



**Energy Efficiency and Conservation Block Grant (EECBG):**

**Better Buildings Neighborhood Program Final Report**

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## 1.0 Executive Summary

The Neighbor to Neighbor Energy Challenge (N2N) brought together a consortium of 14 leading clean energy rural, suburban, and low income communities throughout Connecticut. N2N was awarded \$4.2 million from the U.S. Department of Energy (DOE) competitive *BetterBuildings Neighborhood Program* on August 10, 2010 to run a two-year pilot program (plus one year of transition and evaluation) (Award No. EMCBC- 00969-10).<sup>1</sup> N2N tested innovative program models and hypotheses for improving Connecticut's existing residential energy efficiency programs that are overseen by the ratepayer fund board and administered by CT utilities. N2N's original goal was to engage 10 percent of households in participating communities to reduce their energy usage by 20 percent through energy upgrades and clean energy measures. N2N planned for customers to complete more comprehensive whole-home energy efficiency and clean energy measures and to achieve broader penetration than existing utility-administered regulated programs.

Since this was an ARRA award, we report the following figures on job creation in Table 1. Since N2N is not continuing in its current form, we do not provide figures on job retention.

**Table 1 N2N Job Creation by Quarter**

|                | <b>Jobs Created</b> |
|----------------|---------------------|
| <b>2010 Q4</b> | 6.65                |
| <b>2011 Q1</b> | 7.13                |
| <b>2011 Q2</b> | 4.98                |
| <b>2011 Q3</b> | 9.66                |
| <b>2011 Q4</b> | 5.43                |
| <b>2012 Q1</b> | 11.11               |
| <b>2012 Q2</b> | 6.85                |
| <b>2012 Q3</b> | 6.29                |
| <b>2012 Q4</b> | 6.77                |
| <b>2013 Q1</b> | 5.57                |
| <b>2013 Q2</b> | 8.35                |
| <b>2013 Q3</b> | 6.52                |
| <b>Total</b>   | <b>85.31</b>        |

The N2N team encountered several gaps in the existing efficiency program performance that hindered meeting N2N's and DOE's short-term program goals, as well as the State of Connecticut's long-term energy, efficiency, and carbon reduction goals. However, despite the slow program start, N2N found evidence of increasing upgrade uptake rates over time, due to delayed customer action of one to two years from N2N introduction to completion of deeper household upgrades. Two main social/behavioral principles have contributed to driving deeper upgrades in CT:

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<sup>1</sup> The website provides more information about the CT Neighbor to Neighbor Energy Challenge (N2N): <http://ctenergychallenge.com>.

1. Word of mouth, where people share their experience with others, which leads to others to take action; and
2. Self-herding, where people follow past behavior, which leads to deeper and deeper actions within individual households.

## **1.1 Key Findings**

N2N used Community Based Social Marketing (CBSM) to acquire and feed leads into the existing ratepayer funded Home Energy Solutions (HES) assessment program. Initially, N2N expected that contractors would upsell customers to follow-on rebate programs (*i.e.*, home energy upgrades). In reality, N2N had limited influence over the contractor network, handing off N2N-acquired leads into the existing HES assessment program incentive structure and a subset of the utility-selected HES assessment contractors. N2N spent the first two years focused on improving contractor performance, in areas such as assessment and upgrade complete rates, with limited success due to the existing program constraints.

The inherent challenges in the HES assessment program during the program period, such as that contractors and customers were not incented to complete upgrades, caused N2N to shift marketing and outreach resources from driving demand to the HES assessment programs and instead acquiring customers straight to upgrades. For example, N2N focused on new strategies, including direct lead acquisition for:

1. Home Performance with Energy Star (HPwES),
2. Independent whole-home contractor partnerships (instead of utility program HES contractors), and
3. Solar photovoltaic (PV) programs, *etc.*

N2N piloted the following program elements:

- Portfolio Program. An integrated set of energy efficiency programs, bringing together the state ratepayer funded programs for efficiency and solar PV with free lighting programs.
- Partnerships with Local Organizations. Signed formal partnership agreements between N2N and over 130 local organizations. The local organizations both provided access to networks of people, and acted as trusted messengers for N2N.
- Tracking Database. A comprehensive online platform/tracking database incorporating needs of policymakers, communities, contractor networks, and households, as well as program administrators, implementers, and evaluators.
- Multi-touch Marketing. An on-the-ground outreach team conducting community-based social marketing and outreach, acquiring leads and completed actions from community events, call nights, organizational partnership co-marketing, social and earned media, *etc.*
- Town and Organization Rewards. A performance-based incentive program to reward towns and community groups for meeting N2N goals and targets.
- Contractor Liaisons and Participant Energy Advisors. Several N2N staff members provided dedicated or part-time contractor oversight and advising, as well as hand-

holding/one-stop shopping advisors for participating residents, for example, providing customers with technical and financing options, moral support, trusted community advisor connections, and contractor quality assurance.

- Action Research/Developmental Evaluation. A thorough evaluation program to demonstrate the value of aggregated residential energy savings and to support:
  - Continuous evaluation of the efficacy and economics of each program approach at various phases of deployment, enabling almost real-time course corrections;
  - Identification of best practices; and
  - Aggregation of both in-home lighting visit energy savings and clean energy production to monetize in the state's Renewable Energy Credit (REC) energy trading markets.

Table 2 provides a summary of the N2N piloted program elements listed above, including the barriers addressed, the benefits, and the results.



**Table 2 Summary of N2N Tested Program Elements**

| <b>Program Name</b>                                 | <b>Barriers Addressed</b>   | <b>Benefits</b>   | <b>Results</b>  |
|---|---|---|---|
| Portfolio Program                                   | Customer confusion, individual customer needs                               | Provided customers multiple entry points, clarified existing program options  | With more program options in one place, it was easier to find the right program for each resident's needs   |
| Partnerships with Local Organizations               | Lack of trust for utility programs and contractors, No one else is doing it | Used trusted source messaging and modeling, such as testimonials and lead by example strategies to help customer overcome program distrust                    | Residents were more receptive to programs and messaging coming from trusted sources, and once they saw that others were also taking action  |
| Tracking Database                                   | Issues in the customer pipeline (especially utility and contractor holes)   | Provides transparency to program administrators and identifies problem areas, allowed N2N to handhold customer through each step                              | Improved HES and upgrade completion rates   |
| Multi-touch marketing                               | Lack of consumer awareness and motivation to take action                    | Helps raise customer awareness by touching customers multiple times with specialized calls to action  | Increased awareness and visibility in participating communities, "we see you everywhere"  |
| Town and organization rewards, town leaderboard     | Motivation for quality lead referrals                                       | Provides incentives for communities to engage in outreach to their social networks (while raising funds for the organization)                                 | Increased sign up rates through local organizations. Towns had buy in and reacted positively to competition   |
| Contractor Liaisons and Participant Energy Advisors | Contractor sales pipeline issues  | Contractors received back office support and improved internal processes and business models resulting in their ability to scale up and retain more customers | Contractors were accepting of data transparency and contractor scorecard. They felt supported by N2N staff which made them more willing to address internal problems (resulting in high completion rates) |
| Action Research/Developmental Evaluation            | Overall program issues  | Continual program evaluation and refinement   | Improved program processes, community outreach and collateral materials, which resulted in increased program effectiveness  |

N2N has provided a fast-paced, testing ground for energy efficiency programs, not possible within current CT utility-administered programs operating under regulatory constraints and timelines. The program leaves behind assets that CT should use to continue to test, learn, and quickly adapt program design. Based on evaluation to date, the next version of N2N should include a third-party administrator building on the N2N lessons learned in community-based organizing, contractor coordination and support, and behavioral marketing, including recognizing the following general principles:

1. The most important factor in driving home energy upgrades is the contractor market. In CT, misaligned contractor and customer incentives don't leave enough motivation to sell the customer to increased lifetime energy savings despite aggressive statewide energy efficiency goals.
2. Developing marketing and outreach approaches using the latest in behavioral science and community based social marketing techniques should result in broader customer reach and increased customer motivation to complete harder energy upgrades.
3. A sophisticated real-time tracking database/technology platform supports research and evaluation, data transparency across stakeholders, program reporting, contractor support, and faster market transformation than would otherwise be seen in energy efficiency programs.
4. Program oversight partnerships are crucial to provide access to utility data.

In fact, based on 2 ½ years of program operation and continuous evaluation of outcomes, N2N recommends that energy efficiency and clean energy programs include the following specific recommendations at a minimum:

- Social, targeted marketing campaigns and toolkits, including co-marketing with trusted sources and/or opinion leaders (*e.g.*, local organizations, municipalities, elected officials, *etc.*);
- Alignment of contractor policies and incentives with structured quality assurance and control programs, particularly for post-HES upgrades;
- Well-documented and clear contractor expectations, including providing customer service support and coordination of installations;
- Stable funding for all heating fuels, including electricity, natural gas, oil, propane, wood, *etc.*;
- A well-defined third-party program administration structure; and
- The ability for program administrators to try approaches, fail, and correct, especially in the early years of program administration.

## **1.2 Key Recommendations**

In addition to the next section and N2N's published chapter of documented lessons learned and recommendations (from (Donnelly, 2013)), some communities in the N2N footprint showed strong evidence of reaching momentum, where the above social/behavioral principles appear to be driving demand. Given that N2N funding and implementation have ended, N2N recommends three overarching approaches for CT energy efficiency programs:

1. Keep the Momentum! Continue to fund fast-paced, testing grounds for efficiency programs outside of current regulatory constraints to:
  - a. Inform program design and policy decisions, and
  - b. Direct market innovation/transformation.
2. Tap into the Emotional and the Rational. Use social (*i.e.*, community-based) and behavioral approaches to:
  - a. Motivate, enable, and engage individuals to action,
  - b. Drive viral spreading of efficiency uptake, and
  - c. Deliver compelling economic (*i.e.*, rational) statements of expected results.
3. Improve the Contractor Market. N2N contributed to helping to transition contractors to selling deeper upgrades, but the CT market needs the following support:
  - a. Data tracking to support the contractor business (*i.e.*, the sales pipeline), improve quality, and induce accountability;
  - b. Sales training courses rooted in behavioral and decision science principles;
  - c. Operational and back office training and support including working capital for training and software (such as customer relationship management systems); and
  - d. Energy advisors that provide business support to contractors and technical support to customers.

The ultimate goal is to achieve long-term cultural shifts in how people think about and use energy. To date, traditional approaches in CT have failed to set this goal.

## 2.0 Introduction to N2N

The average CT household spends approximately \$3,500 per year on energy (Colton, 2012; Turmelle, 2012). Numerous inefficient homes in CT use about 30 percent more energy than efficient ones use (APS, 2008; NRC, 2010). In addition to high energy costs, the CT housing stock is also relatively old with approximately 70% of homes older than 50 years old, meaning most houses need energy efficiency upgrades. The N2N pilot was designed to lead to ongoing, sustainable energy efficiency and clean energy diffusion, as well as long-term market transformation in 14 small towns in CT, including: Bethany, Cheshire, East Haddam, East Hampton, Glastonbury, Lebanon, Mansfield, Portland, Ridgefield, Weston, Westport, Wethersfield, Wilton, and Windham. See Appendix A for detailed N2N Town Demographics and Electricity Consumption Information tables.

The 14 selected small towns had the following characteristics:

- CT clean energy leadership history in related CT programs, such as the CT Clean Energy Communities Program.
- Geographically spread across CT with a mix of:
  - suburban low and medium density,
  - rural geographies, and
  - incomes ranging from low-income to affluent.
- Combined population of about 97,000 households.

In the 14 N2N small towns, Connecticut Light and Power (CL&P), a subsidiary of Northeast Utilities (NU), provides electricity and administers the ratepayer fund programs (*i.e.*, overseen by the CT Energy Efficiency Fund (CEEF)).<sup>2</sup> The ratepayer fund and N2N had a formal partnership agreement to allow N2N to leverage existing state programs and subsidies, as well as to access utility data. The original N2N grant application pilot design relied on two ratepayer-funded programs to subsidize the grant's marketing, outreach, and evaluation spending, including:

1. Home Energy Solutions (HES) assessments with direct efficiency installations, which opens customer access to the
2. Follow-on rebates for upgrades, such as insulation, appliance, windows, lighting, and Heating, Ventilation, and Air Conditioning (HVAC) rebates.

## 2.1 The opportunity for N2N

N2N was an attempt to bring performance-based program administration into CT, using the Lifetime Customer Value (LCV) approach adapted to the residential efficiency space.<sup>3</sup> LCV places emphasis on the total customer participation over the program life, spreading out the cost of acquiring this customer over the total number of actions they take (Shaw and Stone 1988). The business goal is to have an ongoing relationship with the customer and place a dollar value on that relationship by cross-selling or upselling additional products and services (*i.e.*,

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<sup>2</sup> The only exception is the town of Lebanon, where approximately 2/3rds of the households have Bozrah Light and Power.

<sup>3</sup> See Appendix D, The N2N Value Proposition, for more detail.

participation in the entire N2N portfolio of actions). In the efficiency space, the goal is higher customer energy savings over time as the home becomes more and more efficient and/or generates clean energy. N2N measures the ‘V’ (Value) in LCV in negawatts<sup>4</sup> (but it can be measured in addition to or instead of revenues or profits, depending on the program).

The LCV approach can be used to improve program cost-effectiveness by making the experience more valuable to the customer. In fact, N2N became a trusted ally to make saving energy in the home easy by:

1. Bringing together available incentives,
2. Selecting pre-qualified contractors,
3. Understanding and guiding the participant through each step of the process,
4. Helping them track energy savings over time (even as rates increase),
5. Providing behavioral prompts, triggers, and reminders (*i.e.*, multiple customer touch points),
6. Connecting them to neighbors to share their experiences, and
7. Helping their community earn rewards.

Improving lifetime program performance provided an opportunity to reach N2N goals of increasing household efficiency levels over time with little additional costs.

## **2.2 N2N goals**

N2N administrative, outreach, and evaluation partners viewed N2N as “a start for addressing customer needs that will help drive energy efficiency through innovative program design, delivery, data handling, and evaluation work” (Stakeholder8, 2012). By Year 2, N2N and several outside stakeholders recognized the difficulties of operating within the existing utility-administered HES assessment program with limited influence over the contractor network, the customer incentives, and quality assurance programs. Despite recognizing the deficient sales pipeline during Year 1, N2N remained focused on piloting within an existing, regulated contractor market to achieve the following goals to:<sup>5</sup>

1. Increase long-term residential energy efficiency upgrade demand and program cost-effectiveness using outreach strategies based on community based social marketing and behavioral strategies;
2. Market the existing Home Energy Solutions (HES) utility-administered program as a first step to lead people to invest in deeper improvements in their home;<sup>6</sup> and

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<sup>4</sup> Amory Lovins of the Rocky Mountain Institute coined the term “negawatts”; he defined a negawatt as one megawatt of electricity conserved for one hour.

<sup>5</sup> DOE grantees were selected to pilot a variety of program approaches with most programs testing independent third-party administered approaches (*i.e.*, providing incentives directly from grant funds rather than from utility-administered ratepayer funds).

