Charting the Home Performance Contractors Territory

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Whole House Contracting Study

- PIER funded project
  - BKi, lead contractor, link to CPUC Home Performance with Energy Star
  - PSD, main subcontractor, experience inside CA and with other programs and private sector activities nationally
- Work Plan
  - Survey of technical and business practices
  - Protocol development
  - Testing of training and installations

Defining Home Performance and Whole House

- Home Peformance
  - Building Science
  - Performance Testing
- Whole House
  - Above plus the ability to deliver both shell and HVAC improvements in a coordinated fashion

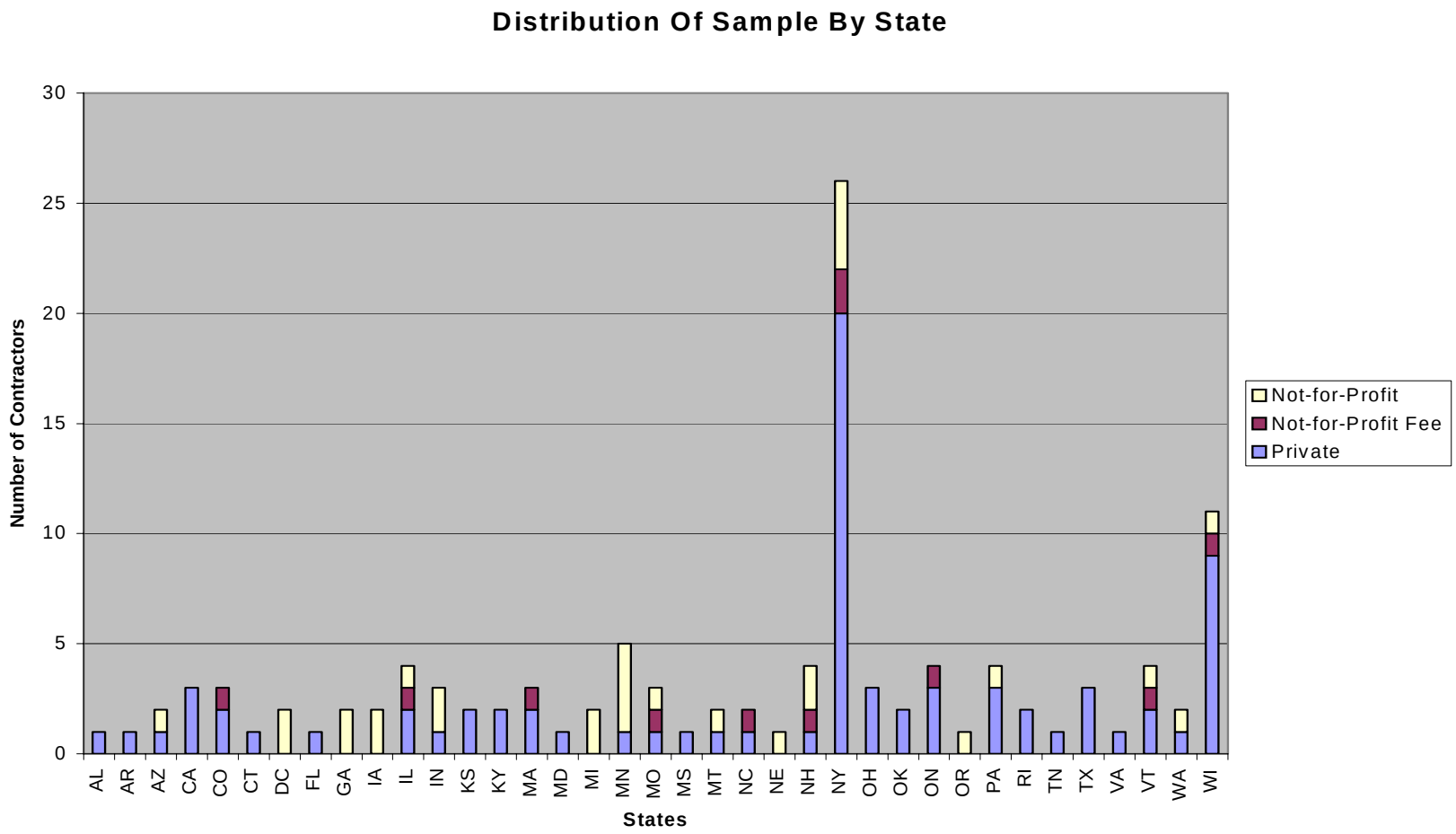
PIER Survey Process

- Online Survey
  - 118 contractor respondents from 35 states, the District of Columbia and Canada
  - Focus on basic business characteristics and basic testing used
- Phone Survey
  - 15 selected contractors
  - Variations in type, location, and business model
  - Contractors talked about what concerned them
  - Explored best practices (see survey)

Key Findings of the Online Survey

- Very diverse response
  - Lots of contractors self identifying as Home Performance contractors outside of the programs
- Patterns in the use of testing
  - Blower doors, Billing, Baseload and IR

