement with the new renewable energy technologies to advance acceptance and adoption countywide.

Broward County has made significant investments to date toward energy efficiency and conservation of resources of county buildings through the Leadership in Energy and Environmental Design process. In furtherance of current efforts, the REAP encourages and promotes formalizing renewable energy through the capital budget process and planning. The REAP calls for:

- Amending the Capital Budget Justification Form,
- Requiring demonstrated consideration of renewable energy cost-benefits for each new construction project and major renovation,
- Using Environmental Service Contracts to consider options that bundle short-term payback with long-term payback initiatives, and
- Budgeting an appropriate amount of funds annually to support engineer, life cycle, structural and electrical review of county facilities for renewable energy retrofits.

Broward County is committed to long-term sustainability to protect our environment and community resilience ensuring a viable future for generations to come. The REAP lays out an approach that contains renewable energy pilot projects for consideration, strategies for including renewable energy to the budgeting and planning process, and approaches to community outreach supporting Broward County Climate Action Plan and recognizing that our local and regional greenhouse gas emissions goals will not be met by energy efficiency alone.

The Broward County Renewable Energy Action Plan (REAP) supports Resolution 2014-054 “supporting President Obama’s Climate Action Plan, Congressional action on climate change, continued engagement with the Southeast Florida Regional Climate Change Compact and federal government, adding goals for using renewable energy, reduction of energy usage, and incorporating renewable energy projects into County buildings and operations.” The Resolution which passed in February 4, 2014, sets goals for 20% use of energy from renewable energy sources and for 2.5% annual improvements in the energy efficiency of County buildings by 2020. REAP is a strategy that can be advanced to help develop and encourage future renewable energy projects within the county, continued reduction in total energy use, and in furtherance of the County’s greenhouse gas (GHG) reduction goals.

Upon the recent adoption of Resolution 2014-054, the Environmental Planning and Community Resilience Division assembled a working group with representatives from agencies including Public Works, Port, Airport, Transit, Planning and Redevelopment, and Parks and Recreation. The group convened to discuss implementation of the County's adoption of the 20% energy efficiency and renewable energy goal, as well as potential opportunities and strategies for achieving the goals. The work group reviewed current efforts, recognizing many investments thus far, but also forthcoming project opportunities. The outcome is a list of project demonstrations and collective agreement that the County has the opportunity to increase efficiency, and ability for a renewable energy portfolio that includes projects ranging from cogeneration from biogas to solar photovoltaic and wind installations.

REAP presents five renewable energy projects deemed suitable for consideration in meeting the new goals, demonstrating the County’s commitment through incorporation of renewable energy projects into new and existing County facilities. The purpose of this strategy is not to supersede current energy efficiency and conservation measures, but is a tool to help develop projects and policies that will encourage future projects. The REAP is part of a larger overall strategy; it outlines projects to serve as **pilot projects**, recommendations for incorporating renewable energy into **capital budget process and planning**, and benefits of **community outreach**.

Broward County government is continually improving efforts and strategies to reduce GHG emissions to meet the goals set by the Broward County Board of County Commissioners. Along

with energy efficiency strategies, Broward County recognizes that it can further reduce operating costs and GHG emissions by integrating renewable energy into facility planning and projects. These investments will also aid in meeting broader agency objectives relating to economic development and community resilience, through investments in the green economy and diversification of energy sources. Transitioning to a renewable energy future, the County could achieve greater energy independence, protect itself from price spikes, and serve to lessen the demand on the energy grid during heat waves and other potential energy disruptions. Moreover, recognizing that energy efficiency alone will not allow the County to meet GHG emission reduction goals, REAP presents four core demonstration projects where the County can play a lead role in innovation, policy development and market transformation:

#### **Project 1: Water and Wastewater Services (WWS) Cogeneration**

- Project Location: Wastewater Treatment Plant
- Lead Agency/Department: Water and Wastewater Services Division
- Project Description: Biogas Cogeneration, or combined heat and power, is the simultaneous production of electricity and heat from a single fuel source; it provides onsite generation of electrical power. The WWS Cogeneration project will work by installation of a generator fired with renewable biogas, currently flared, to offset purchased electricity and injection of Fats, Oils, and Grease (FOG) into digesters enhancing biogas production and increasing the amount of electricity generated.
- Project Benefits: The WWS Cogeneration project will reduce the wastewater treatment plant's annual purchased energy consumption by 12,000,000 kWh; its carbon emissions by over 8,000 tons each year; and provide a dedicated facility for the disposal of Fats, Oils, and Grease (FOG), a by-product of restaurants that often clog sewer pipes.
- Estimated Costs: Executed contract with CHEVRON for \$19,375,378 which provides contractual Guaranteed Energy Savings Program with annual savings for 20 years to repay the cost of the project. Project completion expected to be April 2015.

#### **Project 2: Lauderhill Transit Center**

- Project Location: City of Lauderhill
- Lead Agency/Department: Transit Division
- Project Description: Integration of photovoltaic system, rain water harvesting at the Lauderhill Transit Center, a +/-68,000 square foot parcel of land being designed/developed as a new 2-story (+/-15,000 sq. ft.) State-of-the-Art Mixed-Use

Facility. The new Lauderhill Transit Center will facilitate the daily transit experience for over 7,000 daily passengers. In addition, the new Center will incorporate mixed use with office space and retail areas. Sustainability initiatives will be integrated into the project including energy efficiency measures, rain water harvesting and solar panels.

- Project Benefits: The anticipated rate of rainwater collection will range between 66,400 and 272,000 gallons of rainwater per year. Rainwater collection will be used to maintain the proposed landscape areas, as well as, the associated restroom areas. Additionally, the solar photovoltaic panels are proposed to produce 93,800 to 150,900 kWh annually the equivalent of \$280,000 to \$440,000 of operational cost savings on an annual basis.
- Estimated Costs: To be determined; project is currently still in Schematic Design Phase.

### Project 3: Government Center Garage Solar Carport

- Project Location: Government Center West
- Lead Agency/Department: Facilities Management Division
- Project Description: Photovoltaic system installation creating a solar “carport” with initial consideration of the Government Center West Garage as part of the County’s Green Showcase.



*Image: Parking Garage, GCW Green Showcase, shown with potential solar PV installation.*

- Project Benefits: Solar power systems derive clean, pure energy from the sun. Solar energy combats greenhouse gas emissions and global warming, and reduces our collective dependence on fossil fuel. The carports will also offer shade to county vehicles increasing the lifetime of the vehicles that currently park in full sun. The medium-sized installation “Option B” will offset 743,662 pounds of carbon dioxide annually, the equivalent of nearly 85 acres of trees. This project would support the current GCW Green Showcase, an effort to use GCW as a demonstration site of renewable energy technologies and sustainable building practices. To advance this project, staff is initiating a structural review of the existing structure to ensure the building has sufficient reserve structural capacity to bare the additional load required for a roof top solar installation. The findings will determine the viability of this facility as a pilot location and may also influence the sizing of the installation.
- Estimated Costs: Yet to be determined.

#### Project 4: Tradewinds Sustainable Farm

- Project Location: Tradewinds Park
- Lead Agency/Department: Parks and Recreation Division and Public Works Division
- Project Description: Installation of a windmill and solar energy collector at Tradewinds Park as part of renewable energy demonstration and community education project. An improvement project is planned and funded for the north end of Tradewinds Park with a budget of 7 million dollars. This project will incorporate diverse green components including an organic garden, waste composting, green construction, and installation of an operational/educational windmill and a solar energy collector system. Both systems will be complete functioning renewable energy products, designed and installed in such a manner as to allow park staff/naturalist to conduct educational training opportunities for the public. Project details will be determined in the design process.
- Project Benefits: The primary benefit of the project will be the visible integration of renewable energy as part of the park's landscape, thereby serving as an educational feature and demonstration project. Energy generated by the project will be nominal given the scale of the project but will be used beneficially within the park and will provide an offset to energy costs and serve to reduce the carbon footprint of the park operations.
- Estimated Costs: Not yet determined, but less than \$100,000. Parks and Recreation intends to pursue grants to help offset project costs. .

