Benchmarking ESCO Projects in Public Sector Markets

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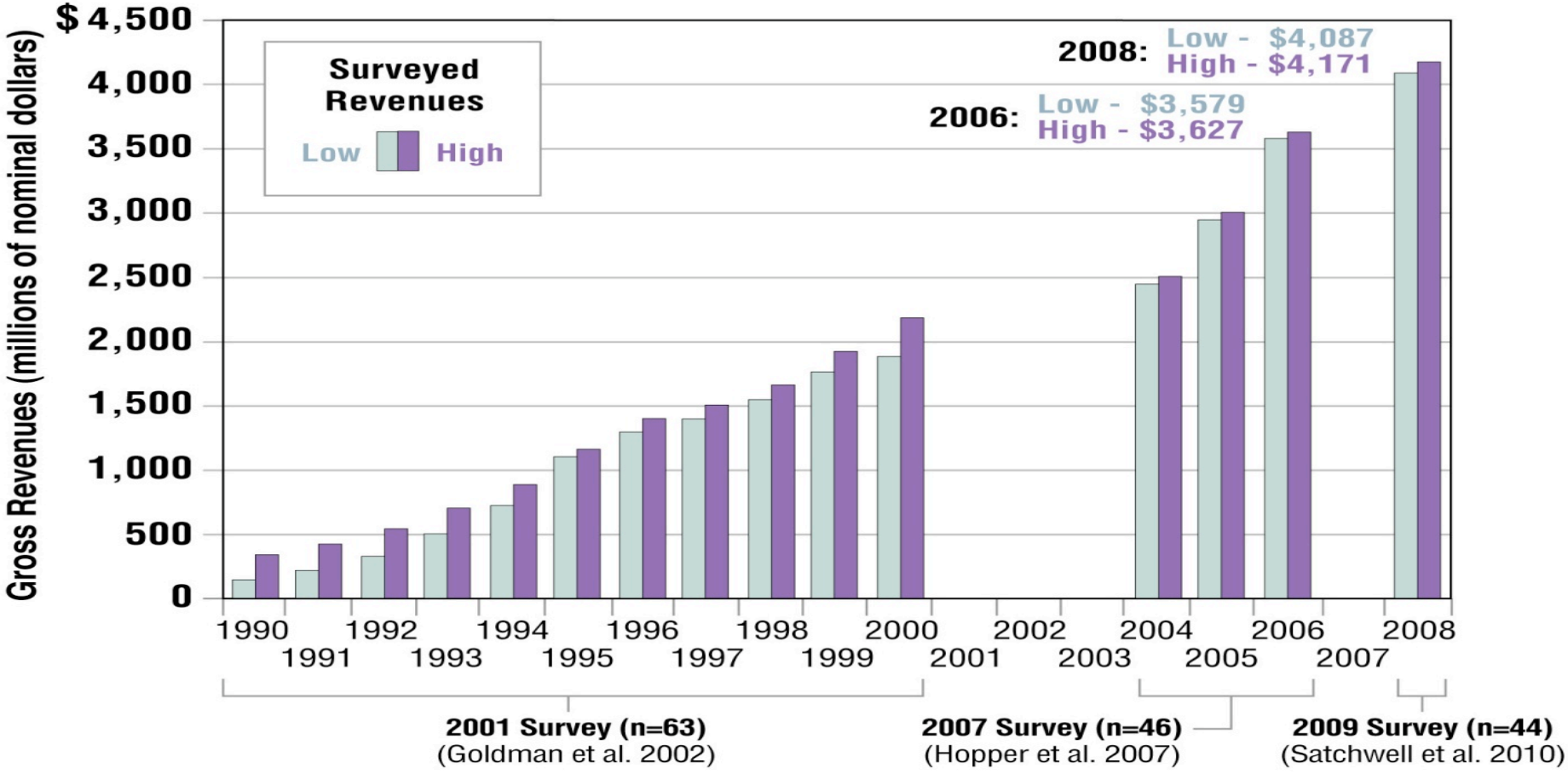
Presentation Outline