<sup>6</sup> This is the most difficult of the three challenges due to market barriers, such as misaligned contractor incentives for, along with a pervasive contractor attitude towards the “one and done” of completing the HES assessment and moving on to the next customer.

3. Use robust data collection and analysis to support real-time program administration, as well as a variety of research and evaluation initiatives, leading to real-time program course correction and longer-term market transformation and innovation activities (See Appendix B for an overview of N2N's data-driven process).

### **2.3 N2N Research Methodology**

N2N focused on a developmental evaluation research methodology (Patton, 2011) based on Community-Based Social Marketing (CBSM) (McKenzie-Mohr, 2008) to pilot solutions. Importantly, developmental evaluation, or action research, includes continuously analyzing a real-world system (in this case, the N2N Energy Challenge) with actual customers participating in their daily lives (Burns, 2007). Action research is based on “clear performance metrics and targets (the expected outcomes), rapid feedback of results (the actual outcomes), and a culture where small failures are tolerated (and learned from) with rapid turnaround of iterative solutions” (Honebein et al 2009). The N2N approach of testing, learning, and adapting yielded small, continuous process refinements and course corrections, using three main components to support the approach:

1. A technology platform that tracks the customer through the entire sales pipeline of energy action;
2. Behavioral research; and
3. Results dashboards frequently published by N2N.

For regulators, cost-effectiveness is the only measure of program success or failure, but for a third-party administrator with outside funding, like N2N, there is room to test, adapt, learn, and refine the processes.

Importantly, N2N used actual participants acting in their everyday lives within existing programs administered by real people collecting real data. The constantly changing implementation strategies often made it difficult to draw definitive quantitatively supported conclusions.

Still, the N2N team continually assessed progress, focused on maximizing completed home energy upgrades and cost-effectiveness. In fact, N2N staff critically accessed program dashboards and reports on a weekly basis, meeting with outreach and contractor staff to discuss findings and solutions. N2N has focused on three primary areas:

1. Managing and incrementally improving N2N contractor performance;
2. Measuring and improving N2N staff and volunteer outreach performance; and
3. Assessing and refining N2N marketing messages.

The N2N research methods were mainly qualitative, including data analysis on 26 in-depth stakeholder interviews and numerous technical advisory committee meetings. For instance, in 2012, Kat Donnelly conducted interviews and collected input from N2N-related stakeholders across CT, including N2N staff, community activist, politician, regulator, utility, contractor, participant, early adopter, and community partner stakeholders. The stakeholders represented a

mix from all 14 N2N small towns, including towns considered both successful and unsuccessful. Stakeholder interview transcripts, testimonials, and meeting participation data were entered into a software program to enable a grouping of ideas and concepts, as well as the development of necessary follow up research areas. Customer surveys were also collected and analyzed, as well as several program data collection sources used for the listening to the voice of the customer analyses (Burchill & Brodie, 2005).

In addition to the qualitative methods, Kat Donnelly conducted primary behavioral research within the N2N population of participants, completing a behavioral economics experiment designed to compare homeowners' willingness to pay (WTP) for upgrades based on receiving varying levels of information about an example home's energy performance. The experiment examined three different housing situations, including people in the market to buy or sell a home, as well as those planning to stay in their current home. The home energy performance information levels were delivered through three different versions of the DOE's Home Energy Score (HEScore) and report that were all modified by the researchers.

Kat Donnelly's PhD thesis contains the results of much of the N2N evaluation work. Chapters 1, 2, 3, and 5 include the N2N qualitative research, while Chapter 4 is focused on the primary behavioral research, especially the HEScore survey and results. (Donnelly, 2013)

## **2.4 N2N Data**

The tracking database/technology platform has supported N2N by enabling real-time data collection, analysis, and reporting, as well as enabling the team to set and track goals for outreach and contractor performance. The data collected over the course of N2N includes information on:

- Customer leads, including numbers, outreach sources, and contractor follow up levels,
- Household energy efficiency actions,
- Contractor performance,
- Outreach activities and participant outcomes,
- Household energy efficiency action cost and savings, as well as monthly electricity usage provided by CL&P, the partner utility,
- Stakeholder and partner discussion documentation,
- DOE *BetterBuildings* program resources, and
- CT census data.

Table 3 represents N2N program penetration into the 14 towns with approximately 97,000 households through the end of the program on July 15, 2013.



**Table 3 N2N Program Accomplishments (11/1/10 through 7/15/13)**

| <b>OUTCOME</b>                                 | <b>PROGRAM TOTAL</b> |
|--|----------------------|
| Coalition partner meetings                     | 294                  |
| Coalition partners signed                      | 134                  |
| Outreach events                                | 1284                 |
| Workshops held                                 | 99                   |
| Workshop attendees                             | 1226                 |
| Facebook Fans                                  | 469                  |
| Email list                                     | 7296                 |
|  |                      |
| HES signups                                    | 6214                 |
| HES assessments completed (% of participants)  | 3571 (57%)           |
| Releases Signed (% of HES assessments)         | 3300 (92%)           |
| Post-HES bids delivered (% of HES assessments) | 923 (26%)            |
| Upgrades completed (% of HES assessments)      | 323 (9%)             |
| Solar Leads Generated                          | 995                  |
| Solar Installs Completed                       | 108                  |

N2N publishes monthly contractor scorecard and program summary visual dashboards, using the results to inform program design and reporting the data to state policymakers on a monthly basis. Transparent data has also enabled a focus on contractor performance, helping streamline customer sales processes.

### 3.0 Final Technical Report

This section includes best practices from all N2N grant sub-recipients' work that could be replicated for future programs. This section addresses all six pillars of the DOE Better Buildings Neighborhood Program, including:

- Institutional Design and Business Model
- Program Design and Customer Experience
- Driving Demand
- Workforce Development
- Financing and Incentives
- Data and Evaluation

N2N believes that the program issues cut across the six DOE pillars. N2N organized the lessons learned into the following six categories, in N2N-recommended order of importance (legend: DOE Pillar: N2N Lesson Learned Category), including:

1. Workforce Development and Customer Experience: N2N Contractor Networks
2. Driving Demand and Customer Experience: Behavior and Community-Based Social Science
3. Data and Evaluation, Workforce Development, Program Design, Driving Demand: Tracking Database Technology Platform
4. Institutional Design: Market Innovation
5. Institutional Design: Policy and Innovation Structure
6. Program Design: N2N Program Administration.

In addition to the discussion of the contractor networks below, please see Table 1 for a summary of the N2N jobs created over the life of the grant. N2N did not result in measurable indirect jobs created because N2N worked within the existing utility program approved contractor market. However, there is anecdotal evidence of contractors that increased the number of technical teams, as well as new contractors moving into the CT market to meet increasing demand from N2N leads.

We also provide a brief discussion of the interest rate buy down program, where the following two charts project the loan volume and interest rate buy down draws for the Cozy Home program for 2013 to 2015 (Table 4 and Table 5).

**Table 4 New Cozy Home Loan Application Projections through 2015**

| #    | Q1 | Q2 | Q3 | Q4 |
|------|----|----|----|----|
| 2013 |    |    |    | 2  |
| 2014 | 8  | 12 | 18 | 30 |
| 2015 | 30 | 25 | 25 | 50 |

**Table 5 Cozy Loan Interest Rate Buy Down Drawdowns**

| \$          | Q1       | Q2      | Q3      | Q4       |
|-------------|----------|---------|---------|----------|
| <b>2013</b> |          |         |         | \$752    |
| <b>2014</b> | \$3,008  | \$4,512 | \$6,768 | \$11,280 |
| <b>2015</b> | \$11,280 | \$9,400 | \$9,400 | \$18,376 |

### **3.1 N2N Lessons Learned**

The N2N program recommendations reflect the needs of three separate interests, including the:

- DOE grant and program requirements,
- Existing CT regulatory environment, and
- Evolving N2N program objectives.

N2N design is based on both the N2N lessons learned and the analysis of progress towards the original program goals, including:

1. Using community-based and behaviorally-focused outreach strategies should increase demand and cost-effectiveness for residential energy efficiency home performance upgrades;
2. Marketing HES assessment (HES) assessments as a first step should lead people to make deeper home energy improvements; and
3. Investing in state of the art data systems should improve community based program results.

The following findings about the above three hypotheses hold that:

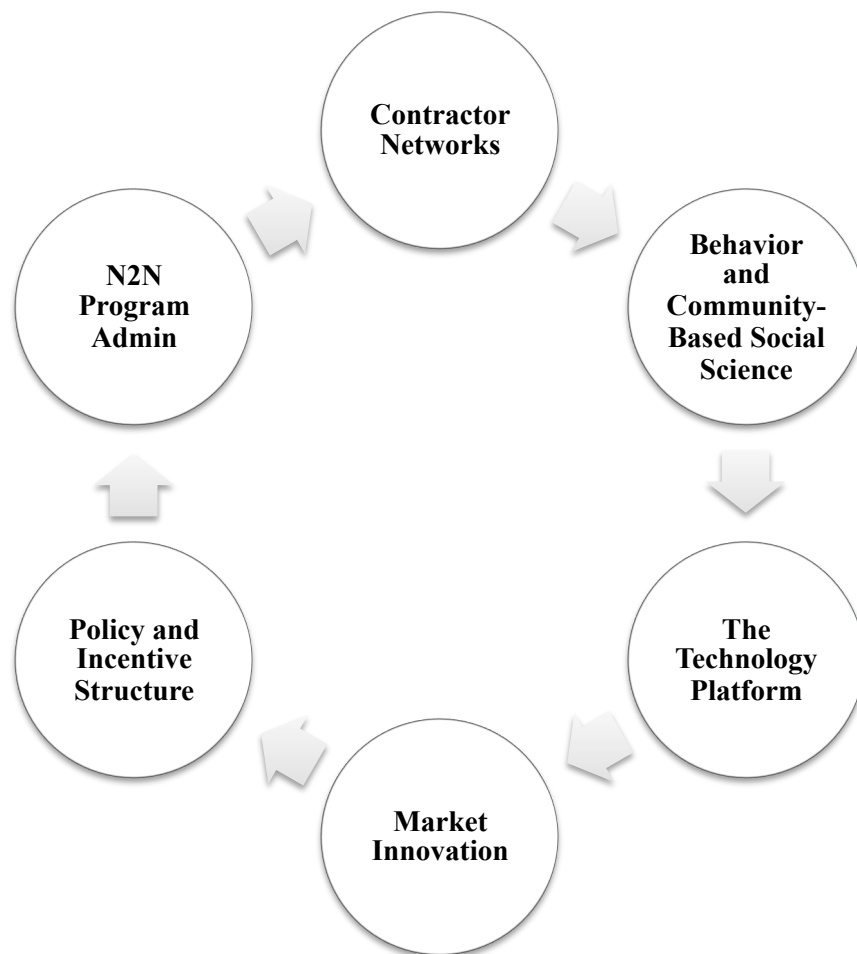
1. N2N is optimistic that community-based programs can be operated using performance-based approaches based on current performance and scenario modeling of increased lead conversion rates. N2N assumed the following elements of the cost structure:
  - a. Leads generated;
  - b. Upgrade conversion rate; and
  - c. Energy and cost savings.
2. During the program period, the contractor compensation incentives favored contractors that operated in a HES core services business model, leaving N2N leads unlikely to complete energy upgrades. While utility program administrators are moving contractor compensation towards deeper upgrades, N2N had not yet seen that translate into a high enough conversation rates to rely solely on HES contractors. In fact, N2N became focused on expanding outside of the HES program in the second year to diffuse energy upgrades.

3. Third, robust data collection and analysis supported through innovative technology has enabled real-time program administration and a variety of research and evaluation initiatives, ultimately contributing to market transformation.

N2N believes that the next iteration of a N2N-like program can be applied in CT and beyond, and includes the following six major categories of lessons learned for achieving wider penetration of deeper household energy savings (Figure 1):

1. Contractor Networks,
2. Behavior and Community-Based Social Science,
3. The Technology Platform,
4. Market Innovation,
5. Policy and Innovation Structure, and
6. N2N Program Administration.

**Figure 1 Six Areas of N2N Lessons Learned**



Importantly, the six areas interact. Implementing any one set of recommendations alone will not be enough to drive diffusion of whole-home performance upgrades. For instance, while N2N

finds the sales delivery infrastructure is necessary to support upgrade conversions, the lead quality developed through behavioral methods impacts the contractor's ability to convert that lead. In addition, the policy and incentive structure impacts the contractor's ability to deliver sales, as well as the customer's motivation to purchase upgrades, and so on, where each system affects the other five systems.

First and foremost, N2N believes that the program and contractor sales delivery technology infrastructure is critical for both achieving upgrade conversions and delivering a cost-effective program. For instance, a sophisticated Customer Relationship Management (CRM) Tracking Database promotes cost-effective program delivery by:

- Keeping track of where a customer sits in the pipeline,
- Enabling multiple customer sales touch points targeted at the next action;
- Spreading the costs of acquiring a customer across a lifetime of customer energy savings actions; and
- Supporting program lessons learned across lessons learned topics.

### **3.2 The Contractor Market**

A well-developed contractor network is the most important factor for achieving:

1. higher upgrade pull-through rates (*e.g.*, completed upgrades), and
2. cost-effective program operations.

Dominating other factors, like behavioral interventions, program administration, outreach approaches, *etc.*, N2N data repeatedly tells the same story that:

The utility-administered, pre-approved HES assessment contractor structure was unable to handle the customer sales processes necessary to drive upgrades, with the exception of just a few contractors.

Unfortunately, prior to starting the pilot, the N2N team did not understand the contractors' challenges with managing the customer pipeline in CT towards upgrades. However, by early 2012, N2N realized the grant goal to convert 25 percent of HES assessments to upgrades was unachievable for the following contractor barriers:

1. N2N does not manage the contractor network;
2. The N2N market of 97,000 households is too small to require drastically higher performance standards to 13 of 26 contractors that were under current administration; and
3. Driven by current contractor and customer incentives, most HES program savings come from core weatherization services delivered on a first visit.

Yet, the contractors are willing, active, and collegial partners, eager to share or learn best practices, N2N research, and other DOE grantees findings. The contractors supported N2N's model of transparency and data sharing of performance metrics. Contractors also embraced

weekly discussions of the customer pipeline, where one-on-one meetings were used to analyze contractor trend data and develop plans for increasing customer upgrades. The N2N approach of close support and oversight is valuable to the contractors, evidenced by the almost half/half split of N2N and contractor lead generation.

In fact, there have been positive changes in the HES contractor network and upgrade follow up processes, achieving:

- A substantial increase in the rate of completed Field Service Tools (FSTs) that track data about the energy audit and/or the upgrade.<sup>7</sup>
- Ninety five percent signed release forms by N2N participants, showing that customer releases are not a barrier to participation.
- The first quarter of 2013 upgrade rates in N2N towns have increased to 11.3 percent from nine percent program average (*i.e.*, of completed HES assessments).<sup>8</sup>

In addition, the N2N contractors have learned the benefits of closely tracking customers to enable a long-term customer relationship. After a steep learning curve, both N2N and the N2N contractor network were using the Tracking Database (the CRM), the N2N contractor scorecards, and the customer pipeline tools to increase upgrade performance.

