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

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SOUTH CAROLINA ELECTRIC COOPERATIVES

1. AIKEN
2. BERKELEY
3. BLACK RIVER
4. COASTAL
5. EDISTO
6. FAIRFIELD
7. HORITY
8. LYNCHES RIVER
9. MARLBORO
10. MID CAROLINA
11. NEWBERRY
12. PALMETTO
13. PEE DEE
14. SANTEE
15. TRI COUNTY
16. BLUE RIDGE
17. BROAD RIVER
18. LAURENS
19. LITTLE RIVER
20. YORK
We don’t own generation...

...We’re Super Consumers!
• 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
A TALE OF TWO PROGRAMS

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

Working 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 established 2010 efficiency goals
  • 10% reduction in residential energy use by 2020
  • Reduce wholesale residential power purchase costs
  • Maintain or improve member satisfaction
• Central Electric partnered with ECSC to design pilot program
• Since 2010, progress with federal legislation to enable 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

PROGRAM #1: THE PILOT
2011-2012
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
HMH PILOT STRUCTURE AND PROCESS

CENTRAL

KW SAVINGS

CO-OP

ACCOUNT REP

BPI AUDITOR

EE TRAINED CONTRACTOR

CONSUMER-MEMBER
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.
<table>
<thead>
<tr>
<th></th>
<th>HMH PILOT PROCESS</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</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

- Electric Furnace to Heat Pump, 27%
- Duct Leakage Reduction, 17%
- Heat Pump Replacement, 17%
- Attic Insulation, 15%
- 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></th>
<th>Amount</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Energy Savings</td>
<td>$1,157</td>
<td></td>
</tr>
<tr>
<td>Annual Net Savings</td>
<td>$288</td>
<td></td>
</tr>
<tr>
<td>Annual Loan Repayment</td>
<td>$869</td>
<td></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

Pre-Project  Post-Project

Pre-Project  Post-Project
PARTICIPANT SURVEY RESULTS
Satisfaction with Co-op

96% same or higher
**Are you more comfortable?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lot more</td>
<td>76%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>13%</td>
</tr>
<tr>
<td>About the same</td>
<td>11%</td>
</tr>
</tbody>
</table>
## Satisfied with Post-Repair Electric Bills?

<table>
<thead>
<tr>
<th>Response</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

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**Monthly bills:**
- $150 to $200 lower!
Pilot Conclusions

- The average home in the HMH Pilot
  - Electricity use dropped by 34% (about 11,000 kWh/yr)
  - Savings exceeded loan repayment by $288/yr
- Coincident peak savings also dropped about one-third
- Load factor unchanged, would have improved with load control switches
- Homes became more comfortable
- Participants were extremely satisfied with the program and their co-ops
- HMH has spawned ongoing OBF (4 active programs)
The Business Case for OBF

▪ Short Term
  • Participant and member satisfaction positive
  • Load factor impacts minimal
  • Lost revenue would be small, even for a long term aggressive program

▪ Long Term
  • EE targets in EPA’s proposed 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
PROGRAM #2: WORKING PROGRAMS

2012-PRESENT
<table>
<thead>
<tr>
<th>Co-ops</th>
<th>Homes/Loans Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiken Electric</td>
<td>168</td>
</tr>
<tr>
<td>Black River Electric</td>
<td>38</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>95</td>
</tr>
<tr>
<td>*York Electric</td>
<td>10</td>
</tr>
<tr>
<td><strong>Running Total</strong></td>
<td><strong>311</strong></td>
</tr>
</tbody>
</table>
On-Bill Financing Project Assistance

EESI offers free assistance:

- Provide experience and lessons learned from South Carolina co-ops’ OBF pilot
- Assess whether OBF is a good fit
- Identify resources, help overcome barriers to get projects off the ground
- Help design the OBF program
- Help utilities and others access funding
- Advise on program implementation

For more information:
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jmcross@eesi.org
202-662-1883
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