Final Report Executive Summary

Building Commissioning Practices in New Construction and Existing Building Markets in the Pacific Northwest

prepared by
SBW Consulting, Inc.

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Northwest Energy Efficiency Alliance
www.nwalliance.org

529 SW Third Avenue, Suite 600
Portland, Oregon 97204
telephone: 503.827.8416 • 800.411.0834
fax: 503.827.8437

SBW Consulting, Inc.
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FINAL REPORT

Building Commissioning Practices in New Construction and Existing Building Markets in the Pacific Northwest

Submitted to

NORTHWEST ENERGY EFFICIENCY ALLIANCE
522 SW Fifth Ave., Suite 410,
Portland, Oregon 97204

Submitted by

SBW CONSULTING, INC.
2820 Northup Way, Suite 230
Bellevue, WA 98004

in conjunction with

R.W. BECK
and
KAPLAN ENGINEERING

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Executive Summary

Background and Purpose

This market study, sponsored by the Northwest Energy Efficiency Alliance ("the Alliance"), is an investigation of the commercial building commissioning practices and related attitudes currently prevailing in the Pacific Northwest. It has been undertaken to provide the information needed to develop a strategic plan for making commissioning "business as usual" in the Pacific Northwest over the next five to ten years. The effort involved a telephone survey of public and private sector Building Owner's Representatives and Commissioning Service Providers in the Pacific Northwest (Washington, Oregon, Idaho, and Montana). Data from the surveys has been used to characterize baseline-commissioning practices and develop strategies for encouraging growth of the private sector commissioning market.

Sample Design and Selection

Two samples were developed for this research. The first sample is a group of building owners, i.e., the buyers of commissioning services (demand-side). The second sample was a group of firms who provide commissioning services, referred to as commissioning service providers (supply-side). Collecting information from both the demand-side and supply-side allows this study to fully characterize the commissioning markets.

The research was limited to market segments that members of the Northwest Commissioning Collaborative believed were likely to be important future markets for commissioning services. Table Exec - 1 provides a list of the market segments surveyed and the quota established for each segment. The table also shows the number of owners for which surveys were completed. These owners were asked about new construction practices if they had projects that reached substantial completion during the last three years. We also sought respondents that could describe commissioning practices for buildings that had been occupied for more than five years (existing buildings market).

Table Exec - 1: Quota and Completions for the Sample of Private Building Owners

	Sample of Building Owners		Number of Responses for...	
Sector/Market Segment	Quota	Complete	New Construction Practices	Existing Building Operation Practices
All Segments	130	130	95	97
Groceries	11	10	8	6
Hospitals	12	16	15	12
Hotels	16	8	3	7
Nursing Homes/Assisted Living	11	18	16	10
Offices (Commercial)	26	22	15	17
Offices (High Tech Ind)	22	16	8	16
Retail Stores	21	26	19	16
Universities/Colleges	11	14	11	13

A sample of 20 commissioning services providers was developed. As shown in Table Exec-2, this sample came equally from two different sources. One half was derived from various directories of commissioning agents and firms actively promoting their commissioning services in the Pacific Northwest. The other half was derived from the building owner surveys. Each building owner respondent was asked for the name of the person that most frequently conducts functional performance tests for their company. This sample design ensured a broader representation of firms that might play an important part in the commissioning markets, including those which primarily sell other services.

Table Exec - 2: Completed Service Provider Surveys by Primary Type of Business

Primary Type of Business	Established Commissioning Providers	Testing Firms Referred by Building Owners
All Types	10	10
HVAC Designer	2	1
HVAC Contractor	1	3
TAB Contractor	0	3
Controls Contractor	0	1
Commissioning	7	0
Other	0	2

Data Collection and Analysis

Telephone Survey

Data was collected for this market study through telephone interviews. Great effort was expended to find and recruit the best respondent for each building owner. For new construction, we sought a mid-level project manager, someone who had to be familiar with the owner's current and recent practices, but was close enough to the project front line to know about specific commissioning activities. For existing building information, we sought a supervisor in the building owner's facility operations staff.

Commissioning Level Score

One of the important goals of this study was to establish a method for measuring the level of commissioning in recent new construction and for the existing building market (buildings occupied for more than five years). This needed to be a repeatable methodology so that a similar study could be performed some years from now to measure the impact of the Alliance's interventions in the commissioning market. A multi-attribute scoring method was developed to measure the level of commissioning in both markets. Certain questions from the interviews were selected as being key indicators of the level of commissioning. The highest possible score in this system is 300.

Importance Score

The other major goal of this study was to gather information that could be used in formulating a strategic plan for expanding and enhancing the commissioning markets. A series of questions were asked of both building owner representatives and commissioning service providers about the benefits of commissioning, barriers to the expansion of commissioning activities, and strategies for overcoming those barriers. The respondents were asked to evaluate the importance of each benefit, barrier, or strategy in two ways. First, they were asked to rate the importance of each separately on a three-point scale. Once all on each list had been evaluated, the respondent was then asked to choose the most important benefit, barrier, or strategy. A joint importance score was computed for each benefit, barrier, or strategy for each respondent.