#### Project 5: FPL Community Solar Demonstrations

- Project Location: Not yet determined.
- Lead Agency/Department: Environmental Planning and Community Resilience Division and Public Works
- Project Description: In May 2014, Florida Power & Light (FPL) announced a new program designed to support community-based solar projects with an initial investment by FPL in five (5) 100 KW demonstration projects throughout the south Florida service area. The Environmental Planning and Community Resilience Division contacted FPL program managers to explore the potential for Broward County properties to serve as locations for one or more installations, based on the County's regional leadership on diverse climate and energy initiatives, including the multi-jurisdictional Florida Go Solar initiative supported by the U.S. Department of Energy and Broward County's adoption

of 20% renewable energy goal. A series of subsequent meetings led to the prioritization of three potential Broward County sites for inclusion in the initial pilot program. Sites under consideration include:

- Broward Children’s Reading Center – Young at Art
- Port Everglades - Northport and Midport parking garages , and Terminal 18 surface parking lot
- Fort Lauderdale/Hollywood International Airport - sound berm of “FLL Green Belt” along Griffin Road
- **Project Benefits:** The demonstration projects are intended to spur individual investment in similar community-based solar projects through voluntary donations toward solar projects as part of monthly utility billing. Solar installations will be fully-funded by FPL with the goal of generating sufficient community support so as to recover the initial project costs and generate sufficient revenues to fund similarly-scaled projects elsewhere in the Broward community and throughout the FPL service area. To maximize the potential for success, the preferred demonstration sites will be visible to a broad and diverse audience and also allow for educational messaging.
- **Estimated Costs:** There is no cost associated with this program for Broward County operations; FPL funds the installation and maintenance of the project.

To ensure maximum progress towards the County’s renewable energy goal, renewable energy considerations need to be included in the earliest phases of project planning, budgeting and development. Upfront inclusion in the project planning process will help to ensure appropriate consideration of all project opportunities and consideration of project economics from both a capital and operational standpoint. Many economic opportunities can be lost if these elements are not incorporated into the initial building design. For example, some renewable energy technologies, like passive solar cooling, may not add to design costs when considered early in the process. Generally renewable energy technologies have a distinct

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*Include in Budget Process*

*Embed in Design Phase*

*Build Solar Ready*

*Engage Agency Directors*

*Leverage Investments*

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capital cost in the fact that costs may be endured upfront but repaid through reduced operating costs over the life of the building, or life of the equipment.

Recommendations:

1. Pre-design or design phases for capital projects should require demonstrated consideration of renewable energy cost-benefits for each new project and major renovation, with calculation of energy production, operational savings, return on investment environmental benefits, and educational opportunities that can be generated.
2. Amend Capital Budget Justification (CBJ) Form to formally include integration of renewable energy as part of the project proposal, and consideration of the County's 20% renewable energy goal.
3. Increase the renewable energy requirements for Energy Service Contracts (ESCO). ESCO's normally assess primarily the low-hanging fruit projects, for example lighting retrofits, motors such as controlled chillers, and installation such as doors and windows. Incorporating renewable energy as a requirement in the ESCO assessment initially could allow the county to bundle short-term payback initiatives like lighting with long-term payback installations like solar photovoltaic.
4. Budget an appropriate amount annually in the various capital funds to support engineering evaluations, life cycle costs, electrical assessments and structural studies to advance retrofit of existing facilities with renewable energy projects, including those managed by the Public Works Department, and relating to the airport, port, and water and wastewater services.

*Investments to Date*

Broward County has made significant contributions to energy efficiency and conservation of resources of County buildings through the Leadership in Energy and Environmental Design (LEED) process, which is used in all new construction and major renovations. The County has many LEED certified buildings with exceptional sustainable qualities. The LEED process is currently used to analyze and implement green strategies, including renewable energy. Further utilization of LEED or more significant feasibility studies could help expand onsite renewable energy generation. It is important not to reject technologies based on preliminary early analysis, but rather use the analysis to inform the ongoing process. Details of resource

availability, design, and magnitude of energy savings cannot be fully determined until detailed analysis is conducted in the later stages of building design.

