GREEN BUILDING TECHNOLOGIES & BEST PRACTICES

'LEEDING' THE WAY

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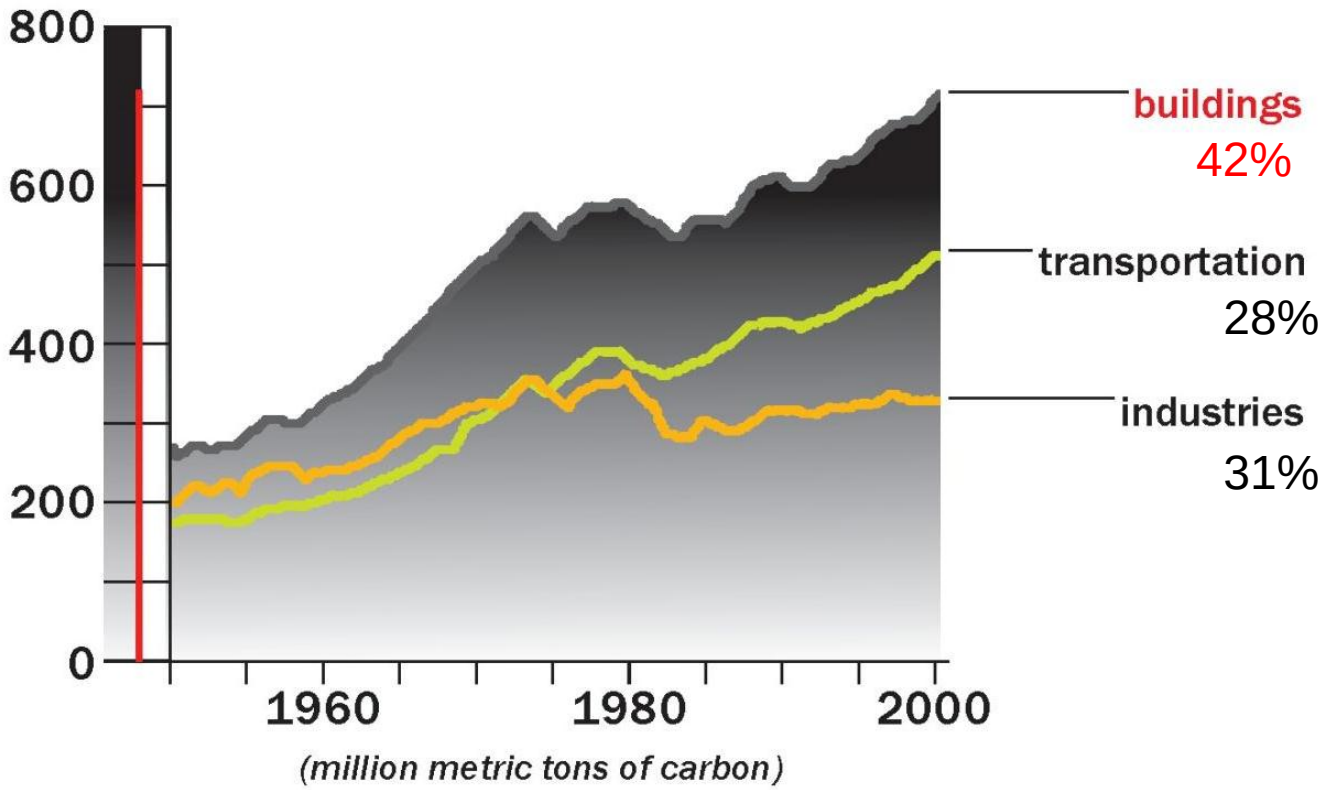
WHY
BUILDINGS?



US ANNUAL CO_2 EMISSIONS BY SECTOR

Source: Energy Information Administration (Annual Energy Review 2010)

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WHY BUILDINGS?

IN THE US ALONE, BUILDINGS ACCOUNT FOR:

75% of all electrical energy use

40% of raw materials use

30% of waste output

14% of potable water consumption

Source: U.S. Green Building Council

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WHAT

CAN A GREEN BUILDING DO?

ADDRESS CRITICAL ENVIRONMENTAL ISSUES

- Climate Change
- Stormwater Management
- Water Efficiency
- Public Health
- Waste Disposal

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WHY
BUILDINGS?

People spend **90%** of their time indoors.

Indoor pollutant levels may be **2–5** times higher than outdoor levels.

Poor indoor air quality is one of the **top 5 health risks** in the U.S. today.

Source: U.S. EPA

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WHAT

CAN A GREEN OFFICE BUILDING DO?

Increase Productivity

Reduce Absenteeism

Lower Operational Costs

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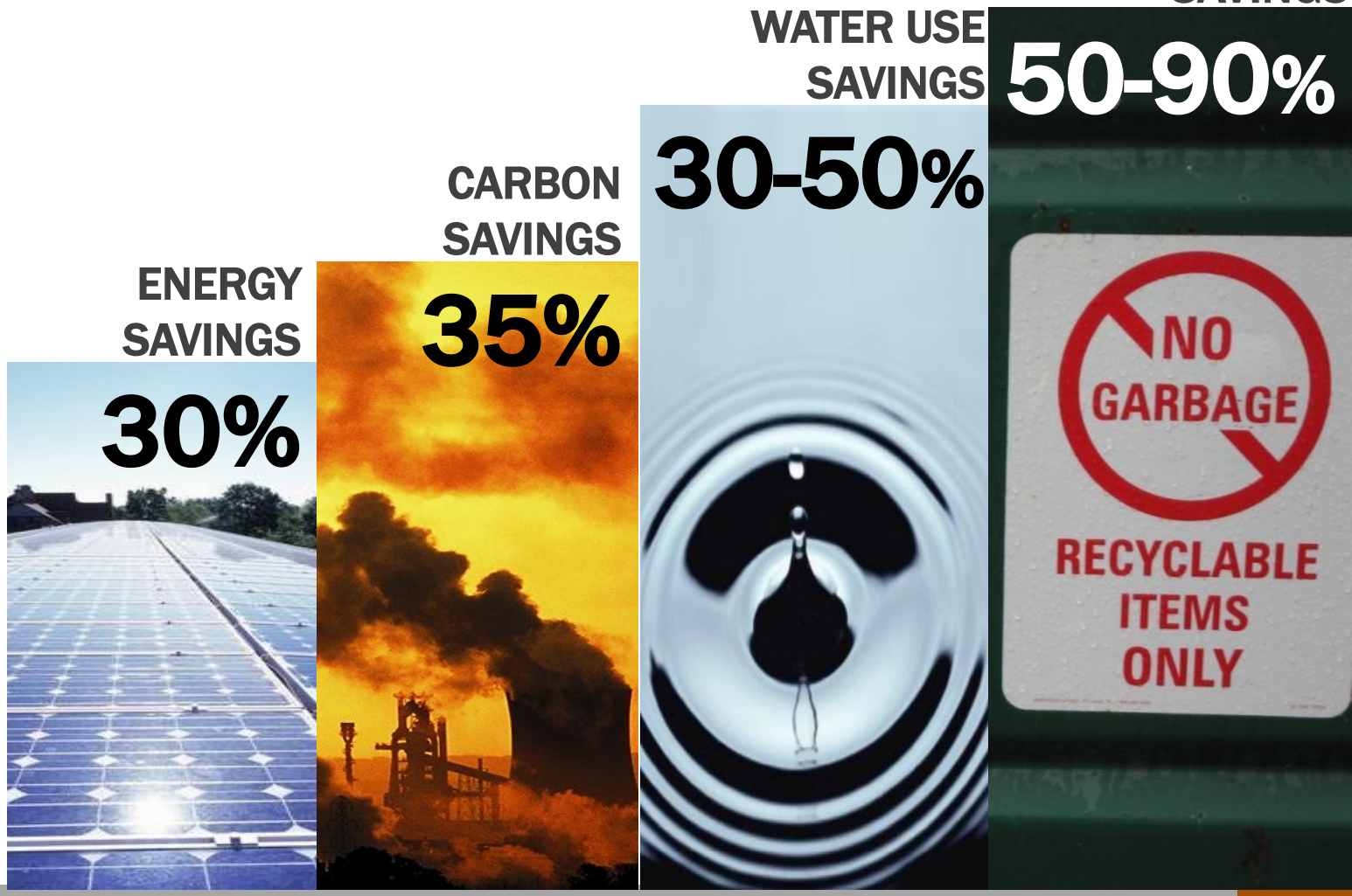
WHAT

