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TCI GLOBAL
COMPETITIVENESS
CONFERENCE

COLLABORATION, INNOVATION AND SUSTAINABILITY

2007 TCI Global Competitiveness Conference

"Collaboration, Innovation and Sustainability"

PORTLAND'S GREEN BUILDING CLUSTER:

ECONOMIC TRENDS AND IMPACTS

**Academic Summit
Portland State University
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Scope of Portland Green Building Cluster Study

- ★ Assessed how factors identified in Michael Porter's "diamond" support the growth of green building industry cluster
- ★ Assessed trends in business development, job creation, and revenue generation
- ★ Initial effort to quantify impacts



Rational for Undertaking Study

- ★ Portland and Oregon have identified green building industry as an area of opportunity.
- ★ Need to develop more credible information about the nature of green building as a cluster.
- ★ Information may help identify areas in need of additional support to realize full potential for economic development.
- ★ Assessment may also inform analysis of other emerging sustainability clusters.



Why approach green building as a distinct cluster?

- ✦ subset of broader construction industry but requires new/additional relationships to achieve goals
- ✦ developers, architects, engineers, landscape architects collaborate early in design process to ensure an integrated design approach
- ✦ development of new supply chain relationships that steer existing suppliers to new products or support emergence of new businesses
- ✦ performance assessment of new materials and technologies → need for supporting institutional structure



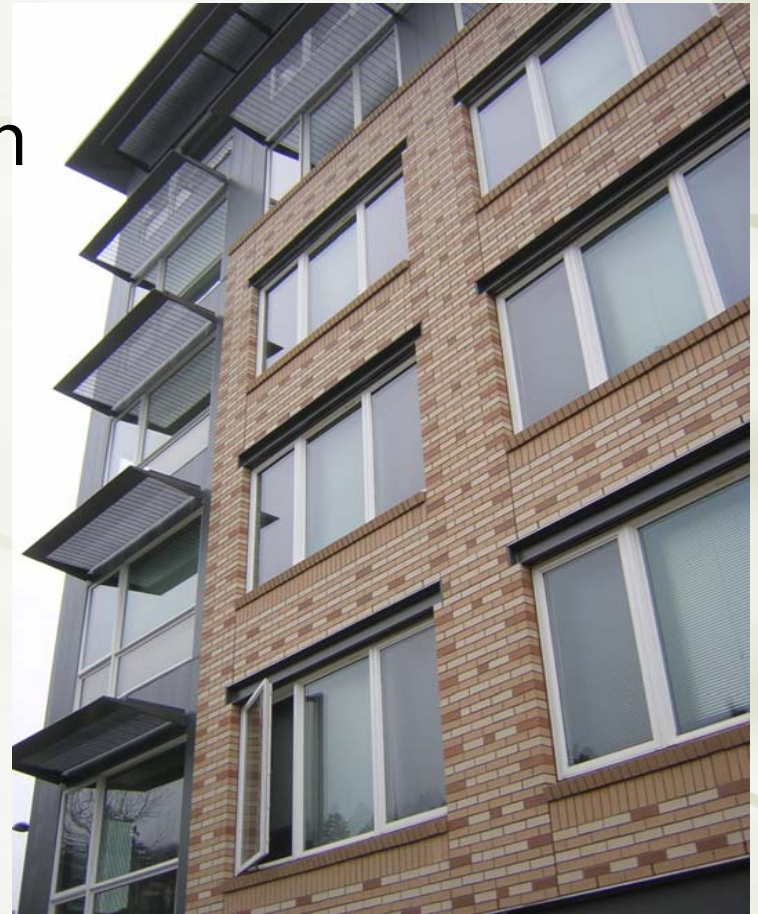
Green Buildings...

- ★ U.S. Green Building Council's (USGBC) Leadership in Energy and Environment Design (LEED) Green Building Rating System TM
 - ★ Sustainable site development
 - ★ Water savings
 - ★ Energy efficiency
 - ★ Materials selection
 - ★ Indoor environmental quality



Stephen Epler Hall

- ★ Climate responsive design
- ★ +90% waste reused & recycled
- ★ Increased insulation, including windows
- ★ Natural ventilation
- ★ Detailed analysis =
- ★ Graduate student thesis



