Examining U.S. ESCO Industry Trends: Practices and Applied Technologies: Results from the NAESCO Database Project

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Project Background

• Objectives
  - Track industry performance and evolution
  - Project data useful for economic analysis, policy development, and technology impacts

• Approach
  - NAESCO/LBNL partnership with voluntary participation from industry and gov’t agencies
  - Project data primarily from accredited process; 18% of projects are from state agencies
  - Information verified through peer review and reference checks

• Market definition:
  - companies must offer performance contracting, but
  - services offered / revenue estimates are not exclusively PC
  - non “value-added” services excluded

• Sources:
  - company interviews
  - state RFQs, NAESCO accreditation applications
  - expert interviews

• Grouped by company size:
  - 14 “large” companies: >$30M/yr
  - 26 “medium” companies: $5-30M/yr
  - 23 “small” companies: <$5M/yr
ESCO Industry has experienced strong growth

- ESCO Market for energy-efficiency related services is ~$1.8-$2.1B in 2000; 24% annual growth rate (1990-2000)
- Performance contract revenues: $0.9-$1.0B in 2000
ESCO Industry Ownership Structure

Industry Ownership in 2000...

- Building Equipment Mnfctrs: 34%
- Engineering Services Companies: 29%
- Other Energy Companies: 28%
- Utility Affiliates: 9%

...based on revenues

- Building Equipment Mnfctrs: 35%
- Engineering Services Companies: 15%
- Other Energy Companies: 44%
- Utility Affiliates: 6%

...based on number of companies

- Quickly changing industry -- mergers and acquisitions very common;
- Expect significant consolidation: fallout from CA, Enron and stalled retail market
- About 12 companies consistently comprise ~70% of industry revenues
$2.55B of work completed by 51 companies

Significant activity in four states (44% in NY, NJ, CA, TX)

Median and average project costs: $0.7M and $1.8M, respectively
### Project Investment Trends by Market Sector

- Median project investment levels are 1.8 times greater in institutional than private sector projects ($2.50 vs. $1.40/ft^2)

<table>
<thead>
<tr>
<th>Market Segment</th>
<th>Project Investment ($/ft^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-12 Schools (n=219)</td>
<td></td>
</tr>
<tr>
<td>State/local gov't (n=107)</td>
<td></td>
</tr>
<tr>
<td>Univ./College (n=66)</td>
<td></td>
</tr>
<tr>
<td>Federal gov't (n=56)</td>
<td></td>
</tr>
<tr>
<td>Health/hospital (n=65)</td>
<td></td>
</tr>
<tr>
<td>Public Housing (n=8)</td>
<td></td>
</tr>
<tr>
<td>Private Sector (n=156)</td>
<td></td>
</tr>
</tbody>
</table>

**N=678**
• Typical project consists of multiple measures and strategies
• Lighting and HVAC are most common measures, in both institutional and private sectors
• Non-energy improvements (e.g., roofs, asbestos abatement) reported in institutional sector projects
Impact of Retrofit Strategy on Project Costs

- ESCOs investment levels significantly greater in Comprehensive Projects compared to Lighting Only
- Lighting project costs comparable across institutional and private sectors

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Project Savings obtained from Energy Efficiency Measures

- Two baseline metrics: utility bill and targeted equipment
- Lighting-Only projects saved 47% of equipment targeted electricity
- Lighting & Non-lighting projects saved 23% of utility bill electricity
Performance Contracting is a Decreasing Share of ESCO Business

- Market share of performance contracting is decreasing among NAESCO members (92% to 76%)
- Design/Build & Fee-for Service approaches account for ~30% of ESCO projects in 1996-2000

![Bar chart showing decrease in performance contracting share]

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Project Economics: Indicators and Approach

• Three indicators:
  - net benefits (direct economic benefits; value of energy and non-energy savings)
  - benefit/cost (B/C) ratio
  - simple payback time (SPT)

• Separate assumptions/analysis for institutional and private sectors
  - 7-10% nominal discount rate for institutional
  - 10-15% nominal discount rate for private

• DSM Incentives accounted for in SPT
## Customer Economics: Institutional Sector

