

GREEN BUILDING

Construction Workers, Safety & Health



W

Sellen



DEVELOPMENT TEAM



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AGENDA: SESSIONS 01 – 04



- 01 ■ Sustainability & Green Building
- 02 ■ Sites, Water & Materials
- 03 ■ Energy & Indoor Environment
- 04 ■ Safety and Green Building Employment

WHAT IS SUSTAINABILITY?



Human Survival Depends On: Healthy Natural Ecosystems

Clean Air (Filtered)

Clean Food Sources
(Rich Abundant Soil)

Clean Water
(Filtered by Flora & Fauna)

Current Population:
Over 6.8 Billion

By 2050: Over 9 Billion

Ecological Footprint

Ecosystems allow our existence.....

Sustainability & Green Building



2010 SESSION 1



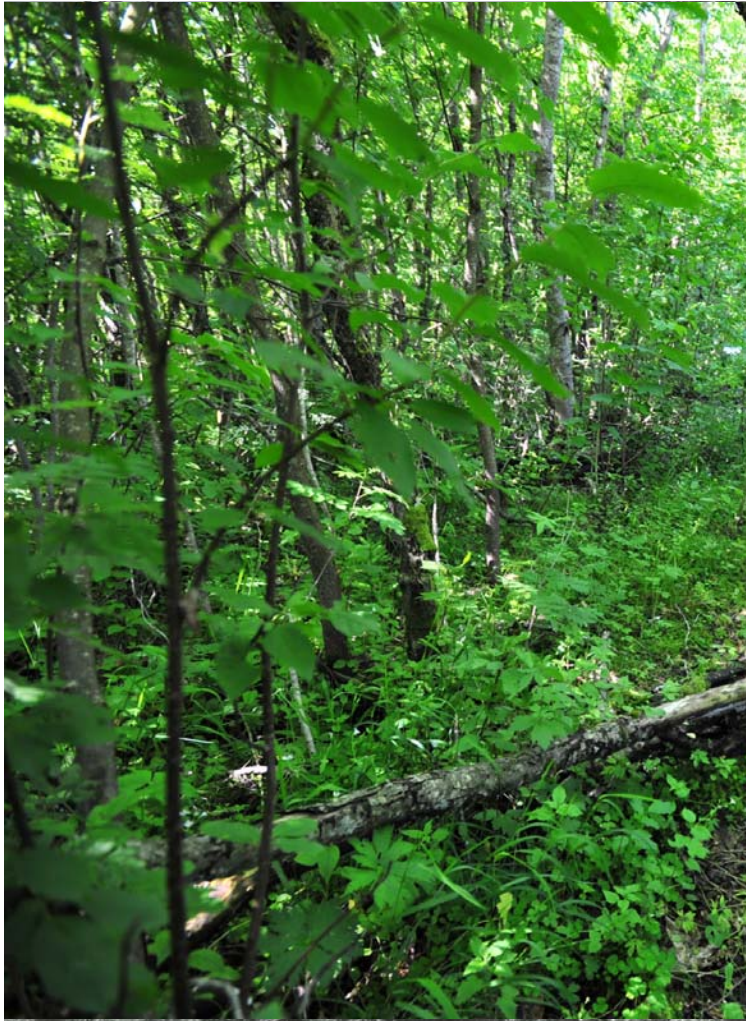
SESSION 01: AGENDA



- Nature vs. Built Environment
- Sustainability and Natural Environment
- Green Building & LEED
- Employment Opportunities



NATURE & BUILT ENVIRONMENT



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WATER & ENERGY BUDGETS



A budget has three parts:

1. Income

2. Expenditures

3. Savings

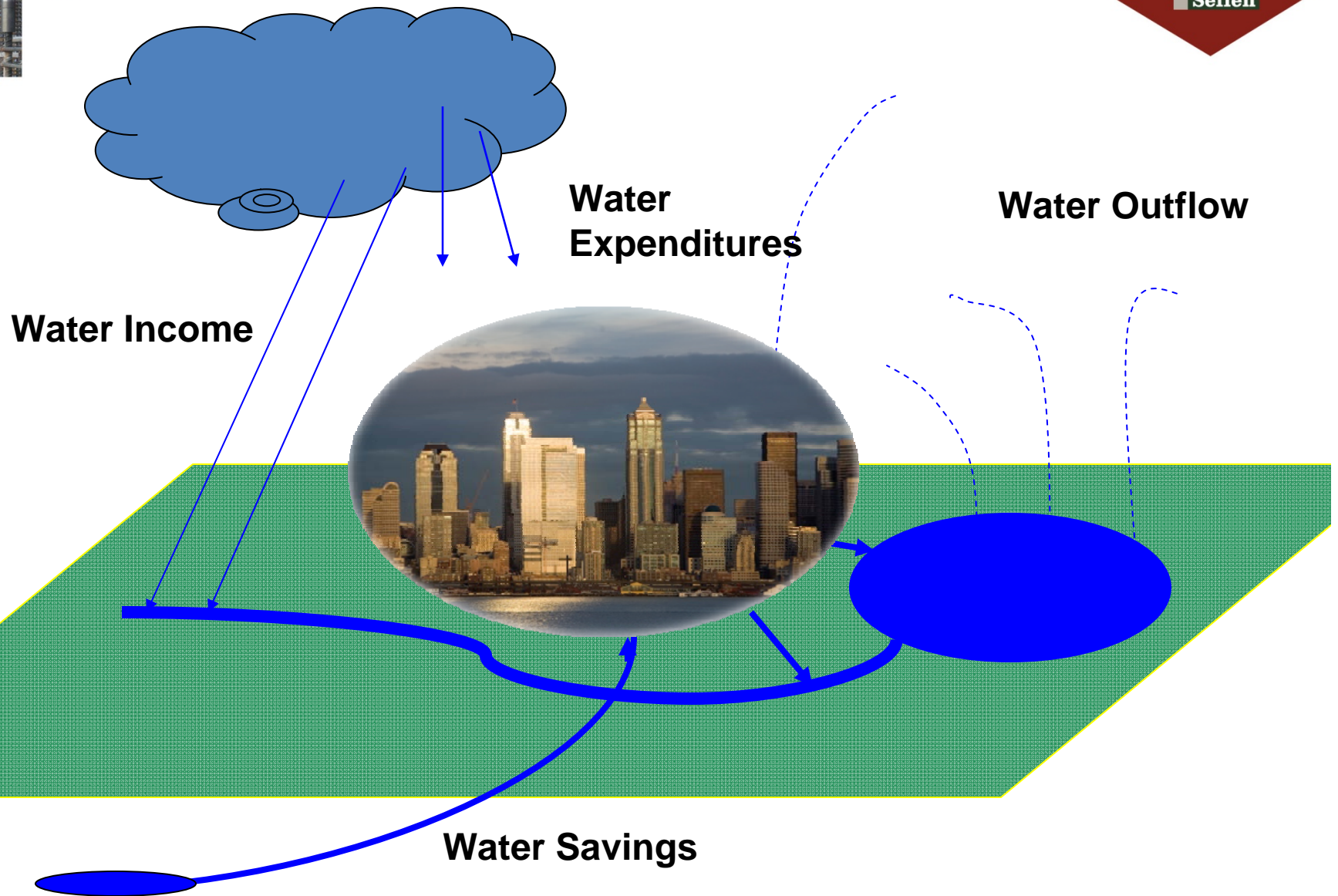
If $\text{Income} + \text{Savings}$ are less than Expenditures, the budget is not sustainable.

This holds for energy and water budgets as it does for money budgets, BUT with an important difference.

Water and Energy are degraded by use.



THE GLOBAL WATER BUDGET



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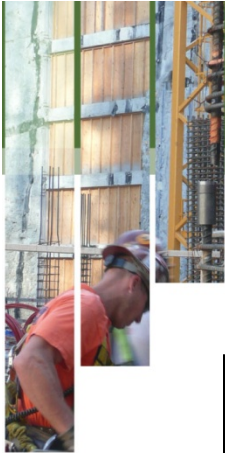


WATER BUDGET NUMBERS



- **Water 'Income':** Precipitation minus evaporation
More than 400 gal/person/day in Seattle
- **Water 'Savings':** Lakes, rivers, reservoirs, etc.
1,000 gal/person/day withdrawn in U.S.
- **Water 'Expenditures':**
 - Needed for survival: 1/2 gal/person/day
 - Needed for 'decent' standard of living:
25 gal/person/day
 - Average in U.S.: 70-100 gal/person/day

How much water do YOU use each day?