 Portland State
UNIVERSITY

Completed September 2003

**RAINWATER
DO NOT DRINK**

Life Guard 





Market Trends for Green Building

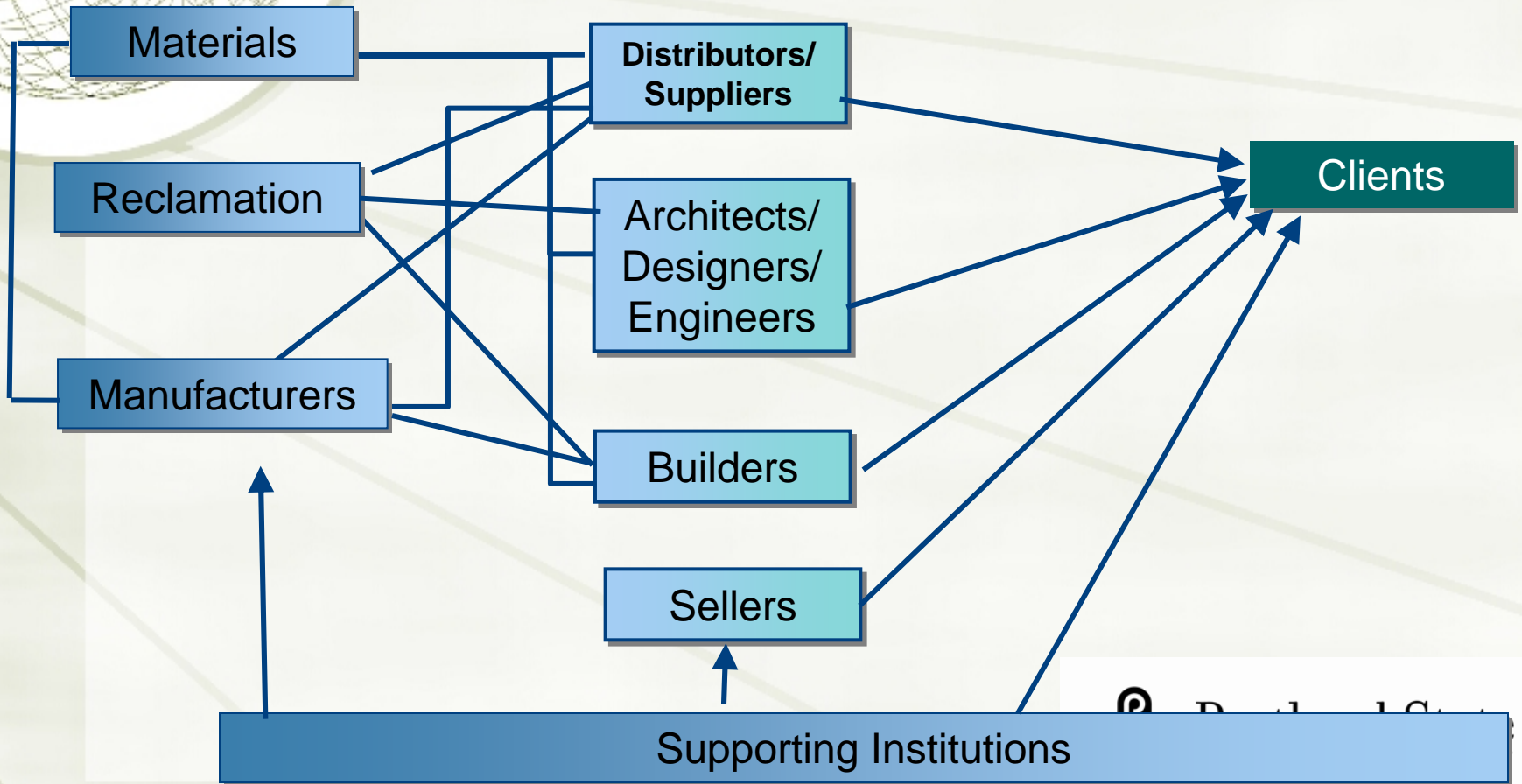
- ★ Green Building a \$3 billion industry in the US (2004)
- ★ By 2010, 5-10% of all new non-residential construction expected to be designed using green building principles - investment of \$10.2 billion to \$20.5 billion

