

**Solid Waste Authority of Palm Beach County
Proposal for Innovative Recycling Grant Program
Florida Atlantic University Materials Recovery Program**

Abstract

The Solid Waste Authority of Palm Beach County (SWA) Is proposing an innovative, comprehensive recycling project in partnership with Florida Atlantic University (FAU). FAU is a multi-purpose university located on a 700-acre site in Boca Raton, Florida with satellite campuses in Broward, Martin, St. Lucie, and Palm Beach Counties. With a student enrollment of 14,492 and staff of 3,780, FAU is a promising institutional site for substantial waste reduction and materials recovery.

The proposed project is an integrated, comprehensive program designed to increase materials recovery and reduce waste through a combination of proactive student participation and the implementation of several advanced processes. The project targets a wide range of traditional and non-traditional materials including glass, plastic, and aluminum containers; office, news, and mixed paper; corrugated paper; yard trash; carpet; waste paint; and wood waste.

Project management responsibilities will be shared by SWA staff and a Project Team made up of FAU faculty and students from the Environmental Sciences Program. SWA staff will lead planning and communication efforts, and the Project Team will carry out field activities. To ensure staff and student participation in the project, FAU will create a course in the Environmental Sciences curriculum that will confer academic credit for participation in the project. FAU will also allocate a full-time work-study position funded by the US Department of Education to manage the recycling program.

The Project Team will develop effective education materials and coordinate collection activities. SWA will provide collection and marketing services through existing market agreements. Waste paint will be distributed to non-profit organizations for reuse in community projects, and wood waste will be donated to a rehabilitation program operated by the Palm Beach County Sheriff s Office. Yard waste diverted by the project will be processed on-site and used for landscape maintenance on the 700-acre campus.

The proposed project constitutes an advanced process because it will be the first university operated comprehensive, integrated waste reduction and recycling program in the state and because it incorporates advanced design features and processes. For example, the formal assimilation of project activities into the Environmental Sciences curriculum is a unique innovation, and FAU will be the first university in Florida to institute carpet recovery and on-site yard waste processing.

The project is unusually cost effective, highly transferable to other Florida universities, and includes several elements that will promote transferability. Because the project is designed to take advantage of FAU's institutional infrastructure, it represents a regional program that crosses county boundaries.

Project Description

The Solid Waste Authority of Palm Beach County (SWA) is proposing an innovative recycling project in partnership with the Florida Atlantic University (FAU). FAU staff, students, and faculty will work with SWA staff to implement campus-wide recycling of traditional and nontraditional materials. The project also involves the participation of the Palm Beach County Sheriff's Department (PBSO) and local non-profit agencies.

Project management responsibilities will be shared by SWA staff and an FAU Project Team consisting of FAU staff and faculty and students from the Environmental Sciences Program. The SWA staff will lead planning and communication efforts, and the Project Team will carry out field activities including coordination of materials collections and data collection for analysis of capture and composition rates. SWA staff will track material collections weekly, and the Project Team will assist with analysis of project results.

Project Elements and Major Tasks

The proposed project consists of eight program elements, one for each of six targeted materials plus educational and reporting activities. The project will implement campus-wide recycling programs for office paper, newspaper, and mixed paper; glass, plastic, and aluminum containers; corrugated paper; waste paint; wood waste; used carpet; and vegetative waste. Program elements will be implemented as the series of major tasks summarized in the following sections.

Recovery Task 1 - Paper Recycling and Container Recovery

A combination of 95-gallon Toter roll carts and Wausau tri-compartmented containers will be used for collection of paper products and drink containers. Small desk-side recycling containers will be procured and placed in classrooms and administrative areas to maximize participation and ensure source separation. Toter carts will be placed at central locations and serviced by SWA recycling collection staff on designated days.

Student volunteers from the Environmental Sciences Program will be responsible for educating FAU students and faculty about the FAU recycling program. Education and promotion responsibilities will also include the following activities:

- Ensuring that offices, dorms, and classrooms are supplied with appropriate containers and that containers are placed at suitable locations.
- Monitoring recycling activity and tracking participation and contamination rates.
- Measuring reductions in solid waste generation and recommending appropriate reductions in solid waste service levels.