HOMework PROJECT 1



Using the table below, find how much water you use per day in your home. <http://ga2.er.usgs.gov/edu/sq3action.cfm>

Use	Cost/use	Your expense
Shower	2 gal/min	
Bath	30 gal	
Handwashing/tooth-brushing	2 gal/min	
Dishwashing (hand)	5 gal/load	
Dishwasher	15 gal/load	
Toilet flush (standard)	3.6 gal per flush	
Clothes washing	20 gal/load	
Drinking water	8 oz/glass	
Shaving	1 gal	



GREEN BUILDING AND WATER USE



Green building affects water...

- **Expenditures** by using less (conservation)
 - Low-flow or waterless toilets
 - Shower head restricters
- **Savings** by
 - Filtering/cleaning water for future use



SUMMARY SO FAR



- Sustainability means maintaining a stable climate and stable budgets of clean water, energy, and other resources
- Buildings use a great deal of energy, land, and water
- “**Green**” buildings cut down on these expenditures and aid in making our society more sustainable



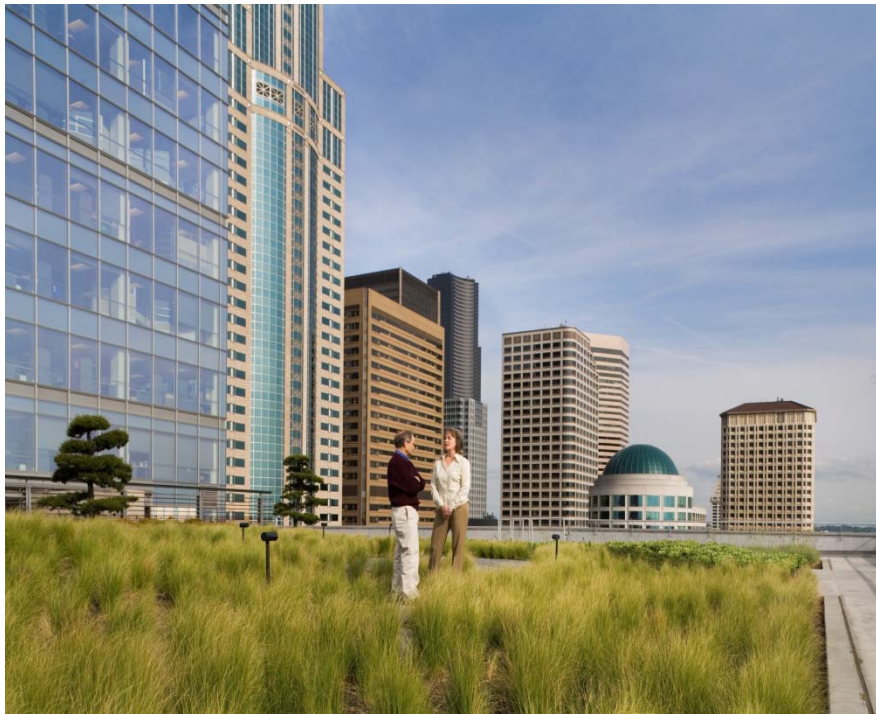
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DEFINING GREEN BUILDING



Green Building: Increasing the efficiency with which buildings and their sites use and harvest energy, water, and materials, and reducing building impacts on human health and the environment, through better siting, design, construction, operation, and maintenance



METRIC FOR GREEN BUILDINGS



LEADERSHIP in
ENERGY and
ENVIRONMENTAL
DESIGN



<i>Site</i>	planning that promotes sustainability
<i>Water</i>	conservation and efficiency
<i>Energy</i>	conservation and efficiency
<i>Materials</i>	conservation and “cradle-to-cradle”
<i>Indoor</i>	environmental <i>quality</i>

A Nationally Recognized system for designing, constructing, operating and certifying Green Building Projects



Measuring Green Buildings.....