### *A Focus on Renewable Energy*

Embedding renewable energy considerations into the design phase for new buildings and major renovations allows for the most economic opportunities for renewable energy options. To meet energy goals economically, the planning team needs to understand that energy use should drive the structure and form of the building. Conducting a preliminary review of renewable energy resources at the site is currently incorporated into the LEED process. However, additional key actions in the design phase could include priority integration of renewable energy opportunities as part of early project design along with: identifying any major restrictions to onsite generation, ensuring renewable energy expertise on the planning team, and identifying and reporting costs and savings (ROI) for renewable energy options. Ultimately, successful transition to a more diverse energy portfolio that includes one-fifth of energy use from renewable energy sources will require proactive consideration of renewable energy opportunities as part of the early design process for all new construction and active integration of renewable energy projects in the retrofit of existing facilities. Both strategies will require some level of initial prioritization of investment, with upfront costs that will ultimately generate a return-on-investment that can be accelerated through proper project selection and early integration in existing planning processes. Immediate opportunities include and next steps should include use of the capital budget process to require consideration of renewable energy goals as part of all future capital projects, set aside recurring funds to support initial engineering evaluations to identify sites best suited for renewable energy retrofits from a structural standpoint, and the use of energy service contracts to identify and advance preferred projects.

When conducting the preliminary review, it is important to consider the technology options that are most often available and cost effective for buildings. Some of the most common renewable energy technologies in South Florida include:

- Solar Thermal water heating is a simple technology that is successful in many situations, especially where it offsets electricity or any high energy costs.
- Photovoltaics (PV) are often the most common renewable electricity option for a building. Prices have historically been higher for PV than other electric technologies, but have been decreasing since 2008.

- Wind turbines have recently been installed locally but may have limited generating capacity.
- Geothermal heat pumps can be very cost effective in mixed climates that have both heating and cooling loads and where electricity costs are low or moderate.

In addition, it is important that clear goals and requirements be laid out for the projects as well as specific requirements for both design teams and construction teams. A Scope of Work (SOW) includes tasks to be performed by the different team members. The SOW should include special language to emphasize the importance of renewable energy goals in each phase of the design, with emphasis on the early phases in which key decisions are made. The SOW should also include the tasks to ensure this is done and that the designers have budgeted enough hours for analysis and design team meetings, including the involvement of the energy analyst or expert.

Incorporating renewable energy goals into new projects will have a budgetary impact; there are various funding options that can be considered for each project. The Environmental Planning and Community Resilience Division recently reported on funding opportunities for installing renewable energy at the BB&T Center (Attachment A). The report includes funding mechanisms that could correlate to other county facilities. Research from that project concluded that the most optimal strategy is to bundle long-payback energy measures such as renewable energy installations with shorter-payback items such as energy-efficient lighting retrofits. Quick-payback retrofits may achieve a savings of 15 percent, but by combining them with longer-payback retrofits, savings could be elevated to 30 percent or more.

Moreover, in order to work within existing budgets, Broward County could choose to phase the installation of renewable energy development. Broward County could commit to “build solar ready,” which involves incorporating future renewable energy projects into the building design, but postponing the actual purchase and installation of the equipment. Often referred to as making a building renewable energy ready, this involves integrating future renewable energy projects fully into the building design, but postponing the actual purchase and installation of the equipment. This strategy has advantages and limitations, but phasing renewable energy should not be viewed as option to postpone the integration of renewable energy into the building design.

For example, design elements could include specifying the roof structure to hold the load of a photovoltaic system, laying conduit or piping for a future system, or installing sufficient pumping system for a future solar hot water system. All require examining the current design with a vision toward future use.