Recovery Task 2 - Corrugated Cardboard Recycling

The Project Team will identify locations where corrugated cardboard is generated and develop an effective collection methodology. Cardboard will be baled at a central location using a standard hydraulic downstroke baler. In other selected areas, special equipment such as the

Myton CK2000 Mobile Compression baler® will be used to minimize storage space requirements and improve material handling. FAU staff will transport the baled material to a central location for collection by SWA.

Recovery Task 3 - Waste Paint Recovery

Hazardous waste, including waste paint, generated by university activities is currently segregated and transported to a central location for storage and disposal by a private hazardous waste disposal company. The Project Team will recover useable latex and oil-based paint at this storage site for donation to various community groups such as Paint You Heart Out, Habitat for Humanity, and the United Way. The SWA Hazardous Waste Program has existing relationships with these organizations, and the FAU project will supplement SWA donations and ensure a consistent supply of useable paint.

Recovery Task 4 - Wood Waste Reuse

The FAU campus includes approximately 61 buildings and 12 satellite facilities, and expansion and renovation projects generate a steady supply of wood waste. The Project Team will coordinate diversion of this material from disposal for donation to a boot camp style rehabilitation program for drug offenders operated by PBSO called the "Drug Farm." Drug Farm residents are required to participate in a selection of work details, including the woodshop where residents repair and construct furniture for various community agencies and indigent families. Woodshop supplies are not funded by the PBSO and are provided entirely by donations. Diverted wood waste will be recovered and temporarily stored in specified campus location(s) for collection by Drug Farm staff.

Recovery Task 5 - Carpet Recycling

The SWA has established a market for recycled carpet that offers a revenue share of .045 cents per pound recovered. The Project Team will recover all available Number 6 nylon carpet generated by routine renovation activities at dorms, offices and classrooms and at tenant facilities at the main Boca Raton campus, as well as at the Martin, Port St. Lucie and Broward satellite campuses. The recovered carpet will be collected at a recycling activity lay-down area where it will be cut, baled, and stored for pickup by the vendor. The downstroke baler used for processing corrugated cardboard will also be used to process this material.

Recovery Task 6 - Vegetative Waste

Currently, all vegetative waste on campus is generated by contract groundskeepers and is disposed of as solid waste in front load garbage dumpsters located at multiple locations throughout the campus. The proposed project will provide containers for the segregated collection of vegetative waste and procure a mulcher/chipper to process waste. This mulching program will not only avoid disposal costs through reduced solid waste volume, but it would also allow FAU to reuse the mulch for university landscaping projects.

Recovery Task 7- Feedback and Education

Throughout the implementation of the program the Project Team will develop and deploy a series of educational messages to promote FAU recycling programs. The Project Team will conduct follow up surveys and focus groups to obtain feedback and modify messages to

improve effectiveness based on that feedback. In addition, various delivery mechanisms will be used including print advertisements; video feeds at campus facilities, newsletter articles, school demonstrations, and library presentations. SWA staff and the FAU Project Team will co-produce an educational video that describes the FAU recycling program and reports its achievements.

Task 8 - Reporting Results and Sharing Data

A final report of project activities will be prepared in a form suitable for publication and for distribution to other jurisdictions. Unusual features of collection methodologies and samples of particularly effective education materials will be highlighted. Photos of various stages of program implementation will be included along with technical data concerning project results. Materials will also be developed in a form suitable for presentation at industry conferences.

Budget Justification

The proposed project reflects a substantial commitment of the combined resources of FAU and the SWA. While FAU and the SWA have committed to funding nearly half of the total project budget and are willing to provide ongoing funding to ensure the project's long-term success, grant funds are essential to subsidize the cost of equipment and services necessary to initiate a recycling project of this size.

Timeline for Major Tasks

1st Quarter. Initiate requisitions for purchase of equipment and assets; establish budget for FAU work-study position(s).