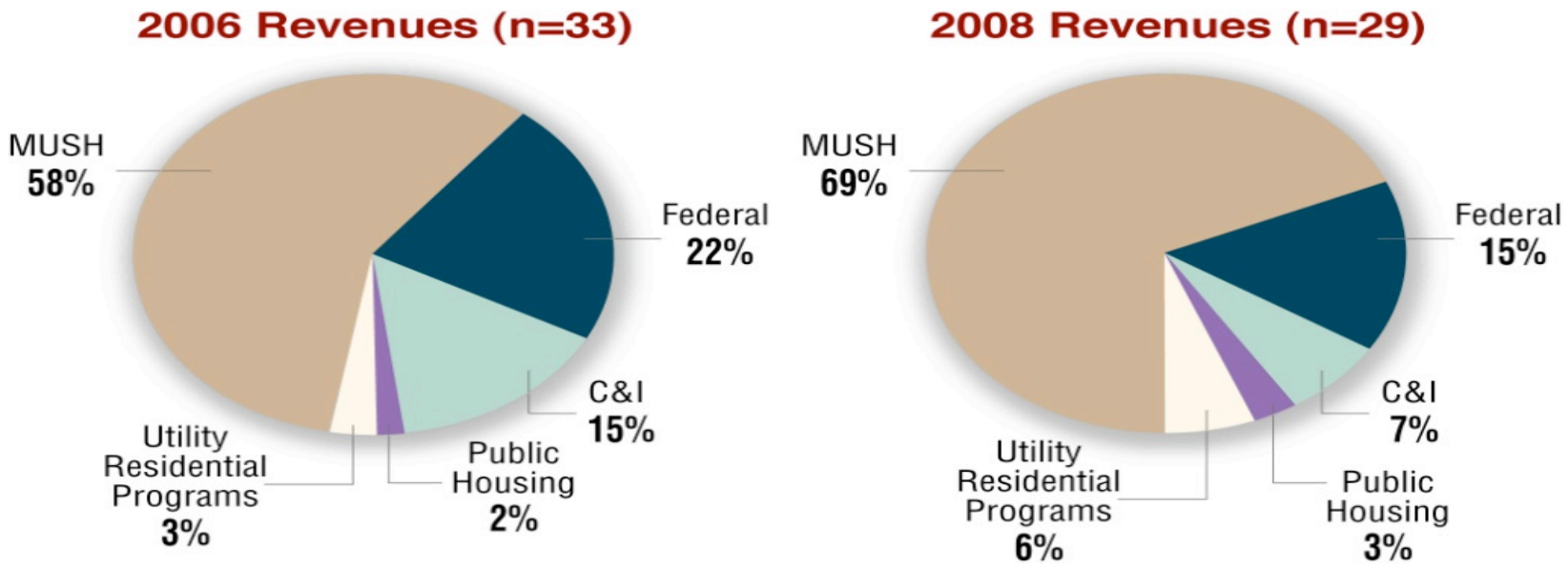
- U.S. ESCO Industry and Market Trends
- ESCO Project Performance: New Results from LBNL/NAESCO Database
- Benchmarking Tools/information to assist State/ Local Governments

U.S. ESCO Industry: Estimated Market Size



- **U.S. ESCO industry revenues were $4.1B in 2008; 7% annual growth from 2006 to 2008 despite general economic slowdown**

ESCO Activity by Market Segment

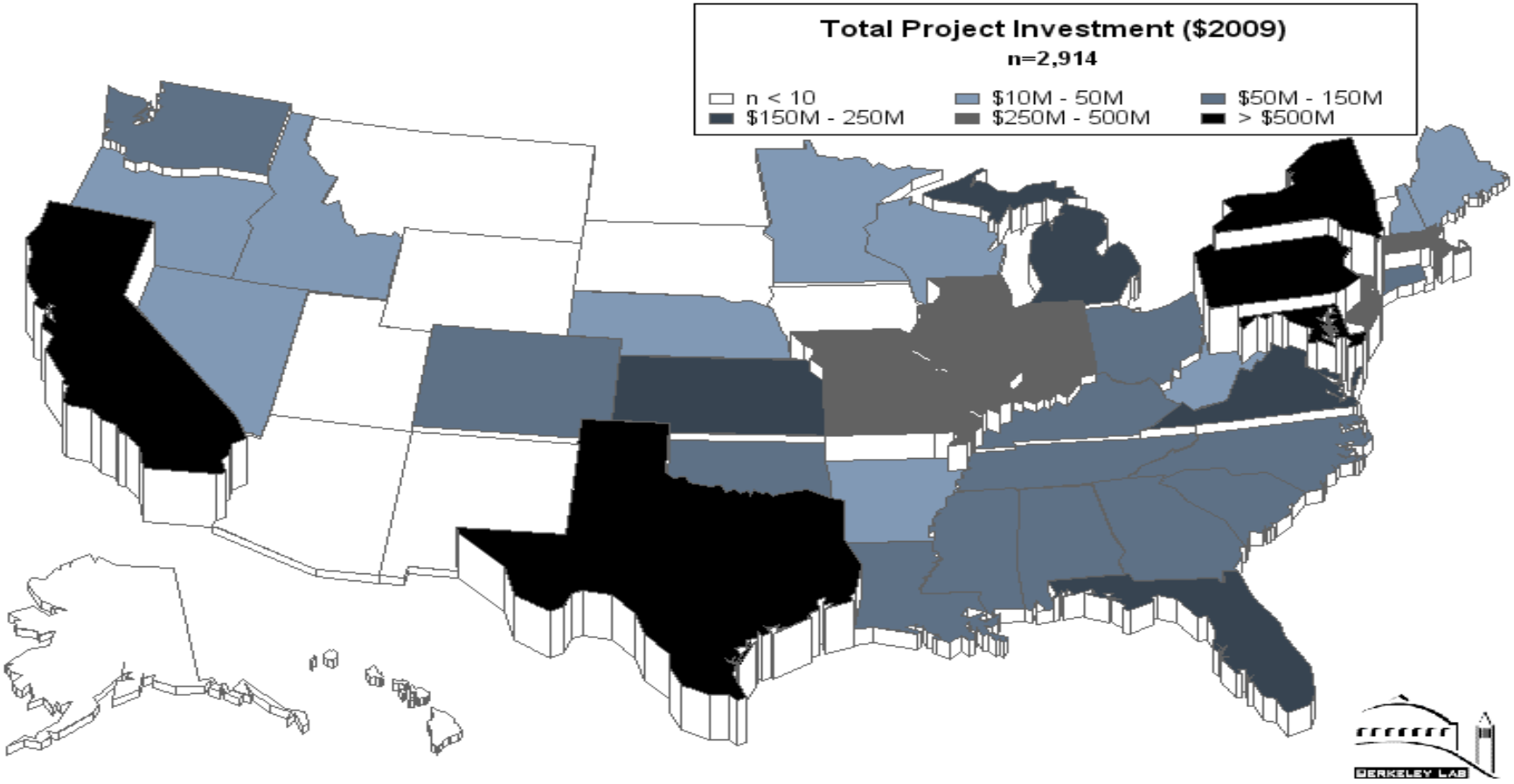


- In 2008, MUSH (i.e., municipal/state govt, universities/ colleges, K-12, hospitals) markets account for $2.8B of ESCO revenues

