On-Bill Finance as an Economic Opportunity in the Southeast

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Background

• Introduction to Appalachian Voices
• Energy Savings for Appalachia
  • Goals
    • Reduce energy costs for Appalachian residents through on-bill finance programs
    • Alleviate poverty
    • Promote local economic development
  • Why we focus on rural electric cooperatives
  • Our Approach
Discussion overview

• Energy waste as an economic problem for Southeast residents
• Economic potential of expanding energy efficiency opportunities in the residential sector
• On-bill finance as a means for maximizing economic impact of energy efficiency investments
  • Introduction to On-bill finance
  • Best practices
  • Case studies
• Achieving an energy efficient economy in the Southeast
• Q&A
WHY ENERGY WASTE IS AN ECONOMIC PROBLEM
Consequences of wasted energy

- Higher energy costs for families (and businesses)
- Exacerbating poverty via burden of home energy costs
- Fewer dollars flowing through the economy for productive purposes
  - Lost economic opportunities: jobs, business and tax revenues
- Greater environmental and health impacts from energy demand, poor indoor air quality
- Higher cost of building out clean energy resources to meet demand
How much energy do we waste?

Residential energy waste ~ 35%
Energy waste in the Southeast

Credit: American Council for an Energy Efficient Economy (ACEEE)
Energy waste in the Southeast

<table>
<thead>
<tr>
<th>Income type</th>
<th>Household type</th>
<th>Median annual income</th>
<th>Median size of unit (square feet)</th>
<th>Median annual utility spending</th>
<th>Median annual utility costs per square foot</th>
<th>Median energy burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-income (≤80% AMI)</td>
<td>Non-low-income</td>
<td>$24,998 ($23,357)</td>
<td>1,200 (1,250)</td>
<td>$1,692 ($1,776)</td>
<td>$1.41 ($1.42)</td>
<td>7.2% (8.2%)</td>
</tr>
<tr>
<td>Low-income multifamily (≤80% AMI)</td>
<td>Non-low-income multifamily</td>
<td>$90,000 ($79,987)</td>
<td>1,800 (1,800)</td>
<td>$2,112 ($2,136)</td>
<td>$1.17 ($1.19)</td>
<td>2.3% (2.5%)</td>
</tr>
<tr>
<td>Low-income multifamily</td>
<td>Non-low-income multifamily</td>
<td>$21,996 ($2,0180)</td>
<td>800 (900)</td>
<td>$1,032 ($1,188)</td>
<td>$1.29 ($1.32)</td>
<td>5.0% (6.2%)</td>
</tr>
<tr>
<td>Renters</td>
<td>Owners</td>
<td>$71,982 ($62,166)</td>
<td>950 (1,000)</td>
<td>$1,104 ($1,200)</td>
<td>$1.16 ($1.20)</td>
<td>1.5% (1.9%)</td>
</tr>
<tr>
<td>White</td>
<td>African-American</td>
<td>$34,972 ($31,000)</td>
<td>1,000 (1,000)</td>
<td>$1,404 ($1,560)</td>
<td>$1.40 ($1.56)</td>
<td>4.0% (4.8%)</td>
</tr>
<tr>
<td>Latino</td>
<td>African-American</td>
<td>$88,000 ($59,769)</td>
<td>1,850 (1,820)</td>
<td>$2,172 ($2,160)</td>
<td>$1.17 ($1.19)</td>
<td>3.3% (3.7%)</td>
</tr>
<tr>
<td>All households</td>
<td>All SE households</td>
<td>$58,000 ($53,000)</td>
<td>1,600 (1,650)</td>
<td>$1,956 ($1,968)</td>
<td>$1.22 ($1.19)</td>
<td>3.3% (3.6%)</td>
</tr>
</tbody>
</table>
Southeast states have a high number of low-income households