LEED-NC

LEED-NC Version 2.2 - Average Responsibility Allocations

Project Name: Project name

Project Address

Yes	?	No			
			1	Sustainable Sites	14 Points
Y				Prereq 1	Construction Activity Pollution Prevention
				Credit 1	Site Selection
				Credit 2	Development Density & Community Connectivity
				Credit 3	Brownfield Redevelopment
				Credit 4.1	Alternative Transportation, Public Transportation Access
				Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Facilities
				Credit 4.3	Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles
				Credit 4.4	Alternative Transportation, Parking Capacity
				Credit 5.1	Site Development, Protect or Restore Habitat
				Credit 5.2	Site Development, Maximize Open Space
				Credit 6.1	Stormwater Design, Quantity Control
				Credit 6.2	Stormwater Design, Quality Control
				Credit 7.1	Heat Island Effect, Non-Roof
				Credit 7.2	Heat Island Effect, Roof
				Credit 8	Light Pollution Reduction

Yes	?	No			Total
			3	Water Efficiency	5 Points
				Credit 1.1	Water Efficient Landscaping, Reduce by 50%
				Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation
				Credit 2	Innovative Wastewater Technologies
				Credit 3.1	Water Use Reduction, 20% Reduction
				Credit 3.2	Water Use Reduction, 30% Reduction

Yes	?	No			Total
			8	Energy & Atmosphere	17 Points
Y				Prereq 1	Fundamental Commissioning of the Building Energy
Y				Prereq 2	Minimum Energy Performance
Y				Prereq 3	Fundamental Refrigerant Management
				Credit 1	Optimize Energy Performance
					10.5% New Buildings or 3.5% Existing Building Renovations
					14% New Buildings or 7% Existing Building Renovations
					17.5% New Buildings or 10.5% Existing Building Renovations
					21% New Buildings or 14% Existing Building Renovations
					24.5% New Buildings or 17.5% Existing Building Renovations
					28% New Buildings or 21% Existing Building Renovations
					31.5% New Buildings or 24.5% Existing Building Renovations
					35% New Buildings or 28% Existing Building Renovations
					38.5% New Buildings or 31.5% Existing Building Renovations
					42% New Buildings or 35% Existing Building Renovations
				Credit 2	On-Site Renewable Energy
					2.5% Renewable Energy
					7.5% Renewable Energy
					12.5% Renewable Energy
				Credit 3	Enhanced Commissioning
				Credit 4	Enhanced Refrigerant Management
				Credit 5	Measurement & Verification
				Credit 6	Green Power

15			Contractor Responsibility
	19		Design Build or Shared Responsibility
			Architect / Owner / Consultant Responsibility



Yes	?	No			Total
			8	Materials & Resources	13 Points
Y				Prereq 1	Storage & Collection of Recyclables
				Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Ceilings
				Credit 1.2	Building Reuse, Maintain 100% of Existing Walls, Floors & Ceilings
				Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements
				Credit 2.1	Construction Waste Management, Divert 50% from Disposal
				Credit 2.2	Construction Waste Management, Divert 75% from Disposal
				Credit 3.1	Materials Reuse, 5%
				Credit 3.2	Materials Reuse, 10%
				Credit 4.1	Recycled Content, 10% (post-consumer + 1/2 pre-consumer)
				Credit 4.2	Recycled Content, 20% (post-consumer + 1/2 pre-consumer)
				Credit 5.1	Regional Materials, 10% Extracted, Processed & Manufactured
				Credit 5.2	Regional Materials, 20% Extracted, Processed & Manufactured
				Credit 6	Rapidly Renewable Materials
				Credit 7	Certified Wood

Yes	?	No			Total
			6	Indoor Environmental Quality	15 Points
Y				Prereq 1	Minimum IAQ Performance
Y				Prereq 2	Environmental Tobacco Smoke (ETS) Control
				Credit 1	Outdoor Air Delivery Monitoring
				Credit 2	Increased Ventilation
				Credit 3.1	Construction IAQ Management Plan, During Construction
				Credit 3.2	Construction IAQ Management Plan, Before Occupancy
				Credit 4.1	Low-Emitting Materials, Adhesives & Sealants
				Credit 4.2	Low-Emitting Materials, Paints & Coatings
				Credit 4.3	Low-Emitting Materials, Carpet Systems
				Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products
				Credit 5	Indoor Chemical & Pollutant Source Control
				Credit 6.1	Controllability of Systems, Lighting
				Credit 6.2	Controllability of Systems, Thermal Comfort
				Credit 7.1	Thermal Comfort, Design
				Credit 7.2	Thermal Comfort, Verification
				Credit 8.1	Daylight & Views, Daylight 75% of Spaces
				Credit 8.2	Daylight & Views, Views for 90% of Spaces