CAN A GREEN OFFICE BUILDING DO?



Source:
Capital E

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WHERE
IS LEED REQUIRED?

LEED BASED INITIATVIES IN 44 STATES

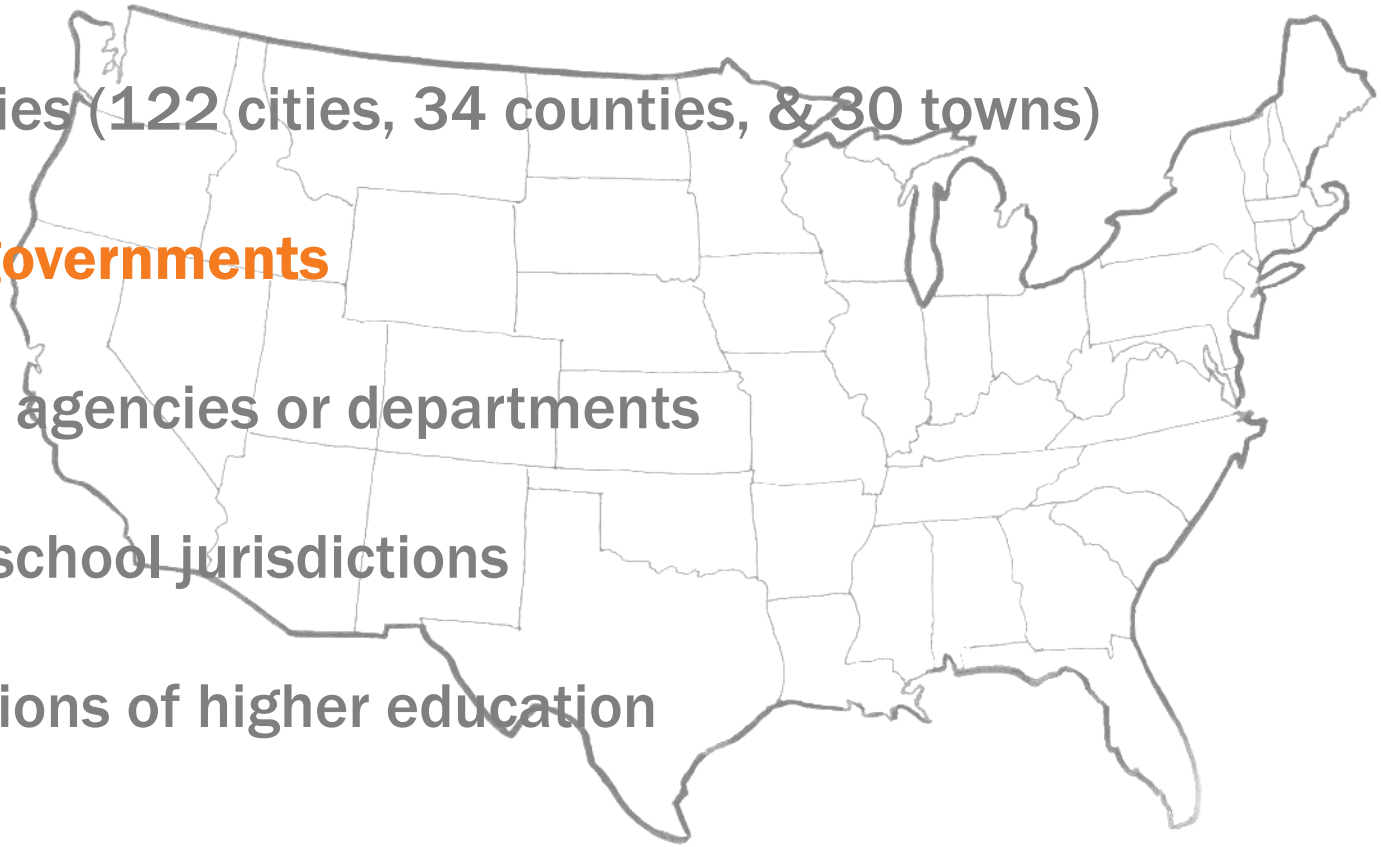
186 localities (122 cities, 34 counties, & 30 towns)

31 state governments

12 federal agencies or departments

15 public school jurisdictions

39 institutions of higher education



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OREGON
GREEN BUILDING INITIATIVES

CONDUCT LEED SELF-ASSESSMENT

STATE ENERGY EFFICIENT DESIGN (SEED)

Mandates 20% better than code energy performance

1.5% FOR SOLAR TECHNOLOGY

Requires 1.5% of construction cost for public buildings to be spent on solar energy technology