<table>
<thead>
<tr>
<th>State</th>
<th>Homes &lt; $35k</th>
<th>Total homes</th>
<th>% low-income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>759,999</td>
<td>1,842,174</td>
<td>41%</td>
</tr>
<tr>
<td>Arkansas</td>
<td>488,079</td>
<td>1,132,488</td>
<td>43%</td>
</tr>
<tr>
<td>Florida</td>
<td>2,697,116</td>
<td>7,217,508</td>
<td>37%</td>
</tr>
<tr>
<td>Georgia</td>
<td>1,293,248</td>
<td>3,540,690</td>
<td>37%</td>
</tr>
<tr>
<td>Kentucky</td>
<td>705,150</td>
<td>1,702,235</td>
<td>41%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>698,460</td>
<td>1,718,876</td>
<td>41%</td>
</tr>
<tr>
<td>Mississippi</td>
<td>494,028</td>
<td>1,092,627</td>
<td>45%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>1,426,197</td>
<td>3,742,514</td>
<td>38%</td>
</tr>
<tr>
<td>South Carolina</td>
<td>712,339</td>
<td>1,795,715</td>
<td>40%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>990,950</td>
<td>2,487,349</td>
<td>40%</td>
</tr>
<tr>
<td>Virginia</td>
<td>816,356</td>
<td>3,041,710</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Total Southeast</strong></td>
<td><strong>11,081,922</strong></td>
<td><strong>29,313,886</strong></td>
<td><strong>38%</strong></td>
</tr>
</tbody>
</table>

ACEEE: Energy costs approximately 8% of household income for low-income families compared to 2.5% for non-low-income.
Most utilities in the Southeast serve areas with poverty rates above the national average.
Electricity Bill Cost Burden for All Utility Service Territories in the Southeast

Sources: GIS layers from Platts; 2012 average residential electricity price and consumption data for utilities from EIA-860 database; median income for counties from US Census Bureau; analysis and mapping by Appalachian Voices, February, 2014.
Economic impact of energy waste in the Southeast

Economic losses associated with energy waste in SE states (2009)

<table>
<thead>
<tr>
<th>State</th>
<th>Avg. energy cost/home</th>
<th>No. homes (million)</th>
<th>20% waste ($M)</th>
<th>35% waste ($M)</th>
<th>Min value added loss ($M)</th>
<th>Max value added loss ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia</td>
<td>$2,100</td>
<td>3.5</td>
<td>$1,470</td>
<td>$2,570</td>
<td>$235</td>
<td>$410</td>
</tr>
<tr>
<td>Florida</td>
<td>$2,000</td>
<td>7.0</td>
<td>$2,800</td>
<td>$4,900</td>
<td>$450</td>
<td>$780</td>
</tr>
<tr>
<td>Tennessee</td>
<td>$1,750</td>
<td>2.4</td>
<td>$840</td>
<td>$1,470</td>
<td>$130</td>
<td>$240</td>
</tr>
<tr>
<td>Virginia</td>
<td>$2,150</td>
<td>3.0</td>
<td>$1,290</td>
<td>$2,260</td>
<td>$210</td>
<td>$360</td>
</tr>
<tr>
<td>Total</td>
<td>15.9</td>
<td>$6,400</td>
<td>$11,200</td>
<td>$1,025</td>
<td>$1,790</td>
<td></td>
</tr>
</tbody>
</table>

ACEEE: “For the US as a whole, avoided utility costs result in 1.16 times the local value-added benefits compared to spending on utility bills...(and have) 2.24 times the effect on domestic employment and wages compared to one dollar spent on utility bills.”
Energy costs are an economic burden for low-income residents in our communities

- 4-county area in Western N. Carolina
  - Media income 25% below state average
  - Average poverty rate of 20% (33,000 residents)
  - Half of all housing units older than 30 years (~ 30,000)

- Appalachian Voices’ Home Energy Makeover Contest
  - 40 completed applications
  - Average energy cost burden (annual): 8% (range: 3% to 28%)
  - One-quarter spent 15% or more of their income on energy costs
  - Burden in winter months as high as 40-50% for some applicants
ENERGY EFFICIENCY AS AN ECONOMIC OPPORTUNITY
Economic impact of energy efficiency

• ACEEE: “For the US as a whole, avoided utility costs result in 1.16 times the local value-added benefits compared to spending on utility bills...(and have) 2.24 times the effect on domestic employment and wages compared to one dollar spent on utility bills.”

