

Educating the Next Generation of Energy Professionals

*Oregon's response to the urgent energy
needs of a changing world*

a presentation at the

Business of Clean Energy in Alaska

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Renewable Energy Engineering

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Overview

- Oregon priorities and directions
- Manpower and market assessments
 - NW Energy Efficiency Task Force (NEET)
 - Clean Edge, Inc., Climate Solutions
 - 3E Strategies
- Education and training for a different kind of labor market
- OIT Renewable Energy Engineering curriculum

Motivation for change



**Oregon goal: 25% of electricity generation from
renewables by 2025**

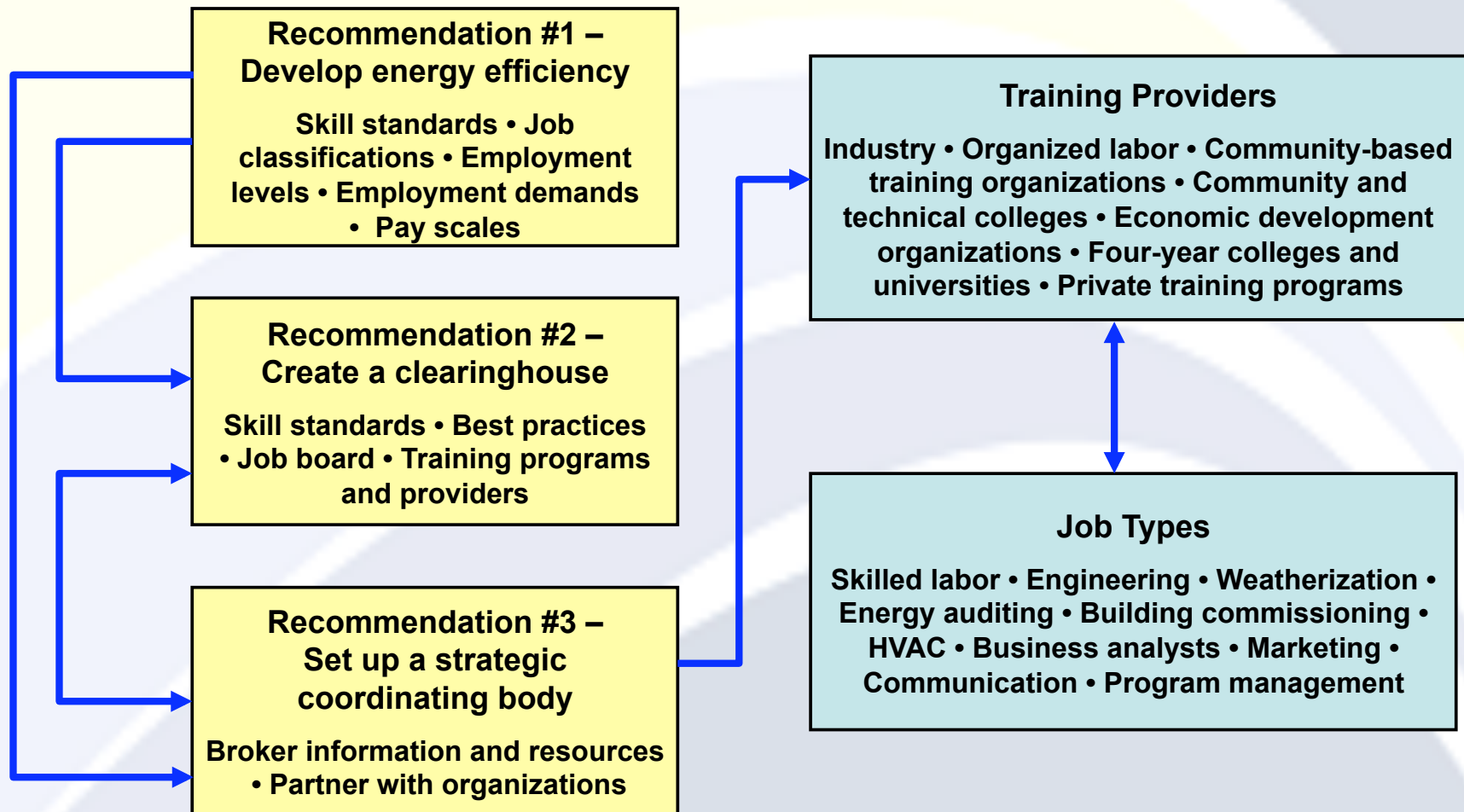
<http://www.worksourceoregon.org/>

NEET workgroup

- **People...** NW Energy Efficiency Task Force (NEET), convened by the Bonneville Power Administration
- **Charter...** To “significantly advance the region’s energy efficiency achievement through greater regional collaboration, commitment, customer involvement, and pursuit of the most cost-efficient program strategies.”
- **Key Question...** “Facing today’s demographics, how do we create systems that build and sustain energy efficiency talent to meet today’s and the future’s needs?”