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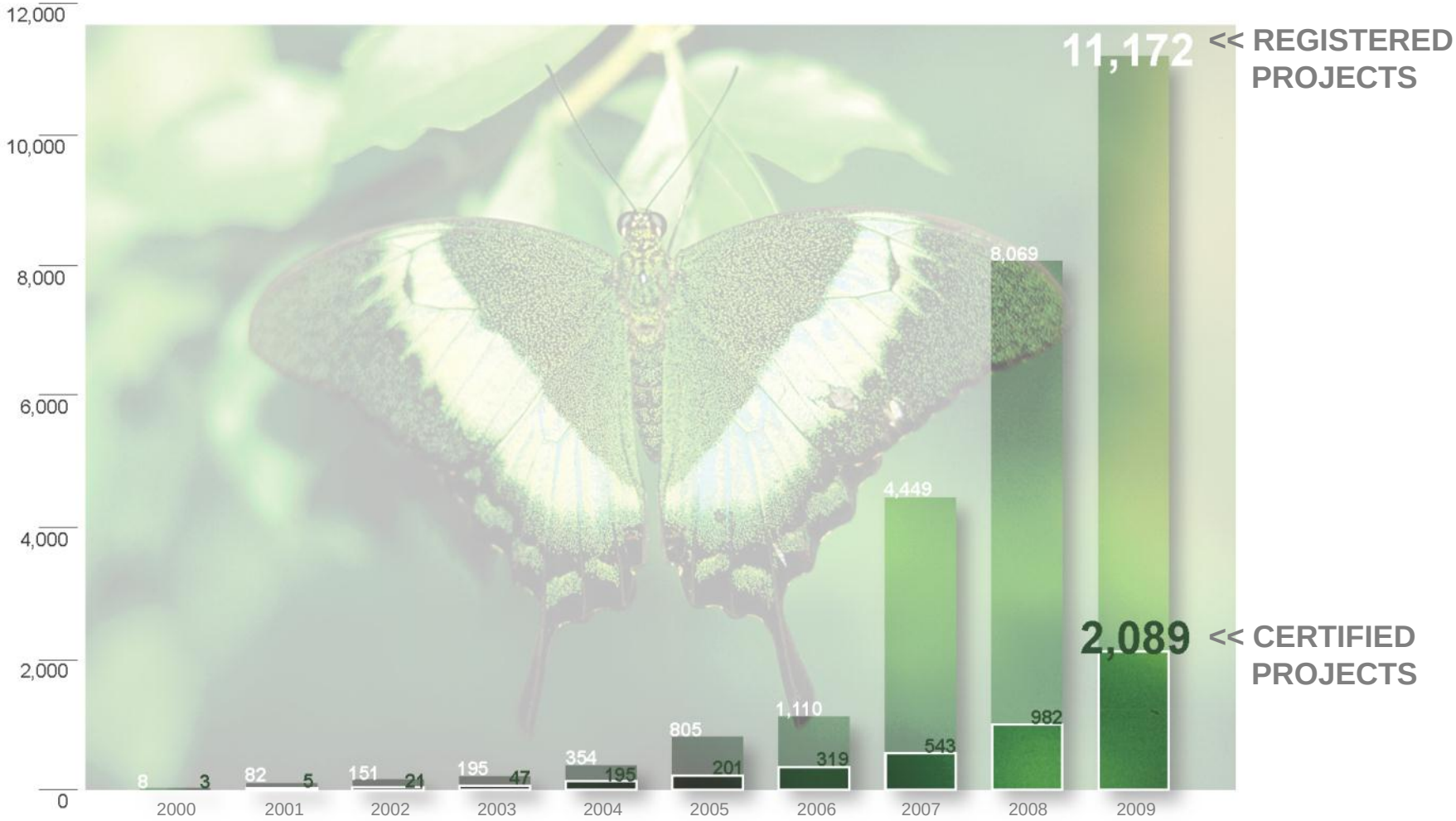
LEED

US CERTIFICATIONS & REGISTRATIONS



Source: U.S. Green Building Counci

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MEASUREMENT

WHAT LEED MEASURES

- SUSTAINABLE SITES
- MATERIALS & RESOURCES
- WATER EFFICIENCY
- INDOOR ENVIRONMENTAL QUALITY
- ENERGY & ATMOSPHERE
- INNOVATION IN DESIGN

* categories under LEED ND rating system

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LEED SUMMARY

SERA

Oregon Department of Transportation - Transportation Building Modernization

LEED-NC® v2.2 scorecard

Last Updated: 16-January-2012

FEASIBILITY RANK		TOTAL
Certain	C	46
Probable	P	5
Unlikely	U	3
Not Attempted	N	15

Tracking towards LEED Gold (C + P = 51)

Certified: 26-32 / Silver: 33-38 / Gold 39-51 / Platinum 52+

CHAMPION		C	P	U	N		**Sustainable Sites** (14 Possible Points)
		9	0	0	5		
DEA	c	✓				P 1	**Construction Activity Pollution Prevention**
SERA	d	1				C 1	**Site Selection**
SERA	d	1				C 2	**Development Density & Community Connectivity**
ODOT/Apex	d	1				C 3	**Brownfield Redevelopment** *defer to c-phase*
SERA	d	1				C 4.1	**Alternative Transportation**, Public Transportation Access
SERA	d	1				C 4.2	**Alternative Transportation**, Bicycle Storage & Changing Roon
ODOT/SERA	d				1	C 4.3	**Alternative Transportation**, Fuel-Efficient Vehicles
SERA	d	1				C 4.4	**Alternative Transportation**, Parking Capacity
n/a	c				1	C 5	
Greenworks	d	1				C 5	
n/a	d				1	C 6	
DEA/Grnwrks	d	1				C 6	
SERA	c	1				C 7	
n/a	d				1	C 7	
n/a	d				1	C 8	

CHAMPION		C	P	U	N		**Materials and Resources** (13 Possible Points)
		4	3	3	3		
SERA	d	✓				P 1	**Storage & Collection of Recyclables**
SERA	c	1				C 1.1	**Building Reuse**, 75% of Existing Walls, Floors & Roof
n/a	c				1	C 1.2	**Building Reuse**, 95% of Existing Walls, Floors & Roof
n/a	c				1	C 1.3	**Building Reuse**, 50% of Interior Non-Structural Elements
Hoffman	c	1				C 2.1	**Construction Waste Management**, Divert 50% from Disposal
Hoffman	c		1			C 2.2	**Construction Waste Management**, Divert 75% from Disposal
Hoffman/SERA	c			1		C 3.1	**Materials Reuse**, 5%
[illegible]						C 3.2	**Materials Reuse**, 10%

		4	0	0	1		W
Greenworks	d	1				C 1	
n/a	d				1	C 1	
SERA	d	1				C 2	
SERA	d	1				C 3	
SERA	d	1				C 3	

		13	0	0	4		En
SWE	c	✓				P 1	
Stantec	d	✓				P 2	
Stantec	d	✓				P 3	
Stantec	d	1				C 1	
Stantec	d	1				C 1.2	**Optimize Energy Performance**, 14% N or 7% E
Stantec	d	1				C 1.3	**Optimize Energy Performance**, 17.5% N or 10.5% E
Stantec	d	1				C 1.4	**Optimize Energy Performance**, 21% N or 14% E
Stantec	d	1				C 1.5	**Optimize Energy Performance**, 24.5% N or 17.5% E
Stantec	d	1				C 1.6	**Optimize Energy Performance**, 28% N or 21% E
Stantec	d	1				C 1.7	**Optimize Energy Performance**, 31.5% N or 24.5% E
Stantec	d	1				C 1.8	**Optimize Energy Performance**, 35% N or 28% E
Stantec	d	1				C 1.9	**Optimize Energy Performance**, 38.5% N or 31.5% E
n/a	d				1	C 1.10	**Optimize Energy Performance**, 42% N or 35% E
SERA/PAE	d	1				C 2.1	**On-Site Renewable Energy**, 2.5%
n/a	d				1	C 2.2	**On-Site Renewable Energy**, 7.5%
n/a	d				1	C 2.3	**On-Site Renewable Energy**, 12.5%
SWE	c	1				C 3	**Enhanced Commissioning**
Stantec	d	1				C 4	**Enhanced Refrigerant Management**
Stantec/PAE	c	1				C 5	**Measurement & Verification**
ODOT/SERA	c				1	C 6	**Green Power**, 35% for 2 yrs

n/a	d				1	C 6.2	**Controllability of Systems**, Thermal Comfort
Stantec	d	1				C 7.1	**Thermal Comfort**, Design
ODOT/SERA	d	1				C 7.2	**Thermal Comfort**, Verification
SERA	d				1	C 8.1	**Daylight & Views**, Daylight 75% of Spaces
SERA	d	1				C 8.2	**Daylight & Views**, Views for 90% of Spaces