Geographic Distribution of the Online Survey



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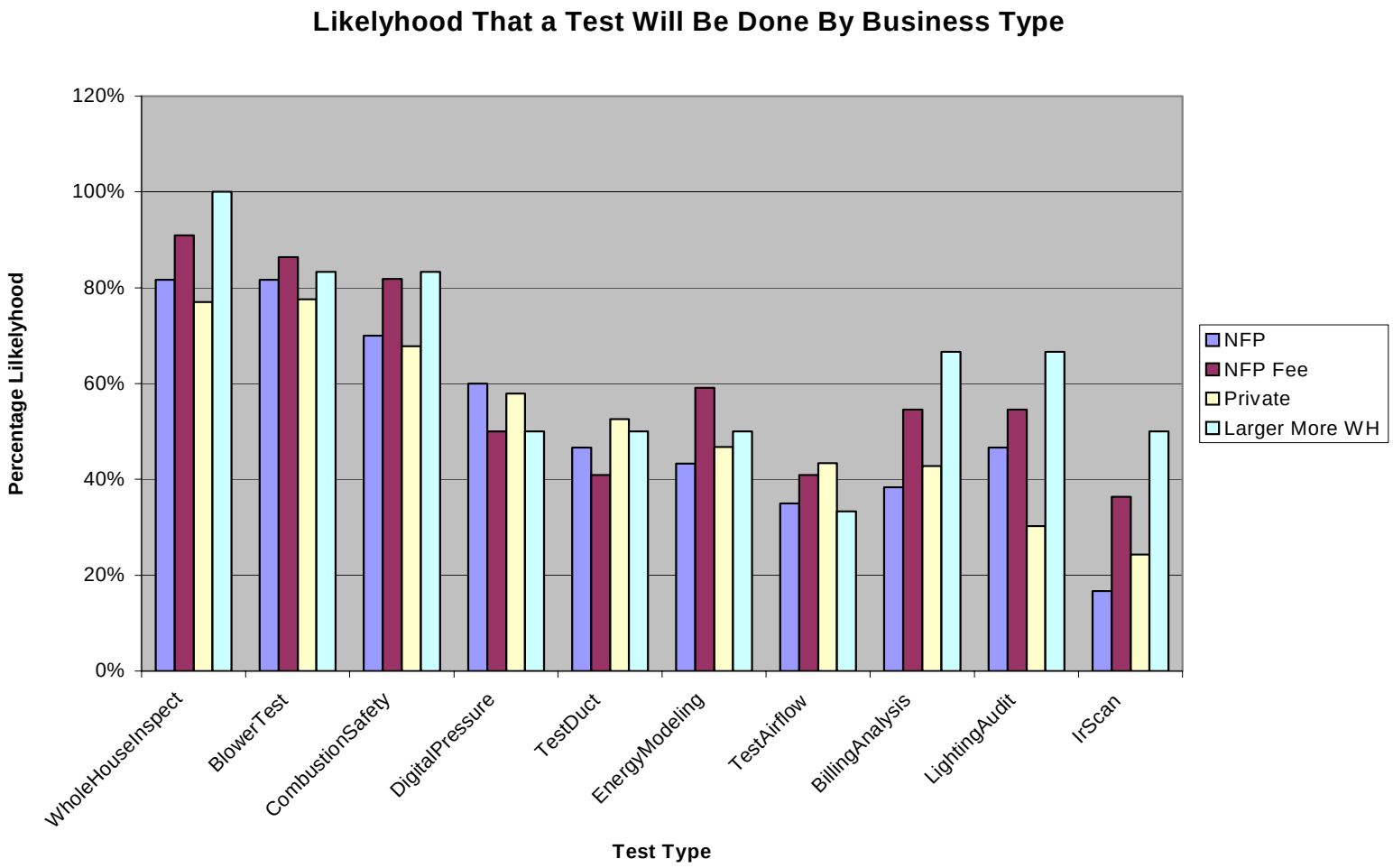
Use of Testing in the Online Survey