LBNL/NAESCO Project Database

- ***Project Objectives:***
  - Track industry performance and evolution over time
  - Examine trends in savings, investment levels, market penetration of EE technologies, and customer preferences
  - Database results can be used to support *BENCHMARKING* projects in institutional and public sector markets
- ***Approach:***
  - NAESCO/LBNL partnership with voluntary participation from industry and government agencies
  - ESCOs provide 75% of all project data (through NAESCO accreditation process)
  - Information verified through peer review and reference checks
  - Database size: ~3,300 ESCO projects in 49 states representing over $8B in total investment (~20% of total ESCO industry activity)

ESCO Project Investment Levels by State



- **ESCO project investments tend to be concentrated in heavily populated states that have supportive enabling policies**

Market Penetration of Energy Efficiency Measures in ESCO Projects

Measure Category	Federal Government (n=448)		MUSH Markets (n=2218)		Private Sector (n=599)	
	No. of projects	% of projects	No. of projects	% of projects	No. of projects	% of projects
**Lighting*	319	71%	1766	80%	396	66%
Heating, Ventilation & Air Conditioning (HVAC):						
**Boilers	87	19%	640	29%	85	14%
**Chillers	127	28%	460	21%	83	14%
Other HVAC sources	48	11%	286	13%	49	8%
**Distribution/ventilation equipment/systems	168	38%	916	41%	127	21%
**Controls	219	41%	1387	63%	148	25%
Other HVAC measures	77	17%	256	12%	25	4%
Packaged/roof-top/split systems	31	7%	286	13%	24	4%
Air quality	26	6%	181	8%	60	10%
**Building envelope (e.g., insulation, windows)*	37	8%	492	22%	51	9%
Geothermal heat pumps	25	6%	15	1%	1	0%
Motors/drives:						
High-efficiency motors	65	15%	268	12%	36	6%
Variable speed drives (VSD)	77	17%	416	19%	78	13%
**Water heating measures*	47	10%	228	10%	46	8%
Miscellaneous equipment/systems	24	5%	266	12%	12	2%
**High-efficiency refrigeration*	3	1%	12	1%	26	4%
**Industrial process improvements*	20	4%	13	1%	16	3%
**Behavioral & operational strategies*	66	15%	402	18%	73	12%
Load management systems	8	2%	31	1%	5	1%
**Customer distribution system equipment*	12	3%	34	2%	13	2%
**Non-energy improvements*	13	3%	161	7%	8	1%
**Water conservation*	111	25%	450	20%	93	16%
Distributed generation:						
Renewables	16	4%	18	1%	4	1%
Cogeneration	20	4%	74	3%	16	3%
Other DG technologies	15	3%	30	1%	7	1%
Backup/emergency generators	7	2%	27	1%	7	1%

- **LBNL database includes ~200 different EE measures, technologies, strategies that ESCOs report**
- **Example: 80% of all "MUSH" projects install lighting efficiency measures; 29% replace boilers**