							Innovation in Design (5 Possible Points)
		5	0	0	0		
SERA	d	1				C 1.1	**Innovation**: Exemplary WEc3 Water Use Reduction 40%
ODOT	c	1				C 1.2	**Innovation**: Green Housekeeping
SERA/ODOT	d	1				C 1.3	**Innovation**: Exemplary SSc4 Alternative Transportation
Stantec	d	1				C 1.4	**Innovation**: HVAC make-up water w/ non-chemical treatment syste
	c				0	C 1.n	**Innovation**: Green Education
	c				0	C 1.n	**Innovation**: Exemplary MRc4 Recycled Content 30%
	c				0	C 1.n	**Innovation**: Exemplary EAc6 Green Power 70% for 2 yrs
	c				0	C 1.n	**Innovation**: Exemplary MRc2 Construction Waste Mgt 95%
	c				0	C 1.n	**Innovation**: Low Emitting Materials: Adhesives & Sealants for ext.
	c	1				C 2	**LEED Accredited Professional**

FEASIBILITY RANK TOTAL

Certain C 46

Probable P 5

Unlikely U 3

Not Attempted N 15

Tracking towards LEED Gold (C + P = 51)

Certified: 26-32 / Silver: 33-38 / Gold 39-51 / Platinum 52+

NOTE: EAc6 and SSc4.3 are owner decisions that could be pursued.

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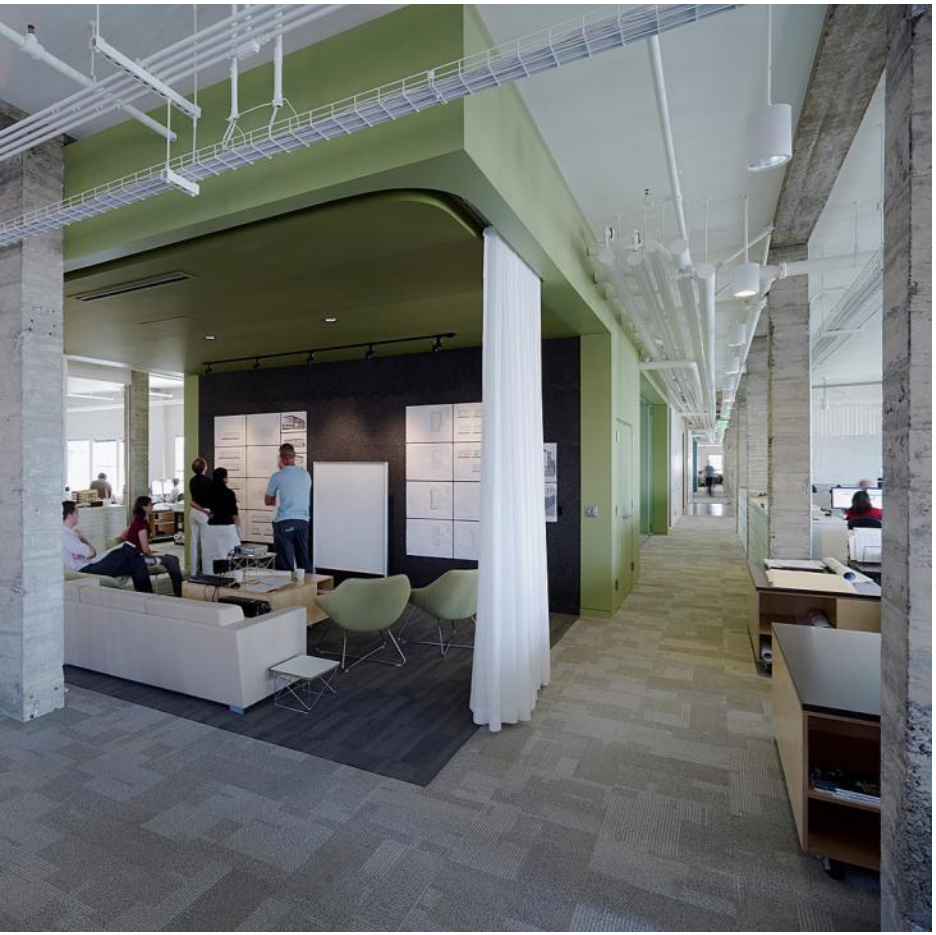
GOALS

high performance workplace



Highly productive workspace

Promote health & safety

Consolidate lease space

Lower utility bills

Improve space utilization

Employee recruitment & retention

Active employee participation

ACHIEVE BUSINESS GOALS

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GOALS

highly productive workspace

DAYLIGHTING & VIEWS

Two LEED credits are associated with providing access to views & daylighting to 90% of regularly occupied spaces.

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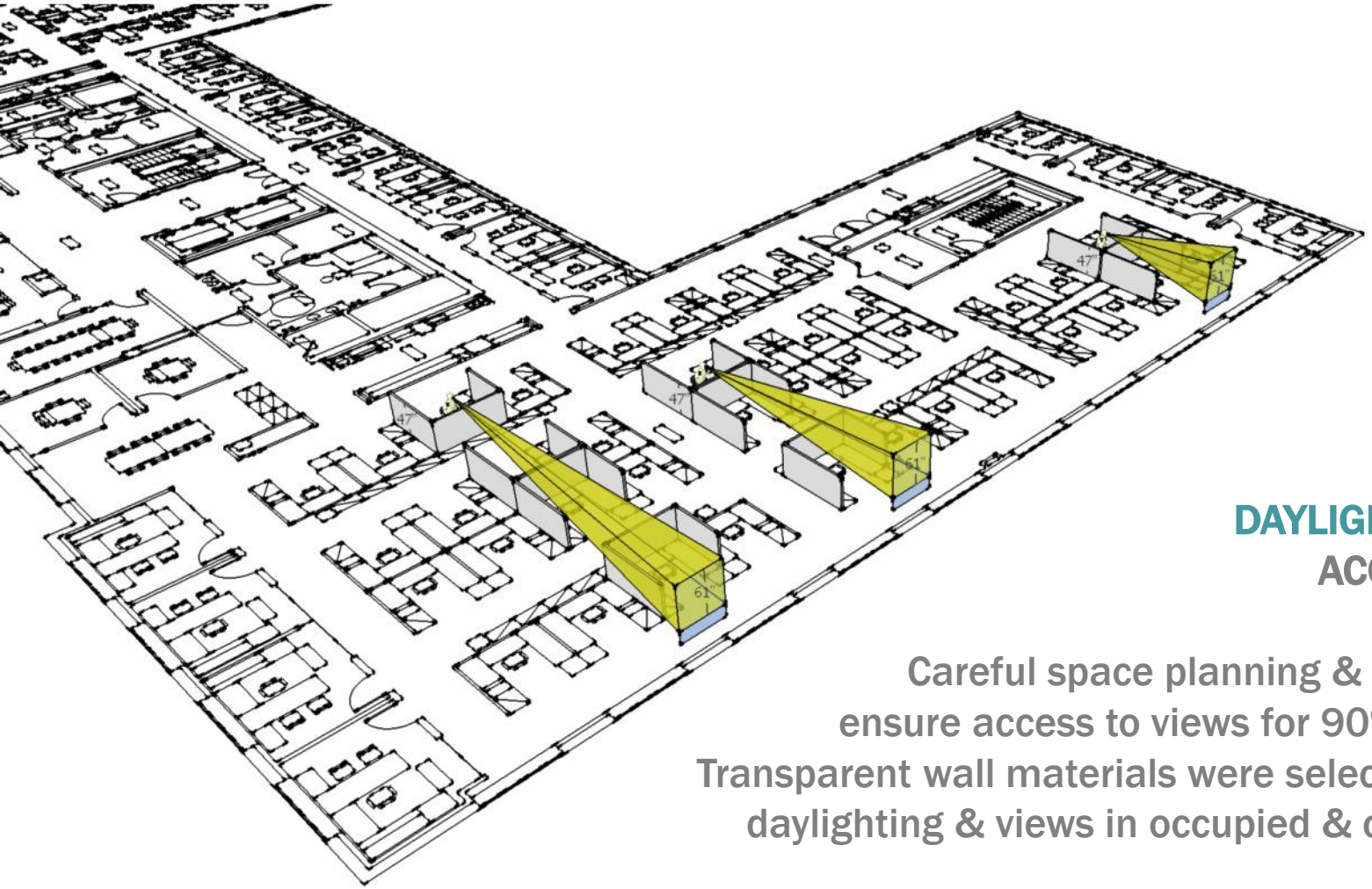
GOALS