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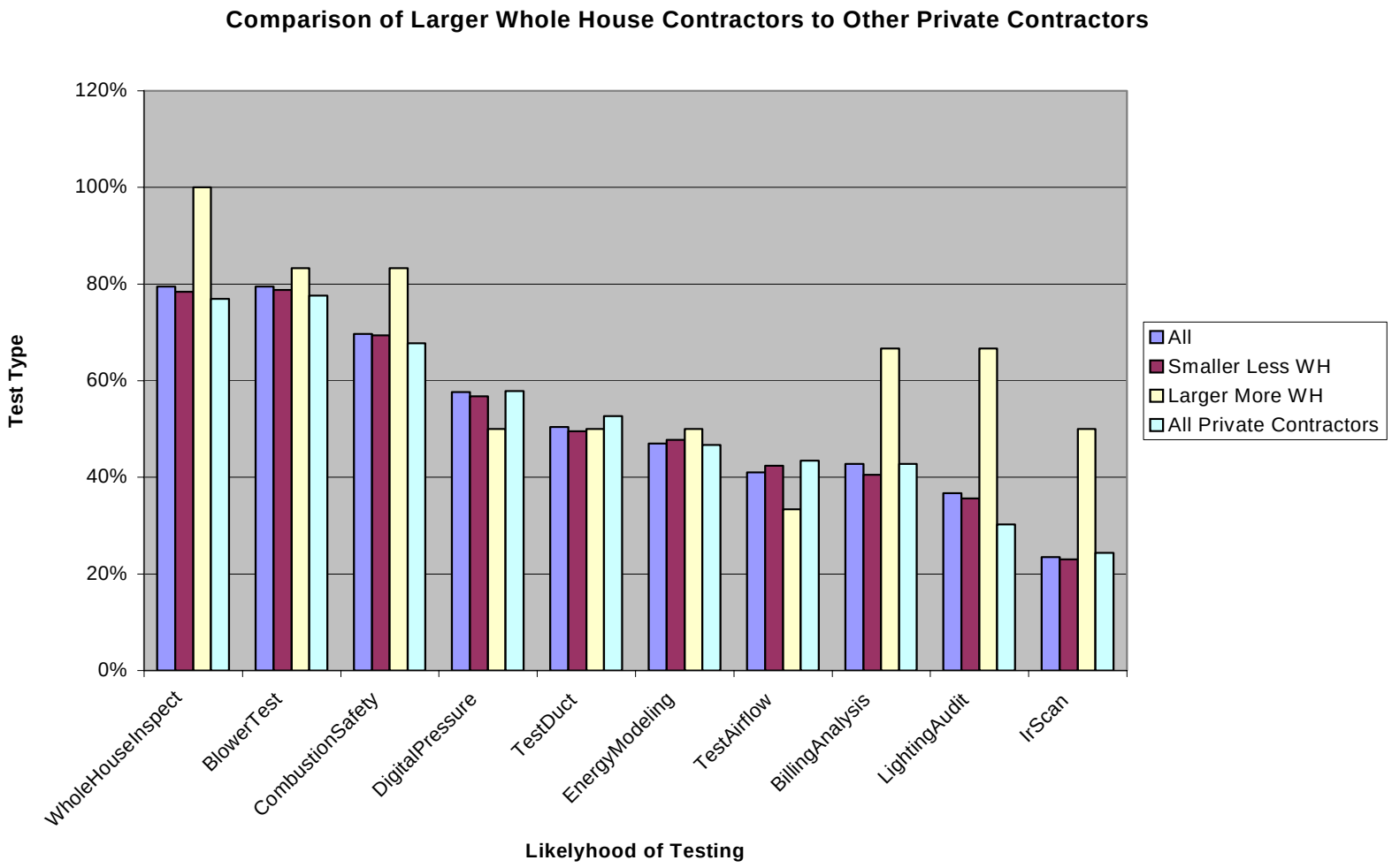