• ACEEE (2013):
  • In 2004, some $43 billion was spent on efficient equipment and services that support 1.6 million jobs.
  • Recognizing these achievements, it is imperative for the U.S. to harness even more of the available efficiency resource to improve productivity and maintain economic competitiveness in the years to come.

• Deutsche Bank Group/Rockefeller Foundation (2016)
  • $279 billion in potential investment in energy efficiency in US
  • Greatest potential in the residential sector ($182 billion)
    • $177 billion in single-family homes
    • Estimated job impact: 2.2 million full-time jobs
    • Average of 11.8 full-time direct/indirect jobs per $1 million invested
Economic impact of energy efficiency

Economic impact of energy efficiency

Economic benefits of investments in energy efficiency upgrades

- Local economic development
  - Expanding local energy efficiency businesses (HVAC, insulation, whole-home, etc)
  - Attracting new energy efficiency contractors, service providers
  - Bolstering retail sales of energy efficient appliances and materials
- Induced economic impacts:
  - Job support, re-spending of savings in local economy
- Utility financial benefits
  - ACEEE: “Each dollar invested in electric energy efficiency measures yields $1.24 to $4.00 in total benefits for all customers, which include avoided energy and capacity costs, lower energy costs during peak demand periods like heat waves, avoided costs from building new power lines, and reduced pollution”
## Economic potential of energy efficiency

<table>
<thead>
<tr>
<th>State</th>
<th>Single-family homes</th>
<th>&gt; 35 yrs old</th>
<th>Percent total households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>1,330,568</td>
<td>702,333</td>
<td>38%</td>
</tr>
<tr>
<td>Arkansas</td>
<td>824,488</td>
<td>410,402</td>
<td>36%</td>
</tr>
<tr>
<td>Florida</td>
<td>4,727,183</td>
<td>1,898,425</td>
<td>26%</td>
</tr>
<tr>
<td>Georgia</td>
<td>2,573,292</td>
<td>981,813</td>
<td>28%</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,208,595</td>
<td>682,277</td>
<td>40%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1,195,880</td>
<td>715,463</td>
<td>42%</td>
</tr>
<tr>
<td>Mississippi</td>
<td>788,755</td>
<td>411,512</td>
<td>38%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2,653,079</td>
<td>1,187,435</td>
<td>32%</td>
</tr>
<tr>
<td>South Carolina</td>
<td>1,244,665</td>
<td>569,482</td>
<td>32%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>1,838,511</td>
<td>931,981</td>
<td>37%</td>
</tr>
<tr>
<td>Virginia</td>
<td>2,271,975</td>
<td>1,130,466</td>
<td>37%</td>
</tr>
<tr>
<td><strong>Total Southeast</strong></td>
<td><strong>20,656,991</strong></td>
<td><strong>9,621,589</strong></td>
<td><strong>33%</strong></td>
</tr>
</tbody>
</table>
Economic potential of energy efficiency

If 1 in 4 single-family homes in the Southeast received comprehensive EE improvements @ $7,500 per home:

• 5.2 million homes made more energy efficient
• $40 billion in total investment
• 470,000 direct and indirect jobs created
• $2.6 billion in total savings for residents each year
• $420 million in value-added economic impact per year
What are the key ingredients for seizing this economic opportunity?

- Recognition of the problem and the opportunity
- Willingness of all stakeholders, including utilities
- Workforce development
- Education and outreach
- And...

**CAPITAL available to homeowners and renters of all income levels regardless of credit scores, debt-to-income ratios, etc**

Which, finally, brings us to...
ON-BILL ENERGY EFFICIENCY FINANCE
What is “On-Bill Finance”? 

• Generally: 
  • A financial instrument for financing comprehensive energy efficiency, renewable energy or water system improvements on a utility, property tax or other bill paid by a home, business, etc.

