

Whole-Home Scale-Up Pilot: Chicagoland Home Energy Savers Working Group

**Anne Evens, CNT
Presentation to the EE SAG
May 26, 2009**

Questions for the Chicagoland Home Energy Savers Pilot

- What is the energy savings potential in Chicago single family homes?
- What are the expenditures required to achieve various savings levels?
- Can a whole house package of measures be funded in a shared manner by gas and electricity EEPs?
- What are barriers to adoption at scale?
- What are solutions to adoption at scale?

Objectives of Working Group

- Convene and working group of local EE practitioners to discuss issues, make recommendations, identify areas for collaboration
- Develop a whole house retrofit program for single family (1 to 4 unit buildings) in Chicago-land that can be scaled-up to make the residential housing stock significantly more efficient
 - Identify savings potential
 - Identify capital costs to achieve various levels of savings
 - Develop a model for gas-electric program coordination
 - Identify barriers to wide-spread adoption
 - Identify solutions for wide-spread adoption

Challenges and Opportunities

- Opportunities:
 - There's a potential for significant savings given that Chicago homes consume more energy than the "average" home in the region
 - Partners are creating and expanding EE initiatives rolling out now, and there's a potential for coordination
- Challenges:
 - Lack of financing for retrofits
 - Many consumers don't want to make non-essential investments.
 - Difficult time for investment in housing
 - Demand for Energy Efficiency is low
 - Supplier capacity is limited (auditors, contractors)

We'd like your feedback on:

- How to make Whole Home retrofits more successful (greater demand)
- We've looked at best practices, are there resources/best practices that we may have missed?
- Other research questions that we should consider?
- Pilot program recommendations?

Participation and Process

- A network of local energy efficiency partners including: CEDA, HCBA, Delta, CNT, MEEA, CUB, CJC, DCEO, Chicagoland Natural Gas Savings Program, ComEd, Wright CC, John Porterfield, Paul Knight, Jim Cavallo, Brian Kumar, and other experts invited by topic (e.g. Shorebank, Treasurer's Office, IEMA/Radon...)
- Weekly Meetings, Work Products
- Basecamp – all materials on unified website

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ChicagoLand Home Energy Savers CHES Working Group

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FRIDAY, 8 MAY 2009

- Milestone** [Pilot planning HCBA & CNT](#) Completed by **Marjorie I.**
- Milestone** [Contractor purchasing consortium](#) Completed by **Marjorie I.**

FRIDAY, 1 MAY 2009

- Milestone** [CHES Meeting #8 - Best Practices](#) Completed by **Marjorie I.**

WEDNESDAY, 29 APRIL 2009

- Milestone** [CHES Meeting #7 - Outreach & Communications, PLUS WorkForce Training PLUS Radon](#) Completed by **Marjorie I.**

FRIDAY, 17 APRIL 2009

- To-do** [Work with Mark and Anne on the format. \(Determine parameters for bidding construction jobs\)](#) Assigned to **Peter L.**
- To-do** [review by Future Energy \(Make RFP for energy audits of CNT units\)](#) Assigned to **Annette B.**
- To-do** [review by Jim Cavallo \(Make RFP for energy audits of CNT units\)](#) Assigned to **Peter L.**
- To-do** [first draft \(Make RFP for energy audits of CNT units\)](#) Reopened for **Peter L.**

THURSDAY, 16 APRIL 2009

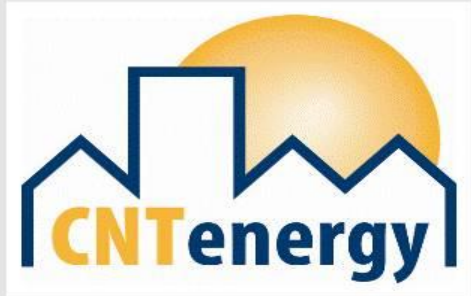
- Milestone** [CHES Meeting #6 - Finances](#) Completed by **Marjorie I.**

TUESDAY, 14 APRIL 2009

- Message** [updated Training list](#) Posted by **Marjorie I.**

WEDNESDAY, 8 APRIL 2009

- Message** [No meeting on April 9](#) Posted by **Marjorie I.**



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This group convened to study, coordinate and make recommendations regarding:

Technical Issues

- √ **Targeting Building Types and Characteristics**
- √ **Benchmarking**
- √ **Energy Audits**
- **Building Systems**
 - √ **Building Envelope**
 - √ **Mechanical Systems**
 - √ **Electrical Systems**
- √ **Measure – Level Analysis**
- √ **Performance Monitoring**

Program Design Issues

- √ **Best Practices**
- √ **Customer Behavior**
- √ **Financing, State/Federal Tax Incentives and Forward Capacity Markets**
- √ **Whole-Home Retrofits Program Plan & *Prescriptive Approach***
- √ **Interaction with other Demand-Side and Clean Energy Approaches**
- √ **Marketing and Communications**
- √ **Workforce Capacity**

Complete Set of Work Products somedue May 31 & July 30

- Checklist of homes that should be excluded from whole home weatherization
- Checklist of home characteristics that are desirable
- Characteristics of dwellings that can achieve 30% savings
- Analyze factors that affect energy savings including housing type, age and condition, income of residents and other relevant factors
- Combination of measures that can achieve 30% savings
- Provide recommendations on whether 30% per home savings is appropriate, or whether lower goal would reduce per therm and per kWh cost
- Checklist of occupant characteristics that are desirable
- By measure (for common Chicagoland dwelling-types and vintages, list of cost, savings, C/E and levelized cost)
- Minimum requirements for participating contractors
- List of acceptable/preferred certifications for auditors and weatherization providers
- Checklist – desirable features of financing products for EE retrofits
- Customer guide on choosing contractors
- Description of marketing approaches that are successful in encouraging dwelling owners to engage in comprehensive home retrofits to reduce energy use
- Best marketing and outreach strategies for low, moderate and higher income bungalow owners
- Other approaches to reducing energy use beyond 30% including SmartGrid, DR, RTP, behavioral
- Recommendations on barriers/opportunities for scaling whole home retrofits, particularly so that programs do not pick up 100% of costs but instead costs are co-funded through customer co-payments and financing
- Recommended training needs to scale whole home retrofits, and how training needs should be coordinated through DCEO, DOE, HFS
- Form Library
 - Contractor work order
 - Contractor-owner agreement

Examples of Work Products

- The following slides (11- 17) are examples of work products & summaries of discussions from the working group

How does Energy Consumption in Chicago Residential Buildings Compare to Regional Data?

Building Type	Chicago Mean EUI (Kbtu/sqft/yr)	RECS Mean EUI¹ (Kbtu/sqft/yr)
Single Family	147	75
Two-Four Units	110	56
Multi-family ≥ 5 Units	84	48

How does Energy Consumption in Chicago Residential Buildings Compare to Regional Data?

- Older housing stock
- Energy prices less volatile than some other regions
- Limited investment in EE
- Less constrained housing market than some other regions

Workforce Capacity

1. Building Workforce Capacity

- √ Summary of the auditor & contractor workforce needs in Chicago

2. Energy Audits (Jim Cavallo)

- √ Summary table (description) of audits offered in Illinois by target housing, purpose and availability (CNT)
- √ Resource Library of Sample Audits, audit procedures, safety inspection protocols,
- √ **Summary of audit tool lending library, evaluate costs**
- √ **Proposal for Audit Expert on call**

3. Auditor Training (CNT/Jim Cavallo/John Hamilton)

- √ **Summary table (description) of audit training offered in Illinois by target housing, purpose and availability (CNT)**

4. Contractors (MEEA and ComEd Participating Contractor Networks)

- √ PEEC Summary
- √ **Summary table of contractor training offered in Illinois by trade**
- √ **Best Practices: Summary of Ohio Training Program**
- √ **Outreach Strategy for MWBE/DDE (Kelly Shelton)**

ECM Discussion: Envelope, Mechanical, Lighting & Appliances

Outcome: Discussion Papers Describing ECMS identifying

- Minimum standards? Are their practices to be avoided?
- Quality control, (what do you need to look for at inspection?)
- Building code issues: energy code and fire code?
- How do provide customer/facility manager education?
- Product availability?
- What do we want to test in pilot?
- Where do we get costs & savings estimates? What do we need to model?
- What's the right feedback mechanism? E.g. how do we keep track of installation failures, good experiences, bad experiences?