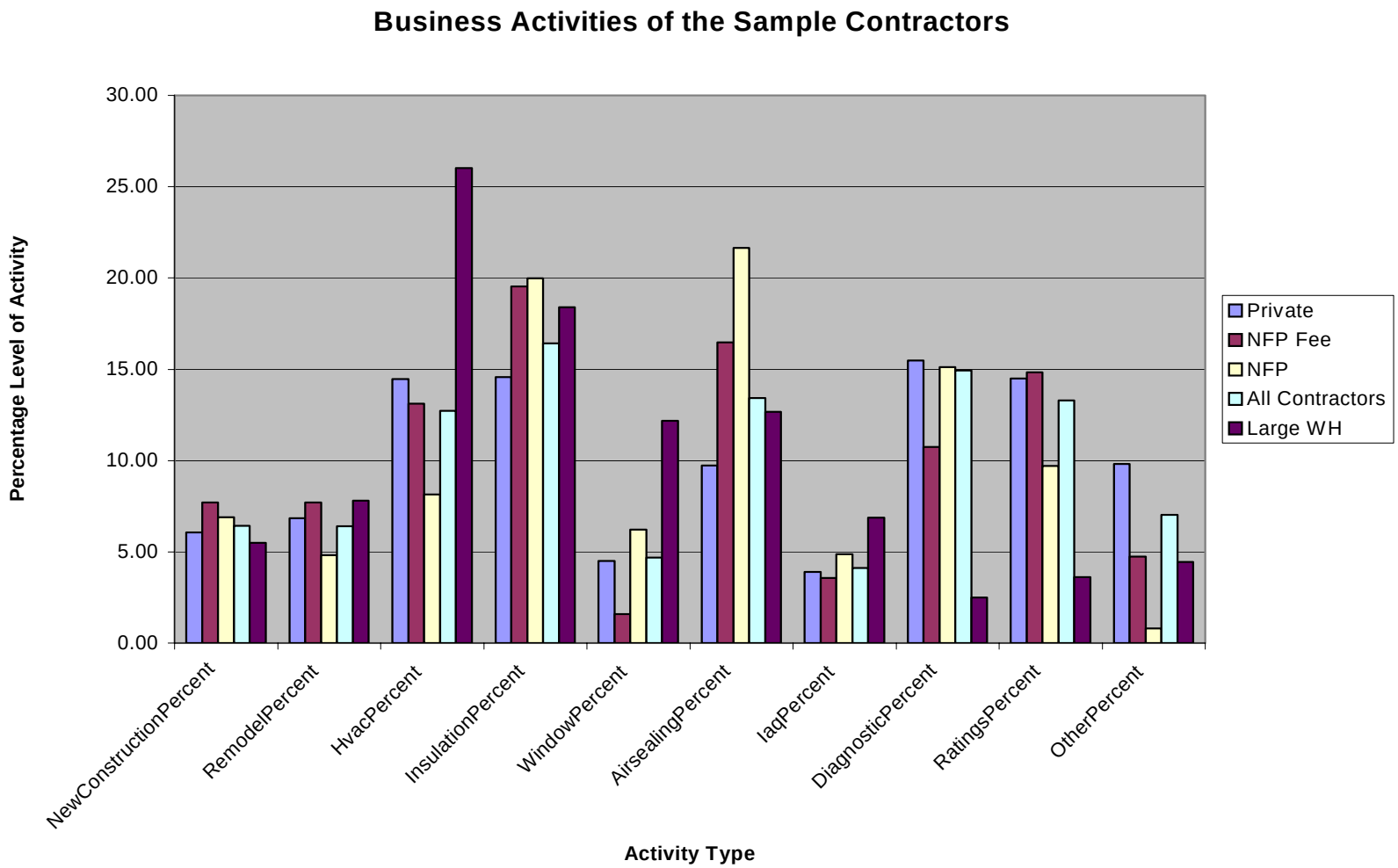
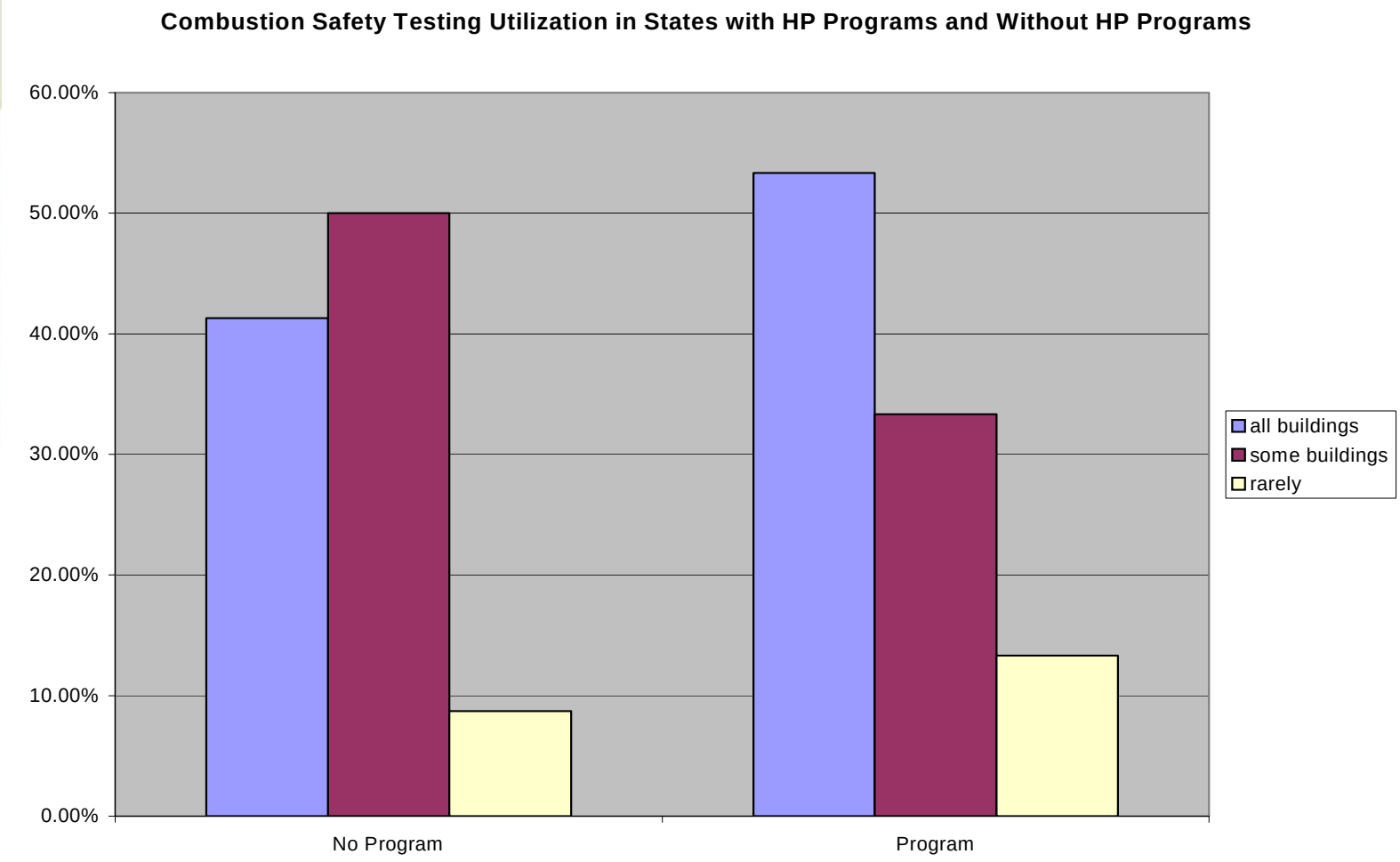
Testing Across Private Contractors