2nd Quarter. Install all equipment and implement collection programs; begin tracking collection data; conduct onsite training and education.

3rd Quarter. Maintain programs; collate data, secure approval for and implement course curriculum.

4th Quarter: Prepare final report and presentations.

Ownership of Equipment

The SWA will initiate all grant funded purchases and will maintain ownership of all equipment deemed assets as defined by F.S. Statute(s) 274.01-274.12. Upon award of grant, the SWA will execute a contract with FAU authorizing permanent transfer of title to all related equipment to FAU.

Targeted Materials

The proposed project represents a partnership between the SWA and FAU, a state university, and, thus, the project satisfies the criterion for targeted materials. In addition, the project includes recovery of two material targeted by DEP, yard waste and carpet.

The proposed project will recover glass, plastic, and aluminum and will implement a comprehensive collection system to recover paper and OCC from offices, classrooms, and residence halls. Paper collection methods will include the use of 95-gallon roll carts, Wausau multi-material recycling containers, and internal office desk-side containers. Innovative "lite balers" will be procured to increase OCC collection efficiency. These balers, which have been used recently in other SWA programs, have proven effective in enhancing efficiency and operational convenience for a large-scale comprehensive program. The lite bales offer an alternative to container storage and improve material handling both inside and outside of campus facilities. All OCC will be baled at a central recycling center located at the T-30 building where it will be collected by the SWA. The baled material will not require additional processing since the FAU program will satisfy bale requirements specified by SWA's contracts with OCC vendors.

In addition to traditional recyclables, the project will also include two materials that can create special disposal problems: waste paint and wood waste generated by routine maintenance and repairs and by ongoing construction activities related to the expansion of the campus. Waste paint is a hazardous material requiring special disposal measures, and wood waste is a bulky waste that increases waste volumes. For both materials, the Project Team will coordinate with FAU staff to recover materials from project sites. Materials will be stored at a central location for collection by participating community organizations and agencies.

Waste paint will be picked up and distributed for reuse to over twenty community service organizations, including Paint Your Heart Out, Habitat for Humanity, and the United Way. Wood waste will be picked up by the PBSO for use by a drug offender rehabilitation program that operates a woodshop where residents build and repair furniture for donation to indigent families in the community.

The project also includes two materials targeted by DEP: yard trash and carpet. Currently, yard trash generated by FAU is collected and disposed of as solid waste. The proposed project will implement on-site yard trash processing to produce mulch for use by FAU grounds maintenance. Post-consumer carpet, which is not currently being recovered, will be recovered from renovations to residence halls, classrooms, and offices; temporarily stored on-site; sorted; and marketed appropriately.

Advanced Processes

The proposed project constitutes an advanced process both as this term is defined by DEP and by generally applied standards in the recycling industry. University recycling programs are not common on a statewide basis in jurisdictions of similar size or demographics, and this program would be the first university-operated comprehensive integrated waste reduction and recycling program in the State. This program also represents an advanced process both in terms of how waste will be managed on campus and in terms of the plan to incorporate recycling program activities into course requirements for the Environmental Sciences curriculum.

The university has committed support for the proposed project at an unprecedented level. To ensure the level of staff and student support needed to initiate and successfully maintain a recycling program of this magnitude, FAU has agreed to commit academic and financial resources to the project. First, the university will create a course in the Environmental Sciences Program curriculum that will confer academic credit for participation in recycling program activities. Students enrolled in the course will carry out project-related duties described in the project description. Second, the FAU physical plant staff, who are responsible for all building services, will allocate a work-study position for graduate students to carry out responsibilities directly related to the project. Work-study programs at FAU are funded by a US Department of Education program.

Content for the newly-created course will include a combination of classroom instruction by FAU and SWA staff, background reading and research, and field experience performing project related activities including: monitoring containers for participation and contamination, coordinating recovery and collection activities with FAU staff and contractors, preparing draft technical reports, conducting waste composition studies, and developing and evaluating educational materials.