<http://www.nwcouncil.org/energy/neet/workgroups/5/NEET%20Workgroup%20Draft%20Final%20Report.doc>

NEET recommendations



Clean Edge assessment

Carbon-Free Prosperity 2025

*How the Northwest Can Create Green Jobs, Deliver Energy Security,
And Thrive in the Global Clean-Tech Marketplace, October 2008*

prepared by Clean Edge, Inc. Climate Solutions



**Carbon Free
Prosperity 2025**

October 2008
71 Pages
PDF Document

<http://www.cleandedge.com/reports/reports-PNW>



Focus of Clean Edge study

- Region's key assets (strengths) and barriers (weaknesses).
- Top five clean-tech opportunities for the region, according to our interview and research findings.
- 10-point action plan for reaching carbon-free prosperity in Oregon and Washington.
- How the region can be the first in the nation to achieve approximately 75 percent of its electricity supply from carbon-free sources (hydropower + renewables) by 2025?
- How the region can create between 41,000 and 63,000 direct jobs by 2025 in just five clean-tech sectors?

Analysis of Clean Energy Workforce Needs and Programs in Oregon

prepared for the Office of Governor Kulongoski

by 3E Strategies, Clean Edge, Inc. Climate Solutions

http://www.worksourceoregon.org/index.php/documents-aampamp-publications-mainmenu-50/doc_download/734-analysis-of-clean-energy-workforce-needs-and-programs-in-oregon

3E recommendations

- **Strengthen** capacity of the community college system to address short-term needs of clean energy industry and establish a sustainable funding mechanism for these programs.
- **Implement** mechanisms for Oregon to track employment and wage information for the clean energy industry using data elements that are aligned with overall state goals.
- **Increase** collaboration among key stakeholders.
- **Establish** industry internship and mentoring systems to strengthen existing programs...as key elements of any necessary new programs.
- **Integrate** clean energy elements into the core curriculum for conventional academic and technical programs such as engineering, electrician, plumbing, buildings sciences, meteorology and geology.
- **Create** pathways out of poverty into the clean energy industry and create career advancement pathways within industry sectors.

Key assessment points

- 1** Develop an inventory of existing training programs and plans.
- 2** Work directly with the clean energy industry to determine their current and near future workforce needs.
- 3** Integrate industry needs into academic programs.
- 4** Network all relevant agencies, academic institutions and trade associations to avoid duplication, increase training program effectiveness and leverage resources.

From the Clean Edge study...

- Solar PV manufacturing
- Green buildings design and consulting
- Wind power
- Sustainable bioenergy
- Smart grid technologies

Where are the jobs?

Green Building Design Services Opportunities

Near-Term (0-5 years)

Green Building Design
Energy Efficiency Upgrades and other Green Retrofits
Smart Grid Interconnection

Mid-Term (6-10 years)

Living/Regenerative Buildings (zero energy or better)
Energy District Planning and Development
Green Neighborhoods
Distributed Infrastructure ('off-grid' energy, water treatment, waste processing)

Green Building Design Services Job Titles

Below is a list of some of the types of jobs being created in the emerging area of Green Building Design Services.