highly productive workspace



DAYLIGHTING & VIEWS

ACCESS TO VIEWS

Careful space planning & wall placement ensure access to views for 90% of all spaces. Transparent wall materials were selected to enhance daylighting & views in occupied & corridor spaces.

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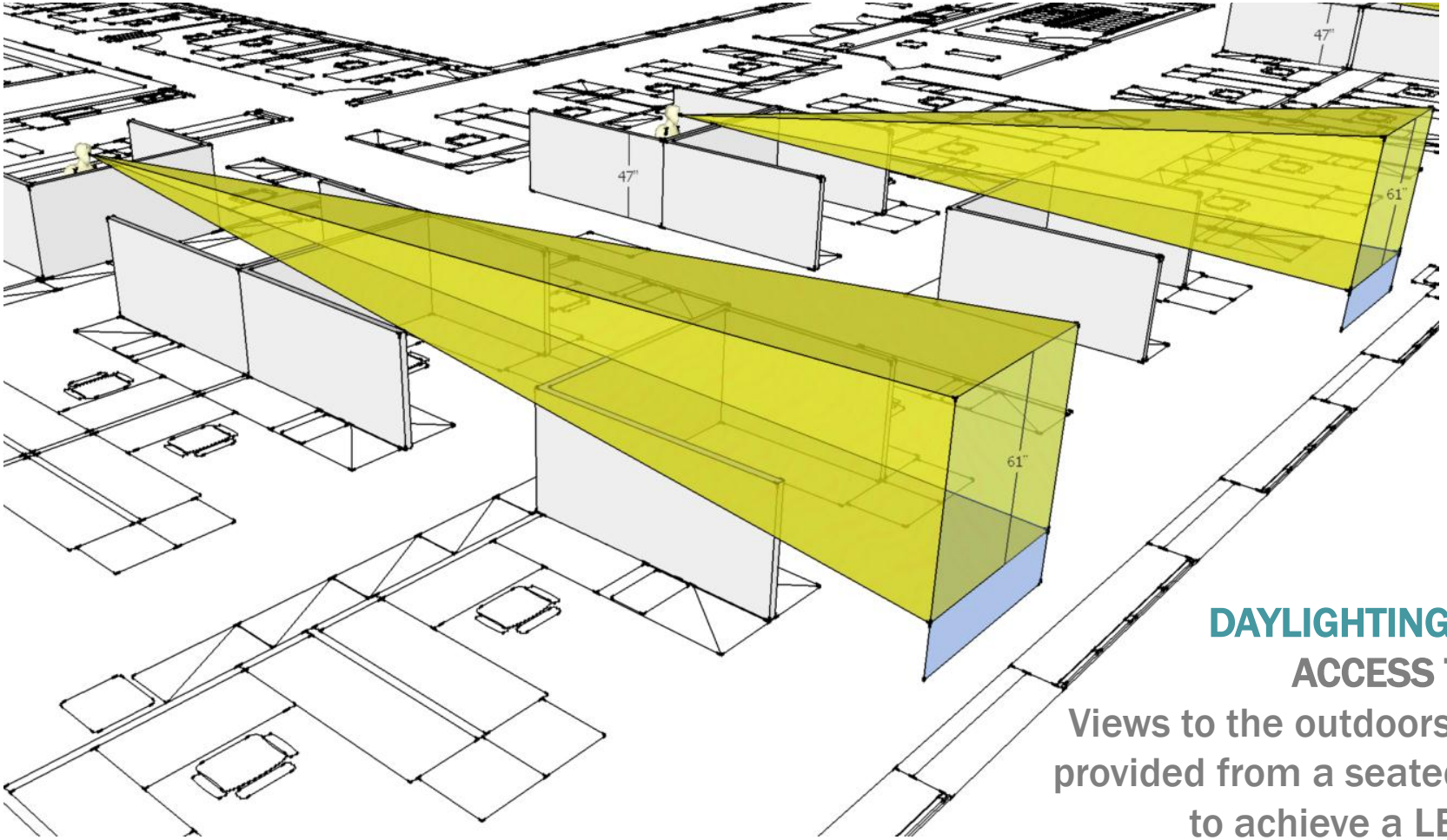
GOALS

highly productive workspace



DAYLIGHTING & VIEWS

ACCESS TO VIEWS

Views to the outdoors, must be provided from a seated position to achieve a LEED credit

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GOALS

highly productive workspace

Natural daylight extends deep into the south wing

DAYLIGHTING & VIEWS POSITIVELY AFFECT EMPLOYEES

Improve productivity

Reduce energy use

Connect people to the outdoors

Foster collaboration

Reduce Stress

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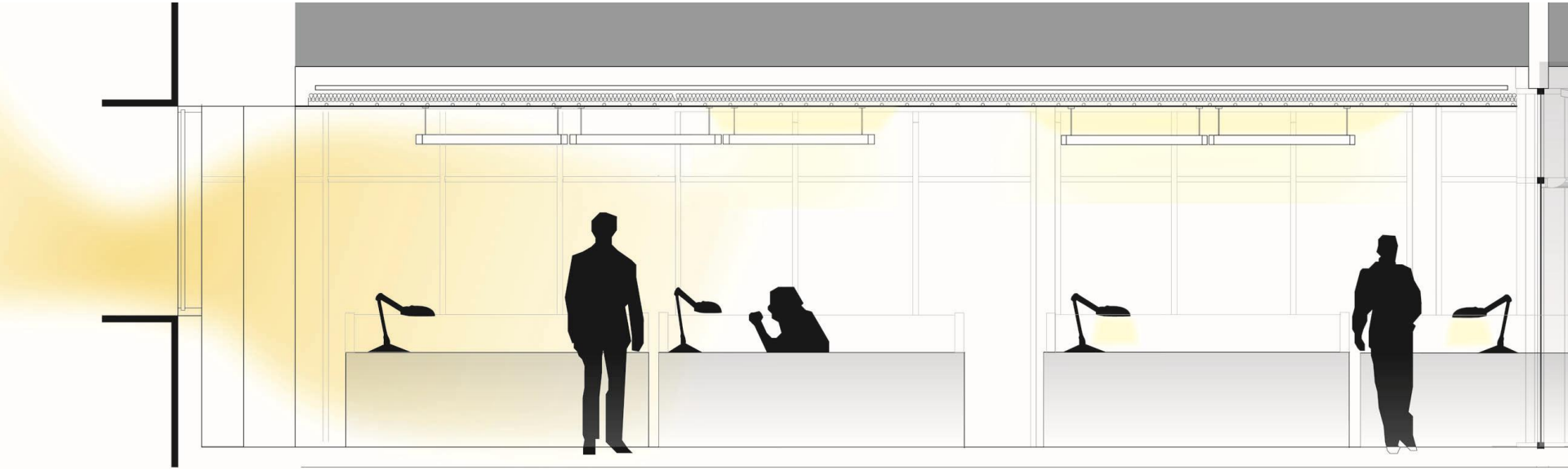
GOALS

highly productive workspace

LIGHTING DESIGN & CONTROLS

The lighting design and controls are responsive to natural daylight in the workspace.