Yes	?	No			Total
			1	Innovation & Design Process	5 Points
				Credit 1.1	Innovation in Design: Provide Specific Title
				Credit 1.2	Innovation in Design: Provide Specific Title
				Credit 1.3	Innovation in Design: Provide Specific Title
				Credit 1.4	Innovation in Design: Provide Specific Title
				Credit 2	LEED® Accredited Professional

Yes	?	No			Total
				Totals	Possible Points 57

Certified: 26-32 points, Silver: 33-38 points, Gold: 39-51 points, Platinum: 52-69 points

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LEED CERTIFICATION TYPES



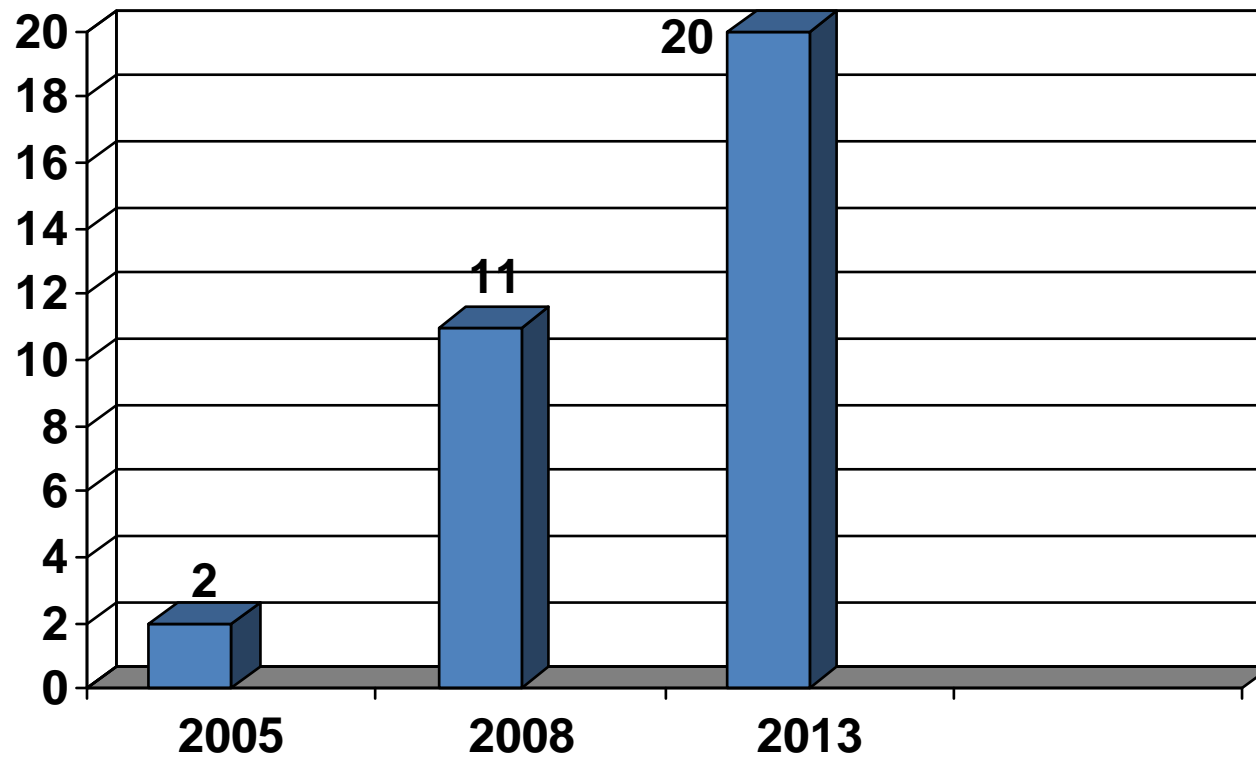
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GREEN BUILDING TRENDS



Green percentage of nonresidential construction starts





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EMPLOYMENT OPPORTUNITIES



A **green-collar worker** is employed in the environmental sectors of the economy. Generally, they implement environmentally conscious design, policy, and technology to improve conservation and sustainability. Formal environmental regulations as well as informal social expectations are pushing many firms to seek professionals with expertise with environmental, energy efficiency, and clean renewable energy issues.