Building Energy Analyst

Design Simulation Professional

Energy Engineer/Building Scientist

Energy Modeler

Green Building Analyst

Green Commissioning Mechanical Engineer

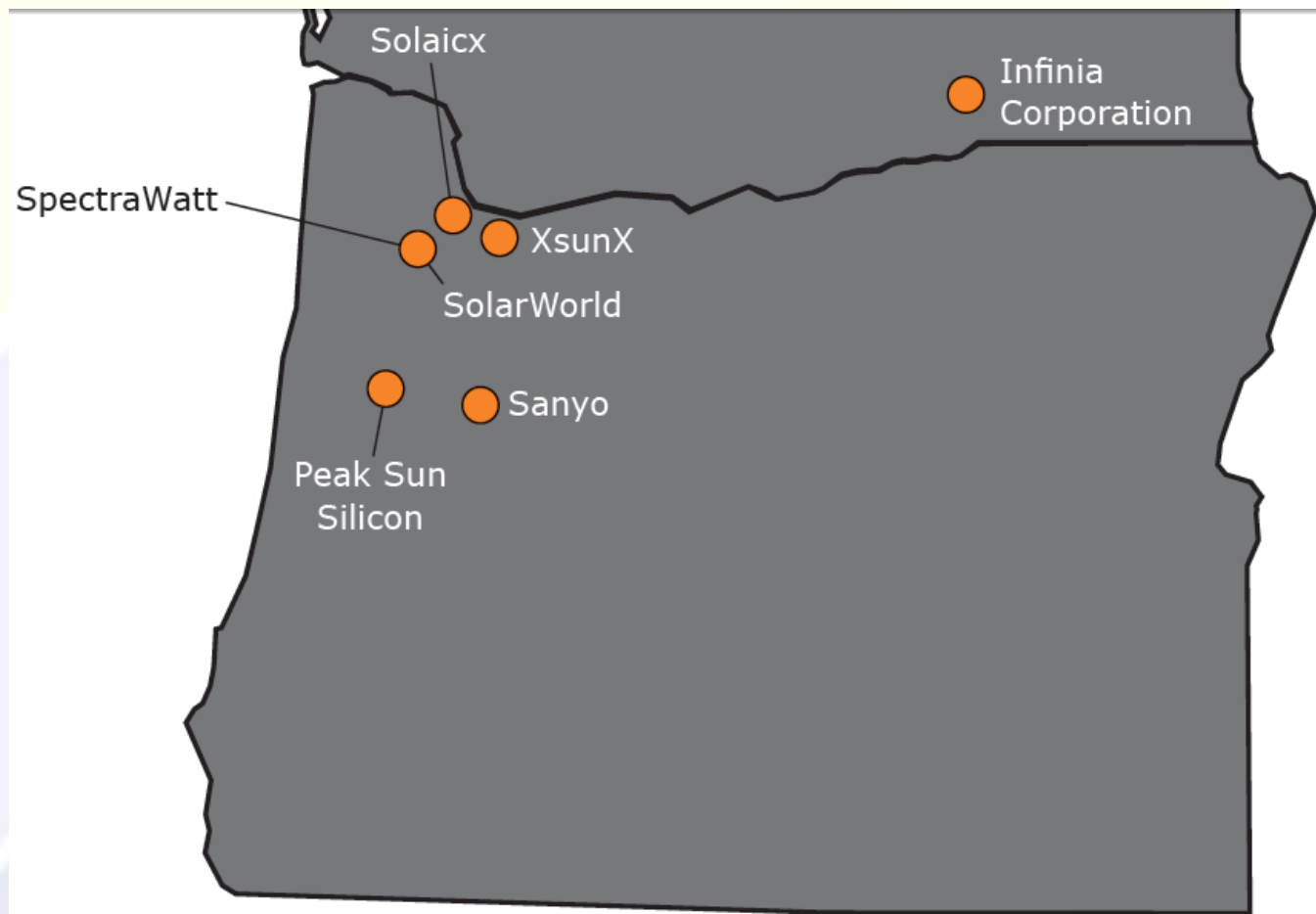
Home Energy and Green Rating Professional

LEED AP

LEED Certification Coordinator

Sustainable Building Engineer

Silicon industry cluster



Talent – from where?

- Policy mavens/economists/government
- Management, marketing, finance
- Engineering
- Technicians
- Skilled trades
- Manufacturing
- Field implementation/maintenance

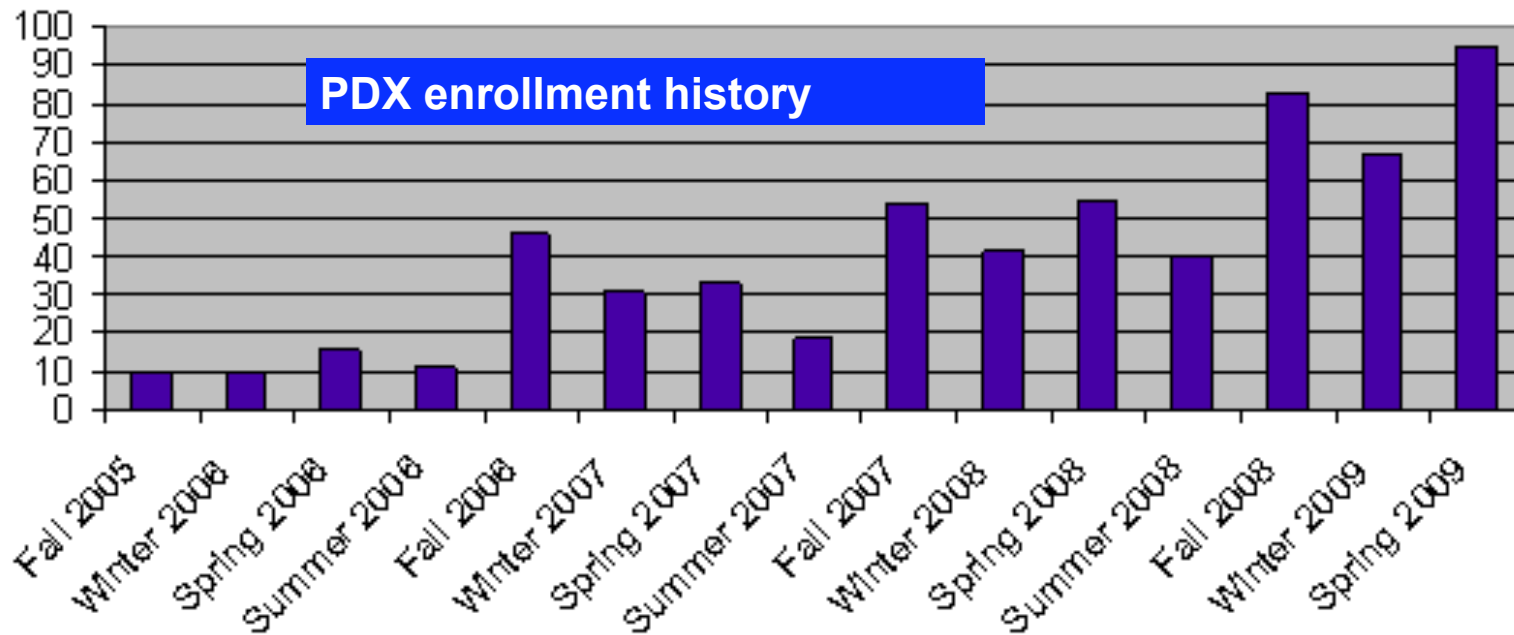
Education and training (1)