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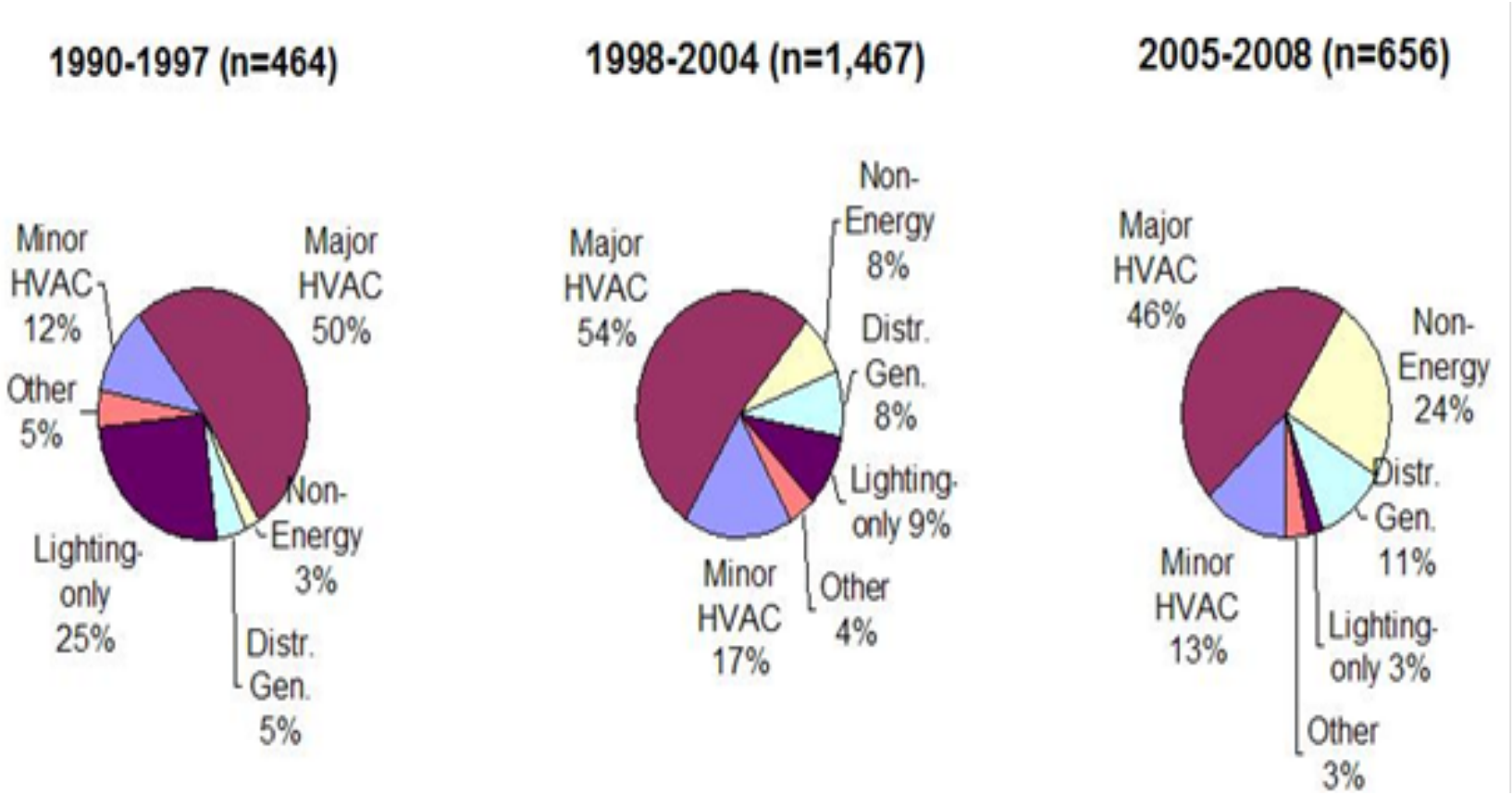
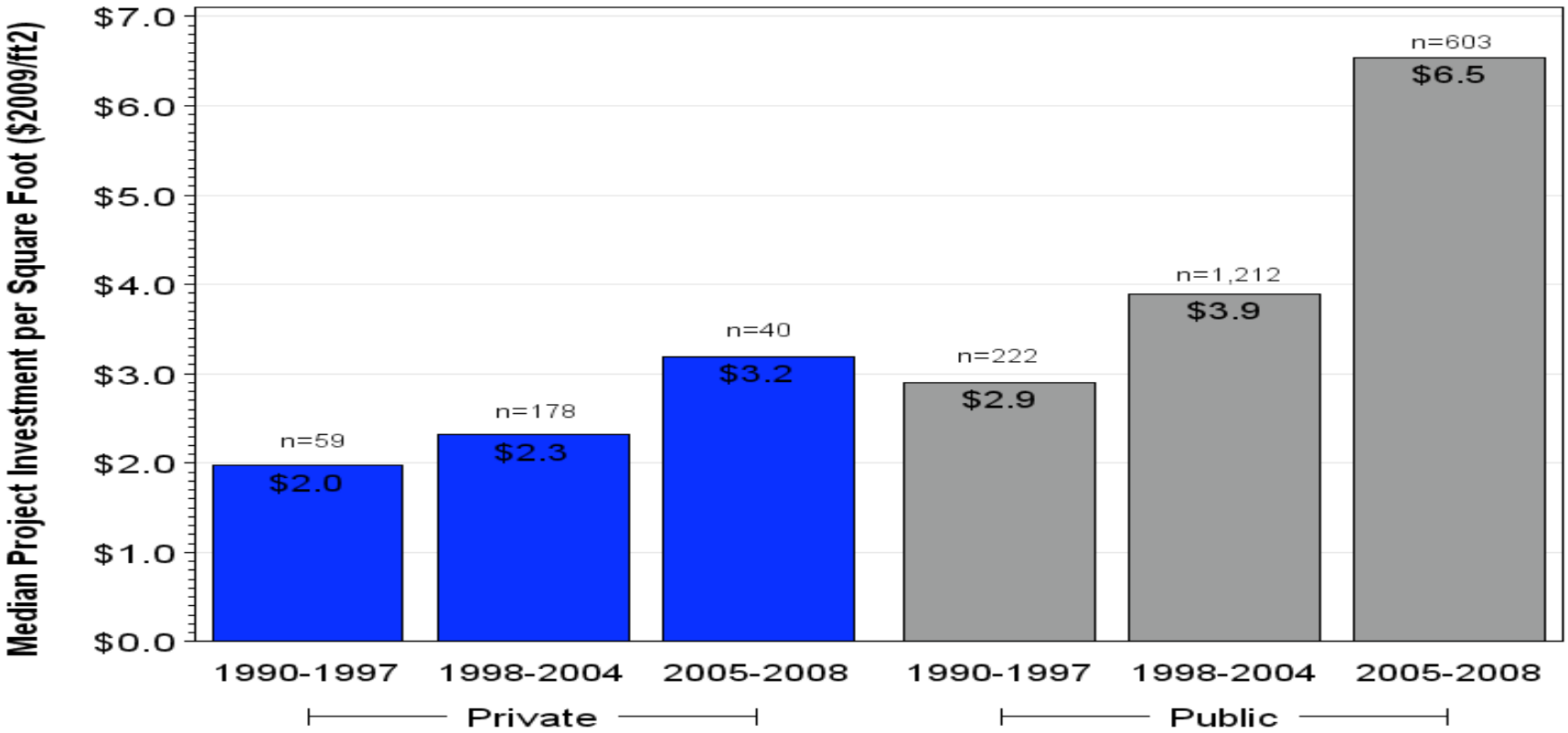
Primary ESCO Retrofit Strategies