Business Activities



Example: Variations in the Use of CO Testing



Key Findings from the Phone Survey

- Not as much whole house
  - Trade contractors tend to stay focused on their trade
  - Startups and remodelers doing more comprehensive workscopes
- Advice to contractors should be tailored
  - To climate and trade add origin and business model

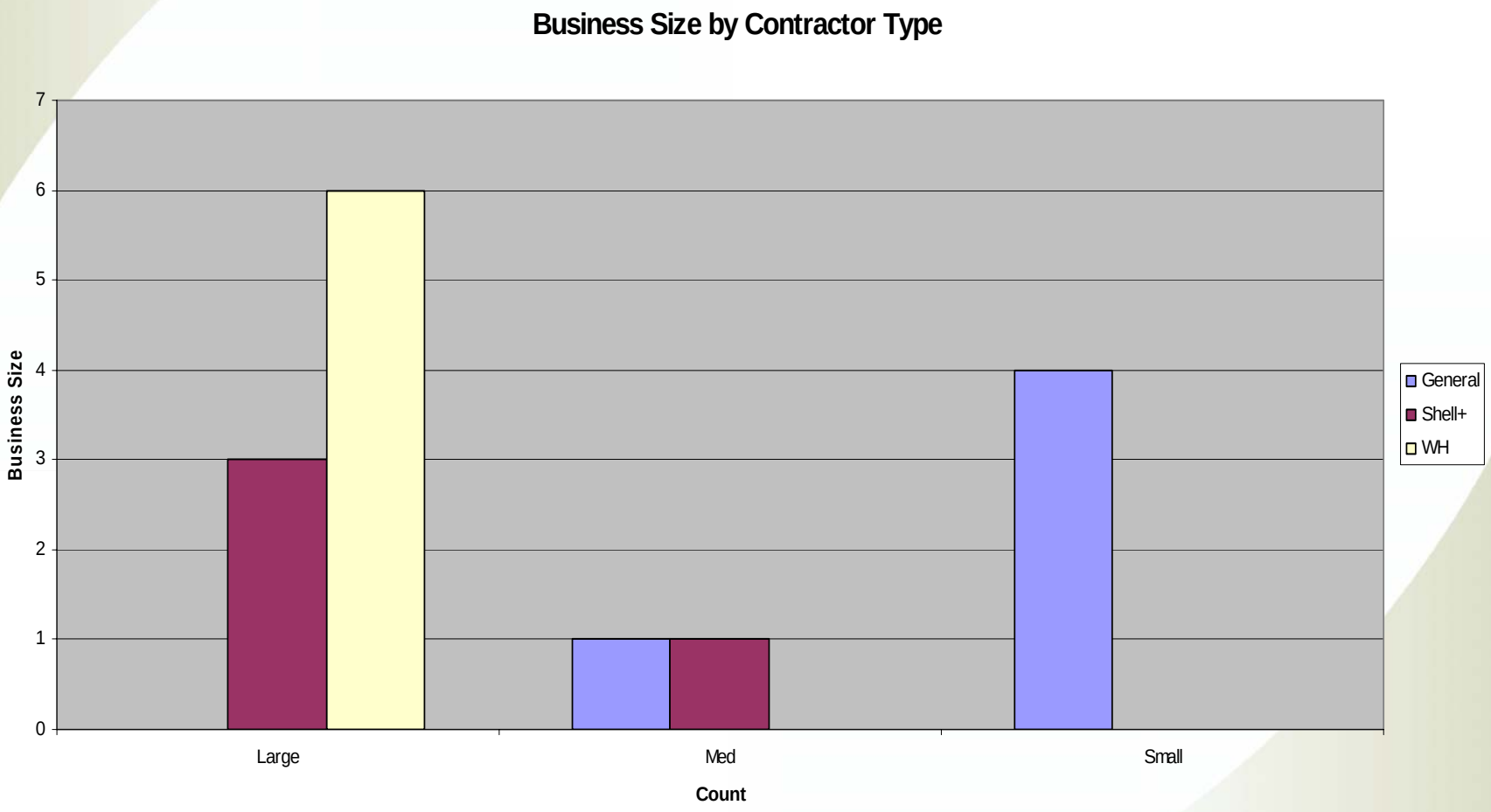
Phone Survey Contractor Summary

Climate	Type	Origin	Size	Had Existing Contracting Business	Years HP	Average Job Size	NFP
Heating	Shell+	Shell	Large	Existing	3	9000	
Heating	Shell+	Shell	Large	Existing	3	8000	
Heating	Shell+	Shell	Large	Existing	4+	4000	NFP
Heating	WH	WH	Large	New	2	9000	
Mixed	WH	HVAC	Large	Existing	4+	18000	
Mixed	WH	Shell	Large	Existing	1	20000	
Heating	WH	Shell	Large	Existing	2	5000	NFP
Mixed	WH	GC	Large	New	4+	8000	
Cool	WH	Shell	Large	Existing	4+	5000	
Heating	General	GC	Med	New	2	2000	
Heating	Shell+	Shell	Med	Existing	2	5000	
Heating	General	GC	Small	New	3	5000	
Heating	General	Shell	Small	Existing	2	2000	
Heating	General	GC	Small	New	3	2000	
Cool	General	Shell	Small	New	2	3000	

Contractor Types

- General Contractor
  - Provides pre and post diagnostics
  - Access to installation through subs for HVAC and Shell
- Shell +
  - Provides pre and post diagnostics
  - Installs shell measures and occasionally works with HVAC contractor
- Whole House
  - Provides pre and post diagnostics along with HVAC and shell installations

