Energy Efficiency Retrofits and On-bill Financing for Existing Homes: A Replicable Model

August 19, 2015

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WHAT WE WILL TALK ABOUT

• Who we are (S.C. co-ops)
• Why on-bill financing
• How our program works
• Results/Lessons Learned
• What we’re doing now/next
SOUTH CAROLINA ELECTRIC COOPERATIVES

We don’t own generation...

...We’re Super Consumers!
S.C. COOPERATIVE MEMBERS

• 24% live in manufactured housing (3X the national average)
• 50% more likely to live below the poverty line
• In some months, many may spend 60-80% of income on energy
• The state ranks 7th in cooling degree days per year
• 80% use electricity as primary form of heating
# One Idea, Two Phases

**Loan Pilot**
- 2011-2012
- 8 co-ops, 125 homes
- Main Purpose: test EE vs. new generation
- RUS and G&T funding

**Ongoing Programs**
- 2012- Present
- 5 co-ops, 311 homes (so far)
- Purpose: Member service
- Mix of co-op and RUS dollars for lending capital
HMH PILOT BACKGROUND

• Central Electric board’s 2010 efficiency goals
  • 10% reduction in residential energy use by 2020
  • Reduce wholesale residential power purchase costs
  • Maintain or improve member satisfaction
• Central partnered with ECSC to design pilot program
• Federal legislation enables more financing of efficiency
• Pilot Program kicks off, accesses USDA financing
ON-BILL FINANCING (OBF) — A TARIFF

- 2010 South Carolina state law (Section 58-37-50) allowed co-ops to move forward
  - Loans are tied to the meter
  - Power can be shut off for lack of payment
  - Loan stays with home if home is sold
  - These provisions eliminate need for credit check
ON-BILL FINANCING (OBF) – A TARIFF

• Allows co-op members to finance energy efficiency measures with low-interest loans

• Loans are repaid on monthly utility bills

• Enables those without sufficient cash in hand to make prescribed and long-awaited efficiency upgrades
Help My House!
Shape Up Your Home for Energy Savings

Phase #1: The Pilot
2011-2012
# Key Partners

1. Participating Co-ops

<table>
<thead>
<tr>
<th>Aiken Electric</th>
<th>Palmetto Electric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black River Electric</td>
<td>Pee Dee Electric</td>
</tr>
<tr>
<td>Broad River Electric</td>
<td>Santee Electric</td>
</tr>
<tr>
<td>Horry Electric</td>
<td>Tri-County Electric</td>
</tr>
</tbody>
</table>

2. Central Electric Power Cooperative

- Purchases wholesale power and distributes it to the state’s co-ops

3. Electric Cooperatives of South Carolina

- Co-ops’ state-wide trade association
**Key Partners**

4. Environmental and Energy Study Institute
   - Assisted with program design, outreach, evaluation

5. Doris Duke Charitable Foundation
   - Grant supported EESI’s work

6. Ecova
   - Program planning, management
KW SAVINGS: A LA CARTE ADMIN

• Available services include:
  – Total program management
  – Energy Audits
  – Contractor management
  – Loan review and processing (Credit Union)
  – Member support and communications
  – Post-retrofit problem resolution
  – Member-contractor mediations
KW Savings

Sets and Maintains Brand Standards

**Quality Controls**
Bookend comprehensive audits of each home per the SC statute.

**Oversight of Loan Processing**
Loan documents either drafted by KW Savings or drafted by the co-op and sent to KW Savings for review before distribution to homeowners.

**Data Collection**
Location of homes, list of installed measures, costs, work and audit results, ongoing energy usage, and any other data required by KW Savings Co.

**Shared Business Plan**
Each cooperative must submit an acceptable written business plan before implementing the program, including any proposed differences from the pilot model.
## HMH Pilot Process

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Participant Selection</td>
</tr>
<tr>
<td>2</td>
<td>Visual Audit</td>
</tr>
<tr>
<td>3</td>
<td>Comprehensive BPI Audit</td>
</tr>
<tr>
<td>4</td>
<td>Loan Approval &amp; Contractor Selection</td>
</tr>
<tr>
<td>5</td>
<td>Measure Installation</td>
</tr>
<tr>
<td>6</td>
<td>Final Inspection &amp; Project Approval</td>
</tr>
</tbody>
</table>
# Measures