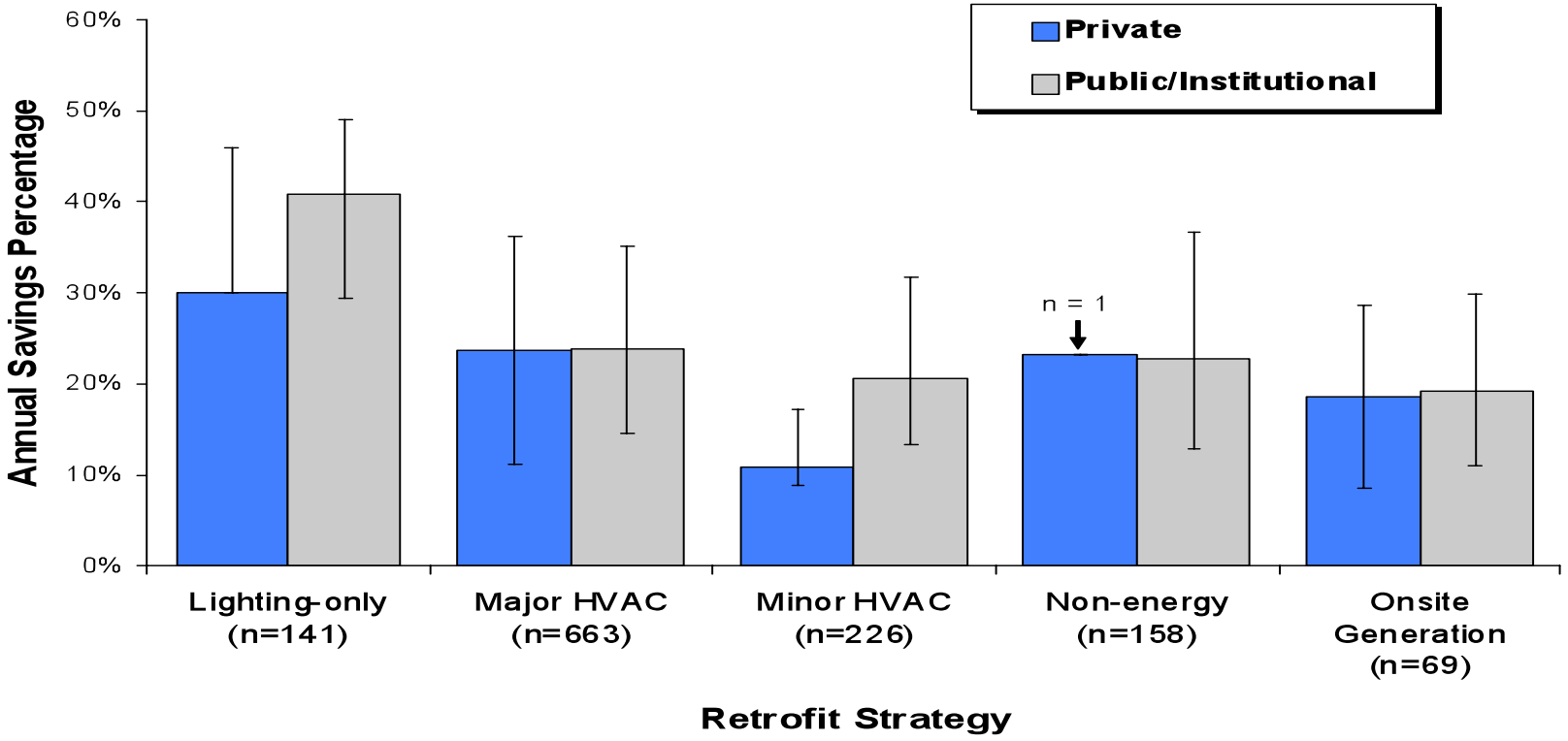
- **For reporting and analysis purposes, we group EE technologies into major retrofit strategies**
- **Share of lighting-only projects is declining over time (25 to 3%) while ESCO projects that include onsite generation is increasing (5 to 11%)**