Over the course of the grant, there have been positive changes by the ratepayer fund in HES assessment program design. For instance, in 2012 the ratepayer fund changed three HES assessment criteria:

1. 20 percent higher average savings per household requirements,
2. 10 percent of HES assessments required to save 25 percent or more per household, and
3. Increased opportunity for socket change outs from 25 to 40 Compact Fluorescent Light bulbs (CFLs).<sup>9</sup>

The ratepayer fund also approved Home Performance with Energy Star (HPwES), launched by the utility administrators in April 2012 to provide a market for hundreds of CT contractors

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<sup>7</sup> Note that while N2N has seen some improvement in the data quality of the FST, the tool itself is inadequate for driving customer decisions to complete upgrades and for tracking lifetime savings data.

<sup>8</sup> Upgrades include measures such as insulation and HVAC systems but not appliances, windows, or lighting (as compared to NU 10 percent upgrade rates (Feasy, 2013)). NU upgrade rates are based on contractor generated leads, where most homeowners come to the program with a problem. N2N leads pull in “harder” leads that do not have a recognized problem. The upgrade percentage does not take into account whether the residence had an opportunity, because N2N believes most homes do have an opportunity. Still, the upgrade numbers are very low when compared with top N2N grantees achieving 30 to 50 percent upgrade rates. Nine percent upgrade conversions is within the bottom quartile of DOE grantee results.

<sup>9</sup> Unfortunately, the first and second criteria were not quickly enforced, nor backed up with published contractor performance data like N2N provides.

locked out of HES program dollars, although this program has not yet seen significant contractor or customer participation.<sup>10</sup> In addition, HPwES is new and not yet a recognized brand in CT.

### 3.2.1 CT Contractor Market Findings

The bullets below contain N2N findings about the HES assessment core services program design from three primary areas, including contractor skills, low public awareness, and program design and administration approaches.

- While effective at achieving HES assessment program goals to reach a broad audience with 10 to 15 percent energy savings, the HES assessment program design during the grant period has been an ineffective approach for driving demand for deeper upgrades into households and across communities.
- The CT home performance industry lacks economies of scale for home performance work.<sup>11</sup>
  - Substantial grant resources were devoted to the contractor customer pipeline, as well as to guiding contractor focus on upgrades.
  - Contractors benefited from the N2N contractor liaisons and other program staff providing small business support and development assistance, such as sales training, sales process development, data management, and customer pipeline analyses skills.
- A large gap between performance-based (*e.g.*, cost-effective) customer follow up procedures and actual contractor follow up exists. For instance, customers receive inadequate feedback (*e.g.*, handholding) throughout the confusing upgrade and customer incentive process.<sup>12</sup>
- There are low public levels of awareness about the home performance industry, and high levels of uncertainty about which contractors to trust for quality assessments and upgrade work.<sup>13</sup>

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<sup>10</sup> In the HES program, only 26-30 contractors each year are selected to gain access to contractor reimbursement, as well as customer rebates and financing, thereby limiting the market competition. N2N has worked with about half of the higher performing HES assessment vendors.

<sup>11</sup> Current contractors tend to be smaller, independent operations with limited back office, operations technology, or marketing capabilities to sell upgrades.

<sup>12</sup> For the first time, HES contractors received leads that didn't have a pre-identified problem that needed fixed immediately. Instead, N2N participants join a community-wide movement of sorts, without the pre-awareness of a strong need for a contractor (for example to solve drafty rooms, ice dams, broken HVAC, etc.). That is, N2N leads required more attention than HES contractors were used to providing.

<sup>13</sup> The mistrust arises partially from large fluxes in contractor staffing levels driven by policy uncertainty, leaving an impression of fly by night operations (which is not warranted, but is still a perception encountered). In addition, outside of HES, many companies sell single products, for instance HVAC only, versus solutions to whole home problems, such as air sealing, insulation, and HVAC.

- The HES assessment program has not focused the same level of program administrator oversight or quality control of the upgrade process after delivery of HES assessment core services, resulting in highly uneven customer experiences. Areas of opportunity for additional program focus include:
  - Customer feedback oversight of upgrade recommendations and bids,<sup>14</sup>
  - More data transparency on the quality of upgrades being performed in the program; and
  - Upgrade-focused marketing materials that include guidance from behavioral marketers, and support for more frequent updating, as well as social and earned media support.
- Although it is too early to know, the current HPwES program design is unlikely to drive whole home performance upgrades, or wider upgrade and clean energy penetration. For instance:
  - While HPwES opens access to rebates and financing to a wider contractor network, N2N and the utilities have found it difficult to recruit contractors into the program due to a precedence of very low customer participation.<sup>15</sup>
  - Community-based programs are disadvantaged because HPwES doesn't include program marketing dollars, therefore, missing an opportunity to build brand awareness, branded collateral, community partnerships,<sup>16</sup> or any of the necessary sales tools.

### 3.2.2 CT Contractor Market Recommendations

Standing up the contractor market of the future starts with ensuring participating contractors have a whole home performance orientation and well defined sales process as a condition to participate in the program. It also involves investments in marketing tools to support contractors. In addition, the customer needs information to better select a contractor. For instance, CT should ensure robust quality control on upgrades through published scorecard data and customer reviews, which will allow market forces to weed out poor performing contractors and support well performing contractors. Program administrators should continue to monitor and remove contractors that do not meet performance standards.

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<sup>14</sup> N2N found that basic program requirements, such as filling out the ineffective Field Service Tool (FST) (formerly the Home Energy Yardstick (HEY tool)), weren't being well managed.

<sup>15</sup> Without contractor reimbursement for the assessment itself, HPwES contractors may not be able to fairly compete with HES assessment contractors. For instance, the HPwES contractor has to decide whether to complete the assessment and paperwork: 1) as a loss leader to acquire an upgrade customer, or 2) by charging the customer. Neither option is as financially attractive as the HES assessment incentives.

<sup>16</sup> For instance, HES contractors and community groups use the \$25 HES assessment converted lead reimbursement to acquire leads together. The partnership is win-win, providing previously untapped leads for the contractor, as well as fundraising for the community group.



The bullets below provide recommendations to help CT achieve a contractor network with the core business to drive whole home energy performance, where CT needs to do the following:

- Provide reimbursement incentives geared towards deeper savings, oversight, sales skills and sales process training, working capital loans, and small business development support, including on-going support for the enabling technology and customer relationship management (CRM) database (also see Technology Platform and Policy and Incentive Structure discussions below).
- To take a flexible approach where HES assessment core services are the first in-home visit of many customer touch points on the ladder to deep household energy savings. There must be an ongoing sales, cross-sell, and upsell processes that moves people to more and more energy savings and renewable energy actions.
- Conduct further study about how the HES and HPwES programs co-exist and to design a holistic programmatic approach. For example, further research is needed about promising market segmentation that would enable target marketing to reach:
  1. HPwES for customers ready to implement upgrades; or
  2. HES marketing to customers unlikely to complete upgrades, not psychologically primed for upgrades, or that would prefer Do-It-Yourself (DIY)) upgrades.
- A portfolio approach to home performance, where the HES and HPwES programs do not compete.
  - Contractors should be encouraged to get creative to cross and up sell between programs and partners.
  - State program marketing approaches need updating, with HES, new HPwES, and other third-party marketing dollars distributed to enable co-branded town, contractor, and third-party marketing efforts.

### **3.3 Behavioral Science and Community-Based Social Marketing**

A program approach that embraces community-based social marketing and behavior change science is more likely to achieve deeper household savings and broader community penetration than current CT programs. N2N has focused on reaching people outside of the traditional HES assessment marketing channels that are primarily focused on fixing household problems as needed. In fact, N2N meets people where they are already going at local community events and meetings, and leverages participants' existing social networks to further diffuse participation.

N2N has achieved 137 signed community partnerships with local organizations, including:

- community groups,
- town governments,
- libraries,

- faith communities,
- education and schools,
- real estate industry, and
- businesses.

N2N tested three rewards programs, where:

1. Towns competed for points to select rewards from a catalog of energy efficient prizes;
2. Local organizations, called community partners, received \$25 per completed HES visit; and
3. Community group programs, testing two iterations, including
  - a. Year 1, where the top three community groups in each community won a prize, and the overall winner won the grand prize; and
  - b. Year 2, where community groups received a set dollar amount for each upgrade.

For the first type, town rewards, preliminary findings suggest that the prizes did not motivate towns by themselves, but that the leaderboard that showed each town's position relative to other N2N towns was motivating.<sup>17</sup> For community partner rewards, experience finds they were compelling as fundraisers for local organizations that have enough social capital to convince members to complete HES or an upgrade. The first year's program design was too complicated, but Year 2 shows promise as N2N began to see increasing upgrade rates. The Year 2 program is similar to solar PV contractor and community group partnerships, where community groups are paid for their leads.

Partnered with a local organization, N2N community outreach includes a trusted messenger/local leader at every event, including the following:

- co-convening workshops with local organizations,
- holding tabling events,
- canvassing neighborhoods,
- following up through call nights, and
- meeting at the neighbor's home through open houses and house meetings.

Several N2N outreach strategies have resulted in promising conversion rates, including:

- Contractor partner<sup>18</sup>,
- Community partner,
- Town-endorsed sign ups (*e.g.*, town website promotion, permanent displays, *etc.*),
- Earned media,
- Referrals (*e.g.*, word of mouth and community partnerships),
- Targeted workshops, and

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<sup>17</sup> For instance, the leaderboard was often the topic of conversation at town task force meetings.

<sup>18</sup> Note that contractor partners don't always report lost leads for their own generated leads (unless the project was lost after entering it into the Tracking Database). In addition, contractor generated leads often derive from word of mouth participation through another N2N participant, or from fixing already identified home problems.

- Web sign ups (*e.g.*, a culmination of the other outreach and marketing efforts in this list).

While showing promise for sourcing leads through many organizations and strategies, N2N also ran into program structure barriers, such as:

- A lack of funding and policy support for co-branding and creating new marketing and outreach materials.
- A difficult low-income customer approval and delivery program processes, including:
  - lengthy HES-IE (Income Eligible) application processes and upgrade approvals, and
  - structural barriers of customer mistrust, difficulty missing work, and lack of awareness and education about energy efficiency.

Combining individual and social behavioral science helps develop brand promise and trust. Two keys to long-term program sustainability and lifetime household participation are providing:

- a simplified process (*i.e.*, motive and enable), and
- a quality lifetime customer experience (*i.e.*, continuously engage).<sup>19</sup>

### 3.3.1 Behavior and Community Findings

N2N employs a portfolio strategy, where the following bullet points describe the behavioral and community-based outreach program findings:

- Customers are at different points of readiness for different energy savings actions; therefore, taking a one-size fits all approach will not capture a broad enough market of participants. N2N finds that a multi-channel, multi-touch strategy is required to gain the trust of and brand recognition with customers, both necessary to drive continued demand.
- Several concurrent community-based campaign approaches of limited duration can be run to increase effectiveness (*i.e.*, the team is spreading through the community's network in a spider web-like pattern). The following factors support more successful campaigns:
  - Set specific goals,
  - Give feedback,
  - Engage with social strategies,
  - Activate with behavioral marketing,
  - Evaluate with continuous analysis, and
  - Correct with near real-time adaptations.
- For instance, effective social strategies encourage participants to engage others, such as:

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<sup>19</sup> Achieved partly because N2N is administered by a third-party, trusted source (*i.e.*, through people's trusted messengers), and partly because N2N reduces the hassle-factor by operating seamlessly across several independently-administered state programs.

1. Using trusted messengers that cross a wide social network;
  2. Driving word of mouth (*e.g.*, a person tells a family member, friend, or neighbor);
  3. Using testimonials (*e.g.*, in-person testimonials during meetings, written trusted messenger testimonials in communications and marketing materials); and
  4. Creating friendly competitions and rewards within communities and across borders.
- In addition, effective behavioral marketing messages tell the right stories in the right way, by:
    1. Priming people immediately to the final outcome of deeper upgrades;
    2. Driving scarcity and urgency (*e.g.*, limited-time, limited number, or pre-qualified rebates; seasonal marketing opportunities)
    3. Providing target marketing to market segments to focus on the benefits that matter, (*e.g.*, increasing personal comfort, fixing a house problem, reducing energy waste and energy bills, achieving energy independence, or helping others, the community, or the environment).
    4. Handling uncertainties by promoting trust and making it easy (*e.g.*, compiling program components for the customer; providing high quality, pre-approved, vetted upgrade contractors).
  - There are several promising and scalable community/social structure characteristics, including:
    - Strong and active municipal leadership;
    - Solid municipal support for reducing energy waste;
    - A base of core volunteers with broad and also non-overlapping social circles; and
    - Existing town activities, gathering places, and community groups where people get together and exchange ideas.
  - Self-identified, or passive, sign up approaches are a growing and promising lead generator,<sup>20</sup> such as:
    - Word of mouth and refer a friend;
    - Earned media, and
    - Town-endorsed passive displays.
  - Campaign outreach strategies require using rigorous data driven approaches to enable regular shifting and reallocation of resources to strategies that are working, and away from strategies that have run their course or weren't working in the first place.<sup>21</sup>

### 3.3.2 Behavior and Community Recommendations

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<sup>20</sup> While these customers signed up passively, it may be that they had heard about or seen N2N previously.

<sup>21</sup> N2N operated in a pilot and learning environment, testing and piloting numerous approaches, but not always optimizing for cost-effectiveness.

The bullets below provide recommendations to help CT achieve a broad base of participants willing to make whole-home energy performance upgrades, with the following guidelines:

- Approaching program marketing and outreach using individual behavioral science and community and social networking theories is critical for finding and targeting a broader audience to complete deeper measures. The recommended approach involves changing the household behaviors, as well as the social fabrics of CT communities (*e.g.*, culture, social norms, and attitudes) surrounding energy waste and energy efficiency, including:
  - Using behavioral science should attract people’s attention and promote action based on the N2N message of whole home energy performance; and
  - Using social psychology should develop program momentum, where social networks continuously drive demand for home performance.
- N2N recommends a portfolio approach that maps outreach strategies and marketing channels to each targeted social group. This provides different ways for people to take action depending on their personal situation, such as:
  - Some would attend an ice dam workshop at a library with an immediate problem, while
  - Others may see N2N at a festival table, signing up for a newsletter, lighting visit, HES assessment, or upgrade action, and
  - Others could read about N2N in the local newspaper, see it on Facebook, or hear about it from a trusted messenger and take action.
- Specifically, N2N recommends further building out several approaches to increase program cost-effectiveness through higher HES assessment and upgrade complete rates, such as:
  1. Co-branding and outsourcing email communications to Towns, community, and contractor partners to further tap into existing trusted outreach communication resources like leading community group and Town web pages, the CT state events calendar, other mailing lists, *etc.* ultimately creating coordinated databases and email blast functionalities;
  2. Expanding on the multi-touch strategy by integrating community-based outreach with sophisticated on-line campaign strategies on Facebook, YouTube, *etc.*
  3. Combining creative outreach strategies with in-depth market intelligence to support broader market penetration in a cost-effective way and

4. Setting up a State of CT stakeholder group set up to reimagine the residential energy programs to support community-based outreach. CT needs a coordinated, customer-focused program delivery model.<sup>22</sup>
- The customer relationship data management (CRM) platform should track all participants (including those that drop out) to later re-engage in additional actions. This lifetime customer, or business portfolio, approach enables continuous upselling, cross selling, and engaging of the participant and their social networks.

