Date: February 13, 2015

Report for the period thru February 15, 2015
Submitted to
Department Business and Professional Regulations
Office of Codes and Standards

Grantee Name:	University of Central Florida/Florida Solar Energy Center		
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Reporting Period:	Thru February 15, 2015		
Project Number and Title:	Developing Exhaust Air Energy Recovery Credits for the Florida Energy Code		

Provide a summary of Project accomplishments to date. (Include comparison of actual accomplishments to the objectives established for the period. If goals were not met provide reasons why

Task Updates

Task# 1: Identify Climate Zones and Cities

- Six major Florida cities were identified for this study. These cities were: Miami, Tampa, Orlando, Jacksonville, Gainesville, and Tallahassee. Miami is in climate zone 1A, and the other five are in climate zone 2A. Run simulation of the nine prototype commercial buildings to determine sensitivity of the building annual energy use in the six cities. It was determined that the annual total energy use of these prototype buildings in Jacksonville and Gainesville were within 1% of each other. Therefore, it is reasonable to assume that these two cities can be represented by the simulation results of either city. Despite the fact that it was proposed to represent cities with 1.0% annual energy use by a single city, we have decided to provide the ERV credit calculations for all the six cities identified.

Task #2: Identify Prototype Building Types

- Identified nine prototype commercial buildings: Large office, Medium Office, Small Office, Standalone Retail, Primary School, Secondary School, Large Hospital, Small Hotel, and Large Hotel buildings.

Task 3: Computer Simulations

- The reference prototype buildings Input Definition Files (IDF) were transitioned to the latest EnergyPlus version V8.2. The reference and proposed buildings test cases input file generation was automated. The automation uses macro to combine a set of conditions from a set of input

macro files to generate the reference and proposed building HVAC system, i.e., HVAC system without and with ERV device. It then simulates the reference and proposed buildings and summarizes the annual energy end uses.

- Pressure drop across the ERV devices and the ERV effectiveness at the design air flow rates were collected from AHRI certified performance database. These set of data were collected for the nine prototype commercial buildings identified.
- Additional electric power input for control purposes and the energy wheel motor drive were also estimated. These inputs assumption are under review. Figure 1 is schematic representation of air loop with an ERV device.
- The simulation run process was tested and completed using the large office building. A preliminary result of normalized annual total energy use, and HVAC energy savings due to ERV installations were determined. Energy uses were normalized using the total conditioned floor area of the building. Preliminary results for large office building without and with fan pressure adjustment are shown in Figure 2 and Figure 3. Similarly, the annual HVAC energy savings potential due to ERV device installation for large office building is provided in Table 1 and Table 2.

