New York State Nursing Homes Clean Energy Initiative
Phase 1 Report Review

Leading Age NY
Financial Professionals Conference
August 30, 2017

Slide Goals and Objectives

Energy Efficiency and Emissions Reductions
- Quantify the energy and emissions reduction potential
- Identify and qualify the operational, retrofit and behavioral measures required to achieve the savings
- Lay out an actionable strategy and rollout plan for accelerating state-wide market adoption and achievement of the full savings potential

Economic and Non-Energy Benefits
- Quantify the utility cost savings potential
- Identify high, medium and low-savings potential nursing homes
- Identify capital funding, resources and capacity-building requirements to support the recommended strategy
- Develop the business case for investment, returns and net cash flow
- Describe the nature, and estimate the magnitude of the clean energy business opportunity and number of jobs to be created through program implementation
- Document the health effects of improved energy efficiency in buildings, and describe the new research work proposed to be conducted as part of this project
PART ONE – THE SIZE OF THE PRIZE

- Sector Profile
- 2015 Utility Costs, Energy and Water Use
- Benchmarking, Targets and Savings Potential

PART TWO – GETTING THERE FROM HERE

- Program Implementation Strategy and Timelines
- Implementation Budget and Return on Investment
- Project Financing and Cost Reimbursement

PART THREE – CONCLUSIONS AND RECOMMENDATIONS

- Pilot Project
- Program Rollout
- Database and Process Development
- Next Steps
Sector Profiles- Totals

<table>
<thead>
<tr>
<th></th>
<th>New York State</th>
<th>New York City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Nursing Homes</td>
<td>615</td>
<td>171</td>
</tr>
<tr>
<td>Number of Beds</td>
<td>113,398</td>
<td>44,146</td>
</tr>
<tr>
<td>Total Building Area (square feet)</td>
<td>63,122,624</td>
<td>21,229,239</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ownership Type</th>
<th># Homes</th>
<th># Beds</th>
<th>% of Total Homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>366</td>
<td>66,061</td>
<td>58%</td>
</tr>
<tr>
<td>Not for Profit</td>
<td>219</td>
<td>38,939</td>
<td>34%</td>
</tr>
<tr>
<td>Public</td>
<td>30</td>
<td>8,398</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>615</td>
<td>113,398</td>
<td>100%</td>
</tr>
<tr>
<td>Multiple Facility Owners (67)</td>
<td>312</td>
<td>56,735</td>
<td>51%</td>
</tr>
</tbody>
</table>

Sector Profile- Distribution

[Map showing the distribution of nursing homes by size across New York State.]
2015 Utility Costs

<table>
<thead>
<tr>
<th>Utility Type</th>
<th>Total Cost</th>
<th>Average Cost</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Per Home</td>
<td>Per Bed</td>
<td>Per ft²</td>
</tr>
<tr>
<td>Electricity</td>
<td>$140.2 M</td>
<td>$227,997</td>
<td>$1,236</td>
<td>$2.22</td>
</tr>
<tr>
<td>Thermal Energy</td>
<td>$58.0 M</td>
<td>$94,385</td>
<td>$512</td>
<td>$0.92</td>
</tr>
<tr>
<td>Water</td>
<td>$39.3 M</td>
<td>$63,838</td>
<td>$346</td>
<td>$0.62</td>
</tr>
<tr>
<td>Other Utilities</td>
<td>$1.1 M</td>
<td>$1,840</td>
<td>$10</td>
<td>$0.02</td>
</tr>
<tr>
<td>Total</td>
<td>$238.6 M</td>
<td>$388,070</td>
<td>$2,105</td>
<td>$3.88</td>
</tr>
</tbody>
</table>

Methodology

1. Energy and Water Consumption
   - Derived from cost data using 2015 utility rates
   - Validated with available actual utility data

2. Energy and Water Targets
   - Top-quartile and top-decile intensity standards
   - Weather-normalized electricity and thermal intensities

3. Scaling Up to Complete Sector
   - Extrapolation for data gaps based on numbers of beds
2015 Energy and Water Consumption