<table>
<thead>
<tr>
<th>Market Segment</th>
<th>N</th>
<th>Total Project Costs ($M)</th>
<th>7% Discount Rate</th>
<th>10% Discount Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct Economic Benefits ($M)</td>
<td>B/C Ratio</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gross</td>
<td>Net</td>
</tr>
<tr>
<td>K-12 schools</td>
<td>289</td>
<td>714</td>
<td>803</td>
<td>88</td>
</tr>
<tr>
<td>State/ local gov't</td>
<td>159</td>
<td>276</td>
<td>581</td>
<td>305</td>
</tr>
<tr>
<td>Univ./ colleges</td>
<td>100</td>
<td>301</td>
<td>809</td>
<td>508</td>
</tr>
<tr>
<td>Federal gov't</td>
<td>58</td>
<td>153</td>
<td>280</td>
<td>126</td>
</tr>
<tr>
<td>Health/ hospital</td>
<td>134</td>
<td>136</td>
<td>365</td>
<td>229</td>
</tr>
<tr>
<td>Public Housing</td>
<td>31</td>
<td>96</td>
<td>140</td>
<td>45</td>
</tr>
<tr>
<td>Institutional Sector</td>
<td>771</td>
<td>1,677</td>
<td>2,978</td>
<td>1,301</td>
</tr>
</tbody>
</table>

- Median B/C ratio for institutional sector projects ranges between 1.0 and 2.3
- B/C ratio >1 for 70% of projects
- Median SPT is 7 years
Customer Economics: Private Sector Projects

**Other includes residential and projects that were not classified as “other.”

<table>
<thead>
<tr>
<th>Market Segment</th>
<th>N</th>
<th>Total Project Costs ($M)</th>
<th>10% Discount Rate Direct Economic Benefits ($M)</th>
<th>B/C Ratio median</th>
<th>15% Discount Rate Direct Economic Benefits ($M)</th>
<th>B/C Ratio median</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td>Gross</td>
<td>Net</td>
<td>Gross</td>
</tr>
<tr>
<td>Commercial*</td>
<td>192</td>
<td>137</td>
<td>349</td>
<td>212</td>
<td>2.2</td>
<td>265</td>
</tr>
<tr>
<td>Industrial</td>
<td>76</td>
<td>95</td>
<td>181</td>
<td>86</td>
<td>1.8</td>
<td>136</td>
</tr>
<tr>
<td>Other**</td>
<td>41</td>
<td>28</td>
<td>47</td>
<td>18</td>
<td>1.8</td>
<td>34</td>
</tr>
<tr>
<td>Private sector</td>
<td>309</td>
<td>260</td>
<td>576</td>
<td>317</td>
<td>2.1</td>
<td>435</td>
</tr>
</tbody>
</table>

*Commercial includes hotels/hospitality, retail space, and commercial offices.

- Median B/C ratio for private sector projects ranges between 1.8-2.2 -- highest in commercial projects
- B/C ratio >1 for 87% of projects
- Median SPT is 3 years
SPT influenced by Choice of Retrofit Strategy & State Guidelines

<table>
<thead>
<tr>
<th>Retrofit Strategy</th>
<th>Simple Payback Time (years)</th>
<th>Institutional Sector</th>
<th>Private Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>25 val</td>
<td>median</td>
</tr>
<tr>
<td>Lighting Only</td>
<td>146</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Lighting &amp; Non-Lighting</td>
<td>498</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Non-Lighting Only</td>
<td>98</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

- More private sector projects are Lighting-Only (43% vs 20%); Two year SPT for institutional and private sector markets
- Lighting/non-lighting and non-lighting only projects payback time is much longer in institutional than in private sector
- SPT influenced by State performance contracting guidelines; 34 states allow max. contract term >10+ years
Drivers of Performance Contracting in Institutional Markets

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<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Rank ($M) N</td>
<td>Rank ($B)</td>
<td>1=low, 2=medium, 3=high**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>1 287 76</td>
<td>2 755</td>
<td>2.3</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>California</td>
<td>2 147 81</td>
<td>1 1229</td>
<td>1.0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Texas</td>
<td>3 131 40</td>
<td>3 687</td>
<td>2.0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Indiana</td>
<td>4 112 23</td>
<td>15 182</td>
<td>1.0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>New Jersey</td>
<td>5 84 95</td>
<td>8 332</td>
<td>2.0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Illinois</td>
<td>6 75 38</td>
<td>4 446</td>
<td>2.0</td>
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<td>6</td>
</tr>
<tr>
<td>Ohio</td>
<td>7 68 45</td>
<td>7 362</td>
<td>2.0</td>
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<tr>
<td>Massachusetts</td>
<td>8 66 27</td>
<td>11 263</td>
<td>1.7</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Florida</td>
<td>9 65 23</td>
<td>5 443</td>
<td>1.0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>10 54 37</td>
<td>6 383</td>
<td>2.0</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

- PC activity in institutional market sectors affected by:
  - State’s overall potential market size
  - favorable enabling legislation & procurement rules
  - state energy program activity

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Conclusions

• U.S. ESCO business is well established
  - ESCOs sell “solutions” to customers: EE is byproduct

• Important accomplishment in face of:
  - Historic low energy prices
  - U.S. government environmental policies

• ESCO business is fluid and will continue to evolve
  - Expect industry growth + firm consolidation