### **3.4 The N2N Technology Platform**

N2N did not expect the time-consuming task of building out the N2N tracking database/technology platform at grant application.<sup>23</sup> Instead, N2N spent approximately 50 percent of pilot administration and evaluation staff resources designing the technology platform for the first eight months, including:

1. Defining and releasing the Request for Proposals (RFP) to select a technology platform provider;
2. Building the data platform backbone, and
3. Iteratively releasing and deploying the platform.

The N2N platform addresses the feedback needs of three stakeholders of pilot implementation: the program, public, and customer. For example, for program-facing implementation, the N2N platform supports N2N data collection efforts, where N2N enters leads using two types of entry:

1. In-field paper worksheets, spreadsheets, and web forms,
2. Computer software applications like the N2N LightSaver App, N2N Event App, and Snugg Home SnuggPro contractor tool.<sup>24</sup>

For the public-facing implementation, the N2N platform enables data transparency, promoting market innovation to both N2N participants and N2N partners, including contractors, CEEF, CEFIA, and the utilities, as well as to state policymakers and regulators (See next section on market innovation).

Although N2N considers the consumer-facing toolset an essential element of any community-based program, it turned out to be harder than expected to build, deploy, and drive participation.

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<sup>22</sup> The N2N Innovation Lab would provide a continuous testing environment to test and optimize stakeholder recommendations.

<sup>23</sup> DOE post-grant award data requirements required a new approach.

<sup>24</sup> The N2N-developed Tracking Database technology platform is the multi-faceted technology platform supporting all other data management tools. The N2N-developed LightSaver iPad application is designed to collect N2N in-home lighting visit data and report back to the customer and to the Regional Greenhouse Gas Initiative (RGGI) market for Class III Renewable Energy Credits (RECs). The N2N-developed Event App enables event related data collection for the event itself and for participants attending the event. The Snugg Home SnuggPro software tool, an advanced version of the HES assessment data collection tool (the Field Service Tool), allows data collection to take place over the course of the assessment, producing results and reports for contractors, customers, and program administrators.

For instance, N2N faced a trade-off between off-the-shelf and customized products (*e.g.*, between implementation timelines and system upgrades vs. branded tools). In addition, due to limited resources, N2N only scratched the surface of beta testing pieces of the optimum consumer-facing tools, which could include feedback, such as:

- A Personal Energy Dashboard, allowing customers to set goals and receive feedback about progress (*i.e.*, see their monthly electricity bill or even better, hourly smart meter data); and<sup>25</sup>
- The DIY Energy Advisor, an on-line tool prioritizing each household's behavioral and upgrade energy savings actions based on a quick survey about household characteristics and energy use patterns.<sup>26</sup>

Proving difficult to gain full program implementation, staff needed continuous training and coaxing to use the data platform.<sup>27</sup> Contractor partners increased platform use and proficiently over time, but still struggle with the additional task of N2N data collection and reporting (*i.e.*, in addition to utility-administrator data requirements).

### *3.4.1 Technology Platform Findings*

Program administration and evaluation is only as strong as the data. Like the utility-administered program, community-based outreach cannot achieve wider community penetration and deep household energy savings by itself without robust data. N2N reports the following findings:

- Achieving aggressive program goals requires a sophisticated data collection and management toolset, including a Customer Relationship Management (CRM) database, that:
  - Keeps track of exactly where each customer sits in the sales pipeline, and
  - Enables multiple customer sales touch points targeted at the next action or the next few actions.
- Programs must invest pre-program and throughout in data collection tools and a robust CRM system. In fact, technology development and implementation should not be taken lightly. N2N's task of developing a technology platform was a complex activity, requiring substantial program resources to both build it and to grow user proficiency.<sup>28</sup>
- The sales delivery technology platform supports the following program aspects:

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<sup>25</sup> Done properly, the customer can learn on their own about energy savings actions to take from waste reducing habits to small DIY one-time actions to upgrades as a result of feedback.

<sup>26</sup> This type of tool could hold promise as an acquisition tool for HES assessments (or upgrades), while also priming customers to the ultimate upgrade and renewable energy actions. The theory is to anchor people's expectations of their household's ultimate needs, immediately framing the solution with respect to upgrades.

<sup>27</sup> For instance, Year 1 outreach staff used spreadsheet data collection tools and participated in platform design. Year 1 staff had to change work protocols on a regular basis, something that staff often openly resisted. The Year 2 outreach team came on board to an almost completely developed data management platform with experienced trainers and refined training materials. Year 2 staff found the system easier to use and widely accepted the platform.

<sup>28</sup> In fact, N2N continues to experience frequent data quality issues despite continuous staff and contractor reminders of proper data management.

1. Customer follow up on the path to upgrade conversions;
2. Quality control processes;
3. Cost-effective program delivery for both contractors and program administrators by tracking and spreading customer acquisition costs across the lifetime of that customer's energy savings actions (*i.e.*, strong measurement, evaluation, and verification)
4. A testing ground for program administration and design, analysis, lessons learned, and redeployment;
5. Business scenario planning and modeling; and
6. Data reporting, and sharing/transparency to a variety of internal and external stakeholders, leading to market innovation.

#### 3.4.2 Technology Platform Recommendations

The N2N recommended data platform should cover three areas of program implementation:

1. Program-facing to enable robust:
  - a. Data collection and data quality checks for the outreach and contractor teams when collecting leads and household data.
  - b. Measurement, evaluation, and verification; and
  - c. Coordinated marketing efforts and program implementation for program administrators, as well as between program administrators, trade allies, and stakeholders.
2. Public-facing to regularly publish and react to contractor and program performance dashboards.
3. Consumer-facing side to encourage goal setting and feedback loops to participants.

### **3.5 Driving Market Innovation**

N2N set an ambitious and transparent data, research, and evaluation agenda, especially for a short, three-year pilot. The DOE funding enabled N2N to act as an innovation laboratory, quickly testing and reshaping numerous strategies and tactics. N2N has documented the evaluation by:

- Participating in DOE and CT policymaker meetings, conferences, workshops, and webinars;
- Writing this final evaluation document; and



- Completing three companion deliverables, including:
  - Completing the N2N quantitative analyses;
  - Studying N2N and CT market segments; and
  - Developing the planning and business scenario modeling toolset, including an examination of pilot cost-effectiveness.

Not only did N2N commit to extensive program evaluation, but many outside organizations have also contributed in-kind to research and evaluation. N2N embraced partnerships across academia and industry, including with the MIT Field Intelligence Laboratory (FIL), Center for Collective Intelligence (CCI), Duke University’s Fuqua School of Business, the DOE Home Energy Score (HEScore), the National Opinion Research Center (NORC) at the University of Chicago, and the National Renewable Energy Laboratory (NREL). The partnerships provide additional lessons learned and insights from respected thinkers across disciplines.

N2N’s market transformation efforts in CT rely on the N2N summary program dashboards and reports, because data sharing and transparency enables:

- Focusing stakeholders on the opportunities and issues, not just in N2N’s program, but also in the broader statewide programs; and
- Helping drive broader policy discussions about needed changes and possible approaches, bringing a level of specificity not previously possible in the policy debate.<sup>29</sup>

N2N, partners, and stakeholders regularly use three other types of dashboards to instigate program evolution and market transformation in the broader statewide program:

1. The DOE summary dashboard that helps N2N and DOE track program statistics, such as completed upgrades and signed utility releases.
2. The detailed contractor pipeline dashboards and reports that enable a view of recent N2N contractor activity, such as created leads, open projects, lead to conversion rates, upgrade bid to conversion rates, HES assessment conversion rates, average age of projects, data entry on the Tracking Database, *etc.*
3. Town aggregate electricity use dashboards, including weather normalization, using the Northeast Utilities (NU)-provided data.<sup>30</sup>

Despite the comprehensive technology platform and data set, more data was needed to add rigor

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<sup>29</sup> For instance, in debating whether the statewide program could implement a process change to get a customer release for access to utility data, N2N demonstrated that half of its contractors had a release complete rate of greater than 92 percent, indicating statewide collection of data releases is possible by sharing best practices among contractors. Similarly, in discussing the low HES-to-upgrade conversion rate in the statewide program, N2N was able to provide detailed data on the variability of bid rates among contractors, highlighting the need for process improvements, contractor engagement (meetings, liaison staff, sales training), and potentially a realignment of expectations for participating contractors in the statewide program. (Livingston, Donnelly, & O’Neill, 2012)

<sup>30</sup> N2N considers the town dashboards a missed opportunity. They provided the towns a first look at aggregate electricity data and should have been used to drive town energy planning, but there is no evidence of this.

to the analysis. For instance, N2N requested utility data from towns with similar defining characteristics as N2N towns to create control group comparisons for HES and upgrade participants, but was unable to obtain this data in time to complete additional analysis.

### 3.5.1 Market Innovation Findings

N2N has had the luxury of using DOE funding to operate a pilot program outside of CT regulatory constraints. In fact, N2N developed a “testing laboratory” of 14 small communities using a subset of the HES assessment contractor base. N2N’s ability to closely oversee program design and operations in an experimental environment has led to market innovation. N2N has simultaneously implemented, tested, evaluated, and adapted program design, continuously discovering new lessons learned to improve program execution. N2N has the following market innovation findings:

- The N2N technology platform is key to data transparency.
- N2N shows early signs of market innovation, including DOE discussions about broader programmatic and policy improvements, as well as influence at the statewide ratepayer program level, where CT programs have incorporated elements piloted in N2N, including:
  - Increasing data sharing and transparency;
  - Issuing a request for proposals for technology solutions specifically to support HES;
  - Instituting new performance metrics and lead distribution for contractors that track and reward the ability to drive deeper savings per household;
  - Running lead by example campaigns that leverage community influencers and public official press conferences;
  - Developing a new training curriculum for contractors, including sales techniques;
  - Supporting N2N control-town utility data requests;
  - Inviting N2N to policymaker stakeholder processes;
  - Implementing customer data releases into loan funding programs, *etc.*
- Examining CT public utility commission meeting agendas also shows evidence that N2N is contributing to an open statewide dialog around driving demand for upgrades.

### 3.5.2 Market Innovation Recommendations

Despite the ambitious research strategy, N2N recognizes a need for policymakers to focus on evaluation and more research. An investment in data and technology data management systems enables more cost-effective and deeper energy savings among a wider range of customers. N2N

makes the following recommendations to CT policymakers:

- Take a more proactive approach to program management, dedicating resources to data and program oversight to improve data quality, as well as measurement, verification, and evaluation work, including the following data details:<sup>31</sup>
  - Customer pipeline data from lead acquisition strategy to lifetime energy actions;
  - Customer demographic and psychographic profiles to understand marketing strategies; and
  - Contractor performance data.
- Understand how to achieve effective target marketing of upgrades in CT, which will allow the design of customer upgrade packages of incentives and measures. In fact, CT policymakers should quickly focus attention towards completing this research, as well as understanding the best practices of consumer marketing strategies.
- Support the next iteration of N2N, which should continue to operate outside of the current regulatory structure to identify strategies that address specific market challenges, and would continue:
  - Quick testing of approaches,
  - Integration of a portfolio of energy efficiency and clean energy programs, and
  - A process of continuous improvement.

### **3.6 Policy and Utility Incentive Structure**

N2N’s experience in marketing HES as an acquisition strategy for upgrades highlights both successes and challenges in pivoting beyond the HES direct install model towards upgrades (achieved through multiple customer touch points). For instance, Table 6 provides a comparison between N2N’s HES assessment conversion to upgrade rate compared to a scenario of what HES conversion rates could be compared to other similar DOE pilots.<sup>32</sup> For instance, instead of 281 upgrades, CT would achieve 977 upgrades (Table 6).

**Table 6 N2N Actual and Scenario Model of Upgrade Conversions**

|                                     | <b>N2N Actual<br/>(March 29,<br/>2013)</b> | <b>Scenario<br/>Model</b> |
|-------------------------------------|--|---------------------------|
| HES leads completing HES assessment | 3,571                                      | 3,571                     |
| HES leads completing upgrade        | 323  | 1,071                     |
| Conversion ratio from HES           | 9.0%                                       | 30%                       |

<sup>31</sup> Note, this requires dedicating more resources to the technology tools that support data management.

<sup>32</sup> The best performing DOE Better Buildings programs overseeing the contractor sales pipeline and contractor operations have conversion rates at 30 to 50 percent.

|                    |  |  |
|--------------------|--|--|
| assessment to lead |  |  |
|--------------------|--|--|

*Table Notes: 1) N2N actual numbers include program to date (July 15, 2013) for HES and HES-IE assessment programs, including N2N spillover towns. 2) Approximately 30 percent of N2N leads do not complete a HES assessment.*

The state should align interests of and increase communications among all program stakeholders consistent with the policy and utility incentive findings discussed next.

### 3.6.1 Policy and Incentive Structure Findings

The HES assessment program is successful, reaching approximately two to three percent of CT households each year and achieving the original program goals (Ben Foster, 2012). Unfortunately, discussed throughout the document, the current HES assessment (HES) program design, incentives, data requirements, and marketing approaches do not support achieving deeper upgrades at scale. There is an opportunity to re-envision the HES program as the first step in a program that is focused on deeper upgrades, and to realign customer and contractor incentives towards installing upgrades.

In addition, the financing programs in existence during the N2N grant period were nowhere near the scale necessary to drive upgrade financing.<sup>33</sup> For lenders to trust and support the loan product, a financing program needs to demonstrate that upgrades are happening at scale (which would lead to significant lending volume), that they are generating real savings, and that consumers have protection if issues arise.<sup>34</sup> For programs like N2N and for the CT green bank (CEFIA), the utility data can facilitate financing upgrades in three ways:

1. During the loan origination, the underwriter needs proof that the utility bill will actually decrease in order to give credit to reduce the cash flow.<sup>35</sup>
2. On the back end, private capital providers are concerned about consumer fraud and want to be assured that upgrades are installed correctly and the customer is actually saving energy, to ensure that loans are repaid.<sup>36</sup>
3. By demonstrating net savings to the end investor financing the loans, there is an opportunity to define a new asset class that takes into account the energy savings as an asset, as opposed to only the financial performance of loan repayments. (Stakeholder8).

Sharing utility data on contractor quality and customer energy savings can contribute to a robust financing program over time, one that requires lower credit enhancement and/or interest rates. This needs to be tracked over the course of several years, as private capital providers expect a

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<sup>33</sup> Unlike CT, other DOE Better Buildings programs have momentum with contractor-driven financing models.

<sup>34</sup> Note: CT Public Act 11-80 created a CT energy office, a CT green bank (CEFIA), and the right for consumer access to data on their utility bill. For NU, the N2N data sharing agreement should be an opportunity to leverage the IT and legal processes to comply with the new legislation. CEFIA used the N2N release template to develop their own release form for their residential financing products. The DOE also requested permission to include N2N's release form in the best practice manuals.

<sup>35</sup> Even discounting the expected savings by 40 to 50 percent is better than zero.

<sup>36</sup> If there are no energy savings, the risk is that the consumer will default on the loan.

data set that ultimately is as deep as the length of the loans in the portfolio.