<table>
<thead>
<tr>
<th>Utility Type</th>
<th>2015 Total</th>
<th># Homes Reporting</th>
<th>Average per Home</th>
<th>Average Intensity kWh/ft²</th>
<th>GHG Emissions Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (kWh)</td>
<td>746,263,735</td>
<td>537</td>
<td>1,389,690</td>
<td>42.4</td>
<td>444,367</td>
</tr>
<tr>
<td>Natural Gas (therms)</td>
<td>49,073,001</td>
<td>519</td>
<td>94,553</td>
<td>83.5</td>
<td>260,877</td>
</tr>
<tr>
<td>Other Fuel (MMBtu)</td>
<td>633,326</td>
<td>229</td>
<td>2,766</td>
<td>20.7</td>
<td>47,188</td>
</tr>
<tr>
<td>Other Utilities</td>
<td>N/A</td>
<td>50</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Total (MMBtu)</td>
<td>8,086,878</td>
<td>541</td>
<td></td>
<td>133.4</td>
<td>752,433*</td>
</tr>
<tr>
<td>Water (gallons)</td>
<td>2,947,428,145</td>
<td>520</td>
<td>5,668,131</td>
<td>51.3 (gal/ft²)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

2015 Energy and Water Use

![Electricity Use Intensities](image1)

![Natural Gas Use Intensities](image2)
2015 Energy and Water Use

Annual (2015) Savings Potential

<table>
<thead>
<tr>
<th>Utility Type</th>
<th>Top Quartile Savings Potential</th>
<th>Top Decile Savings Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent</td>
<td>M$/year</td>
</tr>
<tr>
<td>Electricity</td>
<td>25%</td>
<td>$35.7</td>
</tr>
<tr>
<td>Thermal</td>
<td>46%</td>
<td>$26.8</td>
</tr>
<tr>
<td>Water</td>
<td>51%</td>
<td>$20.1</td>
</tr>
<tr>
<td>Total</td>
<td>35%</td>
<td>$82.6</td>
</tr>
</tbody>
</table>

Average potential per bed: $680, 31.7%
Percent of 2015 average cost: $969, 45.1%
High- Mid- and Low-Savings Potential Facilities

<table>
<thead>
<tr>
<th>Category</th>
<th>Savings Range $/year</th>
<th>Number</th>
<th>% of Total</th>
<th>Total Savings</th>
<th>% of Total</th>
<th>Average $/home</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Potential</td>
<td>&gt; $250,000</td>
<td>77</td>
<td>12.5%</td>
<td>$37.4 M</td>
<td>45.3%</td>
<td>$485,333</td>
</tr>
<tr>
<td>Mid-Potential</td>
<td>$100,000 - $250,000</td>
<td>181</td>
<td>29.4%</td>
<td>$29.7 M</td>
<td>36.0%</td>
<td>$164,291</td>
</tr>
<tr>
<td>Low-Potential</td>
<td>$10,000 - $100,000</td>
<td>304</td>
<td>49.4%</td>
<td>$15.2 M</td>
<td>18.4%</td>
<td>$50,058</td>
</tr>
<tr>
<td>Least-Potential</td>
<td>&lt; $10,000</td>
<td>53</td>
<td>8.6%</td>
<td>$0.2 M</td>
<td>0.2%</td>
<td>$3,148</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>615</td>
<td>100.0%</td>
<td>$82.5 M</td>
<td>100.0%</td>
<td>$134,133</td>
</tr>
</tbody>
</table>

Identifying the High-Potential Facilities

![Savings Potential ($) vs Home Size Graph](image)
Percentile Targets

- Based on good current practice
- Continuous raising of the bar as overall energy efficiency improves
- Additional savings potential due to increased market penetration of underused technologies and best practices
  - Cogeneration
  - Building automation (BMS)
  - Plumbing fixture replacement
  - LED lighting
  - Dishwasher replacement
  - Renewable energy

Monthly Utility Data

- 189 data release forms received from nursing home operators (31% response)
- Limited and inconsistent data received from utility companies for electricity gas and oil
- No monthly water data received so far
Monthly Data Analysis

- Benchmarking with Enerlife’s online Green Building Performance System (GBPS)
- Energy use subdivided into base (non-weather sensitive) and weather sensitive (heating and cooling) components
- Weather-normalization for target-setting to a common weather station (Albany)
- Targets and savings potential determination for each energy component at the individual building level