Local, state or federal policy changes can quickly render a technology cost effective in a matter of weeks if the required building infrastructure is already in place. Therefore, ensuring buildings are solar ready enables future incorporation of renewable energy, even when purchasing and installing the equipment must be postponed.

Whether considering renewable energy during the budget process, implementing into designs, or building solar ready, it is imperative for agency directors to be engaged not only on renewable energy and energy efficiency goals, but on how their departments can help the county move forward, and the active role they play in their roles as directors. The county should also leverage its investments, and municipal partnerships, to increase opportunities countywide.

For local governments, outreach programs are critical to successfully implementing and using renewable energy systems in new building construction or major renovations. REAP presents four pilot projects to not only meet county goals but moreover to provide models that encourage a positive opinion and educate our community about renewable energy. Engaging and educating the public has been shown to be helpful to incorporating renewable energy in government operations.

The primary goal of community outreach is to increase awareness of and engagement with the new renewable energy technologies to advance acceptance and adoption. Outreach programs should present information that encourages people to make informed energy choices in their daily lives. The most effective programs include a blend of educational, instructive, and demonstrative information.

Community outreach materials and activities should be targeted to three primary audiences in Broward County: 1. Building occupants, 2. the Public, and 3. Inter-agency audience which consists of county and municipal agencies planning to construct or renovate similar buildings.

#### *Building Occupant Outreach*

Educating occupants about the benefits of energy efficiency and renewable energy helps engage them as active participants in energy savings, bringing a higher rate of return on investment. Actions can be as simple as turning off lights when leaving an area, to not using

copy machines during peak demand are examples of immediate actions that can be encouraged to help reduce energy use and costs. Some examples of effective educational activities for building occupants include:

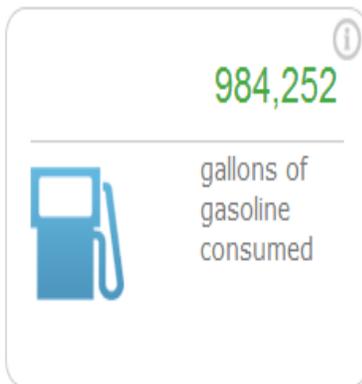
- Energy displays that show feedback data to building occupants.
- Historical energy consumption and renewable energy generation reports for the building.
- Prominently displayed informational posters, educational briefs, and other materials.

### *Public Outreach*

Public outreach on major construction projects that incorporate renewable energy can increase awareness of the economic, environmental, and social benefits of renewable energy and energy conservation. Public outreach programs work best when they are primarily anecdotal instead of technical. Describing sustainable measures and behaviors can influence what people do in their homes and workplaces. A well-designed public education and outreach program could include:

- Interactive educational displays, exhibits, energy monitors, videos.
- Informational tours highlighting the buildings' renewable energy technologies.
- Feature stories in local and national journals, newspapers, and magazines.
- Social network tools and informational videos.

### *Interagency Outreach*



Outreach materials developed to be shared across local government agencies should document processes and procedures that went into project planning, development, construction, and commissioning. Information on successes, barriers, challenges, and lessons learned is an invaluable education tool for other agencies planning to construct or renovate similar buildings. Examples of interagency outreach materials include presentations, case studies, fact sheet and best practices.

Benchmarks for the demonstration projects could be achieved by measuring number of articles published, website traffic and inquiries, along with total kilowatt hours produced and pounds of carbon offset for each of the projects. As the above projects are proposed, they would produce 12,685,140 kWh annually and offset 8,747 metric tons of carbon dioxide which is roughly the equivalent of consuming 100,000 gallons of gasoline. For the purpose of this plan “Option B” for

the Government Center Garage Solar Carport is recommended, and was used to tabulate the potential environmental benefit. Calculated benefits can be converted into visual representations that can be used to generate public interest and outreach on the projects throughout the county.