With scalable customer financing in place, the contractors will need to learn how to sell the financing solutions, for example, like car salesmen know how to sell loans. To support the sales process, consumers need access to consumer friendly reports on energy usage, benchmarking, and feedback towards the goal.<sup>37</sup>

At this writing, CEFIA has already developed four residential financing products, two of which specifically support energy efficiency and deeper upgrades, in an open-access way accessible to any contractor installing efficient measures and holding proper licenses, certifications and insurance levels. CEFIA has also developed working capital solutions for contractors.

### 3.6.2 Policy and Incentive Structure Recommendations

CT needs further evaluation of the mix of ratepayer fund dollars subsidizing HES core services versus whole-home performance, including rebates, financing, performance-based contractor incentives, marketing dollars, *etc.* Based on N2N experience to date, N2N recommends an integrated policy environment focused on whole-home performance, which would require several CT policy and incentive structure changes to support:

- A portfolio of customer and contractor incentives focused on targeted market segments and based on customer needs that promotes the following:
  - Whole-home performance packages, including aspects of the following program types, each representing different ways a customer might enter a sales pipeline culminating ultimately in an upgrade, though it could be many months up to a few years down the road:
    - Lighting (*i.e.*, especially towards transforming to LED lighting), HES assessments, and HES-IE assessments as customer acquisition strategies for driving customers to deeper upgrades;
    - HPwES for customers already interested in a whole home performance solution;
    - Solar and other clean energy programs, to capture customers interested in renewables, as a way to cross-sell them into efficiency upgrades, *etc.*
  - Increased quality control and post-completion inspection procedures for all portfolio actions, with a particular focus on upgrades.
  - Program cross-collaboration, where contractors are rewarded for selling between programs and focused on performance-based results.

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<sup>37</sup> For example, a third-party program, such as OPOWER, Efficiency 2.0, one of many Green Button independent software applications, and other similar consumer-facing dashboards, as well as asset mapping benchmarks like the DOE Home Energy Score, Energy Points, Energy Performance Score, EPA's Home Energy Yardstick, *etc.*

- All-fuels energy efficiency programs with stable funding, especially for oil and propane.<sup>38</sup>
- Customer and contractor business incentives aligned to promote upgrades. In fact, CT should strongly consider changing funding splits between HES and upgrades to shift the balance of incentives toward whole-home performance packages. Consider following a model like MassSave, where air sealing and insulation are packaged together with 75 percent reimbursement incentive (CSG, 2013), rather than partially sealing homes in non-insulated homes through HES assessments.
- Multi-year budgets with clear performance metrics for getting to deeper upgrades.<sup>39</sup>
- Third-party (or third-parties) program administration and marketing for targeted market segments, with an adaptive program administration of portfolio management, able to implement lessons learned about program design, marketing, and outreach.
- Scalable customer financing and feedback solutions that work for all-fuels and reach a broader segment of the market.
- Scalable contractor working capital or partial upfront incentive payments to help contractors manage cash flow.<sup>40</sup>
- A focus on co-branding approaches to increase customer trust and buy-in by significantly increasing program administrator, town, local organization, business, and contractor co-marketing initiatives and budgets.

### **3.8 N2N Program Administration Redesign**

Although the N2N team exhibited passion and flexibility through the grant that enabled a friendly working environment toward a common goal, the N2N team structure was weak with unclear lines of authority and partner hierarchy. In fact, N2N did not exist as a formal organization. Instead, N2N was a loose federation of partners, which as structured, is a

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<sup>38</sup> Stops and starts to oil funding in an oil-dominated market has created contractor uncertainty, as well as hiring, training, laying off, and hiring staff again. This creates an unsustainable business model, especially for the small contractor teams working in the HES program. Contractor companies do not have time to gain momentum with their business and in-home technicians do not have time to gain proper experience to learn solid customer service and sales skills.

<sup>39</sup> Multi-year budgets give programs time to iron out the kinks, and help create contractor market stability, which would end the uncertainty caused by the stop and start oil-heated funding of the past.

<sup>40</sup> For instance, CEFIA solar rebates offer 40 percent payment at material delivery and 60 percent at solar PV install. New CEFIA loan programs offer a 1/3 progress payment to contractors at start of job, and 2/3 at customer sign off of work completed.

suboptimal organizational structure for cost-effective operations, teamwork distribution, and accountability.<sup>41</sup>

### 3.8.1 Program Structure Findings

N2N found four main program administration design structure findings:

1. Bringing together a team of passionate industry thought leaders that understood and embraced a pilot environment made N2N nimble, able to quickly recognize and deploy real-time program course corrections with varying degrees of execution success.<sup>42</sup>
2. On the other hand, some N2N partners were disconnected from administering a cost-effective and performance-based energy savings program, as well as from the fast-paced, constantly changing style of implementing guerilla marketing. For example:
  - a. The N2N Clean Energy Corps outreach team made up of AmeriCorps recent college graduates was internally mission driven. While it may have helped with community relationships, the Student Conservation Association (SCA) aims for professional development and work experience rather than optimizing performance or cost-effectiveness.
  - b. Partner pre-program expectations paired against the reality of implementing an on-the-fly program caused tension within the N2N organization at times, where some partners resisted an approach of real-time evaluation and course corrections.
3. The town recruitment strategies created both strong and weak town partnerships.
4. The next N2N program iteration, would include a systematic and solutions-oriented program design focused on the:
  - a. Contractor,
  - b. Program partner,
  - c. Customer, and
  - d. Program design elements, including the technology backbone, program design, market innovation activities, and the policy environment.

### 3.8.2 Program Structure Recommendations

Moving forward, a third-party, non-profit organization should be created to house the N2N assets and intellectual property so that CT does not lose the \$4.2 million investment of the DOE grant. Numerous State programs exist that could benefit from N2N's marketing and outreach, contractor oversight, and performance-based program management skills. As one example, the

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<sup>41</sup> N2N was designed as a pilot structure to test numerous approaches to see what sticks. The program's cost-effectiveness was impacted by heavy startup tasks, continuous testing and evaluation, oil-heated funding stops and starts, HES incentive structures, etc.

<sup>42</sup> In fact, the team's passion led to substantial hours of in-kind work on the pilot, for instance, for working to catch up after a hurdle, as well as to meet the next last-minute opportunity to further N2N's lead generation, policy influence, or funding opportunities, etc.

third-party organization could implement the on-the-ground marketing efforts of Energize CT.<sup>43</sup>

While N2N needed flexibility to develop the program design, N2N recommends adding more structure into the program partners. For instance:

- For the internal team, N2N recommends a model that has more staff working directly for a newly created non-profit organization, and specialized functions performed by partners or vendors in formal partner roles with formalized program expectations.
- For program partners, N2N recommends structured partnership agreements for town partners, as well as external utility, community group, contractor, and customer stakeholders. In fact, like Solarize CT, future programs should consider competitive selection processes for town partners to assess and ensure community commitment, buy in, and minimum support levels.

If a Corps outreach model is used in the future, separate funding should be secured that is aligned to the mission of experience-based professional development, as opposed to performance-based funding typically available in the energy space.

Each program design and execution decision should meet the needs of the contractor, the customer, and the program administrators and partners.

### **3.9 Final Thoughts**

With the right customer and contractor incentives layered on top of a behaviorally focused marketing approach, HES assessments (HES) could be one of several programs marketed as customer acquisition strategies for upgrades. However, the complete portfolio of programs should include:

- N2N-like outreach efforts in receptive communities, employing an on-the-ground outreach team that is integrated with other statewide (or regional) marketing efforts.
- Intensive engagement across the entire community, employing the outreach approaches outlined in this document, such as partnerships, challenges, competitions, testimonials, word of mouth, workshops and local events, community meetings, volunteers, co-branding communications, *etc.*

N2N believes that using an Innovation Lab approach combined with solid performance metrics and data systems, would achieve higher levels of participation by:

1. Creating an environment of testing and learning, such as trying seasonal specials, scarcity programs, incentive payments to contractors versus customers or community groups, *etc.*

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<sup>43</sup> Note: Energize CT is an energy efficiency and clean energy statewide marketing initiative offered by the ratepayer fund, CEFIA, DEEP, and CT electric and gas utilities from utility bill systems benefits charges.



2. Creating community outreach and marketing partnerships by adding a third-party program administrator with investment and participation from utility partners.
3. Achieving scale by thinking like the customer by:
  - a. applying market research, segmentation, and behavior-based practices, and
  - b. driving these approaches through all marketing channels and outreach collateral.<sup>44</sup>
4. Developing value proposition marketing grounded in behavioral science to support customer education on why market segments should complete upgrades. For example:
  - a. What's in it For Me?
  - b. What are the right behaviors that others do?
5. Integrating social media strategies into all marketing and outreach efforts to reach a broader customer base.
6. Reorienting all program marketing to position upgrades, rather than, for example, HES assessments being the end goal.

The previous sections of this document should illustrate the complexity of achieving whole-home performance upgrades in the residential market, as well as why a systems approach to implementation should be used.

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<sup>44</sup> These are competencies most readily found in specialized marketing and advertising firms.

## **4.0 Accomplishments**

This section provides the actual accomplishments of N2N with a comparison of the goals and objectives of the project. We cross reference the statement of project objectives (SOPO) to determine if goals were met.

### **Budget Period 1 (August 2010 to July 2011)**

#### **4.1 Task 1.0 Program Coordination and Management**

Target:

1. Develop project roles, work plans, project tasks, deliverables, and milestone;
2. Secure town partnership agreements,
3. Develop detailed operational models to encapsulate projected project outcomes by program component.

Actual: All target tasks completed.

##### **4.1.1 Subtask 1.1 Recruiting and Training Clean Energy Community Corps**

Target: Recruit and train a young adult clean energy community corps in all aspects of the community outreach for the program, including a community lighting initiative and outreach to local community groups to market the program and recruit residents into the Challenge.

Actual: Target task completed.

##### **4.1.2 Subtask 1.2 Analysis of Outcomes and Economics**

Target: Provide continuous analysis and reporting of project outcomes, metrics and feedback to all stakeholders will ensure prompt resolution of issues.

Actual: Target task completed.

#### **4.2 Task 2.0 Marketing, Outreach and Online Platform**

Target:

1. Recruit households into the Challenge through community outreach, keep them progressing through ongoing marketing, friendly competitions and incentives, and to become spokespeople for the program selling the program to their neighbors.

2. Create a Community Action Platform that includes community-based outreach, a dynamic consumer marketing online platform, community toolkits, tailored messaging, and an online social network.

Actual: All tasks completed.

#### 4.2.1 Subtask 2.1 Website Development and Maintenance

Target: Build a dedicated website that includes a Personal Energy Advisor (PEA) and leaderboards for communities.

Actual: All tasks completed, except the PEA, which was removed from the program design after selecting a new technology platform provider in the first year.

#### 4.2.2 Subtask 2.2 Outreach and Marketing Strategy and Implementation

Target: Develop an overall community outreach strategy and a marketing strategy, including marketing collateral and training materials.

Actual: All tasks completed.

#### 4.2.3 Subtask 2.3 Stakeholder Process

Target: Manage an extensive stakeholder process to ensure detailed input from various community groups and constituencies. This will also include a collaborative process for setting community goals and designing incentives.

Actual: All tasks completed.

#### 4.2.4 Subtask 2.4 Program Launch in Regional Clusters

Target:

1. Rollout the program in four decision phases: Startup, Focus, Intensive Outreach, and Maintain.
2. Evaluate the efficacy of the strategies to refine the marketing and community outreach plan after intensive outreach phase.
3. Determine which towns are ready to move into maintain.

Actual: All tasks completed. All towns were maintained in the first budget period.

#### 4.2.5 Subtask 2.5 Incentive Program Design and Implementation

Target: Design a performance-based community rewards and recognition program based on participation and savings goals.

Actual:

N2N tested three rewards programs, where:

1. Towns competed for points to select rewards from a catalog of energy efficient prizes;
2. Local organizations, called community partners, received \$25 per completed HES visit; and
3. Community group programs, testing two iterations, including
  - a. Year 1, where the top three community groups in each community won a prize, and the overall winner won the grand prize; and
  - b. Year 2, where community groups received a set dollar amount for each upgrade.

For the first type, town rewards, preliminary findings suggest that the prizes did not motivate towns by themselves, but that the leaderboard that showed each town's position relative to other N2N towns was motivating.<sup>45</sup> For community partner (*i.e., local organization*) rewards, experience finds they were compelling as fundraisers for local organizations that have enough social capital to convince members to complete a HES assessment or an upgrade. For community group programs, the first year's program design was too complicated, but Year 2 showed promise as N2N began to see increasing upgrade rates. The Year 2 program is similar to community partnerships rewards, where community groups are paid for their leads that convert to an upgrade.

### **4.3 Task 3.0 Residential Interventions and Actions**

Target: Support a portfolio of energy efficiency and clean energy actions, including efficient lighting, a home energy assessment that includes direct install energy savings measures (*i.e., HES assessments*), major retrofits including a financing option, feedback devices, solar thermal water heating including a financing options, solar PV, and voluntary clean energy purchases.

Actual: All intended actions were supported, except for feedback devices, which were pulled from the program design due to the complexity of implementing the experiments.

#### **4.3.1 Subtask 3.1 Financing Program Design**

Target: Design the financing program to support coordination with other financing options available in the state.

Actual: N2N relied on existing CT financing options, since after the grant was awarded financing options became available through CEEF.

#### **4.3.2 Subtask 3.2 Sign-ups and Installations for Interventions and Actions**

Target: The household/participant goals for each program element for budget period 1: Personal Energy Advisor – 3,018; lighting retrofits – 2,883; Home Energy Solutions – 2,510; major

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<sup>45</sup> For instance, the leaderboard was often the topic of conversation at town task force meetings.

retrofits – 502; feedback devices – 200; CTCleanEnergyOptions – 1,006; solar thermal water heating – 75; solar PV – 50.

Actual: As previously discussed, the Personal Energy Advisor and feedback devices were removed from the project. Solar PV and solar thermal water heating goals were not focused on in Budget Period one due to difficulty getting contractors to move customers past the HES assessment. A focus on CTCleanEnergyOptions was downplayed due to asking the participant to do too many actions and the limited energy savings achieved from the action. Achievements: Personal Energy Advisor – N/A; lighting retrofits – 152; Home Energy Solutions – 2,663; major retrofits – 33; feedback devices –N/A; CTCleanEnergyOptions – 9; solar thermal water heating – 0; solar PV – 1.

#### **4.4 Task 4.0 Evaluation, Measurement, and Verification**

Target:

1. Test the effectiveness of various marketing strategies and program components, in terms of realized savings, cost-effectiveness, scalability and progress on outcomes.
2. Employ large-scale aggregate utility bill analysis of participating households through the on-line personal energy advisor (PEA).
3. Develop a separate M&V program on the lighting retrofit program component.
4. For households financing major retrofits, track energy savings through the use of the Green Energy Compass (GEC) program, which interacts with the EPA's Home Energy Yardstick, calculating and recording a building's score for peer comparison or pre-screening for incentive programs.