Green Building Cluster

Production

Provision

Consumption





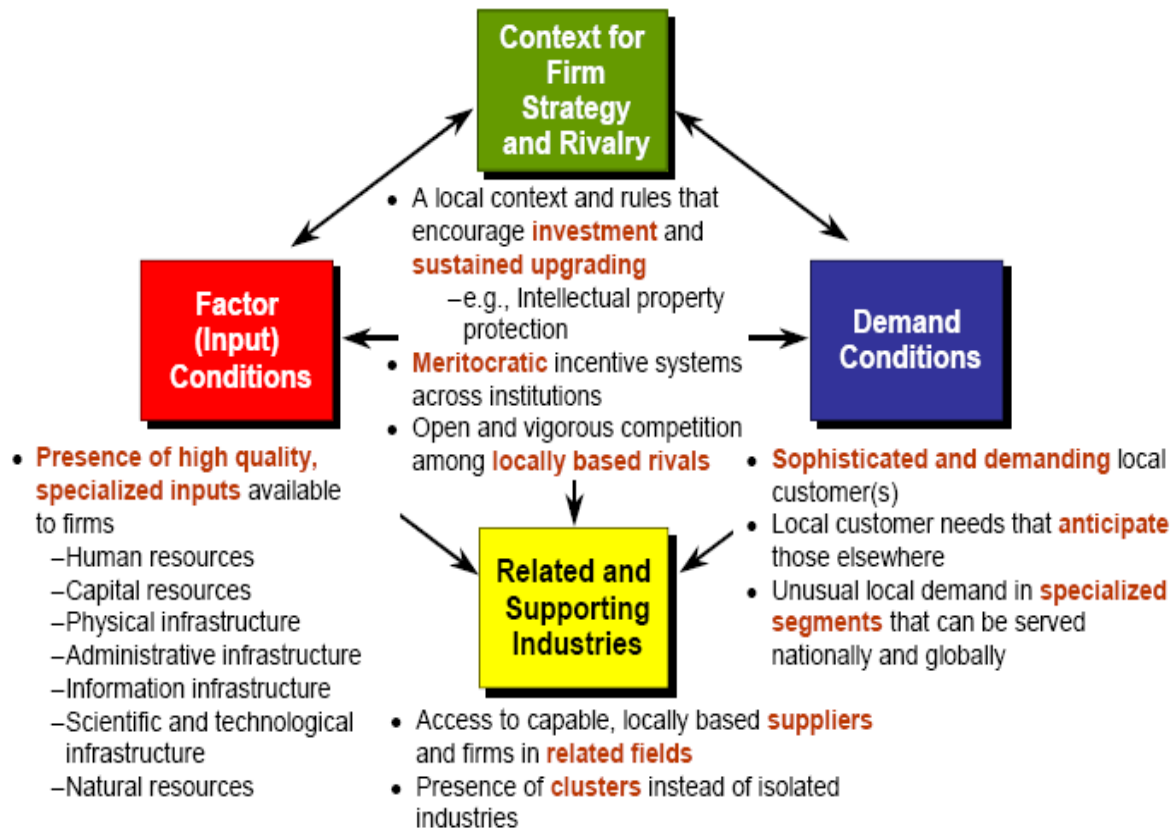
Clusters

★ Clusters

- ★ geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agreements, and trade associations) in particular fields that compete but also cooperate. (Porter 2000, p. 3)

Porter's Diamond

Productivity and the Regional Business Environment





Elements of Porter's "Diamond"

- ★ **1. demand conditions** - strength of local and export demand;
- ★ **2. factor conditions** - costs, infrastructure, resources, and scientific and technical knowledge in the region, etc;
- ★ **3. related and supporting industries** - especially those providing for local sourcing of products and services; and
- ★ **4. firm strategy and rivalry** - cooperative and competitive relationships among firms in the cluster



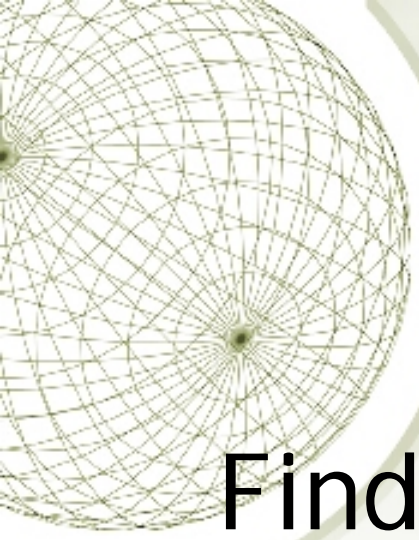
Methodology...

- ★ Adapt approach from green building cluster study in Seattle, Washington (Berk and Associates, 2005)
- ★ Rely on surveys and interviews from “key informants”
- ★ Do not use an input-output analysis due to NAICS classifications and limited data - though this study may provide a beginning path to an input-output approach

A decorative wireframe globe is positioned in the top-left corner of the slide. The globe is composed of a grid of lines forming a sphere, with a central point from which lines radiate outwards. The background of the slide features a light green and white color scheme with abstract geometric shapes and lines.