## Percent of homes with each measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>Percent of Homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Sealing</td>
<td>99%</td>
</tr>
<tr>
<td>Duct Leakage Reduction</td>
<td>98%</td>
</tr>
<tr>
<td>Attic Insulation</td>
<td>91%</td>
</tr>
<tr>
<td>Electric Furnace to Heat Pump</td>
<td>47%</td>
</tr>
<tr>
<td>Heat Pump Replacement</td>
<td>42%</td>
</tr>
<tr>
<td>Floor Insulation</td>
<td>31%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>3%</td>
</tr>
<tr>
<td>HVAC Tune-up</td>
<td>3%</td>
</tr>
</tbody>
</table>

## Percent of savings from each measure

- **Heat Pump Replacement**: 17%
- **Attic Insulation**: 15%
- **Duct Leakage Reduction**: 17%
- **Electric Furnace to Heat Pump**: 27%
- **Floor Insulation**: 11%
- **Air Sealing**: 12%
- **HVAC Tune-up**: 1%
- **Miscellaneous**: 0%
**Measured Results Close to Predicted**

<table>
<thead>
<tr>
<th></th>
<th>Predicted</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual kWh Savings</td>
<td>11,593 kWh</td>
<td>10,809 kWh</td>
</tr>
<tr>
<td>Annual $ Savings</td>
<td>$1,285</td>
<td>$1,157</td>
</tr>
<tr>
<td>Project Costs</td>
<td>$7,684</td>
<td>$7,684</td>
</tr>
<tr>
<td>Project Simple Payback</td>
<td>6.0 years</td>
<td>6.6 years</td>
</tr>
</tbody>
</table>

* All values are per home averages for a typical meteorological year.
## Annual Savings: Average HMH Home

<table>
<thead>
<tr>
<th>$1,157</th>
<th>$288</th>
<th>$869</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Energy Savings</td>
<td>Annual Net Savings</td>
<td>Annual Loan Repayment</td>
</tr>
</tbody>
</table>

All values are per home averages for a typical meteorological year.
DEMAND SAVINGS

Average Summer Day Load Shape

Average Winter Day Load Shape

Kilowatts

Hour

Pre-Project

Post-Project

Kilowatts

Hour

Pre-Project

Post-Project
Pilot Participant Survey
SATISFACTION WITH CO-OP

96% same or higher
ARE YOU MORE COMFORTABLE?

A lot more 76%
Somewhat 13%
About the same 11%
**Satisfied with Post-Repair Electric Bills?**

<table>
<thead>
<tr>
<th>Satisfied Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>69%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>20%</td>
</tr>
<tr>
<td>Neutral</td>
<td>0%</td>
</tr>
<tr>
<td>Somewhat not</td>
<td>7%</td>
</tr>
<tr>
<td>Very unsatisfied</td>
<td>4%</td>
</tr>
</tbody>
</table>
**TERI AND JOHN NORSWORTHY’S HOME**

**Summerton, S.C.**

**Santee Electric**

- Site built home, 1979
- Size: 2013 sq. ft.
- 3 bedrooms

**Energy efficiency measures:**
- New heat pump,
- Duct sealing, air sealing,
- Attic insulation

**Loan amount:** $6,540

**Monthly bills $150 to $200 lower!**
Pilot Lessons and Conclusions

The average Help My House pilot home...

- used 34% less electricity, saved $288/yr. after payments
- had coincident peak savings of about one-third
- showed no change in load factor (would have improved with installed control switches)
- was more comfortable to the homeowners
- had an extremely satisfied homeowner
The Business Case for OBF

- **Short Term**
  - Positive participant and member satisfaction
  - Minimal impacts on load factor impacts minimal
  - Nominal lost revenue for co-ops, even for a long-term aggressive program

- **Long Term**
  - EE incentives for states in EPA’s final 111(d) rules
  - Energy efficiency is cheaper than new generation - likely less than 2 cents/kWh
  - Broader economic benefits: good for contractors and other local businesses; supply chain
Phase #2: Ongoing Programs

2012-Present
## Ongoing Programs

<table>
<thead>
<tr>
<th>Co-op</th>
<th>Homes/Loans Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiken Electric</td>
<td>182</td>
</tr>
<tr>
<td>Black River Electric</td>
<td>40</td>
</tr>
<tr>
<td>*Little River Electric</td>
<td>n/a</td>
</tr>
<tr>
<td>*Lynches River Electric</td>
<td>n/a</td>
</tr>
<tr>
<td>Santee Electric</td>
<td>116</td>
</tr>
<tr>
<td>*York Electric</td>
<td>10</td>
</tr>
<tr>
<td><strong>Running Total</strong></td>
<td><strong>348</strong></td>
</tr>
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