Efficiency in the lighting system is achieved when natural light is maximized.
Photosensors turn off lighting, when natural light is plentiful.
Occupancy sensors assure lights are only on when people are present.

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GOALS

highly productive workplace

ACTIVATE EMPLOYEE PARTICIPATION

Tenant engagement in green building practices contributes to a healthy & productive workforce and impacts building performance.

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GOALS

promote health & safety

LEED has helped to move the marketplace to produce safe, durable, maintainable finishes, which improve indoor air quality.

HEALTHY AIR QUALITY

Durable, water based paints

No urea formaldehyde in building materials

Monitor & limit low volatile organic compound (VOC) content

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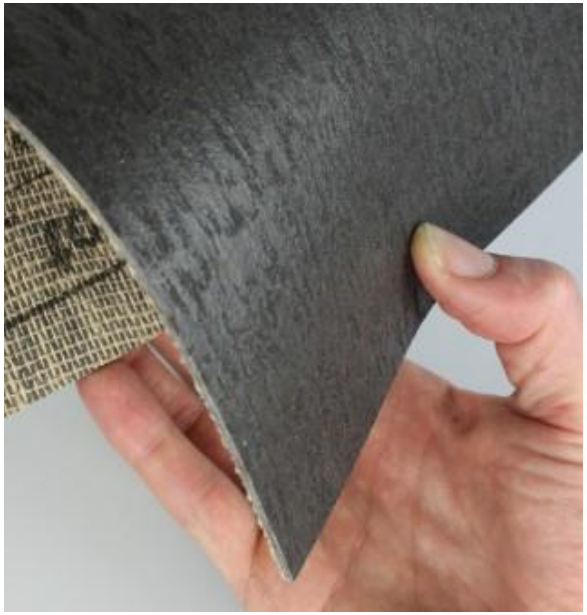
GOALS

promote health & safety

CARPET

WOOD PRODUCTS



FLOORING

SEALANTS

Third parties certify materials to assure low levels of off-gassing compounds. The LEED process assures products in the above categories are selected with limited VOC content.

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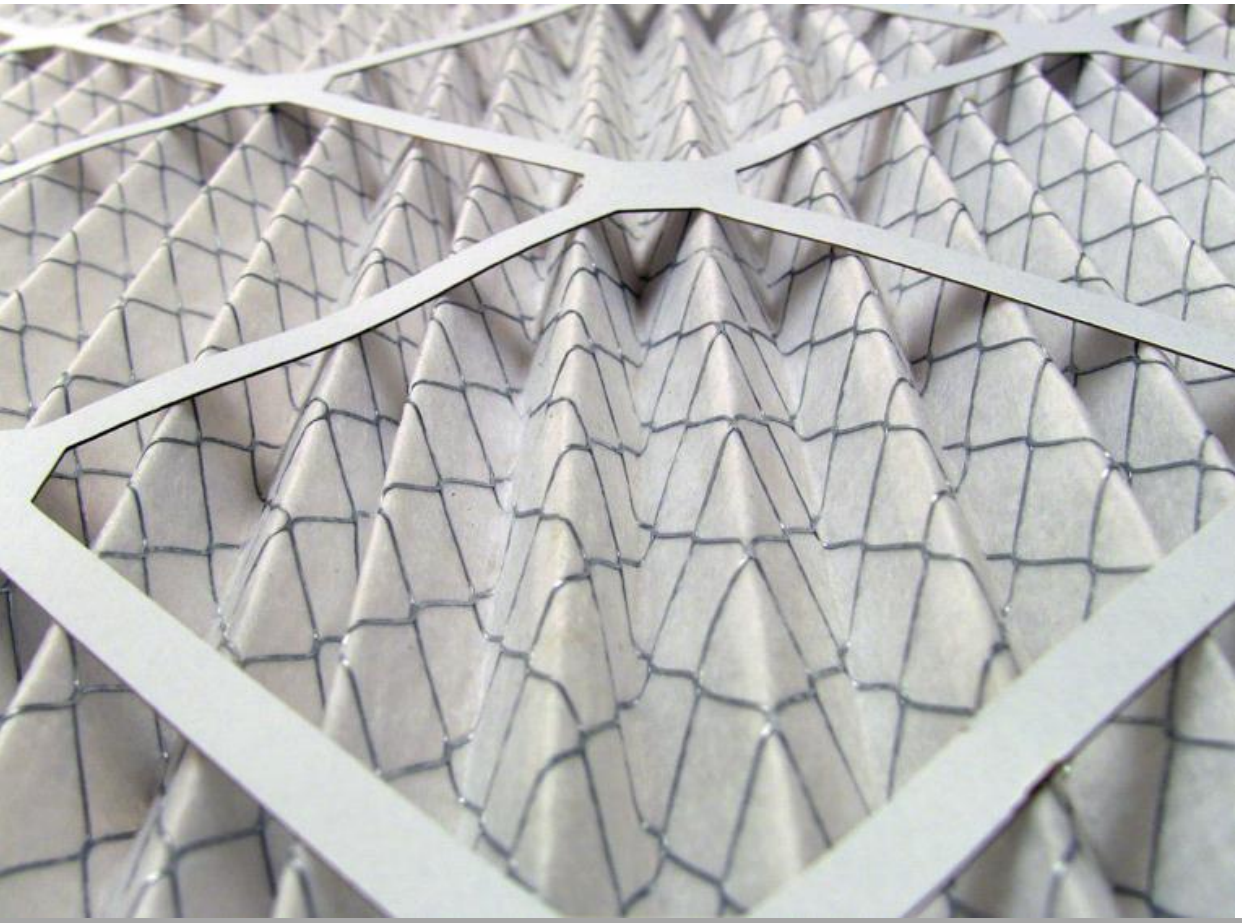
GOALS

promote health & safety



INDOOR AIR QUALITY MANAGEMENT PLAN DURING CONSTRUCTION

Full flush-out period & filter replacement before move-in

Additional filter replacement after furniture move-in

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GOALS

promote health & well being

GREEN CLEANING

Implement green cleaning program
Purchase sustainable cleaning products
Provide sustainable cleaning equipment
Reduce indoor chemicals

LEED recognizes ODOT & DAS policies already in place which promote use of green cleaning products & methods.

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GOALS

promote health & safety

SMOKE FREE ENVIRONMENT

ODOT's property-wide smoke free policy will be rewarded with a LEED credit.