Actual: Tasks 1 and 3 were accomplished. Task 2 was abandoned with the abandonment of the PEA. Task 4 was not accomplished, since N2N did not implement its own financing program once CEEF's program became available after the grant was awarded.

##### **4.4.1 Subtask 4.1 Renewable Energy Credit Monetization**

Target: Monetize energy savings in Connecticut's Class III Renewable Energy Credit market, including independent third-party verification of energy savings. Follow the state regulatory process to register RECs and attempt to sell those RECs in the market.

Actual: The project was approved for RECs monetization by the Connecticut Department of Public Utility Control in June 2009 and again in February 2012, and an application for qualification of the generated RECs was submitted in April 2013. At this time, that application is awaiting approval.

## **Budget Period 2 and 3 (August 2011 to July 2012 and August 2012 to August 2013)**

### **4.5 Task 5.0 Program Coordination and Management**

Target: Continue the program coordination and management approach outlined in budget period 1. Recruit and train a second clean energy community corps in budget period 2.

Actual: All tasks completed.

### **4.6 Task 6.0 Marketing, Outreach and Online Platform**

Target: Continue marketing, outreach, and online approach.

Actual: All tasks completed.

### **4.7 Task 7.0 Residential Interventions and Actions**

Target: These are the household/participant goals for each program element for budget period 2: Personal Energy Advisor – 5,030; lighting retrofits – 4,441; Home Energy Solutions – 2,489; major retrofits – 498; CTCleanEnergyOptions – 1,006; solar thermal water heating – 75; solar PV – 50. These are the household/participant goals for each program element for budget period 3: Home Energy Solutions – 1,250; major retrofits – 250; CTCleanEnergyOptions – 1,006.

Actual: As previously discussed, the Personal Energy Advisor was removed from the project. A focus on CTCleanEnergyOptions was downplayed due to asking the participant to do too many actions and the limited energy savings achieved from the action. Although no goals were originally set for solar in Budget Period 3, it proved to be the most successful period for generating solar interest through the launch of targeted Solarize campaigns in 4 Neighbor to Neighbor towns. Budget Period 2: Personal Energy Advisor – N/A; lighting retrofits – 390; Home Energy Solutions – 2,181; major retrofits – 170; CTCleanEnergyOptions – 11; solar thermal water heating – 1; solar PV – 6. Budget period 3: Home Energy Solutions – 1,012; major retrofits – 119; CTCleanEnergyOptions – 0; solar thermal water heating – 4; solar PV – 104.

### **4.8 Task 8.0 Evaluation, Measurement and Verification**

Target: Prepare a final M&V report for the project.

Actual: A final process evaluation, lighting M&V report, HES assessment and upgrade quality control report, and final program report have been/will be submitted for N2N.

## 5.0 Challenges

Most of the project challenges are detailed in Section 3.0 Final Technical Report. Here, we provide a high level timeline of N2N that briefly summarizes some of the problems outside of our control that impacted our planned approach and project results.

Two major themes arise throughout the N2N program history and the process of continuous developmental evaluation: uncertainty and change. Both often affected program momentum, where various stakeholders had to stop, assess, and refine processes to adapt to external factors.<sup>46</sup> Figure 2 provides a high-level N2N timeline.

The timeline illustrates the fairly constant state of program flux, depicting four distinct time periods, including:

1. Program design (described in this chapter); and
2. Three years of program execution and developmental evaluation, including:
  - a. Year 1: N2N Start up,
  - b. Year 2: Improving the HES assessment program, and
  - c. Year 3: Shifting to upgrade customer acquisition.

Starting in early 2009, Earth Markets formed the internal program team and community stakeholder partnerships, and began designing the N2N pilot. On September 14, 2009, the DOE released the Request for Information feedback on the upcoming Funding Opportunity Announcement (FOA) for Energy Efficiency and Community Block Grants (EECBG). One month later, the DOE released the FOA (October 18, 2009), leaving a three-month window to design and write the pilot proposal (due December 14, 2009). Six months later, the DOE announced award to the CT Energy Finance and Investment Authority (CEFIA) (CT Clean Energy Fund (CCEF) at the time) (June 11, 2010). N2N team members immediately began (unpaid) pilot preparation work.

Year 1 program execution started on July 26, 2010 when the grant funding began. The first two months entailed hiring the outreach and management staff and then hiring the Clean Energy Corps (Corps) outreach team. Next, the Corps completed over two weeks of formal N2N training about CBSM, outreach, and the technical aspects of the pilot's energy efficiency actions. Unfortunately, the outreach team was in place before N2N finished refining the pilot design and implementing a data management solution. Unexpected DOE reporting requirements would require designing a new Information Technology (IT) system, as well as hiring a new IT provider. When N2N began outreach in November 2010, the team relied on spreadsheets to collect, track, and analyze data. The IT system contract was signed in March 2011 and implemented in day-to-day operations by August 2011.

Between late March and June of 2011, N2N began a series of formal launch events in the 14 N2N towns, starting with an overall kick-off in March with the CT Governor, Dannel Patrick Malloy, and Energy Commissioner, Daniel C. Esty. The 14 communities publically renewed

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<sup>46</sup> Program stability and business certainty are necessary to maintain program momentum.

their formal commitments, and N2N began raising awareness from earned media stories. After the first few months of grant execution and low upgrade conversion rates, developmental evaluation helped N2N understand an important lesson: to prime and commit homeowners for energy upgrades at the first touch point (rather than asking them just to sign up to the Challenge).

On May 1, 2011, just as N2N was kicking off program marketing and outreach efforts, the CT Energy Efficiency Fund (*i.e.*, the ratepayer fund) placed severe caps on the number of oil heated Home Energy Solutions (HES) assessments. Since about 85 percent of N2N homes are heated with fuel oil, N2N participants could not complete HES assessments. With budget caps removed four months later (September 2011) as N2N began Year 2, the funding gap caused substantial contractor layoffs and the loss of numerous N2N leads. At the same time, the Year 1 Corps service period ended. About half of the Corps stayed for a second service year.<sup>47</sup> Going into the 2011 heating season, contractors began to slowly increase fuel oil HES assessment completions, but were hesitant to hire additional contractor teams due to regulatory and market stability uncertainties.

Over the remainder of the Year 2, N2N focused efforts on bringing participants through to upgrades via lighting and HES assessment sign ups. Unfortunately, just as fuel oil funding was reinstated and the N2N technology platform was ready to go, N2N ran into two more program crises. On August 28, 2011, Tropical Storm Irene knocked out power to 670,000 CL&P customers for more than a week. On October 29, 2011, nor'easter Alfred knocked out power to 810,000 customers for up to 11 days (Kane, 2012). Both storms caused CT to virtually shut down, hampering both N2N and contractor operations even after N2N towns had power restored.

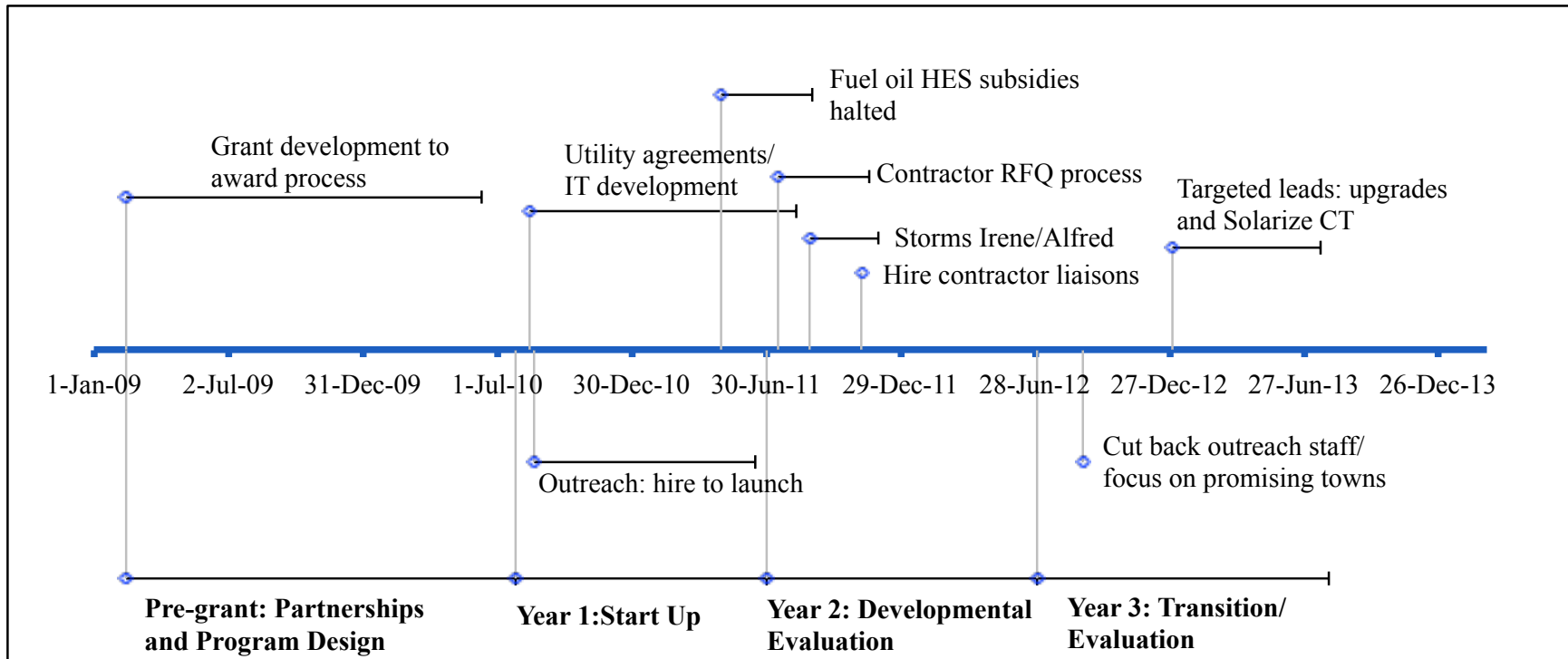
During the four-month heating oil-funding hiatus, N2N focused on improving contractor performance. For instance, N2N released a Request for Qualifications (RFQ) to hire and oversee a subset of contractors, selecting the new contractors in October 2011. At the same time, N2N designed the positions and hired two contractor liaisons/energy advisers to assist both contractors and customers through the upgrade pipeline in November 2011. In conjunction with the contractor liaisons, N2N implemented lead priority processes, attempting to deliver leads most likely to complete upgrades to contractors most likely to deliver upgrades.

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<sup>47</sup> An updated training program was delivered to the new and returning Corps members.



**Figure 2 N2N High-Level Timeline**



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In September 2012, N2N cut back to approximately one-third of program support from Years 1 and 2 for outreach, marketing, the technology platform, and administration. Note, in the original program design, N2N was not planning to conduct outreach and marketing in Year 3, but to focus on research, analysis and EM&V. However, the team decided to re-orient funding to extend the outreach phase to focus on a few key areas for testing and learning. Learning from the continuous developmental evaluation, the N2N team concluded that in its current form, the HES program could not be an effective customer acquisition strategy for home energy upgrades, one of the original program hypotheses. Needing to both provide a sustain program design and to close out the grant in Year 3, the N2N team began major program transformations, shifting outreach focus from HES acquisition to direct upgrade customer recruitment, including the following new priorities:

1. Implementing Solarize Connecticut, a CEFIA-funded pilot program in four N2N towns, designed to drive Solar PV in Connecticut. N2N particularly focused on helping CEFIA combine energy efficiency and solar messaging, as well as pulling lost solar leads to energy efficiency (CEFIA, 2013a).<sup>48</sup> Four towns were selected for Solarize Connecticut Phase I and II pilots: Mansfield, Portland, Westport, and Windham.
2. Introducing a vertically-integrated whole home performance energy upgrade contractor into the CT market to test upgrade acquisition strategies.
3. Assigning leads to three out of 10 of the RFQ-selected N2N contractors.
4. Supporting outreach for the CEFIA, Housing Development Fund, and Opportunity Finance Network Cozy Home loan launch (CEFIA, 2012b).
5. Supporting CEFIA Smart-E loan launch outreach and partnership with contractor mentioned in #2 above. Smart-E will provide \$28 million in “private sector capital for investment into deep energy retrofits, renewable energy deployment”, and HVAC fuel switching from fuel oil to natural gas (CEFIA, 2012a).

N2N also learned that some communities might be able to independently sustain a volunteer-driven organizational program model, but others could not under present conditions. Therefore, Year 3 included cutting N2N support to six towns.<sup>49</sup> Year 3 N2N outreach will focus on eight N2N communities that had the volunteer resources in place to (hopefully) take over program implementation, including: Lebanon, Mansfield, Portland, Ridgefield, Westport, Wethersfield, Wilton, and Windham.

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<sup>48</sup> Approximately 20 percent of the Solarize CT leads convert to solar installations losing others due mainly to siting issues, such as heavy tree cover, roof orientation, and other barriers, such as price, timing, *etc.* (CEFIA, 2013b).

<sup>49</sup> Bethany, Cheshire, East Haddam, East Hampton, Glastonbury, and Weston are not receiving Year 3 active N2N support.

## 6.0 Program Sustainability Plans

Unfortunately, to date, N2N has been unsuccessful at securing additional funding in the State of Connecticut to sustain operation of the N2N Energy Challenge as a stand-alone initiative. Still, several N2N team members have moved into other roles in the state's efficiency market. Most significantly, three key team members now work at the Clean Energy Finance and Investment Authority (CEFIA), the state's Green Bank and N2N's grants administrator: Bryan Garcia is the President and CEO, Kerry O'Neill is the Director of Residential Programs, and Madeline Priest is a Project Assistant for Residential Programs. CEFIA has launched 4 residential financing products in the past year and many key program elements of N2N will be carried forward at CEFIA in the residential sector.

While N2N won't live on in a stand-alone format, its programmatic approaches and lessons learned are being incorporated into CEFIA's residential products and programs, supporting efficiency, natural gas conversions, and renewable energy.

What program name will be used:

All products are marketed under the Energize Connecticut (EnergizeCT) statewide brand and initiative. CEFIA has developed 4 residential financing products: Smart-E Loan, Cozy Home Loan, CT Solar Loan and CT Solar Lease.

Any building upgrade or market transformation goals:

CEFIA is operating under a two year comprehensive plan with the following targets for the residential sector:

- Clean energy deployed: 15 MW and 75k MMBtu
- Residential solar PV deployed: 15 MW
- Total dollars of investment in clean energy: \$70MM
- Deploy \$60MM of private capital leveraged by \$12MM of public funds by end of 2014
- Ratio of private capital to public funds: 5:1
- Number of installations/loans/leases: 4,250
- Number of jobs created: 1,273

The market you will be serving:

CEFIA has developed 4 residential financing products that serve a variety of markets detailed below. These products are geared towards homeowners of residential 1-4 units with a minimum credit score of 640. These loan products serve approximately 80% of the available market.

Additionally, CEFIA is tasked with implementing an on-bill repayment (OBR) program by April 1, 2014, per legislation in Section 58 of Public Act 13-298. This legislation is intended to attract private capital investment in clean energy at low costs and long terms. As outlined in the state's Comprehensive Energy Strategy, this on bill repayment program supports, but is not limited to, conventional energy efficiency and renewable energy measures, as well as other important technologies like smart meters, natural gas conversions, EV recharging and natural gas fueling stations, CHP, and healthy home measures (i.e. asbestos removal, lead

abatement, mold remediation, roof replacement, etc.). This program could be used to address the market not currently served by the other products, in particular with alternative underwriting criteria.