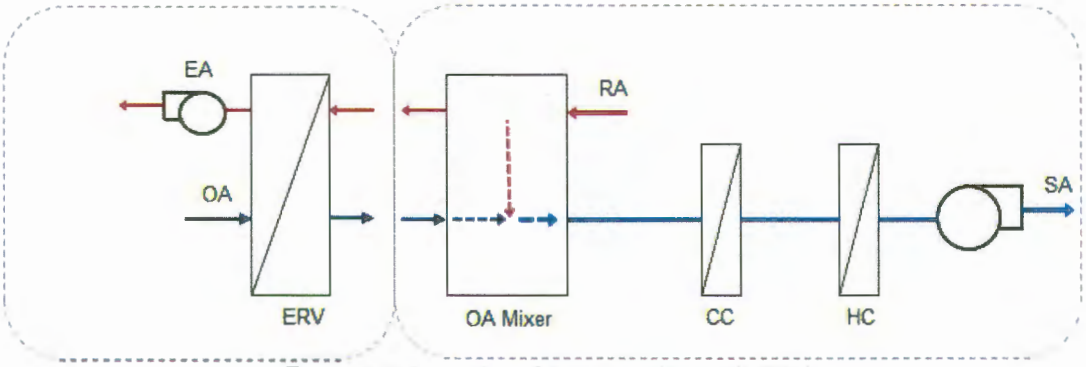


Figure 1 Schematics of HVAC system with ERV

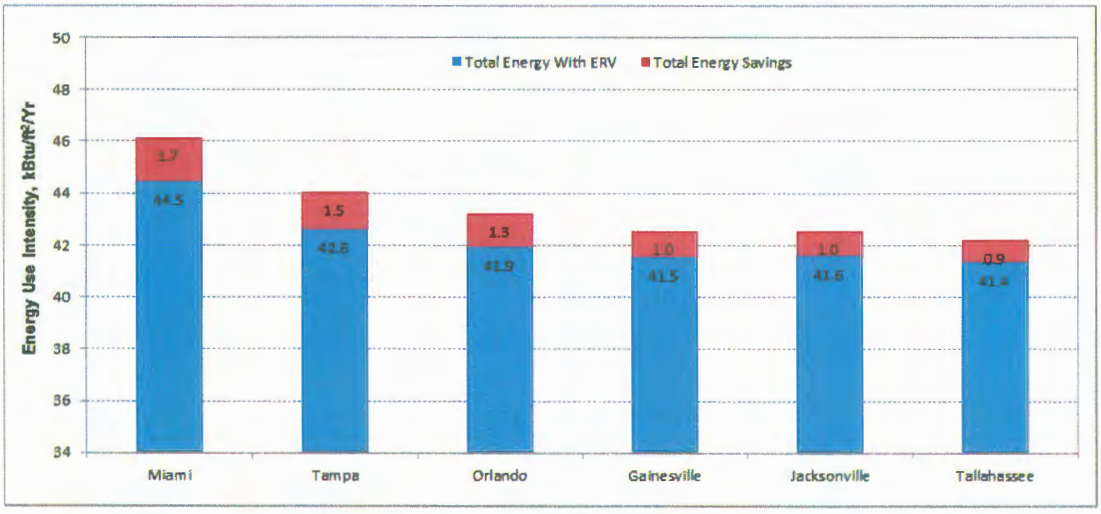


Figure 2 Total energy use and savings intensity of the large office building without fan pressure adjustment

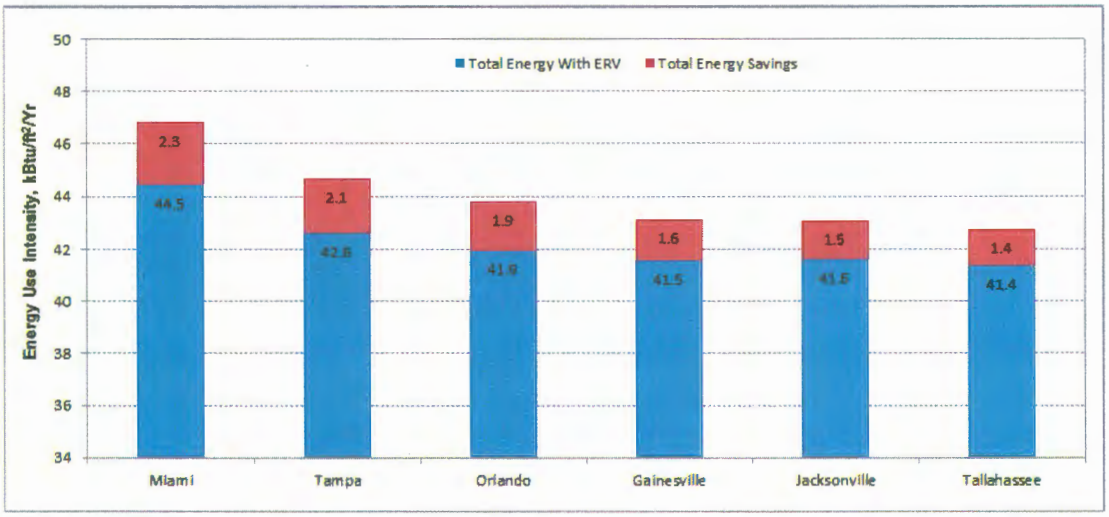


Figure 3 Total energy use and savings intensity of the large office building with fan pressure adjustment

Percent HVAC energy use savings were calculated as follows:

$$HVACEnergySavings = 100\frac{HVACEnergyUse_{withoutERV} - HVACEnergyUse_{withERV}}{HVACEnergyUse_{withoutERV}}$$

Table 1 HVAC Energy Savings due to ERV device installation without fan pressure adjustment

	Units	Miami	Tampa	Orlando	Gainesville	Jacksonville	Tallahassee
HVAC Energy Savings	kBtu/ft^2/yr	1.69	1.45	1.29	1.01	0.97	0.86
	%	10.14	10.05	9.51	7.87	7.55	6.87

Table 2 HVAC Energy Savings due to ERV device installation with fan pressure adjustment

	Units	Miami	Tampa	Orlando	Gainesville	Jacksonville	Tallahassee
HVAC Energy Savings	kBtu/ft^2/yr	2.35	2.08	1.88	1.57	1.52	1.40
	%	13.55	13.76	13.25	11.67	11.30	10.70

Task 4: Update ERV Credits

No activity.

Deliverable Update:

Deliverable #1 Interim Report

Completed with this submission

Deliverable #2 Final Report

Due June 1, 2015

A. *Provide an update on the estimated time for completion of the project and an explanation for any anticipated delays.*

Delays are not anticipated.

B. *Provide any additional pertinent information including, when appropriate, analysis and explanation of cost overruns or high unit cost*

No relevant information to report at this time

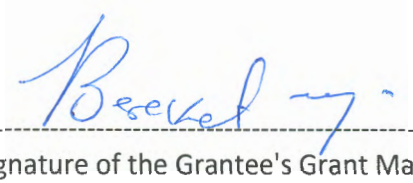
C. *Identify below, and attach copies of, any relevant work products being submitted for the project for this reporting period (eg. report data sets, links to on-line photographs, etc.)*

No relevant information to report at this time

D. *Hours and budget update*

245 hours and about $ 12,814 amount has been spent at the time of reporting.

This report is submitted in accordance with the reporting requirements of Work Authorization for $ 34,817 dated Nov 3, 2014.



Signature of the Grantee's Grant Manager

Bereket A. Nigusse, Ph.D

February 13, 2015

Date