Trends in ESCO Project Investment



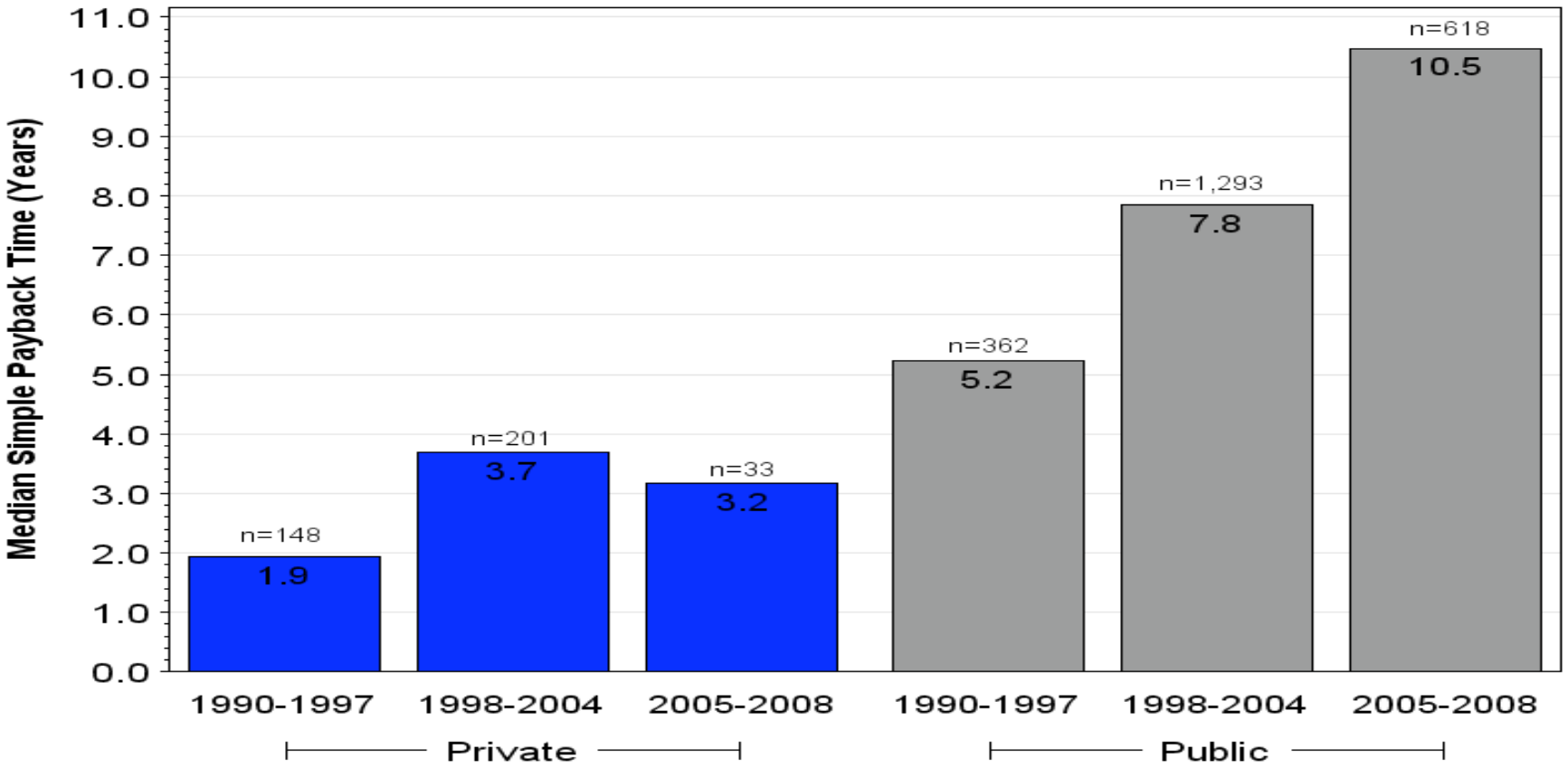
- **Project investment levels (i.e., per-contract installation costs) are increasing over time, even after accounting for inflation**
- **Reasons: More comprehensive projects (measures per project), more on-site generation installations; & possibly, increases in labor and material costs (relative to inflation rate)**

ESCO Project Savings by Retrofit Strategy



- Major HVAC projects typically save ~25% of baseline energy usage
- Lighting-only retrofits typically save ~30-40% of baseline energy usage, but these are becoming less common and are often “stipulated savings”

ESCO Project Economics for Customers



- More comprehensive projects and increasing installation costs result in longer median payback times for public sector projects
- ~3300 ESCO projects in our database achieved ~2.3 billion in direct net economic benefits to customers

Benchmarking Tool for ESCO Projects

- **LBNL and NAESCO are developing fact sheets to help state/local govt. ARRA grantees benchmark and assess performance of proposed EE projects as part of DOE EERE WIP Technical Assistance efforts**

- **LBNL developed analytical tool—using ESCO database—to benchmark historic project performance using the following metrics:**