What product or service you will be offering:

- Smart-E Loan – a credit enhancement program that uses \$2.5 million of repurposed ARRA-SEP funds as a loan loss reserve and interest rate buy down to attract nearly \$31 million of private capital from local credit unions and community banks. The product provides low interest (i.e. 4.49-6.99%) unsecured loans at long terms (i.e. between 5 to 12 years) for technologies that are consistent with the goals of the Comprehensive Energy Strategy.
- Cozy Home Loan – a credit enhancement program that uses \$460,000 of repurposed ARRA-SEP and N2N funds as a loan loss reserve and interest rate buy down to attract \$2.5 million of private capital from Community Development Financial Institutions (i.e. Opportunity Finance Network). The product, administered by the Housing Development Fund, provides 10-year loans for technologies that are consistent with the goals of the Comprehensive Energy Strategy to households below 80% of area median income in the Fairfield, Litchfield, and New Haven counties. Please see **Table 4** and **Table 5** for an approximate schedule for when the interest rate buy down (IRBD) funds will be disbursed and the amount of loans by quarter that are expected to be supported with the IRBD funds.
- CT Solar Lease – a lease program that uses \$3.5 million in repurposed ARRA-SEP funds as a loan loss reserve and \$7.6 million in debt and equity from CEFIA-approved by the Board of Directors to attract \$40 million of private capital from a tax equity investor (national bank) and a syndicate of local lenders to provide homeowners with FICO scores of 640 and above with a no upfront financing option for residential solar PV and solar hot water system deployment.
- CT Solar Loan – a loan program that uses \$300,000 in repurposed ARRA-SEP funds as a loan loss reserve and \$1.5 million in debt from CEFIA approved by the Board of Directors to attract \$4.5 million in private capital to provide 15-year secured loans at 6.49% interest rate for homeowners interested in owning solar PV systems.
- OBR Program – under development.

All products are supported by a channel marketing strategy including the contractor, lender and community channel. It is in product design and marketing and outreach where the lessons of N2N have been fully absorbed. CEFIA is running town-based campaigns for solar (under the Solarize mantle) and natural gas/efficiency (under the Energize mantle), as well as statewide campaigns for Solar (GoSolarCT) and efficiency/gas conversions (for the Smart-E and Cozy Home Loan products).

Intended collaboration with partners:

Department of Energy and Environmental Protection, Connecticut Energy Efficiency Fund, utilities, local lenders and other capital providers, contractor trade associations, community-based organizations, local municipalities, to name a few.

How you will communicate this sustainability strategy to the public:

There is no specific communication on the sustainability strategy for N2N. Instead, as part of the overall messaging of CEFIA, the lessons of contractor-focused execution,

community-based marketing, behavior-based messaging et al have been integrated into communications. And N2N is cited as evidence of why CEFIA should be doing this.

Other team members, Kat Donnelly and Jessica Bergman, are creating a new nonprofit entity called Empower Efficiency to use the lessons learned from N2N. This new nonprofit advising company is dedicated to making energy efficiency programs and products desirable to consumers. Empower Efficiency will help program administrators from non-profit groups, municipal, and state organizations to utility companies and home performance contractors learn how to motivate, enable, and engage customers in efficiency programs.

Empower Efficiency's mission is to drive sustainable demand for energy efficiency products and services in the residential sector by creating innovative programs centered around research-based strategies, marketing and messaging and the tracking database technology platform, as well as to empower local groups and program administrators with the best tools to implement them. Empower Efficiency will provide program design, implementation, data, and evaluation. Empower Efficiency will continue to partner with strategic organizations, such as the Clean Water Fund/Clean Water Action.

Clean Water Action is currently partnering with Next Step Living to pilot solar outreach using lessons learned from N2N. They also received a year-long grant to train energy committees in how to run effective outreach campaigns (they will be working with 8 towns over the next year and providing training and materials to 80 active energy committees). They are continuing to look to improve the State's efficiency programs based on lessons learned and are focused on looking at equity and improving programs for moderate and low income. They are also participating in Participating in NELEN- New England Local Energy Networks, a collaboration of grassroots environmental groups supporting municipal work across New England.

Additionally, Kate Donnelly and the Smart Power team are working on the Solarize CT program, a CEFIA initiative; and two outreach staff members are working at Next Step Living: Erin O'Neill and Chamae Monroe.

## 7.0 Verification of Data

N2N has reviewed and verified the DOE summary of data in BBNIS for N2N prior to close out.

## 8.0 Developed Products

This section identifies products developed under the award.

### 8.1 Publications

We completed five program evaluations:

Donnelly, Kat A. (2013). *Empowering Consumers to Reduce Residential Energy Waste: Designing, Implementing, and Evaluating the Connecticut Neighbor to Neighbor Energy Challenge*. (Ph.D.), Massachusetts Institute of Technology, Cambridge, MA. Retrieved from: <https://dl.dropboxusercontent.com/u/749694/2012April28%20Donnelly%20Full%20Dissertation%20Final.pdf>

Livingston, Ann, Donnelly, Kat A., & O'Neill, Kerry. (2012). *Technology Solutions and Programmatic Approaches to Support Cost-Effective Strategies for Residential Energy Efficiency*. Paper presented at the ACEEE Summer Study on Energy Efficiency in Buildings <http://www.aceee.org/files/proceedings/2012/data/papers/0193-000056.pdf>

Celtic Energy (2011), State of Connecticut – Residential Energy Efficiency Program Qualification Class III Resource – Direct Install Community Lighting Program "Neighbor to Neighbor Energy Challenge (N2N)" Measurement and Verification (M&V) Plan, Class III Resource – Direct Install Lighting, May 10, 2011. Retrieve from: <https://dl.dropboxusercontent.com/u/749694/Final%20DOE%20Report%20Supporting%20Docs/MV%20Plan%20Class%20III%20EarthMarkets%20N2N%20Direct%20Install%2010511%20Final.pdf>

Abreu, Joana and Donnelly, Kat (2012), Draft Weather Normalization Methodology of Town Aggregate Data. Retrieve from: <https://dl.dropboxusercontent.com/u/749694/Final%20DOE%20Report%20Supporting%20Docs/2012July1%20N2N%20Weather%20Normalization.docx>

Cundiff, Jennifer, Zelenetz, Jenna, and Hamlin, John (2013), Neighbor to Neighbor Energy Challenge Quality Assurance and Quality Control Contractor Evaluation Report, July 14, 2013, (Confidential – Do Not Distribute).

### 8.2 Presentations

Program Duration

- Presented on N2N performance at monthly CT Energy Efficiency Board meetings

### Q3 2013

- Presented N2N best practices, “lessons learned”, and sustainability plans to CT Department of Energy & Environmental Protection on 7/9
- Presented findings from QA/QC contractor evaluations to CT Residential Energy Efficiency Board on 7/10 and published findings in formal report to EEB and participating contractors 7/19
- Presented “lessons learned” and N2N program activity summary in webinar to town task forces, community group partners, and contractors on 7/10

### Q2 2013

- Presented to City of Boston and Greenovate Boston stakeholders on N2N best practices and “lessons learned”
- Presented at Yale School of Forestry & Environmental Studies’ lunchtime seminar series on N2N “lessons learned”
- Presented at ACI conference on cost-effectiveness and why community-based model is a good investment
- Presented webinar to fellow DOE BetterBuildings grantees on transforming behavior change research into consumer action on 5/29/2013

### Q1 2013

- Presented N2N program overview and lessons learned to CEFIA on 1/8/2013, and returned to demo Salesforce platform on 1/15/2013 and cost-acquisition scenario model to inform Smart-E loan launch strategy on 3/1/2013
- Presented to Housing Development Fund (HDF), a CDFI in the state that CEFIA has partnered with to create a loan product that N2N will start to market
- Presented to the residential committee of the state ratepayer fund, Energy Efficiency Board, on recommendations for the future of residential programs in support of the state’s Comprehensive Energy Strategy
- Presented to Green Justice Coalition in MA
- Presented to Connecticut Fund for the Environment
- Presented to utilities consultant in MA
- Presented to New Haven Investment Fund

### Q3 2012

- Presented 6/27/12 to the Office of Consumer Counsel, the state ratepayers’ consumer advocate, on the current status of N2N
- Presentation on 6/28/12 on N2N website, online tools and social media to state marketing team comprised of representatives of Department of Energy and Environmental Protection, CT Energy Efficiency Board, and Clean Energy Financing and Investment Authority
- Presented on N2N performance at monthly CT Energy Efficiency Board meetings



## Q1 2011

- February 2, 2011 – presentation at DOE BetterBuilding conference by Kerry O’Neil on faith-based community outreach strategies
- February 2, 2011 -- presentation by Kat Donnelly to DOE BetterBuildings conference on “listening to the voice of the consumer” data analysis process
- March 10, 2011 – presentation by Bob Wall to Northeast Sustainable Energy Association – Building Energy 11 conference on “Innovative Models in Energy Efficiency & Renewables: Motivating Consumer Demand” panel discussion

## Q4 2010

- October 14, 2010 – presentation by Kerry O’Neill, Bryan Garcia and Kat Donnelly at Yale University regarding research opportunities;
- October 22, 201 – presentation by Kerry O’Neill and Kat Donnelly to MIT for the Enabling an Energy Efficient Society;
- December 13, 2010 – presentation by Kat Donnelly to the Customer Engagement in a Smart Grid World (San Francisco); and
- December 14, 2010 - presentation by Kerry O'Neill to AESP Subcommittee on Community Efforts (overview of Neighbor to Neighbor Energy Challenge program model with a focus on outreach approaches and performance-based rewards program.)

## 8.3 Website

Figure 3 Excerpt from N2N Website (Town Leaderboard)



#### **8.4 Networks or collaborations fostered**

Not only did N2N commit to extensive program evaluation, but many outside organizations have also contributed in-kind to research and evaluation. N2N embraced partnerships across academia and industry, including with the MIT Field Intelligence Laboratory (FIL), the MIT Center for Collective Intelligence (CCI), the MIT Energy Efficiency Strategy Project, Duke University's Fuqua School of Business, the DOE Home Energy Score (HEScore), the Center for Business and the Environment at Yale University, the National Opinion Research Center (NORC) at the University of Chicago, and the National Renewable Energy Laboratory (NREL). Recent implementation partnerships include the CT Housing Development Fund. The partnerships provide additional lessons learned and insights from respected thinkers across disciplines.

#### **8.5 Technologies/Techniques**

N2N developed a tracking database, in-home lighting visit mobile application, outreach activity signup mobile application, and website signup tools.

#### **8.6 Inventions/Patent Applications, licensing agreements**

None

#### **8.7 Other Products**

N2N developed the following "other products",

1. YouTube channel (<http://www.youtube.com/ctn2nec>)
2. Energy Challenge Resource Center (<http://ctenergychallenge.com/energy-resource-center>)
3. Tracking database of over 9,500 participants
4. Training curricula for outreach team, including in-home lighting visits
5. Town toolkits for transition of outreach, marketing, and program implementation

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## Appendix A: N2N Town Demographics and Electricity Consumption Information

**Table 7 Demographics: Bethany, Cheshire, E. Haddam, E. Hampton, Glastonbury, Lebanon, Mansfield**

| Town Demographics   | Bethany | Cheshire | East Haddam | East Hampton | Glastonbury | Lebanon | Mansfield |
|---|---------|----------|-------------|--------------|-------------|---------|-----------|
| <b>Population (2010 ACS)</b>  | 5,563   | 29,261   | 9,232       | 14,302       | 33,097      | 7,308   | 24,726    |
| <b>Households per town (CL&amp;P, Dec 2010)</b>                             | 2,063   | 9,953    | 3,557       | 5,557        | 13,771      | 2,009   | 5,888     |
| <b>Average Home Size (sq. ft.) (calculated)</b>                             | 2,330   | 1,970    | 1,850       | 1,880        | 1,820       | 1,760   | 1,980     |
| <b>Median Home Size (sq. ft.)</b>   | 2,196   | 1,862    | 1,749       | 1,701        | 1,608       | 1,546   | 1,843     |
| <b>Average Year Built</b>   | 1974    | 1978     | 1978        | 1975         | 1961        | 1974    | 1967      |
| <b>Single-Family Homes</b>  | 65.70%  | 92.40%   | 92.40%      | 81.10%       | 68.80%      | 82.70%  | 70.30%    |
| <b>Property Tax</b>   | \$2,792 | \$4,191  | \$4,191     | \$4,768      | \$6,018     | \$3,589 | \$4,361   |
| <b>Yearly Residential Electricity (mWh)</b>                                 |         |          |             |              |             |         |           |
| <b>2008 CL&amp;P Residential Electricity Use</b>                            | 22,314  | 111,774  | 36,647      | 51,173       | 128,655     | 22,314  | 49,403    |
| <b>2009 CL&amp;P Residential Electricity Use</b>                            | 21,788  | 108,623  | 36,091      | 50,374       | 122,534     | 21,788  | 49,020    |
| <b>2010 CL&amp;P Residential Electricity Use</b>                            | 22,904  | 113,765  | 37,666      | 52,387       | 132,409     | 22,904  | 49,650    |
| <b>2011 CL&amp;P Residential Electricity Use</b>                            | 22,277  | 111,971  | 37,508      | 52,309       | 127,533     | 22,277  | 50,512    |
| <b>2008 to 2011 CL&amp;P Average Use</b>                                    | 22,321  | 111,533  | 36,978      | 51,561       | 127,783     | 22,321  | 49,646    |
| <b>Avg. Residential Electricity Consumption / Household (kWh)</b>           |         |          |             |              |             |         |           |
| <b>2,008</b>  | 10,816  | 11,230   | 10,303      | 9,209        | 9,342       | 11,107  | 8,390     |
| <b>2,009</b>  | 10,561  | 10,914   | 10,147      | 9,065        | 8,898       | 10,845  | 8,325     |
| <b>2,010</b>  | 11,102  | 11,430   | 10,589      | 9,427        | 9,615       | 11,401  | 8,432     |
| <b>2,011</b>  | 10,798  | 11,250   | 10,545      | 9,413        | 9,261       | 11,089  | 8,579     |
| <b>Avg. Consumption per Household 2008 to 2011 Average</b>                  | 10,820  | 11,206   | 10,396      | 9,279        | 9,279       | 11,110  | 8,432     |
| <b>2008 to 2011 Electricity Intensity (kWh/sq. ft./year)</b>                |         |          |             |              |             |         |           |
| <b>2008 to 2011 Electricity Intensity (kWh/sq. ft./year)</b>                | 4.64    | 5.69     | 5.62        | 4.94         | 5.1         | 6.31    | 4.26      |
| <b>2008 to 2011 Residential Average Electricity Consumption/person/year</b> | 4,012   | 3,812    | 4,005       | 3,605        | 3,861       | 3,054   | 2,008     |