Methodology...

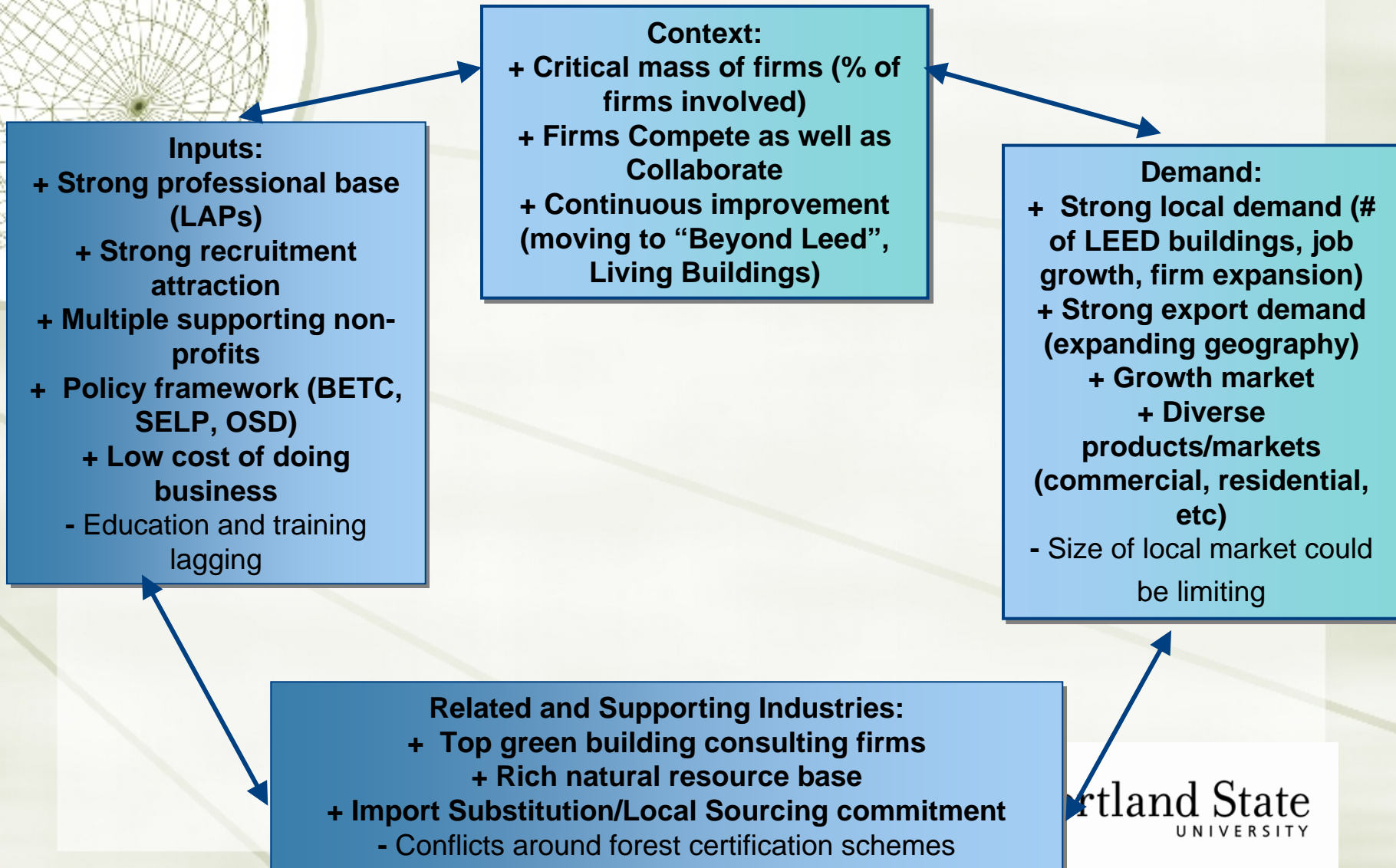
- ★ Geographic coverage - Multnomah, Washington, Clackamas counties in Oregon
- ★ 15 individuals or firms interviewed or responded to a questionnaire
- ★ Groups targeted:
 - ★ Architecture firms
 - ★ Developers
 - ★ Landscape architecture firms
 - ★ Engineering firms
 - ★ Wood product companies
 - ★ Green building consultants
 - ★ Certifying organizations
 - ★ Non-profits