Business Size by Contractor Type



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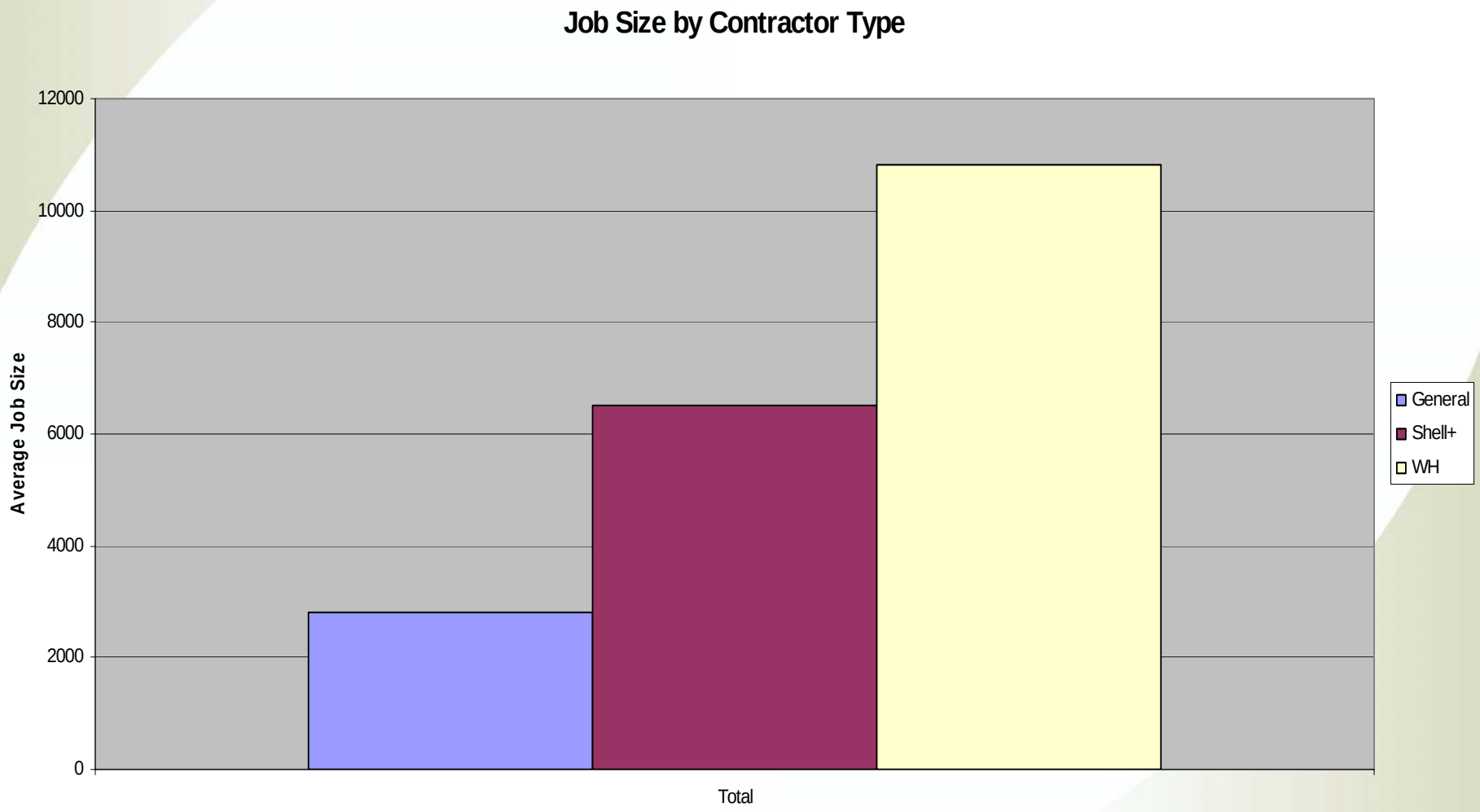
Job Size by Contractor Type



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Results: Origins

- Previous experience helped
  - Other programs with testing
- More shell than HVAC or remodeler
  - Shell has greater need to differentiate?
  - More experience with programs?
  - HVAC as big money income source

Results: Transitions

- Larger contractors tended to sell larger jobs
  - Big jobs have a bigger impact on profits and on customers
- How you operate varies if you are a startup or have an existing customer base
- Inspection fees help to screen customers
- Relationships sell jobs
  - Testing helps build trust
- Financing helps

Results: Technical

- 3 to 4 hours in the house
  - Total of 8 hours
  - 5 to seven days to get report
  - Mostly close by phone or by second visit
- Not much IEQ specific remediation work done
- Not much baseload
- Some type of building modeling was strong inside and outside programs