Private Sector New Construction Market Analysis

Table Exec-3 shows the number of owners, projects, and floor area associated with the responses to the new construction surveys. Across all market segments, the responses describe 569 projects with more than 28 million square feet of floor area that reached substantial completion in the last three years.

Table Exec - 3: New Construction - Number of Owners, Projects, and Floor Area in Sample

	New Construction (Substantial Completion 1995-98)					
		Number of Projects		Total Floor Area		Floor Area / Project
Market Segment	Number of Owners	Total	# Miss	(000's Sq. Ft.)	# Miss	(000's Sq. Ft./Project)
All Segments	95	569	2	28,760	4	50.54
Groceries	8	94	0	3,229	0	34.35
Hospitals	15	80	0	2,089	1	26.11
Hotels	3	9	0	507	0	56.28
Nursing Homes/Assisted Living	16	98	0	3,623	1	36.97
Offices (Commercial)	15	50	0	5,185	0	103.70
Offices (High Tech Ind)	8	34	0	3,158	0	92.88
Retail Stores	19	166	2	10,273	2	61.89
Universities/Colleges	11	38	0	697	0	18.33

Miss - Number of responses missing, either Don't Know or Not Asked

Responses from the surveys were used in assigning a "Level of Commissioning" score to each building owner participating in the market study. The mean scores for each market segment are shown in Table Exec - 4.

Table Exec - 4: Level of Commissioning in Recent New Construction

Sector/Market Segment	Mean Commissioning Level Score (300 point scale) New Construction (Substantial Completion 1995-98)	Percent of Floor Area with Low, Medium and High Commissioning Scores		
		Low (0 to 100	Medium (100 to 200)	High (200 to 300)
All Segments (N=95)	124	42%	39%	19%
Groceries (N=8)	88	75%	25%	
Hospitals (N=15)	177	13%	33%	53%
Hotels (N=3)	76	67%	33%	
Nursing Homes/Assisted Living (N=16)	107	50%	31%	19%
Offices (Commercial) (N=15)	131	27%	53%	20%
Offices (High Tech Industrial) (N=8)	142	50%	13%	38%
Retail Stores (N=19)	106	47%	53%	
Universities/Colleges (N=11)	125	45%	45%	9%

Private Sector Existing Building Market Analysis

Table Exec - 5 shows the number of owners, buildings, and floor area associated with the existing building surveys. Across all market segments, the responses described typical commissioning practices for 97 building owners, responsible for 1,650 buildings, containing more than 102 million square feet of floor area.

Table Exec - 5: Existing Buildings - Number of Owners, Buildings, and Floor Area in the Sample

Market Segment	Existing Buildings (Occupied for at Least Five Years)					
		Number of Buildings		Total Floor Area		Floor Area / Building
	Number of Owners	Total	# Miss	(000's Sq Ft.)	# Miss	(000's Sq. Ft./Building)
All Segments	97	1650	0	102,939	5	62.39
Groceries	6	212	0	6,290	1	29.67
Hospitals	12	131	0	15,371	0	117.34
Hotels	7	36	0	4,020	2	111.67
Nursing Homes/Assisted Living	10	100	0	5,432	0	54.32
Offices (Commercial)	17	166	0	18,030	1	108.61
Offices (High Tech Ind)	16	230	0	15,339	0	66.69
Retail Stores	16	481	0	29,817	1	61.99
Universities/Colleges	13	294	0	8,640	0	29.39

Miss - Number of responses missing, either Don't Know or Not Asked

As shown in Table Exec- 6, the existing building markets display somewhat higher commissioning scores than the new construction markets. A less complete set of factors was considered in forming these scores.

Table Exec - 6: Level of Commissioning in Existing Buildings

Sector/Market Segment	Mean Commissioning Level Score (300 point scale) Existing Buildings (Occuppied for at Least Five Years)	Percent of Floor Area with Low, Medium and High Commissioning Scores		
		Low (0 to 100	Medium (100 to 200)	High (200 to 300)
All Segments (N=97)	153	40%	9%	51%
Groceries (N=6)	94	50%	33%	17%
Hospitals (N=12)	193	25%	8%	67%
Hotels (N=7)	168	43%		57%
Nursing Homes/Assisted Living (N=10)	123	60%		40%
Offices (Commercial) (N=17)	186	24%	12%	65%
Offices (High Tech Industrial) (N=16)	167	38%	6%	56%
Retail Stores (N=16)	109	50%	19%	31%
Universities/Colleges (N=13)	153	46%		54%

Survey Results for Commissioning Service Providers

Interviews were also conducted with a sample of 20 commissioning service providers. Ten of the respondents are representatives of firms found in various directories of commissioning agents or firms actively promoting their commissioning services in the Pacific Northwest. The other ten were cited by building owners as being the person that most frequently conducts functional performance tests for their company. These service providers were asked about the same topics as were the building owner representatives. Table Exec - 8 shows the type and size of the markets served by these firms.