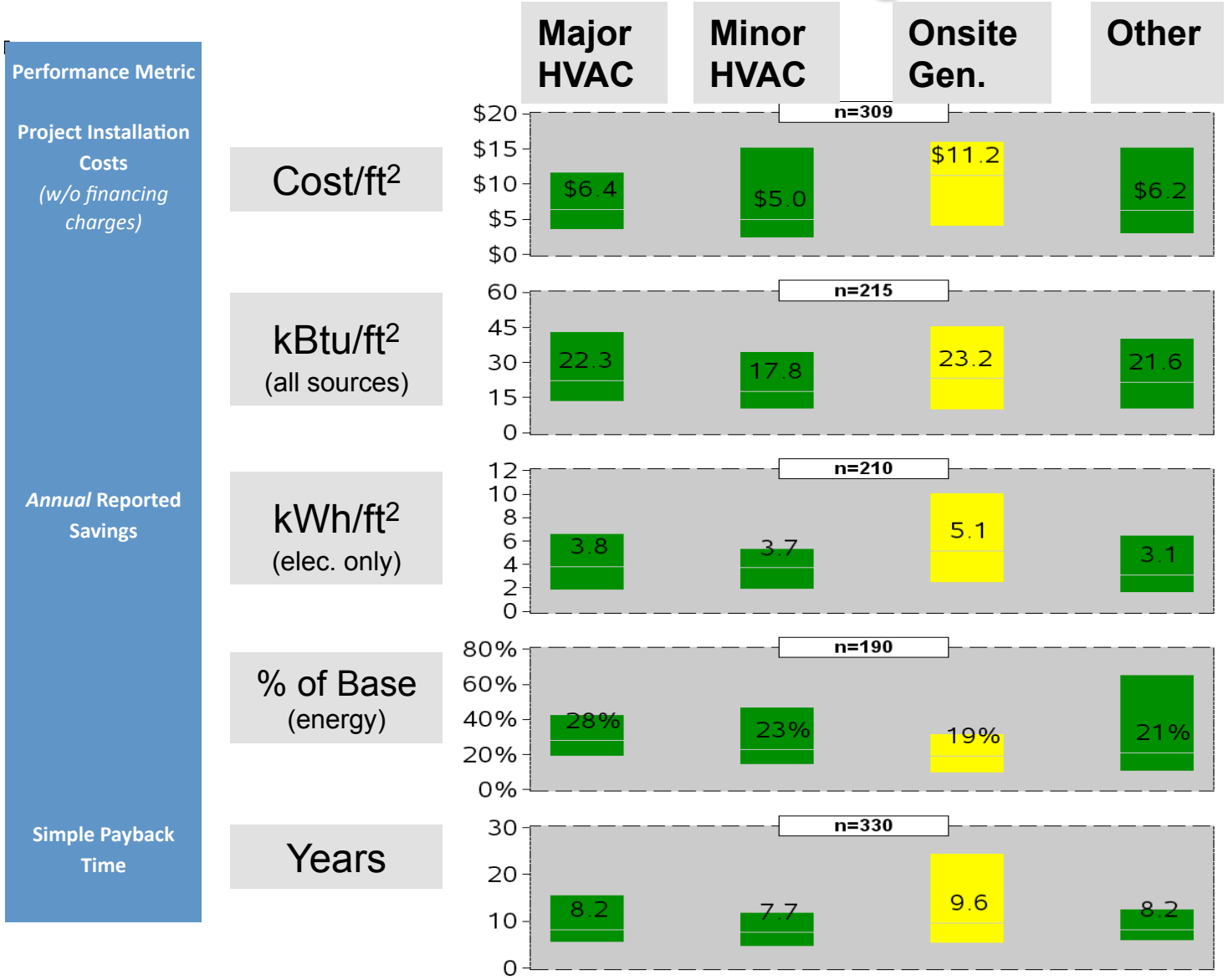
  1. **Typical Installation costs per square foot (w/o financing charges);**

  2. **Reported annual energy savings expressed in (a) kBtu/ft^2, (b) kWh/ft^2, and (c) % of baseline energy; and**

  3. **Simple payback time.**

- **LBNL will report benchmarking data by retrofit strategy (major HVAC, minor HVAC, onsite generation, and other) for each market segment (e.g. state/ local govt., K-12 schools)**

Benchmarking Performance of ESCO Projects: State/Local Government Buildings



Summary

- ESCO industry revenues continue to increase despite general downturn in the broader economy; poised for additional growth
- ESCOs are installing a more comprehensive mix of technologies at project sites
- Public/institutional market sector continues to be the dominant market for U.S. ESCOs
- ESCO project investment levels increasing over time due to customer demand for more comprehensive projects, increase penetration of onsite generation
- ESCO projects are producing net economic benefits for customers ($2.3B in net benefits for ~3300 projects in our database)
- LBNL/DOE/NAESCO are developing project benchmarking tools to help state/local government gauge the expected performance of ESCO projects