ECM Discussion

- Goal: Develop a **TABLE** of energy efficiency costs and savings estimates for the Chicagoland Residential Housing Stock to be used for program design, cost-effectiveness tests and scale-up
- Data Sources: Actual Program Experience, and Energy Modeling and other jurisdictional data
- Residential Building Model Profiles
 - Single Family
 - Bungalow and Frame
 - 2 Flat (brick and frame)
 - 3 Flat (brick and frame)
 - Multi-Unit, 3-story walk-up

THE TABLE

(for each housing type)

DRAFT – FOR ILLUSTRATIVE
PURPOSES

System	Measure	Cost	Therms Saved/yr (Interacted)	Therms Saved/yr (Non-interacted)	Kwhr Saved/yr (Interacted)	Simple Payback	Useful Life (Years)
Appliances	Install low-flow shower heads	\$500	219	219	N/A	1.8	10 - 15
Roof	Install 6 in loose cellulose in roof w/ air sealing	\$6,960	5156	5156	168	1.3	20 - 25

Best Practices

- In Residential Energy Efficiency Programs: *NATIONAL ENERGY EFFICIENCY BEST PRACTICES STUDY*
 - *Submitted to California Best Practices Project Advisory Committee, Itron, Inc, July 2008*
- *ACEEE Best Practices*
- *Lessons Learned Presentation, Michael Blasnik, ACEEE 2008*
- *Any others we should consider?*

The Pilot Homes

(the following slides describe the pilot)

Target Housing Parameters

- Location?
 - 15% in North Shore Gas Territory
 - Evenly North, West, South ?
 - Concentrated in one neighborhood – CDOE priority
- Demographics?
 - Owner Occupied
 - Willingness to Take Make Behavioral Changes
 - Agreement to accept recommended retrofit
 - Willingness to be Publicized
 - Stable Occupancy (not excessive) (atleast two years prior to retrofit)
 - Home Offices allowed
 - Attends a training session?
 - CCAP? Pledge??
 - O & M Manual
- Building Condition ?
 - No health and safety violations
 - No significant structural damage that would preclude installation of ECMs
 - Pre 1990 construction



8432 Paulina



868 N Sacramento Bl

3017 W Belden



Housing Types

- Single Family Bungalow
- Single Family Frame
- Ranch/ Concrete on Slab
- Brick/Grey Stone Two Flat (two to four)
- Frame Two Flat (two to four)

Recruitment Sources

- Energy Savers Pipeline: Chicago Low-Income Housing Trust (~1000)
- Delta's Pipeline (~50 in North Shore Gas Territory)
- Historic Chicago Bungalow Association Pipeline (~300)

Energy Audits

- HERS / RemRate
- Treat or Earth Advantage's Energy Performance Score (EPS)
- Blower door
- Test of Owner Acceptance: Two-page report versus comprehensive report?

Approach

- Whole Home
- Prescriptive (Blower-door Assisted Air Sealing + HVAC + LITE Audit)
- How do we decide which home goes in which approach?

Treatment Groups

	Whole Home	Prescriptive
Single Family Bungalow	38	38
Single Family Frame	6	
Ranch/ Concrete on Slab	6	
Brick/Grey Stone Two Flat (two to four)	12	
Frame Two Flat (two to four)	6	
TOTAL	68	38

Data Collection/ Performance Monitoring

- Utility Bill Analysis
- Owner Complaint Report
- Call-back history
- Documentation of Costs by Measure
- Customer Survey
- Customer Satisfaction
- Occupancy Demographics

Time Line

- **Timeline:**

- May 1 – May 15, 2009: Identify and contact potential program participants
- May 16 – May 30, 2009: Conduct energy audits
- May 16 – May 30, 2009: Develop Scope of Work, Bid out projects and review project bids, project approvals
- May 30 – July 31, 2009: Measures installed, independent post-work audits completed
- August 1 – August 15, 2009: Submit Interim Report
- On-going results of energy performance (winter, 2009 and summer 2010, winter 2010, summer 2011).

Thank You!