**Table 8 Demographics: Portland, Ridgefield, Weston, Westport, Wethersfield, Wilton, and Windham**

| <b>Town Demographics</b>  | <b>Portland</b> | <b>Ridgefield</b> | <b>Weston</b> | <b>Westport</b> | <b>Wethersfield</b> | <b>Wilton</b> | <b>Windham</b> |
|---|-----------------|-------------------|---------------|-----------------|---------------------|---------------|----------------|
| <b>Population (2010 ACS)</b>  | 9,508           | 24,073            | 10,179        | 26,391          | 26,668              | 18,794        | 24,699         |
| <b>Households per town (CL&amp;P, Dec 2010)</b>                             | 4,052           | 9,399             | 3,653         | 10,525          | 11,505              | 6,396         | 9,000          |
| <b>Average Home Size (sq. ft.) (calculated)</b>                             | 1,900           | 2,590             | 3,000         | 2,690           | 1,780               | 2,780         | 1,730          |
| <b>Median Home Size (sq. ft.)</b>   | 1,696           | 2,494             | 3,022         | 2,560           | 1,536               | 2,678         | 1,514          |
| <b>Average Year Built</b>   | 1960            | 1968              | 1967          | 1959            | 1957                | 1966          | 1966           |
| <b>Single-Family Homes</b>  | 84.90%          | 78.60%            | 96.70%        | 86.00%          | 84.60%              | 85.50%        | 65.70%         |
| <b>Property Tax</b>   | \$5,768         | \$10,428          | \$16,062      | \$13,397        | \$5,407             | \$12,924      | \$2,792        |
| <b>Yearly Residential Electricity (mWh)</b>                                 |                 |                   |               |                 |                     |               |                |
| <b>2008 CL&amp;P Residential Electricity Use</b>                            | 34,403          | 119,359           | 66,853        | 161,649         | 88,054              | 96,551        | 63,979         |
| <b>2009 CL&amp;P Residential Electricity Use</b>                            | 33,171          | 114,985           | 64,473        | 156,849         | 84,742              | 92,878        | 63,396         |
| <b>2010 CL&amp;P Residential Electricity Use</b>                            | 35,573          | 120,993           | 68,491        | 169,212         | 90,295              | 99,350        | 66,265         |
| <b>2011 CL&amp;P Residential Electricity Use</b>                            | 34,912          | 118,356           | 66,957        | 170,086         | 90,145              | 97,305        | 67,230         |
| <b>2008 to 2011 CL&amp;P Average Use</b>                                    | 34,515          | 118,423           | 66,694        | 164,449         | 88,309              | 96,521        | 65,217         |
| <b>Avg. Residential Electricity Consumption / Household (kWh)</b>           |                 |                   |               |                 |                     |               |                |
| <b>2,008</b>  | 8,490           | 12,699            | 18,301        | 15,359          | 7,654               | 15,095        | 7,109          |
| <b>2,009</b>  | 8,186           | 12,234            | 17,649        | 14,902          | 7,366               | 14,521        | 7,044          |
| <b>2,010</b>  | 8,779           | 12,873            | 18,749        | 16,077          | 7,848               | 15,533        | 7,363          |
| <b>2,011</b>  | 8,616           | 12,592            | 18,329        | 16,160          | 7,835               | 15,213        | 7,470          |
| <b>Avg. Consumption per Household 2008 to 2011 Average</b>                  | 8,518           | 12,600            | 18,257        | 15,625          | 7,676               | 15,091        | 7,246          |
| <b>2008 to 2011 Electricity Intensity (kWh/sq. ft./year)</b>                |                 |                   |               |                 |                     |               |                |
|   | 4.48            | 4.86              | 6.09          | 5.81            | 4.31                | 5.43          | 4.19           |
| <b>2008 to 2011 Residential Average Electricity Consumption/person/year</b> |                 |                   |               |                 |                     |               |                |
|   | 3,630           | 4,919             | 6,552         | 6,231           | 3,311               | 5,136         | 2,640          |

## Appendix B: N2N's Data-Driven Outreach Approach (e.g., the Tracking Database)

The CT Neighbor to Neighbor Energy Challenge (N2N) was designed to meet State objectives, as well to enable a test bed of approaches. One end goal is to understand the cost-effectiveness of different approaches. N2N's program design is rooted in behavioral science, and based on an organizational change management approach called Community Based Social Marketing (CBSM) (McKenzie-Mohr, 2008). A major tenant of N2N, the team believes that a CBSM approach is more cost-effective than a traditional utility-marketed program.

One of the cornerstones of CBSM, or action research, is learning early and continuously, and then changing course as often as necessary. To conduct action research, N2N relies heavily on intensive data collection and transparency, which allows not only constant refinement of the strategies employed, but also a self-reflective approach to incrementally build upon lessons learned to inform and generate increasingly sophisticated tools for planning and modeling.

N2N's approach is divided into six parts:

- 1) Outreach strategies are tracked in real-time through our Tracking Database (see Figure 4 on next page). Organizers enter detailed information for each campaign or event, including:
  - Event type - workshop, canvassing, tabling event, mailing, *etc.*
  - Total planning and deployment time
  - Staff and volunteers involved
  - Host or sponsor organization type (*e.g., a town, school PTO, etc.*)
  - Location – from town to table position to weather conditions
  - Materials and messaging employed
  - Successful approaches, resident feedback, and thoughts for improvement

Most importantly, each generated lead is associated with their primary outreach activity and/or referral contact, allowing review of attendance, sign-up rates, and eventual complete rates of each outreach activity and related community leaders. Information updates from participating contractors and utilities grant access to savings data and pull-through to additional measures. N2N can track leads from the outreach activity where they signed-up (including refer-a-friend activity) through to upgrades to calculate the household's entire portfolio of energy saving actions.

- 2) From there, organizers and evaluators review reports of recent events and leads on a weekly basis to identify patterns and consistencies in those that garnered high attendance and high rates of sign-ups per hour and per staff hour. Through real-time updates from contractor partners, we see which leads are responding to contractor follow up to schedule assessments, and how many are expressing a lack of interest. Eventually, this careful, continuous analysis allows organizers to set baselines and goals for performance by strategy, pursuing only strategies that meet key performance-based success indicators.

**Figure 4 Screenshot of Event Tracking Report in Tracking Database**

| Number of Outreach Staff | Number of Outreach Volunteers | # of Attendees | # of Attendees to Sign-up for HES | Notes about Basic Pitch  | Other Pitch Motivators | Other Motivators  | Notes about N2N Presentation | General Audience Interest(s) | Resident Problems/Concerns/Feedback   | Pitch Successful Approaches  | Thoughts for Improvements  | Sign-ups/Hour | Sign-Ups/Staff & Volunteer Hour | Sign-Ups/12N Staff Hour |
|--------------------------|-------------------------------|----------------|-----------------------------------|--|------------------------|---|------------------------------|------------------------------|---|--|--|---------------|---------------------------------|-------------------------|
|                          |                               |                |                                   |  |                        |   |                              |                              |   |  |  | 0.86          | 0.43                            | 0.86                    |
| 1                        | 1                             | 3              | 3                                 | -  | -                      | Money savings   | -                            | -                            | -   | -  | -  | 0.86          | 0.43                            | 0.86                    |
|                          |                               |                |                                   |  |                        |   |                              |                              |   |  |  | 1.60          | 0.40                            | 1.60                    |
| 1                        | 3                             | 4              | 4                                 | We pitched the Home Energy Solutions program by first asking whether the person has joined the Westport Home Energy Challenge and then asking if they have heard of HES. I described what the technicians do in the home during a HES visit and how \$25 will b... | -                      | Money savings; Environmental benefit; Energy independence | -                            | -                            | We didn't get the chance to talk to many adults. Most of our visitors were children (who loved our cookies) and we gave them collateral to hand to their parents. | Many of the people who stopped by our table have heard of us before. They signed up for HES because they have seen us at other events. | Bring activities for the kids! We did not know there would be hundreds of children at the event and did not prepare accordingly. We did, however, hand out hundreds of stickers and cookies! | 1.60          | 0.40                            | 1.60                    |
|                          |                               |                |                                   |  |                        |   |                              |                              |   |  |  | 4.83          | 0.81                            | 1.21                    |

- 3) N2N findings have informed the development of overall best practice guides by strategy (e.g., workshop, canvassing, tabling, etc.) that lay out which event features to avoid and how to maximize opportunities. By employing best practices for each strategy, N2N is able to effectively employ a wide range of outreach activities in a comprehensive quarterly campaign.
- 4) Effectiveness of outreach events by strategy is summed and reviewed quarterly, informing the next quarter's campaign plan and goals. Following two years of outreach, N2N built a model based on signups per hour for each strategy by quarter, enabling a ranking of strategies from high to low investment of staff time. To determine overall cost-effectiveness, HES complete and upgrade rates by strategy were built on top of the direct outreach and program administrative costs. This allows for scenario modeling of a portfolio of high-investment and low-investment strategies to maximize resources and impact.
- 5) The detailed outreach model has informed a higher-level scenario model driven by more detailed cost-acquisition metrics. Incorporating and breaking out program administrative, direct outreach, indirect outreach, M&V, and startup costs, the management team is able to determine the full cost of each lead, customer, and saved MMBtu to the program. The enhanced visibility allows goal setting for success based on these metrics, as well as scenario modeling with different mixes of program overhead costs, revenue streams, complete rates, etc.



- 6) Finally, these tools and pilot lessons learned were used to develop a model delivered to the Clean Energy Finance and Investment Authority (CEFIA) to inform campaign plans and goal setting for a comprehensive upgrade and renewable loan package. The framework includes other acquisition strategies and energy reduction measures, and incorporates proven customer pull-through rates from one measure to another. Tracking and distributing the cost of acquiring a customer across the lifetime of that customer's energy-saving actions results in a sophisticated and flexible tool for scenario planning, and allows N2N's program model and lessons learned to be adapted and applied to a broader market context.

The technology and program management tools help structure N2N's large data repository, keep all of N2N's partners on the same page, and instigate program evolution and market transformation in the broader statewide program. In the end, this may be the biggest accomplishment of N2N - driving changes in how ratepayer funded residential efficiency programs are administered. The N2N Energy Challenge uses the data platform to continuously drive forward on implementing existing, and discovering new, best practices to improve program execution. In addition, the platform firmly supports N2N program design, lessons learned, redeployment, and scenario planning and modeling tasks. It is also important for proper data collection, management, relationship building, customer follow up, quality control, and measurement, evaluation, and verification.

## Appendix C: The N2N Team

N2N required a diverse set of skills; therefore, N2N employed a multi-disciplinary team with expertise in community outreach, energy education, marketing, media relations, social media, behavioral science, project management, policy development, web-based design and software tools, and performance evaluation. Earth Markets, a social venture company, led the development of the grant application, organizing a consortium of public, private, academic, and non-profit organizations to administer, execute, evaluate, and report on N2N, including the following organizations:

- The Connecticut Clean Energy Fund (CCEF) (now the Clean Energy Finance and Investment Authority (CEFIA), or the State’s “green bank”) for grant and renewables funding administration;
- The Connecticut Energy Efficiency Fund, the state ratepayer funding administrator providing direct install residential efficiency programs, rebates on insulation, appliances, windows, and HVAC equipment, customer financing, and funding for a municipal rewards program; and
- Clean Water Fund for program implementation to develop, manage, and provide the outreach and community organizing;
- Earth Markets as program manager, including program design, implementation, and evaluation;
- EMpower Devices and Associates and the MIT Field Intelligence Lab partnership, providing behavioral strategy and messaging, program design, and evaluation, measurement, and verification.<sup>50</sup>
- SmartPower for marketing strategy and implementation;
- Snugg Home for the technology platform development, and Mobile Genius<sup>51</sup> for the lighting mobile application development; and
- The Student Conservation Association, acting as the Clean Energy Corps, providing grassroots outreach and the in-home direct install lighting program;

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<sup>50</sup> Note: Kat Donnelly, report author, was the Field Intelligence Lab representative, and led the evaluation work for EMpower Devices, a consortium primarily of MIT graduate students, recent graduates, as well as academic affiliates, such as in-kind research contributions from MIT, the University of Chicago National Opinion Research Center, Lawrence Berkeley National Lab, the University of Cambridge, and the DOE.

<sup>51</sup> Mobile Genius partnership developed through MIT with Thomas Rand-Nash, MIT ESD PhD.

## Appendix D: The N2N Value Proposition

The N2N program framework has adapted the Lifetime Customer Value (LCV) to the residential efficiency space. Typically not used in utility-administered energy efficiency programs, LCV places emphasis on the total customer participation over the program life and spreads out the cost of acquiring this customer over the total number of actions they take (Shaw and Stone 1988). The business goal is to have an ongoing relationship with the customer and place a dollar value on that relationship by cross-selling or upselling additional products and services (*i.e.*, N2N ladder of actions). In the efficiency space, the goal is higher customer energy savings over time as the home becomes more and more efficient and/or generates clean energy. N2N measures the ‘V’ (Value) in LCV in negawatts<sup>52</sup> (but it can be measured in addition to or instead of revenues or profits, depending on the program).

N2N employs community-based strategies to systematically overcome barriers to residential participation in energy programs.<sup>53</sup> Strategies include providing motivation to reduce energy waste in the home, as well as education on available state programs and incentives, how to prioritize energy improvements, and how to find trustworthy contractors. A community-based approach was selected to allow for a trusted messenger strategy for outreach and marketing to support increased participation – both for reaching more participants and for having those participants achieve deeper energy savings. (Fuller, Kunkel, Zimring, Hoffman, Soroye, and Goldman, 2010; Michaels 2009)

The N2N outreach team focuses on nurturing community leaders to become N2N trusted messengers, including tailored strategies for libraries, faith-based groups, community and civic groups, schools, local businesses, social service agencies serving the elderly and low-income residents, municipal leaders, and community leaders. Strategies include educational workshops, tabling at local events/meetings, neighborhood canvassing, “lead by example” campaigns with community leaders, word of mouth, social media, earned media stories, contractor co-marketing, among others.

N2N relies on multiple customer touch points to build customer awareness and trust, and bring customers into the energy efficiency upgrade sales pipeline. N2N especially focusing on touching those that may not otherwise participated in a traditional program model. N2N is supported by proven behavior-based strategies, including framing, social norming, friendly competition, peer pressure, scarcity, goal setting, feedback loops, and a strong focus on language and messaging (Abrahamse 2009; Ehrhardt-Martinez, Donnelly, and Laitner 2010; Honebein, Cammarano, and Donnelly 2009; Lutzenhiser 2009).

The N2N value proposition for customers (*i.e.*, N2N participants) is a trusted ally to make saving energy in the home easy by:

1. Bringing together available incentives,

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<sup>52</sup> Amory Lovins of the Rocky Mountain Institute coined the term “negawatts”; he defined a negawatt as one megawatt of electricity conserved for one hour.

<sup>53</sup> The Clean Water Fund has developed an extensive tool kit to support community asset assessment, campaign management, and an approach testing, learning, and adapting.

2. Selecting pre-qualified contractors,
3. Understanding and guiding the participant through each step of the process,
4. Helping them track energy savings over time,
5. Providing behavioral prompts, triggers, and reminders (*i.e.*, multiple customer touch points),
6. Connecting them to neighbors to share their experiences, and
7. Helping their community earn rewards.