University and college education	Programs	Work force needs addressed
Oregon Institute of Technology (Portland / Klamath Falls)	Renewable Energy Engineering (First B.S. program in energy engineering in North America)	Engineering of energy systems design, applications, testing, and management
Portland Community College	Facilities Maintenance Certificate	Facilities maintenance and building energy efficiency
Portland Community College (planned for future)	AAS degrees in Engineering Technology	<ul style="list-style-type: none"> • Solar installation and maintenance or fuel cell development • Hydro or wind generation
Central Oregon Community College (Bend)	Sustainable Building Advisor Certificate	Green building design, operation, and construction
Columbia Gorge Community College (The Dalles)	1- or 2-year certificate, or AAS degree in Renewable Energy Technology	Hydro and wind generation; automated manufacturing
Lane Community College (Eugene)	2-year AAS degree in Energy management or Renewable energy technician	<ul style="list-style-type: none"> • Facilities managers, energy auditors, energy program coordinators • Designing and installing solar electric and domestic hot water systems

Education and training (2)

Training and certification	Programs	Work force needs addressed
Lane Community College, Northwest Energy Education Institute (Eugene)	Certification in these areas: Energy Management, BPA Residential Inspector, BPA Residential Energy Auditor, and Building Operator	<ul style="list-style-type: none"> • Advanced energy management • Residential energy audits • Weatherization and residential energy conservation • Energy and resource-efficient building operations
Energy Star / Energy Trust Technical School Outreach	<ul style="list-style-type: none"> • Residential Inspector Certification • Support for high-school and community college curricula 	Concentrations in: <ul style="list-style-type: none"> • Building science/construction • Architectural drafting • Green buildings • Energy conservation
Apprenticeship, unions, and the Clean Energy Industry — NECA, IBEW, JATC, and others	<ul style="list-style-type: none"> • Certifications and licensing 	<ul style="list-style-type: none"> • Electrical, plumbing and steamfitters, HVAC, roofing, glaziers, ironworkers, sheet metal working, carpenters, painters, solar installers, heat/frost insulators, renewable energy technicians

REE status – growth!



- Current enrollments: 95 Portland/43 K-Falls
- New admits for Fall 2009: 60 Portland/100 K-Falls

Portland REE student profile

- Median age is ~ 29 to 31
- Real-world experience already
- About 40% already have bachelor's degrees
- From 20+ states and at least two foreign countries
- Eclectic, creative, non-traditional
- Highly focused and motivated
- *Common denominator* – a passion to contribute solutions to pressing problems



REE program requirements

- Interdisciplinary blend of mechanical and electrical engineering curricula; some chemical engineering.
- Rigorous math, physics, chemistry foundation.
- Focus on the design, analysis, development, and application of energy and power systems and energy conversion technologies.
- Wind, solar, PV, biomass/biofuels, fuel cells, hydro, geothermal, wave/tidal, and “green” buildings.

Summary points

- A renewable energy mix will be unique to each state's natural resources and economy.
- Jobs will be driven by market development.
- Emerging markets in energy systems and energy efficiency are accelerated by policy and incentives.
- Training/education is not enough to support these emerging markets.
- Overlap/redundancy in labor markets can be avoided with focused coordination.
- Education in energy engineering is novel and very much in-demand.