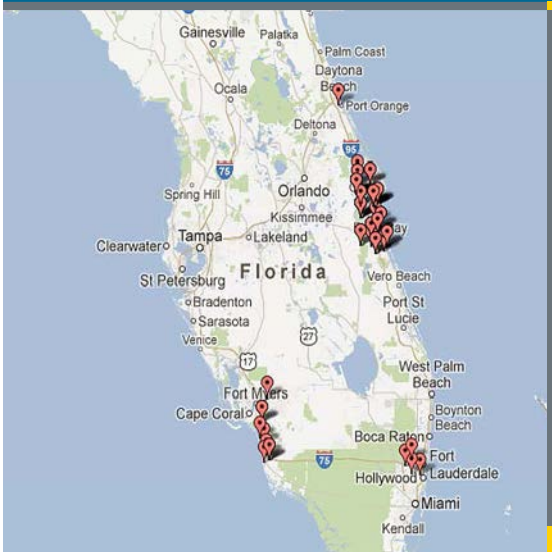

Building America Case Study

Whole-House Solutions for Existing Homes

Pilot Demonstration of Phased Retrofits in Florida Homes

PROJECT INFORMATION

Project Name: Pilot Demonstration of Phased Retrofits in Existing Florida Homes

Partners:

Building America Partnership for Improved Residential Construction, *www.ba-pirc.org*

Florida Power & Light, *www.fpl.com*

Location: Brevard, Collier, and Palm Beach Counties, Florida

Application: Retrofit; Single-family

Number of Homes: 60

Age Range: 1958–2006

Applicable Climate Zone(s): Hot-humid

Year Tested: 2012–2013

PERFORMANCE DATA

Estimated cost of energy efficiency measures (including labor):
$300–$500/house–Phase I
$10,000–$12,000/house–Phase II

Projected annual energy savings:
10%–Phase I
40%–Phase II

Projected energy cost savings:
$200/year per house–Phase I
$800/year per house–Phase II

Building America SM U.S. Department of Energy

In this project, the Florida Solar Energy Center and Florida Power & Light are combining energy research and utility expertise to retrofit a large number of homes using a phased approach. The project is creating detailed data on the energy and economic performance of two levels of home retrofit—simple and deep. Through this pilot project, the team expects to gather the information necessary to replicate energy savings on a community scale, in collaboration with utilities, program administrators, and other market leader stakeholders.

The team has selected sites, performed preliminary audits, and collected 4 months of pre-retrofit energy end-use data on 60 homes located in central and south Florida built from 1958–2006. The study aims to identify measured energy savings and peak demand reductions of the different retrofit levels and technologies. Pre-retrofit data are being used to identify and target where energy is being used.

Figure 1. Phased Retrofits Project: End Use Monitoring Data:
September–December 2012

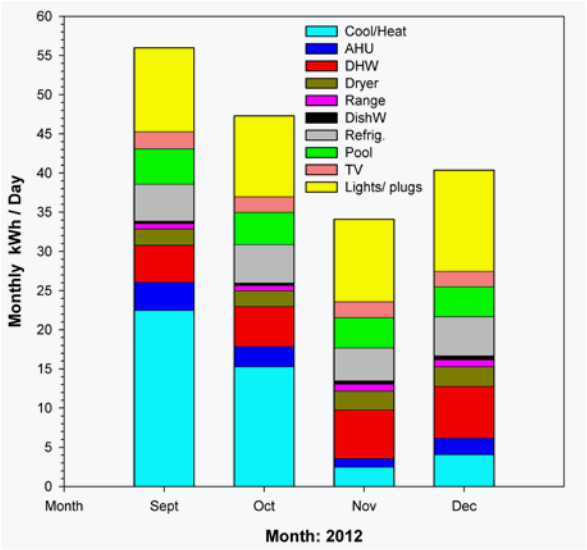

Figure 1. summarizes the average energy use seen in the sample of retrofit homes from September–December 2012 for all end uses. The data revealed how house air conditioning drops with cooler temperatures and the marked seasonal variation in hot water energy use. In addition, energy use for refrigeration, clothes dryers, and television/entertainment centers was relatively high for these homes.