The project also employs several technologies and processes not in common use in Florida. First, the project includes on-site yard trash processing. The university will utilize its groundskeeping crews to collect vegetative waste and process it into mulch. The mulcher/chipper selected for the project will produce a quality of mulch required for reuse in campus landscaping projects. Thus, on-site mulch processing will not only reduce solid waste disposal costs but also offer the opportunity for closed-loop recycling. Mulching equipment procured for use on the Boca Raton campus can be easily loaned out or shared with the satellite campuses as discussed below in *Regional Programs*.

Second, recovering carpet and identifying markets for this non-traditional material is an advanced process not common to Florida recycling programs. The SWA has already established preliminary agreements with Waste Management and AlliedSignal to market this material for FAU and for potential programs at other institutions and organizations. The proposed project provides the opportunity for FAU to identify and overcome the challenges associated with recovering and marketing this material as the Project Team works with FAU staff and contractors to develop procedures for diverting carpet from on-campus work sites. Carpet will be collected and processed according to vendors' specifications and stored at a designated location for pick up by the vendor.

In addition, the project will utilize innovative "lite balers," small mechanical devices for bundling OCC at the point of generation to protect material quality, improve ease of handling, and maximize collection container capacity. This advanced technology will particularly benefit the FAU program where OCC is generated at numerous locations throughout the campus and must be carried to central locations for collection. These "lite balers" have been tested in other SWA programs and have demonstrated their value to programs like FAU'S. For example, these balers have already significantly improved participation rates for OCC recycling in cities such as West Palm Beach and Delray Beach where traditional collection methods are not feasible.

Technology Transfer

The proposed programs for recovering paper, glass, plastic, aluminum, OCC, yard trash, carpet, waste paint, and wood waste are easily transferable to other universities, schools, and institutions. The proposed project will demonstrate the transferability of these programs by expanding project programs to FAU campuses in Broward, Palm Beach, St. Lucie and Martin counties. Initially, the more challenging, non-traditional materials such as carpet and waste paint will be targeted for recovery at satellite campuses. The Project Team will also investigate the feasibility of sharing the mulching equipment with satellite campuses by transporting equipment to other campuses on a rotating schedule to expand recovery of this material.

FAU staff has undertaken initial discussions with the Recycling Coordinator at Florida International University (FIU) regarding FIU's willingness to serve as an evaluator for the proposed project. FIU, whose main campus is in Miami, has an enrollment of nearly 30,000 students and operates several regional campuses. FIU's participation in the proposed project would lay the foundation for implementing a similar integrated, comprehensive recycling program at FIU in the future. SWA and FAU staff will include FIU in all aspects of project planning and reporting activities. SWA staff and the Project Team will share lessons learned from the proposed project and will develop recommendations for FIU recycling program planners.

To enhance transferability, program descriptions, recycling data generated by the project and reports of project results will be posted to the University's web page. Regular, periodic project updates will be prepared and posted by the Director of Environmental Sciences.

To further facilitate transferability, the project includes production of an instructional video suitable for training purposes that will include an overview of the campus recycling program achievements. The video will be produced jointly by the SWA's Media Arts and FAU's Instructional Services departments. The SWA is committed to making at least one formal presentation about the project at an appropriate state or national workshop, and this video can also be incorporated into the presentation developed for recycling workshops and educational forums.

The informational brochure produced for campus educational purposes will be designed for distribution and use by other interested groups. Recycling groups potentially interested in the proposed university recycling project include Recycle Florida Today (RFT), the Association of Physical Plant Administrators (APPA), National Recycling Coalition's (NRC) College &

University Recycling Council (CURC), and any other groups seeking information about university recycling.

The SWA will also investigate the possibility of FAU serving as a site for CURC's Campus recycling series.

Cost Effectiveness

Because the proposed project entails recovery of the full range of traditional and non-traditional materials, a precise cost/benefits analysis is difficult to project. In general, however, the project appears unusually cost effective, primarily because it incorporates several unique cost saving features in its design and because it will divert substantial quantities of materials from the FAU waste stream.