Table Exec - 7: Service Providers - New and Existing Markets, Public and Private Markets and Last Year's Projects

Sample/Primary Business of the Firm	Percent of Commissioning Work in New and Existing Markets			Percent of Commissioning Work in Public and Private Markets			Commissioning Related Projects in the Last Year	
	New Construc-tion	Existing Buildings	Other*	Public	Private	Other*	Number of Projects	Floor Area
All Providers								
HVAC Designer (N=3)	93%	7%	0%	43%	57%	0%	14	1,450,000
HVAC Contractor (N=4)	65%	35%	0%	64%	36%	0%	92	18,500,000
TAB Contractor (N=3)	73%	27%	0%	45%	55%	0%	116	175,000
Controls Contractor (N=1)	50%	50%	0%	50%	50%	0%	75	
Commissioning (N=7)	69%	31%	0%	21%	79%	0%	56	3,730,000
Other (N=2)	46%	55%	0%	95%	6%	0%	46	675,000
Total (N=20)	69%	31%	0%	45%	55%	0%	399	24,530,000

Strategic Plan for Intervening in the Commissioning Markets

The purpose of this strategic plan is to identify specific market interventions that will achieve the goal of making commissioning "business as usual" over the next 5 to 10 year period. Our surveys of building owners and service providers produced considerable evidence that substantial portions of the new construction and existing building markets already practice aspects of commissioning. It is possible to conclude that commissioning is "business as usual," for at least a portion of these markets. However, this study also demonstrates that there is ample room for expanding these practices. Expansion could be achieved by bringing more market segments to higher levels of commissioning practice. In addition, expansion could come from improving the depth, scope, and quality of commissioning practice.

The market study provides significant information about what interventions might be effective. This comes from the opinions of owners' representatives about what would help advance the practice of commissioning in their own organizations. These same respondents also provided substantial information about perceived benefits of commissioning and barriers to its expanded practice. These opinions were reinforced by commissioning service providers who were asked the same questions. Clearly, we can not know for sure what actions will be effective. However, the best place we have to start is with the people who are on the front line, either buying commissioning services (owners representatives) or selling those services (commissioning service providers). The market study provides a wealth of information from both of these perspectives.

As detailed as the market study was, it still only provides broad directions for the strategic plan. Deciding, in detail, how to pursue these strategic directions will have to be left to organizations that broadly represent the market of commissioning service buyers and sellers, such as the Northwest Commissioning Collaborative and the Alliance.

Three strategic directions have been identified.

Education

Participants in the new construction market clearly desire educational programs that will explain testing procedures and the benefits of commissioning. Two educational programs are needed. The first would focus on members of the design community. For all market segments this should include design engineers. For most market segments the program should also address architects. The second program would focus on the education of building owners.

There are three types of educational programs needed for the existing building markets. For some market segments, the provision of technical assistance for first time users is an important strategy. Educational programs for building owners will be important for a number of market segments. Finally, building operator education is needed in many market segments

Case Studies

The lack of documented benefits was the 3rd most important barrier to commissioning in the new construction market. Well-crafted case studies might be the solution to this barrier although this strategy was ranked 5th overall. Certain market segments clearly see the value of case studies. Service providers also ranked this strategy 2nd. Informal comments from respondents indicate that they would need case studies that are specific to the type of buildings built by their organization. Respondents may believe that case studies would be too generic to be of use and thus discount them as an important strategy. Some additional research should be done to determine where market segment specific case studies would be of value. We also have some indication from owners who have built large numbers of buildings that case studies would have to be done for one of their buildings, in order for the results to be useful.

In the exiting building market, case studies were ranked 3rd. Some market segments also gave a high rank to technical assistance for first time users of testing procedures. These two strategies can be effectively combined. Case studies for first time users will clearly demonstrate the benefits of commissioning. Clearly, service providers are keen on the combination of these two strategies, as they ranked them 1st and 2nd.

<u>Tax Incentives</u>

Tax credits were the 2nd rank strategy for existing building markets and the 4th rank strategy for new construction markets. This is a complex topic and it is not clear what actions would be effective. More research should be conducted with market segment representatives to identify the specific tax credits they feel would be effective. This research could also identify and examine existing tax credits that have been used for similar purposes, such as the Oregon Business Energy Tax Credit. Further specification of the action plan in this area will have to be accomplished by the experts that conduct this additional research.

<u>What Not to Do</u>

Sometimes what is not to be done is just as important what is to be done. The surveys for both new construction and existing buildings clearly identified two actions that should not be taken.

1. Professional Certification. The certification of commissioning service providers has been much debated over recent years. The markets do not place a high value on certification.

2. Non-Financial Awards. Some commissioning programs have relied on non-financial awards, e.g., certificates of merit, to expand the practice of commissioning. Again, the markets place little value on these awards.

The Alliance has limited resources for intervening in the commissioning markets. It is vital that these resources be narrowly focused on the best possible strategies and not be diverted to common but ineffective actions.