

## SUMMARY OF FSEC IDEAS FOR ENERGY AND MECHANICAL TACS

### Simulating the Effects of Temperature Based Smart Ventilation Control on Comfort, Energy Use and Air Exchange

Eric Martin, Chuck Withers, Rob Vieira, Jeff Sonne, Florida Solar Energy Center

#### Rationale:

This research will provide simulation results that may lead to further code specification with respect to requirements for whole-house mechanical ventilation systems. The research will evaluate the impact of automatically disabling all or part of mechanical ventilation systems in new Florida homes during periods of high outdoor temperature and moisture. Resulting air exchange, indoor relative humidity and space conditioning energy use from ventilation systems that utilize outdoor temperature and moisture based whole-house ventilation control will be compared to continuous ventilation levels called for in the 2014 Florida Building Code and ASHRAE 62.2-2016. *Estimated budget: \$30,000*

### Residential Performance Code Methodology for Crediting Dehumidification and Smart Vent Applications

Rob Vieira, Florida Solar Energy Center

#### Rationale:

As energy efficiency reduces the hours where air conditioning is called for, and as codes require outdoor air to be brought into homes, humidity levels in homes may rise to the point where dehumidification is required. However, there are currently no standards in Florida's Energy Conservation Code for dehumidification. Thus, a mechanical contractor that invests in an expense such as variable speed heat pumps or heat pipe technology in order to maintain humidity and save energy receives little benefit relative to another home that installs an inefficient dehumidifier. A reference home dehumidification strategy needs to be determined.

Another strategy to reduce moisture loads is to allow flexible hours of ventilation. The energy conservation code will need to have a strategy for providing the appropriate baseline for a reference home. *Estimated budget: \$20,000*

### Measured Impacts Whole-House Mechanical Ventilation on Comfort, Energy Use and Pollutants

Chuck Withers, Eric Martin, Rob Vieira, Dave Chasar, Florida Solar Energy Center

#### Rationale:

As codes wrestle with the level of air tightness that should be allowed before mechanical ventilation systems are needed, the effectiveness of ventilation fans to reduce pollutants is a key

piece of information. This study would expand the knowledge by comparing CO2 and overall VOC levels in ten homes with and without code levels of ventilation. Temperature and relative humidity will be measured also. Results may help inform future Florida code changes. *Estimated budget: \$81,000*

## Code Compliance for High-Efficacy Lighting in Florida Homes (Energy TAC)

Karen Sutherland, Florida Solar Energy Center

### Rationale:

This research proposes to investigate how well builders are following the Code's mandatory requirement on high-efficacy lighting. The requirement for high-efficacy lighting is an important aspect of the Florida Building Code because of great economics given the low cost of this measure with high energy-savings potential. And if builders are not complying with this requirement, what are the barriers to implementation – is it simply education, cost, or are there other issues? *Estimated Budget: \$30,000*

## Improved Hot Water Code Calculation (Energy TAC)

Philip Fairey and Rob Vieira, Florida Solar Energy Center

### Rationale:

Code calculations for hot water use and energy consumption are overly simplistic. Current calculations do not consider plumbing design, which typically engenders significant hot water waste. They also assume that the same quantity of hot water is used by homes regardless of the time of the year and regardless of climate location. Further, hot water recirculation systems that are gaining popularity can cause significant increases in hot water energy consumption if adequate controls are not employed. None of these hot water energy impacts are currently considered by Florida's Energy Code. This work will provide an improved methodology. *Estimated Budget: \$22,000*

## Investigation of Potential Daylight Energy Savings Attributed to the Use of Skylights in Florida Residential Buildings (Energy TAC)

Charles Withers and Bereket Nigusse, Florida Solar Energy Center

### Rationale:

Are daylighting energy savings from installed skylights in new Florida single-family home construction significant enough that credit should be provided in the Florida residential energy conservation code? This simulation project will determine potential savings modeling both shaft and tubular skylights. *Estimated Budget: \$26,000*

## Thermal Analyzer for Concrete Blocks (Energy TAC)

Lixing Gu, Florida Solar Energy Center

### Rationale:

A web application or Excel-based tool will be developed for contractors to more easily assess energy code compliance based on a variety of possible concrete blocks. The tool will allow the inputs of the concrete characteristics (density, thermal conductivity and specific heat), geometry (various web designs are on the market), filling material for cores, and spacing of reinforced concrete cores, to calculate an overall U and R value. Goal is to make construct outputs that can be read by typical code compliance software. *Estimated budget \$20,000*

## Developing VRF System Credits for the Florida Energy Code (Energy TAC)

Bereket Nigusse and Muthusamy Swami, Florida Solar Energy Center

### Rationale:

The commonly used code compliance software does not have modeling capabilities for VRF systems, and the 2014 Florida Building Code – Energy Conservation does not have an alternative procedure or provision for assessing credits for VRF systems code compliance. This work will develop appropriate credit for homes installing VRF systems. *Estimated budget \$24,000*