• Can take multiple forms 
  • For utility programs 
    • Loan (On-bill “recovery” or “repayment”) 
    • Tariff** 
  • Higher tax assessment (Property Assessed Clean Energy finance)

• With utility on-bill finance: 
  • Utility finances (pays upfront cost for) energy efficiency improvements 
  • “Customer” repays the utility through a new charge on their utility bill until the investment is paid off 
  • Customer receives energy savings, lower energy bills* and enhanced comfort
Tariffed on-bill finance models

- On-bill loan with debt service through a tariff
  - Example: Help My House in S.C.

- Efficiency Paid Improvement Costs (EPIC) On-bill Tariff model
  - Sustainable Environments, Inc.

- Pay As You Save (PAYS®) model
  - How$mart programs in Kentucky and Kansas
  - Upgrade to $ave in North Carolina
  - HELP PAYS® in Arkansas
Key aspects of tariffed OBF

• Utility provides upfront capital to finance all cost-effective energy efficiency improvements

• Cost recovered through a fixed charge on the customer’s bill that is less than the estimated savings

• Cost recovery obligation tied to the meter, not the customer
  • No consumer loan and no debt obligation
  • Successor customers at that site benefit from the investment and the tariffed terms apply automatically

• Available to renters and multi-family tenants
  • If needed, eligibility determined by bill payment history
How tariffed OBF works

Credit: Clean Energy Works
Implementing an OBF investment program is worth the effort

- Tariffed on-bill financing offers the greatest potential for achieving maximum economic and environmental benefits

This video says it best...
Capital is readily available

- Various funding sources available for most utilities
  - Utility balance sheet
  - USDA financing
    - Energy Efficiency and Conservation Loan Program
    - Rural Energy Savings Program
    - Rural Economic Development Loan and Grant program
  - Private Capital – more appropriate for scaled-up investments
    - Traditional lenders
    - WHEEL
    - Community Development Financial Institutions
    - Cooperative Finance Corporation
  - Complementary federal funding
    - State Energy Program (USDOE) – can defray start-up costs
    - Weatherization Assistance Program (USDOE) – can buy-down cost of some investments
Impact of program design

Energy and Cost Savings

- Net Savings Percent
- Value of Efficiency as a Resource
- Program Fees
- Cost Recovery Period
- Eligible Upgrades
- Initial Energy Use
- Funding Source
- Cost of Capital
- Cost Effectiveness Criteria
Benefits of OBF

Customer
- Lower energy costs
- Comfort, health
- Environment

Utility
- Customer service
- Community development
- Lower utility costs

Economy
- $M in new capital
- New jobs, businesses
- Higher tax revenues

Environment
- Energy savings
- Pollution, health impacts
- Lower cost of clean energy resources to meet demand
Barriers to scaling up

• Lack of available/skilled workforce in many areas
• Few third-party program operator options

• Need scaled-up programs to:
  • Keep contractors interested
  • Achieve significant savings – economic and environmental benefits
  • Diversify/strengthen local economy
ON-BILL FINANCE IS WORKING: CASE STUDIES
How$mart (Kansas)

- Midwest Energy (electric and gas), launched in 2007
- Multiple funding sources:
  - Tariff-based OBF program using Pay As You Save®
  - Owners and renters eligible
  - Bill payment history
  - Max cost recovery term: 15 years or 75% of measure life
  - Cost of capital = 3%
  - Cost recovery charge capped at 90% of estimated savings
  - Max investment determined by cost-effectiveness of upgrades
  - Savings not guaranteed
How$mart (Kansas)

- Approx. 1,400 completed retrofits (Aug. 2015)
  - 57% conversion rate
- Total invested
  - $8.3 million by Midwest Energy through tariff for full cost recovery
  - $2.3 million by customers
- Avg project cost: $7,400 ($1,600 customer)
- Avg. kWh savings: 2,250 kWh/year
- Avg. therm savings: 273/year
- Avg. percent savings: ~25%
- Avg. net $$ savings: $120/year
- Default rate: < 0.1%