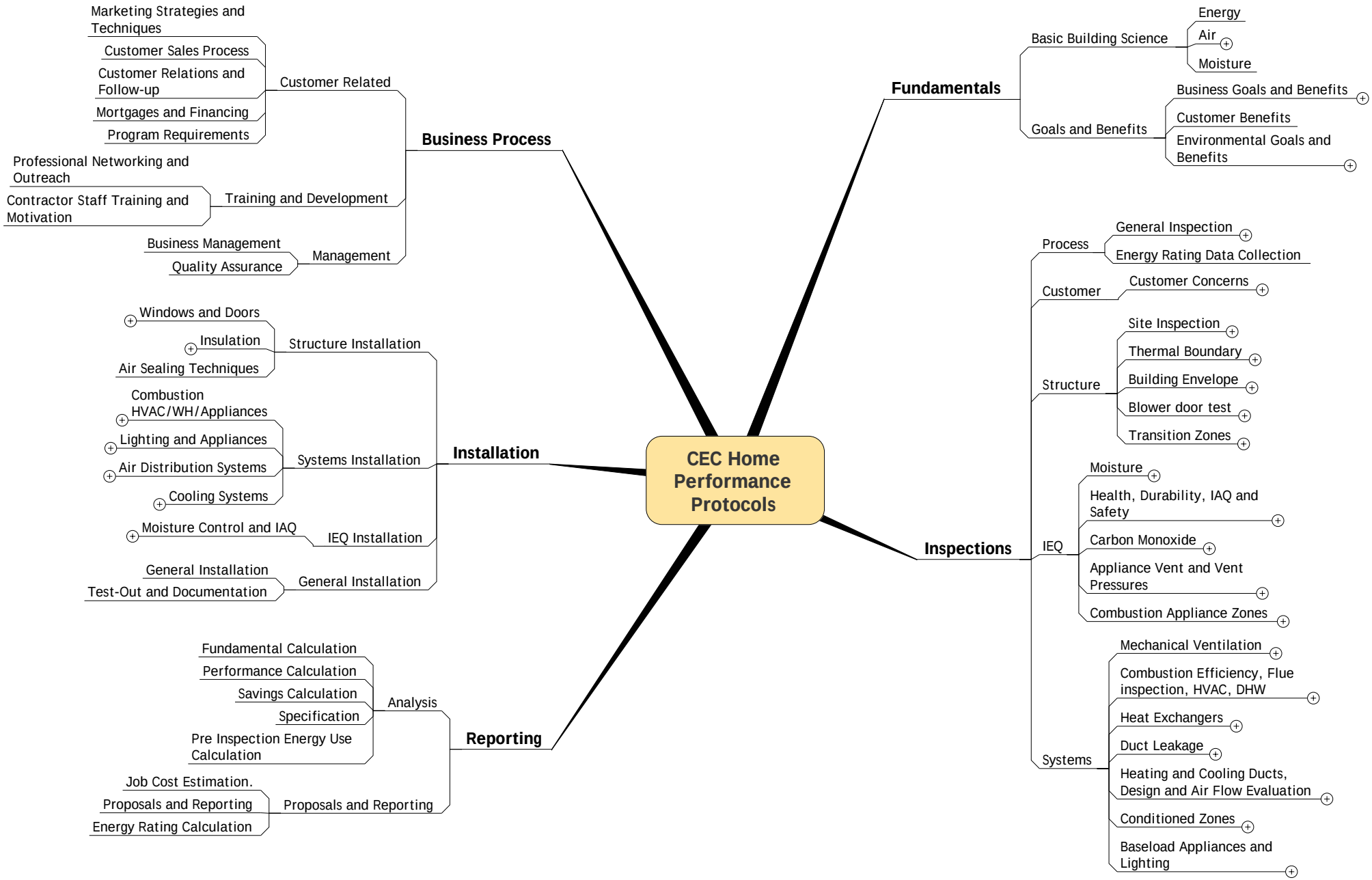
Results: Training and Education

- General dissatisfaction with public efforts at energy education
  - Not effective at stimulating customers
  - Not enough focus on how to get the job done right
- On the job training was preferred over other approaches such as training events or classroom training

Protocol Development

- Development of more detailed best practices for contractor operations
  - Offer multiple detailed images of success
  - One size does not fit all
  - Business systems need the most definition
  - References to existing resources, particularly technical
    - BPI, LBL, NATE, CEE. etc.
    - NARI, etc.