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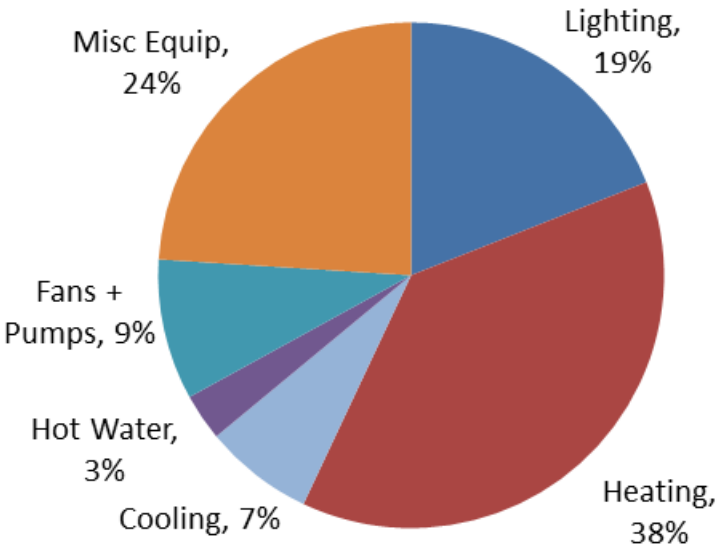
GOALS

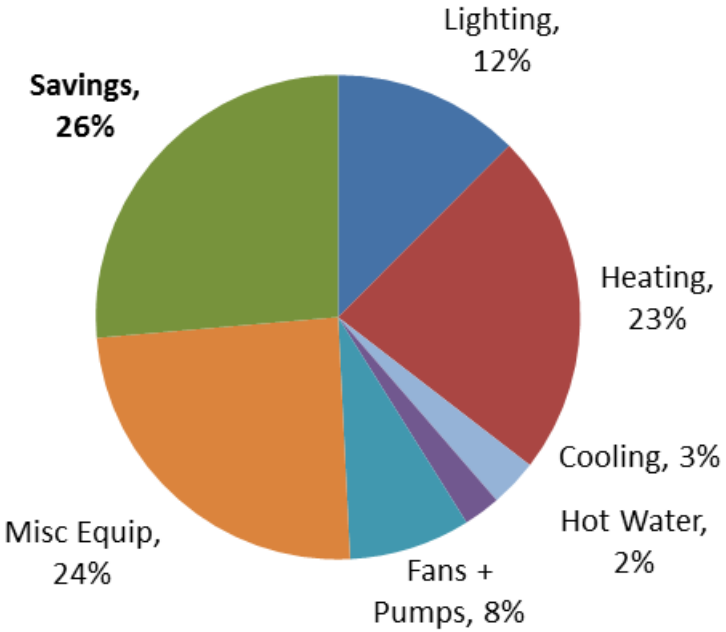
lower utility bills

ENERGY USE REDUCTION

Projected energy savings are 26% lower than a comparable new building constructed to current code.



CODE BUILDING



ODOT DESIGN

SERA ARCHITECTS, INC. ©2012

GOALS

lower utility bills

Spray foam insulation applied to exterior concrete walls

Radiant heating & cooling ceiling panels

ENERGY USE REDUCTION

RADIANT HEATING & COOLING
is a more efficient way to distribute heating and cooling throughout the building , when compared to typical forced air systems

WALL INSULATION
saves energy by limiting heat loss to the outside in the winter, and limits unwanted heat gain in the summer.

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GOALS

lower utility bills

MANAGE PLUG LOADS

Building occupants can play a big role in overall energy savings by reducing 'plug loads'

Office equipment, appliances, and plugged in devices are projected to account for ~25% of all energy use in the building

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GOALS

lower utility bills

ON SITE RENEWABLE ENERGY

226 rooftop solar panels installed to meet 1.5% for Solar Energy requirements

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GOALS

regional materials & manufacturers

Precast window sills

Bronze window refurbishment

Photovoltaic panel supplier

Precast concrete tables & benches in East Courtyard

Locally sourced & manufactured materials reduce transportation costs and lower CO2 emissions.

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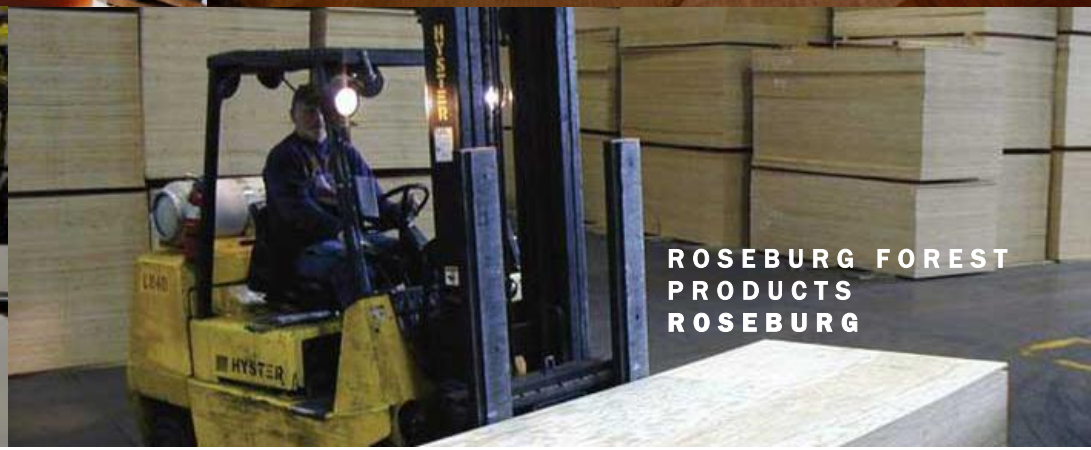
GOALS

oregon grown



Locally sourced wood is a project priority. 100% of wood is sourced from OR, WA and CA.
90% of wood in the project is sourced from Oregon.

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GOALS

water conservation

Sensor operated, low flow fixtures reduce water consumption by 40%

A rainwater harvesting system in the basement continually collects, stores, filters and treats up to 10,000 gallons of water for flushing basement and first floor water closets.

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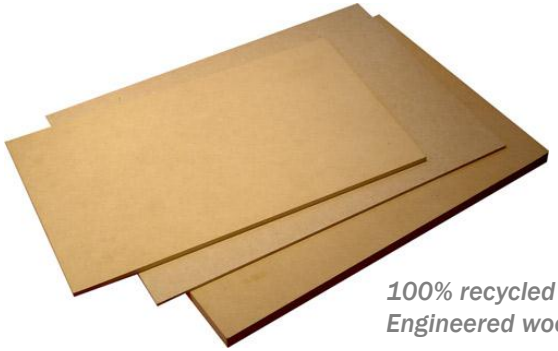
GOALS

resource conservation

20% recycled glass, sand & soda ash: Acoustic wall insulation



100% recycled wood: Engineered wood panels for casework

90% recycled cotton: Acoustic & thermal insulation for ceiling panels

25% recycled metal: Mechanical Screen Wall enclosure

44% recycled metal: Stainless Steel Toilet Compartments

Specifying products will recycled content diverts materials from landfills & conserves virgin resources.

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GOALS

resource conservation

There are 2 credits awarded to the contractor's effort in sorting construction debris, and diverting that debris to recycling centers and upcycling materials for new uses. 75% of all construction waste will be diverted from landfills during the course of the ODOT renovation.