For More Information…

- **Download reports here:**

  http://eetd.lbl.gov/ea/emp/ee-pubs.html

- **LBNL Contacts:**

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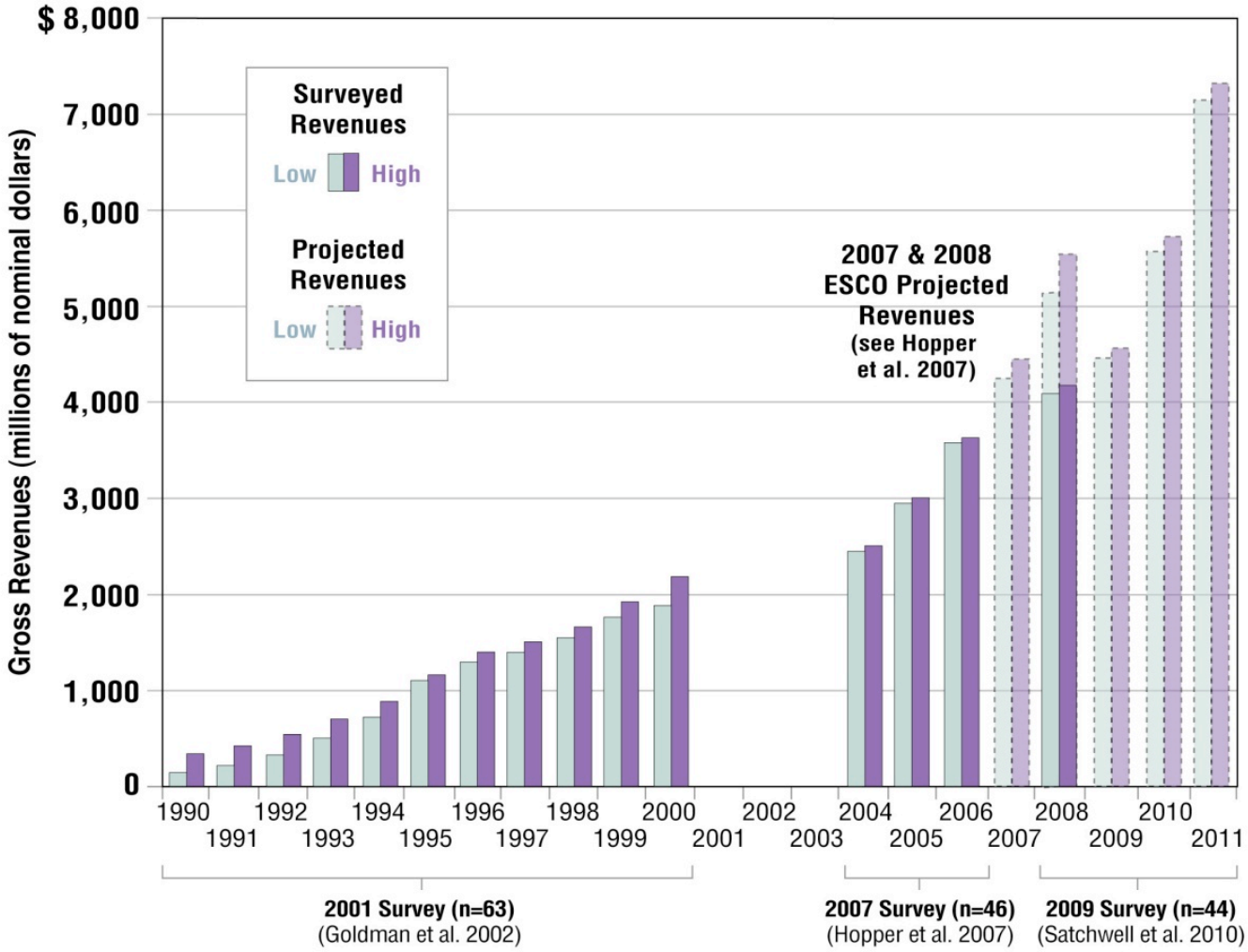
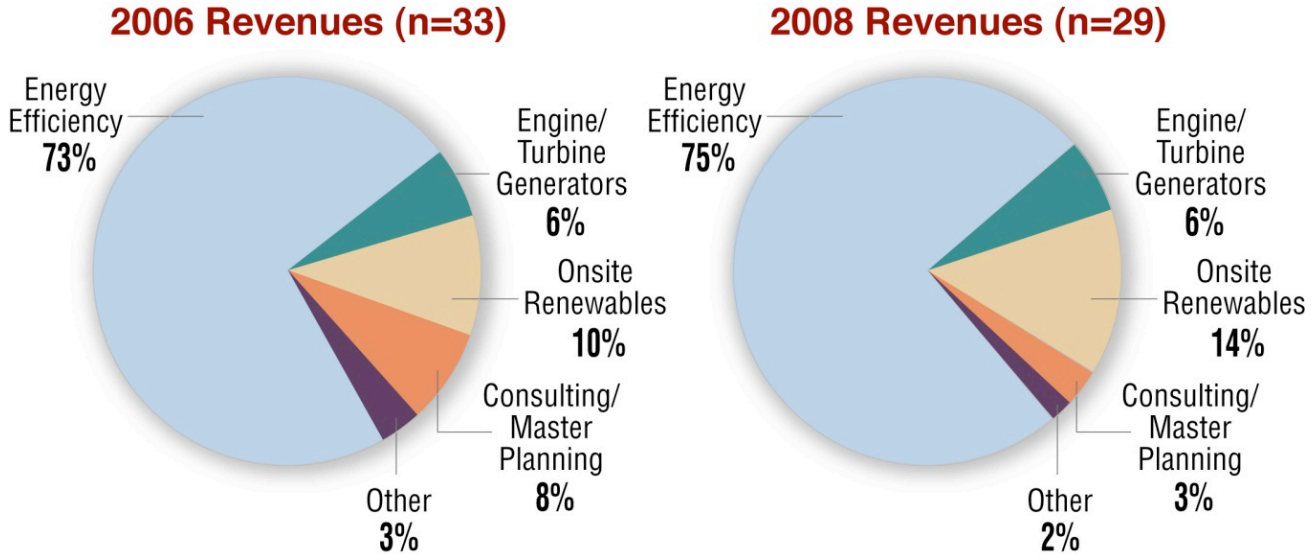
Background Slides

Growth Projections for U.S. ESCO Industry



ESCO Market Activity:
Industry Revenues by Project/Technology Type



- Onsite renewable generation accounts for 14% of ESCO industry revenues in 2008 (~$570 million)
- Contributing factors to increased deployment are:
  - ESCOs leveraging publicly-funded incentives
  - bundling renewable energy with energy efficiency improvements to help customers meet various goals (*e.g., energy independence, environmental footprint reductions)*

ESCO Projects: Benefit/Cost Ratio

- **Despite installation cost increases, ESCOs are still able to generate net economic benefits for their customers.**
- **We estimate that ESCO projects in our database generated about $2.3 billion in direct net economic benefits to customers.**