Findings from Interviews in the Context of Porter's Diamond Analysis

Portland's Green Building Cluster

Characteristics





Local Demand

- ★ Significant growth - “3 times higher than national average”
- ★ Portland has highest number of certified buildings in the country
- ★ Employment expansion in green building related businesses
- ★ Besides strong commercial green building practices, residential side growing



Export Demand

- ★ Firms indicate growing opportunities; offices opening in other states
- ★ Some limits due to competition by large firms, geographic distance, staffing, and carbon footprint due to travel issues



Other Demand Conditions

- ★ Growth Markets vs. Mature Markets

- ★ Respondents report that this is a growth market, outpacing other business segments

- ★ Breadth and Diversity

- ★ Customer base expanding in both public and private sectors
- ★ Seeing growth across commercial, industrial, and residential construction activities



Human Resources

- ★ Growing in number and qualifications but lagging in LEED Accredited Professionals (LAP) compared to Chicago, Atlanta, Houston, Dallas, and Philadelphia
- ★ Some shortage of staff related to insufficient educational and training infrastructure (engineering, building commissioning, energy modeling)
- ★ Good ability to attract talent from around the U.S. and the world



Multiple supporting institutions

- ✦ Oregon Natural Step Network
- ✦ Urban Land Institute
- ✦ Energy Trust of Oregon
- ✦ Oregon Department of Energy
- ✦ Portland Office of Sustainable Development
- ✦ University of Oregon's Daylighting Lab
- ✦ Better Bricks
- ✦ Builders Owners and Managers Association of Portland
- ✦ Cascadia Chapter of USGBC
- ✦ ETC ETC ETC!



Other Factor conditions

★ Natural Resources

- ★ Rich resource base in wood products, bio-based products
- ★ Challenges with Forest Stewardship Council (FSC) certified wood



Policy Framework

- ★ Oregon Business Energy Tax Credit (BETC), State Energy Loan Program (SELP), Energy Trust of Oregon
- ★ Challenges with some building codes and permitting process



Firm Strategy and Rivalry

- ★ 50 - 80% of A&E firms, 50% of general contractors in commercial building activity involved in green building
- ★ 75% of architects in Portland have some experience with green building
- ★ Most competition at local and regional level
- ★ Collaborative "teams" of competitors on projects
- ★ Collaborative efforts support innovation in the industry





Related and Supporting Industries: Local Supply Chains

- ★ Large local resource of green building consulting firms
- ★ LEED Local/Regional Materials points for sourcing within 500 miles
- ★ More local sourcing → greater economic impact for the region
- ★ Some products and services (eg glass) not readily available in region
- ★ Recent PDC/OSD study of opportunities to expand local supply chain



Quantifying the Impact....

- ★ Used payroll data for the 3 counties from the Oregon Department of Employment
- ★ Assumptions from Seattle study as baseline, with adjustments



Initial Observations on the Economic Value of Portland's Green Building Cluster

- ★ Use payroll data for the 3 counties from the Oregon Department of Employment
- ★ Use assumptions from Seattle study as baseline, with adjustments due to interviews and survey results
- ★ Covert the SIC codes of the Seattle study to the newer NAICS codes





Assumptions Compared to Seattle Study

- ✦ Portland has more LEED certified buildings than Seattle
- ✦ Seattle study used 2002 wage data
- ✦ Portland has more policies in place to support a green building cluster
- ✦ Conservatively, added one percentage point to the minimum and maximum ranges for the NAICS codes

Table 3: Estimated Wages Paid in Green Building Sector
Clackamas, Multnomah, Washington Counties, 2006