REUSE STORIES

- A homeowner purchased stone to face their backyard fireplace.
- The Rebuilding Center will install 3 wall mounted drinking fountains with filters.
- An artist purchased 15 oak door jam pieces for their work.
- North Portland church received a donation of a porcelain sink and 2 doors from the ODOT building.
- A recently returned veteran purchased 10 stone slabs for his backyard barbeque project.
- A customer purchased 5 door jam pieces (ODOT) to mill into door sills.
- A customer purchased 2 paper towel dispensers (ODOT) for her beauty salon.

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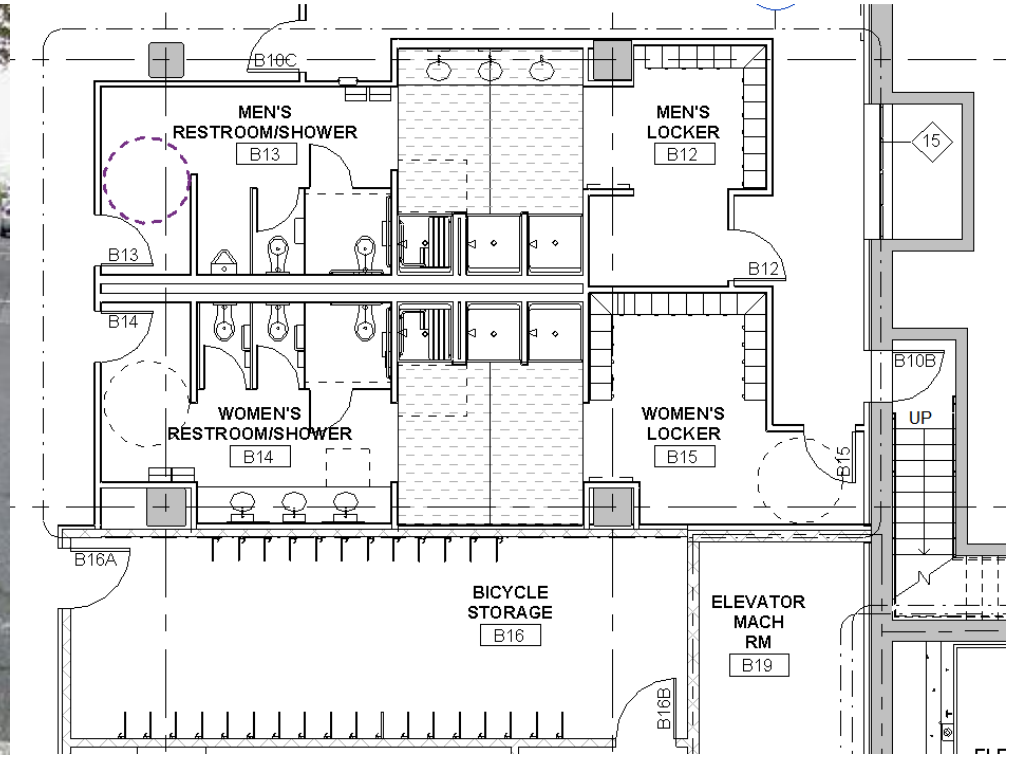
GOALS

sustainable sites



No net addition of new on-site parking

Bicycle storage facilities and employee lockers & showers.

Access to public transportation

Promote alternative forms of transportation by siting building within a public transportation network & by providing amenities for bicycle commuters.

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GOALS

storm water management

Storm water quality improves on site with flow through planters that filter water before it flows into the city storm water system. Permeable surfaces allowing for water infiltration help to manage storm water on site. Diverting storm water into collection tanks reduces pressure on city storm water system.

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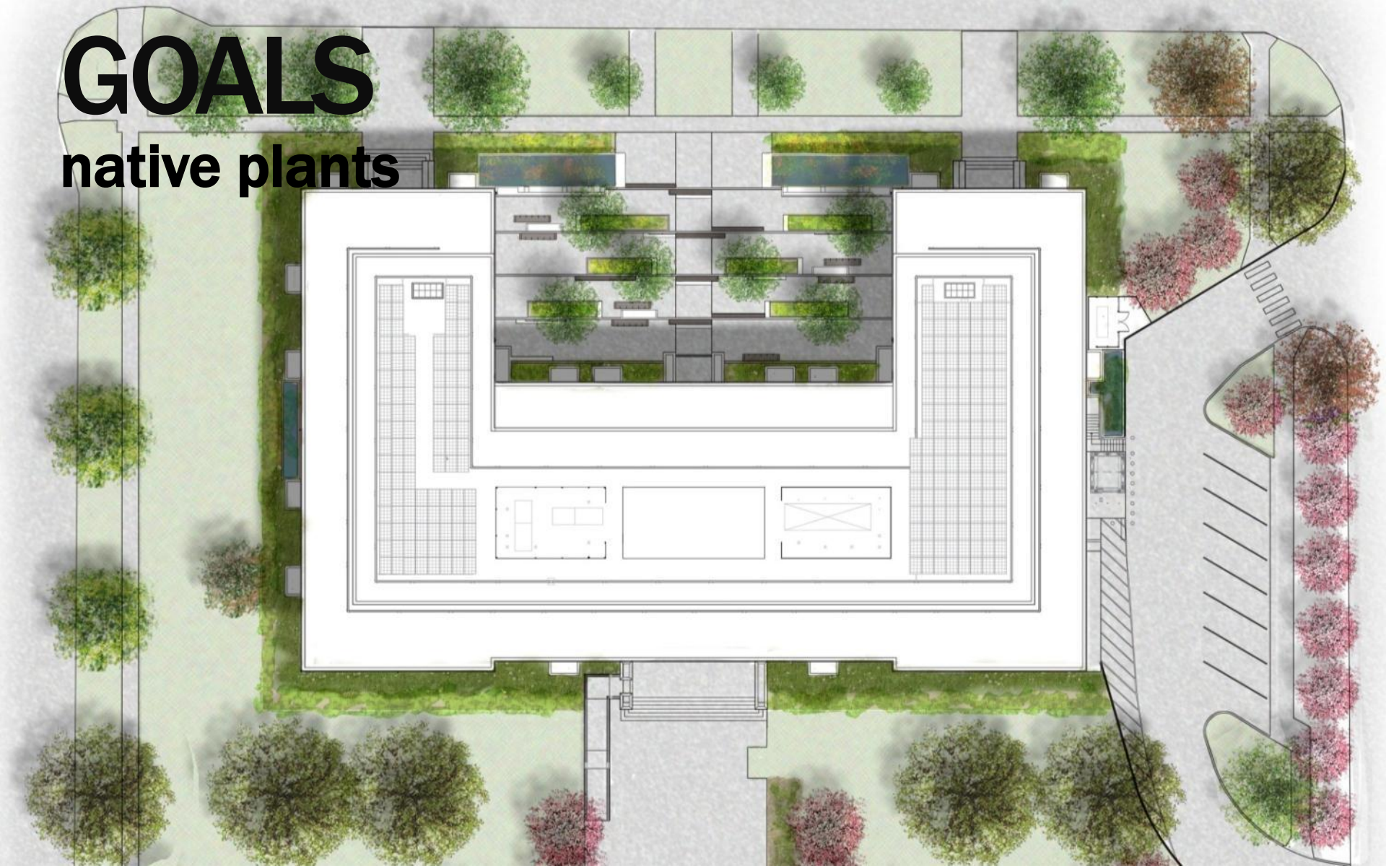
GOALS
native plants



Native plantings selected & meet the Capitol Mall Master Plan requirements.

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