Resulting top quartile component energy targets (based on 40 building subset):

<table>
<thead>
<tr>
<th>Energy Component</th>
<th>Base</th>
<th>Heating</th>
<th>Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric</td>
<td>31.1</td>
<td>-</td>
<td>4.4</td>
</tr>
<tr>
<td>Thermal</td>
<td>24.6</td>
<td>54.6</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>35.5</td>
<td>Total</td>
<td>79.2</td>
</tr>
</tbody>
</table>

Energy Components- Electricity

<table>
<thead>
<tr>
<th>Energy Component</th>
<th>Building Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Electricity</td>
<td>Lighting, fans, equipment, elevators, heating pumps, cogeneration (offset)</td>
</tr>
<tr>
<td>Cooling Electricity</td>
<td>Central and local air conditioning, cooling pumps and towers</td>
</tr>
<tr>
<td>Heating Electricity</td>
<td>Room and entrance heaters, snow-melting, pipe tracing</td>
</tr>
</tbody>
</table>
Energy Components - Thermal (gas, oil, steam)

Component Savings Potential
PART TWO – GETTING THERE FROM HERE

Delivering the Full Savings Potential

1. Energy Assessments
   • Diagnostic analysis of monthly and interval data
   • Targeted testing and data logging

2. Operational and Behavioral Measures
   • Scheduling plant and equipment
   • Equipment repair and replacement

3. Standardized Measures
   • Lighting and water
   • Cogeneration, equipment and renewable energy

4. Retrofit Projects
   • HVAC retrofits and redesigns
   • Building Automation Systems

5. Standardized Facility Audits (scope and format)
   • Performance Monitoring
   • Ongoing weather normalized reporting to all stakeholders
   • Continuous improvement
Investment, Returns and Net Cash Flow

![Graph showing annual costs, annual savings, and cumulative net cash flow over 10 years.](image)

Needs Assessment

- Interviews with nursing home managers
- Strong motivation to make savings
- Unaware of comparative performance or savings potential
- Significant prior experience with energy efficiency
- Interest in systematic rather than piecemeal approach
- Would welcome technical support
- Utility company incentives important to business case
- Energy audits generally found useful
- Range of needs for financing
Potential Implementation Strategy

- Pilot Project – High-Potential Facilities (2017 - 2018)
  - Fast-track project development and implementation
  - Capture a significant part of the potential
  - Support ongoing engagement, service delivery and capacity-building
- Program Rollout (2018 – 2023)
  - State-wide implementation
  - Recruitment, support and reporting
  - Funding and research partners
- Embedded Facilities
  - 51 facilities and 8,547 beds (7.5% of total) located in hospitals, with 11 reporting utility costs
  - Identify needs and opportunities

PART THREE – CONCLUSIONS AND RECOMMENDATIONS
Conclusions

• Energy and Environmental Potential
  • Energy savings, emissions reductions

• Economic Potential
  • Capital investment, utility cost savings, incentives, ROI and cash flow
  • Business Potential for the New York State Clean Energy Sector

• Health Effects of Upgraded Buildings
  • Longitudinal research with baselines and monitoring

• Renewing the Energy Vision
  • Improving utility data retrieval
    • EDI and DOH Cost Reports
  • Record actual savings being made
  • Replication with other building sectors

• Standards and Best Practices
  • Streamline delivery, maximize savings, make best use of resources and achieve economies of scale

Pilot Project

• Recruitment
  • Compelling case for participation

• Technical support and standards

• Procurement and project management

• Project financing

• Alliances
  • Utility companies
  • Other funding partners
  • Health research partner

• Timelines
Pilot Project- Technical Support

- Energy Assessments
- O&M audits
- Lighting audits
- Water efficiency audits
- Equipment replacement
- HVAC testing
- Facility audits and engineering
- M&V reporting

Program Rollout

- Governance and direction
- Recruitment and communications
- Technical support and standards
- Case studies and best practices
- Recognition and awards
- Capacity-building
- Alliances
  - Utility companies
  - Other funding partners
  - Health research partner
- Timelines
Next Possible Steps

• Program Funding
  • Utility companies and other funding partners
  • Health research partner
• Initiate Pilot Project
• Address process development
• Maintain communication with nursing homes