Source: Midwest Energy
Help My House (South Carolina)

• Initiated in 2011 by Central Electric Cooperative, Inc and Electric Cooperatives of S.C.
• Motivated by EE goal of 10% by 2022
• Eight co-ops participated in pilot
• Support from Environmental and Energy Study Institute
• Detailed monitoring and reporting
• Required state legislation**
Help My House (South Carolina)

- Structured as consumer loan, with debt service treated as a tariffed charge authorized under state legislation
- On-bill repayment, tied to meter
- Loan amount determined by cost effectiveness
- Max loan term of 10 years
- 2.5% interest
- No upfront payment
- Bill neutral “goal” (no guarantee)
- Only owner-occupied structures, all electric
- Funded by 0% interest REDLG loan
Help My House (South Carolina)

- Impacts of the pilot program as of June 2013
  - 125 completed retrofits
  - Total invested: $1 million
  - Avg project cost: $7,700
  - Avg. kWh savings: 10,800 kWh/year
  - Avg. % savings: 34%
  - Avg. payback: 11 years
  - Avg. net $$ savings: $288/year
  - Default rate: 0.1%

Source: Help My House Final Report on Pilot Program
Upgrade to $ave (North Carolina)

- Roanoke Electric Cooperative, launched in June 2015
- Licensed the Pay As You Save (PAYS®) program design
- Sourced $6 million in financing for investments from the Energy Efficiency and Conservation Loan Program (USDA)
- Program operator is the Roanoke Center
- Program details
  - Tariffed investment tied to meter
  - Cost recovery charge capped at 75% of estimated savings
  - Cost recovery period limited to 10 years
  - Energy efficiency credits purchased by the utility to meet NC Renewable Energy Portfolio Standard
- Utility also offers workforce training support
## Upgrade to $ave (North Carolina)

### Sample of over 75 homes

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost of upgrades</td>
<td>$6,900</td>
</tr>
<tr>
<td>Average payment for EE Credits *</td>
<td>$482</td>
</tr>
<tr>
<td>Average monthly estimated savings per site</td>
<td>$120</td>
</tr>
<tr>
<td>Average monthly tariff</td>
<td>$62</td>
</tr>
<tr>
<td>Average monthly estimated savings for member</td>
<td>$58</td>
</tr>
<tr>
<td>% of savings kept by member during cost recovery (Target: 25%)</td>
<td>50%</td>
</tr>
</tbody>
</table>

Source: Roanoke Electric Cooperative, January 2016
HELP PAYS (Arkansas)

- Ouachita Electric Cooperative, launched in March 2016
- Tariff approved unanimously by AR Public Service Commission
- Licensed the Pay As You Save® (PAYS®) program design to replace a prior on-bill loan program
- Capital sourced from utility balance sheet and CFC bank
- Program operator is EEutility
- Program details
  - Tariffed investment tied to meter
  - Cost recovery charge capped at 80% of estimated savings
  - Cost recovery period limited to 12 years
  - Rigorous quality assurance protocol
- Achieved $1 million in investment in first 60 days
ACHIEVING AN ENERGY EFFICIENT ECONOMY IN THE SOUTHEAST
Achieving our collective potential

- Utility commitment
- Supportive infrastructure
- Consumer awareness/demand
- Collaborative networks

Energy Efficiency for ALL
Collaborative networks are key

NC On-Bill Working Group

- NC Electric Membership Corp
- NC's Rural Electric Cooperatives
- NC Utilities Commission
- NC State Energy Office
- Energy Efficiency Businesses
- Community Service Agencies
- Partner Advocacy Org's
- Consultants
Contact us to get involved

**Tennessee**
Amy Kelly, TN Energy Savings Outreach Coordinator
[amy.kelly@appvoices.org](mailto:amy.kelly@appvoices.org)

**North Carolina**
Rory McIlmoil, Energy Policy Director
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NC On-Bill Working Group
[NCOnBill@seealliance.org](mailto:NCOnBill@seealliance.org)