Preliminary End-Use Results

Refrigeration energy use is surprisingly high—nearly equal to the magnitude of water heating when second refrigerators are considered

The main television and entertainment center, seldom considered from an energy-efficiency perspective, used a large amount of energy (approximately 750 kWh/year).

Homes with pools show pool pumping to be another very large electrical load—5.2 kWh/day.

For more information, including access to monitored data, visit the project website at: *www.infomonitors.com/pdr/*

Image credit: All images were created by the BA-PIRC team.

Figure 2. Electricity by End Use, Daily Demand Profile
Houses 1–60, Dec 1, 2012 to Dec 31, 2012

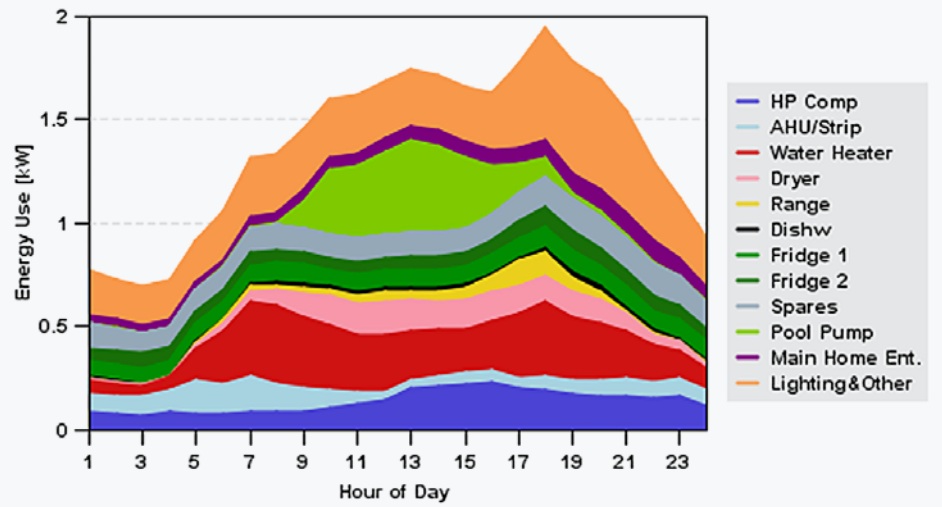

Figure 2 shows the average daily demand profile from each site and for each end use during December.

All the homes are slated to receive the simple pass-through retrofit measures. The simple retrofits are applicable to all homes and provide critical data to the design of Phase 2 deep retrofits that make a major impact on whole-house energy use, peak demand, and greenhouse gas emissions. The deep retrofits would be performed on a subset of homes participating in Phase I.

Table 1. Description of Simple and Deep Retrofits

Phase I Simple Retrofits	Phase II Deep Retrofits
Hot water tank and pipe insulation	Upgrade to R-38 ceiling insulation
Light-emitting diode/ compact fluorescent lamps	Duct testing and sealing
Cleaning of refrigerator coils	ENERGY STAR® refrigerator, clothes washer, and clothes dryer
Low-flow showerheads	2-stage, SEER 16 heat pump for space conditioning
Reduction of pool pump hours	Variable speed pool pump
Smart power strips for home offices and entertainment centers/game consoles	Heat pump water heater

Lessons Learned *(also see sidebar)*

- Although air conditioning demand is sizeable in September, no other single end-use load is otherwise dominant (see Figure 1).
- Other loads, which include lighting, computers, ceiling fans, and plugs, show a jump in December that is likely related to holiday lighting (Figure 1 and Figure 2).

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

For more information, visit:
www.buildingamerica.gov

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 10% post consumer waste.

The U.S. Department of Energy's Building America program is engineering the American home for energy performance, durability, quality, affordability, and comfort.

DOE/GO-102014-4440 • August 2014