The proposed project will result in significant waste reduction and produce substantial cost savings through disposal cost avoidance. FAU staff estimates that the proposed program will divert approximately 50 percent of the institution's waste stream from disposal. Immediate waste reduction benefits will generate direct cost savings to FAU in the form of reduced solid waste collection and disposal fees. The Project Team will be responsible for monitoring actual reductions in solid waste generation campus wide. Students will inspect solid waste containers regularly, prepare reports of container audits, and develop recommendations for reducing service levels. Student-generated reports will be submitted to FAU staff for review and appropriate action.

At the same time, FAU will not incur significant recycling costs. SWA will provide collection and marketing services without charge to FAU for all the materials generated by the project. The SWA has established programs in the vicinity of the FAU campus and can provide collection services in exchange for the revenue generated by the sale of the materials. Throughout the project, SWA will coordinate with FAU staff and the Project Team to monitor project results and document cost effectiveness.

The proposed project is designed to be economically viable to implement and sustain. Since labor costs typically constitute the most expensive part of any recycling or solid waste collection program, the use of student coordinators greatly enhances the cost effectiveness of the proposed project. Because this program is being assimilated into the academic curriculum, student and faculty participation is virtually ensured. The credit course being developed for project participants will provide Environmental Sciences students with practical field experience, a course component that is popular with FAU students. The work-study position allocated to the project by the FAU physical plant staff is a paid position funded by the United States Department of Education and, therefore, not charged to the FAU budget.

In addition to waste reduction benefits, the project will produce mulch for use on-site by FAU for landscaping and grounds maintenance. This element of the project will reduce costs for mulch material currently procured by contract. Since the mulching unit will be mobile, the Project Team will evaluate the possibility of sharing equipment with satellite campuses to expand vegetative waste recovery efforts.

Recovered carpet will be marketed to commercial remanufacture markets. This material will be diverted from satellite campuses as well the main campus to ensure sufficient quantities for successful marketing. The SWA has identified a vendor and established a market price of \$.045 per pound. Revenue generated from this commodity will benefit the FAU recycling program. Carpet recovery rates are difficult to project, but considering the amount of renovation and new construction at FAU, marketing revenues are expected to offset additional costs associated with collecting and processing the material.

While paint and wood waste will not generate marketing revenues, material diversion will reduce solid waste disposal costs, and 100 percent of the materials recovered will be reused by nonprofit organizations in projects benefiting the community.

Several FAU departments will realize indirect cost savings from the implementation of this program. These departments include the physical plant, surplus division, property management, and facilities planning. In addition, private corporations that have lease agreements with FAU for facilities at the Research Park will also benefit from avoided disposal costs as a result of the project.

Regional Programs

Like many large institutions, FAU's organizational structure spans multiple jurisdictions and crosses political boundaries. In order to serve institutions like FAU, a regional approach is necessary when planning and implementing comprehensive recycling programs. The proposed project is designed to take advantage of FAU's institutional infrastructure and the economies of scale offered by a regional program. The proposed program will serve as a model for other county recycling programs and will demonstrate the benefits of this approach to integrated, comprehensive recycling.

While the SWA, in partnership with faculty, students, and staff at FAU's main campus in Boca Raton, will take lead responsibility for implementing the proposed project, FAU staff and the Director of Environmental Sciences program are committed to implementing elements of the proposed recovery program at FAU's satellite campuses in Broward, Palm Beach, St Lucie and Martin Counties. SWA and FAU staff have not yet determined how many program elements will be implemented at satellite campuses, but carpet has been targeted for recovery at all locations.

The SWA will cooperate with FAU staff to coordinate collection and marketing activities in Broward, St. Lucie, and Martin counties. Under an existing agreement, the SWA currently accepts recyclables for MRF processing from St. Lucie and Martin counties and maintains a cooperative relationship with neighboring Broward County SWA staff will provide FAU staff with technical support and will facilitate arrangements with other jurisdictions for collection and processing of materials recovered outside of Palm Beach County.

FIU's interest in participating in the program as an evaluator will lay the foundation for future implementation of comprehensive recycling at FIU's campuses.