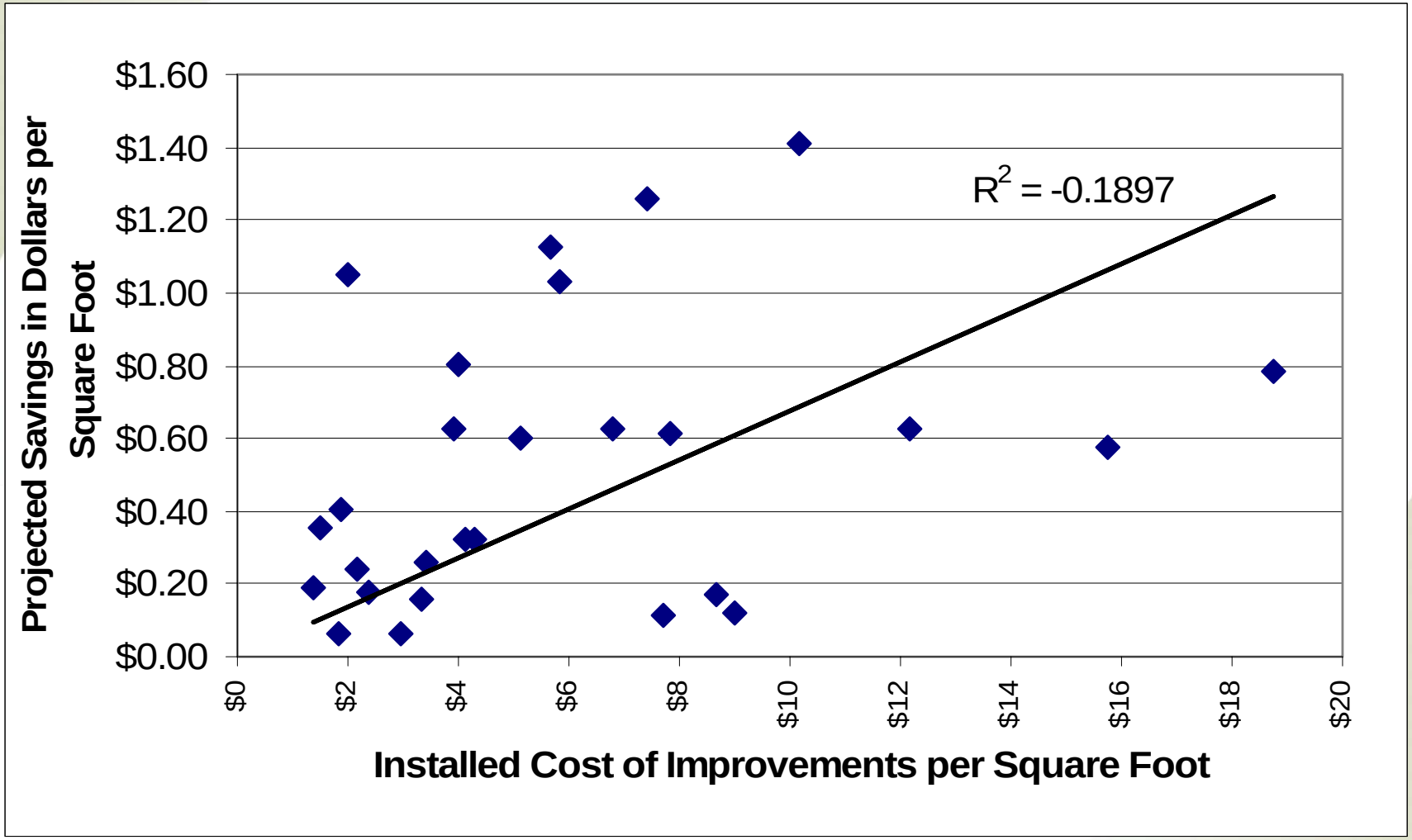
CEC Home Performance Contractor Protocols



Typical Contractor Adoption Process

1. Initial Exposure
2. Information Acquisition
3. Personal Engagement
4. Commitment of Staff Time
5. Commitment of Capital
6. Trying Out Testing
7. Initial Changes to Business Practices
8. Conversion of Business and Technical Practices

Are Customers Buying Efficiency?



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Whole House Evaluation Considerations

- Deemed Savings vs Modeling or Billing Analysis
- The TRC, whole house treatments and customer investments in non-energy benefits

Introduction to Home Performance Protocols

There are more than 76 million residential buildings and nearly 5 million commercial buildings in the U.S. today. The ever-increasing demand for increasingly scarce resources is a basic driving force that will create inevitable growth weatherization and building performance services. There is a growing building performance industry, and this industry, like other industries before it, requires standards for quality, the development of efficient business systems to support production, and the creation of efficient and inspiring ways to transition people to its methods and knowledge.

These Home Performance Protocols incorporate all the functional aspects of becoming a whole house building performance contractor. This includes technical investigation, data interpretation, installation, remediation, and a full range of related business practices. They have been built and tested through the California Energy Commission's PIER project - in conjunction with the California Building Performance Contractor's Association. These Protocols are designed to disseminate critical information on building performance sciences in a way that allows for practical application in the field.

Demonstration Preparation: Introductory information is presented in the Preparation documents. These documents contain references and links that prepare contractors to perform the tasks at hand properly in a way that can be measured.

Demonstration Procedures: Step-by-step instructions walk contractors through the tasks at hand, providing guidance and techniques that can make the difference between success and failure. These Procedure documents are designed to be used in the field, and users are encouraged to check off each step as it is completed.

Protocols are now available for the following tasks:

- Performing a General Inspection
- Interviewing for Occupant Concerns
- Performing a Site Inspection
- Inspecting for Health Durability IAQ and Safety
- Inspecting the Thermal Boundary
- Inspecting for Combustion Efficiency, Flue Capacity, HVAC and DHW
- Performing a Moisture Inspection
- Inspecting for Duct Leakage
- Inspecting Heat Exchangers
- Performing a Blower Door Test
- Inspecting Conditioned Zones
- Inspecting Transition Zones
- Inspecting and Diagnosing the Combustion Appliance Zones
- Inspecting Appliance Venting and Vent Pressure
- Inspecting for Carbon Monoxide
- Inspecting the Building Envelope
- Inspecting Mechanical Ventilation Systems
- Performing a Baseload Appliance Inspection
- Inspecting Heating and Cooling Ductwork Design and Airflow
- Repairing Air Distribution Systems
- General Installation
- Insulation Installation
- Lighting Installation
- Window Installation
- Cooling system Installation
- Combustion HVAC, water heater, appliance - Installation and Repair
- Moisture Control and IAQ Installation
- Test-Out and Documentation

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