EMPLOYMENT OPTIONS:

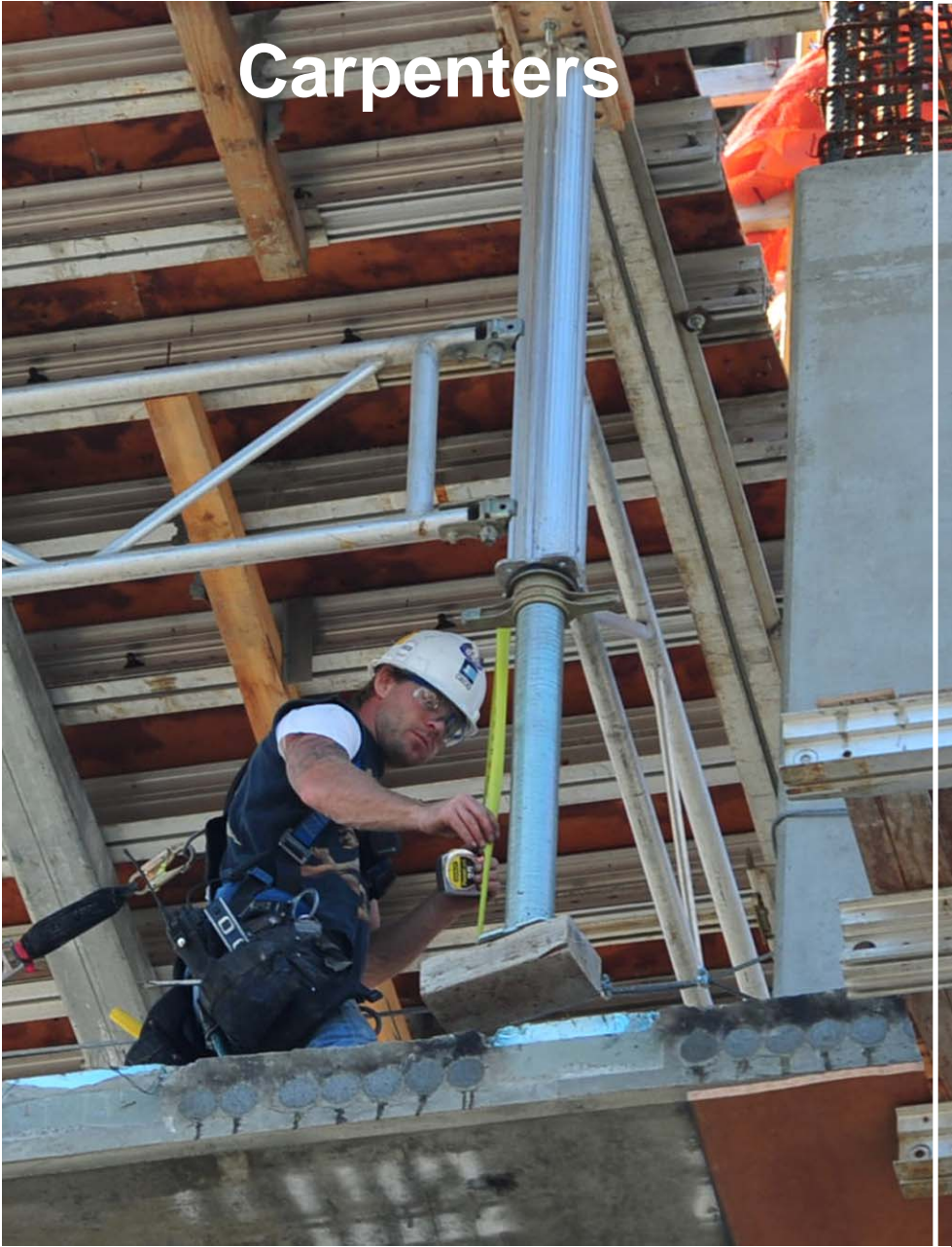


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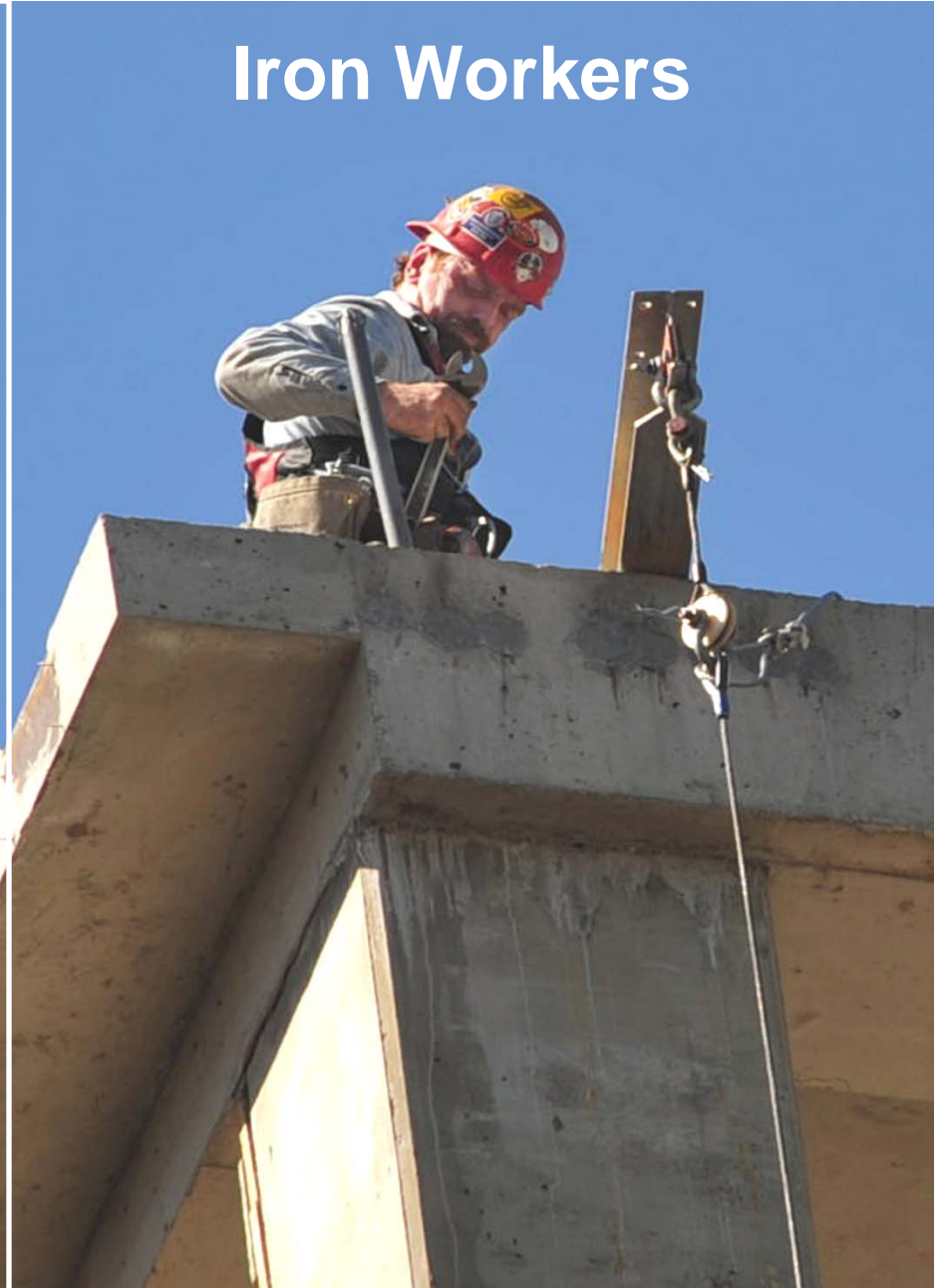


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Carpenters



Iron Workers



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Operators



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EMPLOYMENT OPPORTUNITIES



Chart 3. Job-Growth Projections for Oregon and Washington

Year	Solar photovoltaic manufacturing	Wind-power development	Green-building design services	Bioenergy	Smart-grid	TOTALS
Current	800	2,217	3,826	3,207	1,280	11,330
2010	1,863	3,043	4,284	3,224	1,491	13,905
2015	3,677	2,650	6,899	4,100	1,715	19,041
2020	9,260	3,408	10,137	5,688	2,209	30,703
2025	14,182	4,507	12,937	6,946	2,669	41,241

"Carbon Free Prosperity 2025." Climate Solutions Inc. & Clean Edge, Inc., October 2008.

NOTE: These numbers are based on the "medium-growth scenario".



QUESTIONS?

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