Benchmarking and reporting are important to community outreach but crucial for continued internal improvement. As a result of the resolution and updated goals, County staff will now provide progress reports as part of the Climate Change Action Plan updates which will include specific projects and their reduction benefits, and government operations GHG emissions inventories. *(Note, to avoid duplication of effort and confusion, these updated goals and progress reports will supersede the goals and progress reports identified in the May 30, 2008, Broward County Government Operations Climate Change Report).* Successes achieved and best practices from the projects will be shared with our 31 municipalities through the Sustainability Stewards of Broward, and communicated to residents and businesses through energy efficiency and conservation, climate change, and environmental outreach.

Concurrent to REAP, Environmental Planning and Community Resilience Division is completing a complimentary energy strategy for Broward County with a team of community leaders. The Community Energy Strategic Plan (CESP), a program of the Department of Energy, is being developed. CESP is a step-by-step process of which the outcome will be a robust strategic energy plan for our community. REAP will be included in the CESP as the local government leadership component of the community-wide strategy. Staff aims to complete the CESP planning process this summer. CESP and REAP together, simultaneous with the GoSOLAR statewide initiative, help to build energy success by moving from single projects and programs to a comprehensive, long-term energy strategy that delivers benefits for county operations, local community, and the South Florida region to help save money, create local jobs, reduce GHGs, and improve energy security.

Most of the energy consumed in Broward County is generated through the burning of fossil fuels which results in direct impacts on air quality and the emission of GHGs. Buildings are responsible for 74% of our county operations greenhouse gas emissions. Both renewable and efficient energy measures are critical for Broward to minimize environmental impacts and contributions to climate change. Renewable energy resources like solar, wind, biomass, hydropower, and landfill gas are zero carbon sources that reduce GHGs by replacing fossil fuels.

Renewable energy can create jobs and open new markets for the local economy, and can be used as a hedge against price fluctuations of fossil fuels.

From cooling our buildings, to lighting our roadways, powering our port, and fueling our fleet, energy has a huge impact on our environment and our economy. It is clear that meeting our future needs for clean, affordable, abundant energy requires a diverse energy portfolio as well as a strategic approach. REAP lays out an approach that contains renewable energy pilot projects for consideration, strategies for including renewable energy to the budgeting and planning process, and approaches to community outreach.

Broward County is committed to finding innovative energy solutions that encourage long-term sustainability to protect our environment and ensure a viable future for generations to come; recognizing that our local and regional GHG emissions goals will not be met by energy efficiency alone. Both energy efficiency and conservation are needed to address many recommendations made in the Broward County Climate Change Action Plan as well as the Regional Climate Action Plan developed by the Southeast Florida Climate Change Compact. These needs are echoed by other collaborative efforts documented in current ongoing municipal sustainability action plans, as well as other community-wide and Southeast Florida regional action plans and working groups.

## RESOURCES

*Creating an Energy Awareness Program, A Handbook for Federal Energy Managers*, U.S. Department of Energy, Energy Efficiency and Renewable Energy, July 2007,  
[http://www1.eere.energy.gov/femp/pdfs/yhttp\\_ceap\\_hndbk.pdf](http://www1.eere.energy.gov/femp/pdfs/yhttp_ceap_hndbk.pdf)

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U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP), May 2012,  
[http://www1.eere.energy.gov/femp/pdfs/re\\_construction\\_guide.pdf](http://www1.eere.energy.gov/femp/pdfs/re_construction_guide.pdf)

*Procuring Architectural and Engineering Services for Energy Efficiency and Sustainability, Greening Federal Facilities: An Energy, Environmental, and Economic Resource Guide for Federal Facility Managers and Designers*, U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP), October 2012,  
[http://www1.eere.energy.gov/femp/pdfs/51367\\_resguidedefconsmgr.pdf](http://www1.eere.energy.gov/femp/pdfs/51367_resguidedefconsmgr.pdf)

*Operations & Maintenance Best Practices, A Guide to Achieving Operational Efficiency*, U.S. Department of Energy, Energy Efficiency and Renewable Energy, August 2010,  
[http://www1.eere.energy.gov/femp/pdfs/omguide\\_complete.pdf](http://www1.eere.energy.gov/femp/pdfs/omguide_complete.pdf)