| | <u>Total Payroll</u> | | <u>Green Building:</u> | <u>Green Building:</u> | |
|--|--------------------------------|--------------|------------------------|------------------------|----------------------|
| | (Source: Or. Dept of Labor) | <u>Min %</u> | <u>Max %</u> | <u>Minimum Value</u> | <u>Maximum Value</u> |
| Architectural, Engineering, and Related Services | \$687,174,117 | 8% | 22% | \$54,973,929 | \$151,178,306 |
| Construction of Buildings | \$617,469,320 | 4% | 17% | \$61,746,932 | \$104,969,784 |
| Residential Building Construction | \$282,132,792 | 11% | 15% | \$28,213,279 | \$42,319,919 |
| Industrial Building Construction (part) | \$53,118,422 | 4% | 15% | \$2,124,737 | \$7,967,763 |
| Commercial and Institutional Building Construction (part) | \$282,218,106 | 8% | 18% | \$22,577,448 | \$50,799,259 |
| Heavy and Civil Engineering Construction* | \$274,381,945 | 4% | 12% | \$10,975,278 | \$32,925,833 |
| Specialty Trade Contractors | \$1,417,147,754 | 4% | 12% | \$56,685,910 | \$170,057,730 |
| Other Services to Buildings and Dwellings (part) | \$12,899,275 | 4% | 11% | \$515,971 | \$1,418,920 |
| Remediation Services (part) | \$16,159,535 | 4% | 11% | \$646,381 | \$1,777,549 |
| Clay Product and Refractory Manufacturing | \$18,077,862 | 4% | 11% | \$723,114 | \$1,988,565 |
| Primary Metal Manufacturing | \$342,241,099 | 4% | 11% | \$13,689,644 | \$37,646,521 |
| Fabricated Metal Product Manufacturing | \$480,989,700 | 4% | 11% | \$19,239,588 | \$52,908,867 |
| Merchant Wholesalers, Durable Goods | \$1,437,520,340 | 3% | 11% | \$43,125,610 | \$158,127,237 |
| Wholesale Electronic Markets and Agents and Brokers | \$539,662,625 | 3% | 11% | \$16,189,879 | \$59,362,889 |
| Furniture and Home Furnishings Store | \$122,828,438 | 3% | 11% | \$3,684,853 | \$13,511,128 |
| Building Materials and Garden Equipment and Supplies Dealers | \$184,919,570 | 3% | 11% | \$5,547,587 | \$20,341,153 |
| Real Estate | \$486,832,417 | 3% | 11% | \$14,604,973 | \$53,551,566 |
| TOTAL | \$7,255,773,317 | | | \$355,265,114 | \$960,852,990 |

* Not included in Seattle study



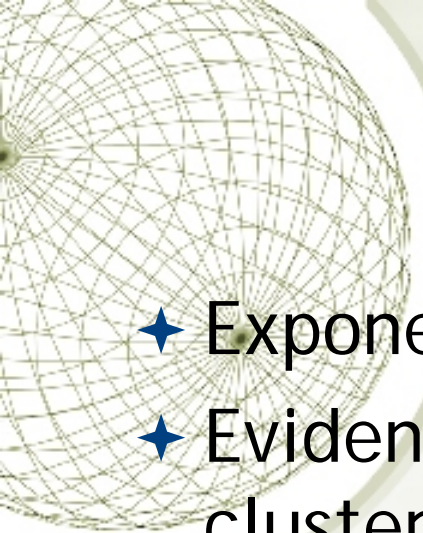
Estimated Wages Paid

- ★ Green building wages in the Portland area in 2006 ranged between \$355 million and \$960 million, compared to \$60 million to \$195 million for Seattle in 2002
- ★ Ranges were as low as 3% and as high as 22%
- ★ Based on interviews, ranges are conservative



Summary ...

- ★ Strong (“exponential”) growth of green building cluster in the Portland area
- ★ Evidence points to a vibrant, competitive cluster according to Porter’s Diamond
- ★ Green building cluster is supported by:
 - ★ Strong local demand by public and private sectors
 - ★ Critical mass of firms in a competitive/collaborative environment
 - ★ Strong foundation of supporting institutions
 - ★ Rich pool of talent locally and ability to attract to the region
- ★ Challenges to continued growth
 - ★ Lag in education and training
 - ★ Research and development capacity
 - ★ Relatively small size of Portland market



Summary Observations

- ◆ Exponential growth of green building cluster
- ◆ Evidence suggests vibrant, competitive cluster
- ◆ Cluster is supported by:
 - ◆ Strong local demand by public and private sectors
 - ◆ Critical mass of firms in a competitive/ collaborative environment
 - ◆ Strong foundation of supporting institutions
 - ◆ Rich pool of talent locally and ability to attract to the region



Challenges to Cluster Growth

★ Challenges

- ★ Lag in education and training
- ★ Research and development capacity
- ★ Relatively small size of Portland market

★ Opportunities

- ★ Community College-University effort to build workforce training
- ★ Oregon Bio-Economy and Sustainable Technologies Center



Limitations & Areas for Further Research

- ★ Data constraints -
 - ★ NAICS categories do not reflect green businesses
 - ★ Oregon lacks a sales tax
- ★ Did not include revenue data, output values, taxes, indirect impacts
- ★ Study therefore understates economic value impact of green building cluster
- ★ Input-output analysis still desirable to provide more comprehensive assessment
- ★ Could apply qualitative approach used here to analysis of other emerging sustainability clusters



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