

National Research Center

University of Louisville

James R. Stone III

Director

The work reported herein was supported under the National Research Center for Career and Technical Education, PR/Award (No. VO51A070003) as administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education and you should not assume endorsement by the Federal Government.



It is (or isn't) easy to be "Green"

With Apologies to Kermit

Agenda

- What is green?
- The green economy
- The nature of green employment (the new “high tech?”)
 - Green enhanced demand occupations
 - Green enhanced skills occupations
 - New and emerging green occupations
- Implications for Career and Technical Education
 - New green programs
 - Expanding existing green programs
 - Greening of existing programs

What is green?

The Green Economy

The Green Economy: Green sectors (Dierdoff et al, 2009)

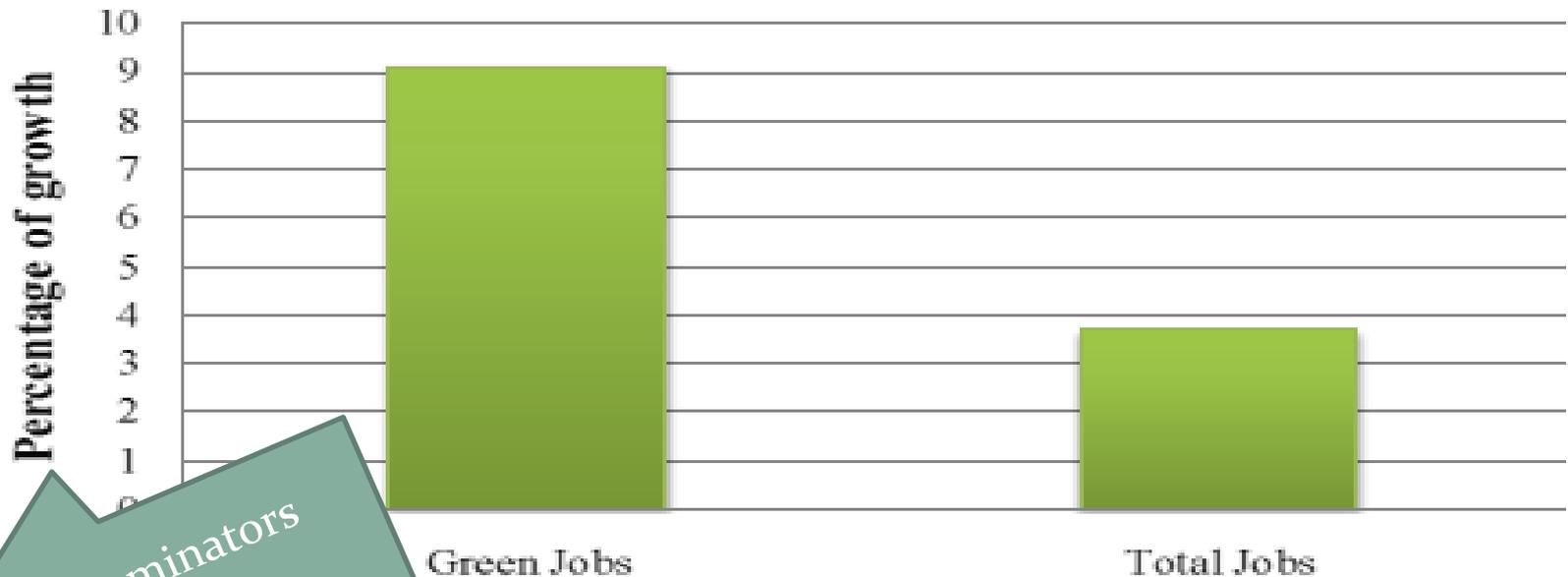
- Renewable energy
- Energy efficiency
- Green construction
- Energy trading
- Energy and carbon capture and storage
- Research design and consulting
- Environmental protection
- Agriculture and forestry
- Manufacturing
- Recycling and waste reduction
- Government and regulatory administration
- Transportation

Career Categories: Claiming Turf

- Wind Power
- Solar Power
- Organic Farming
- Natural Building
- Mass Transit
- Hydropower
- Holistic Alternative Medicine
- Green Engineering
- Geothermal Power
- Energy Efficient Automobiles
- Environmental Science
- Conservation Sustainability
- Clean Energy
- Cellulosic Biofuels
- Carbon/ Co2 Emissions
- Building Retrofitting
- energy-efficient building, construction and retrofits;
- renewable electric power;
- energy-efficient and advanced drivetrain vehicles;
- biofuels;
- deconstruction and materials use;
- energy efficiency assessment industry
- manufacturers

Green Employment: Myth vs Reality

Economic Growth between 1998 and 2007



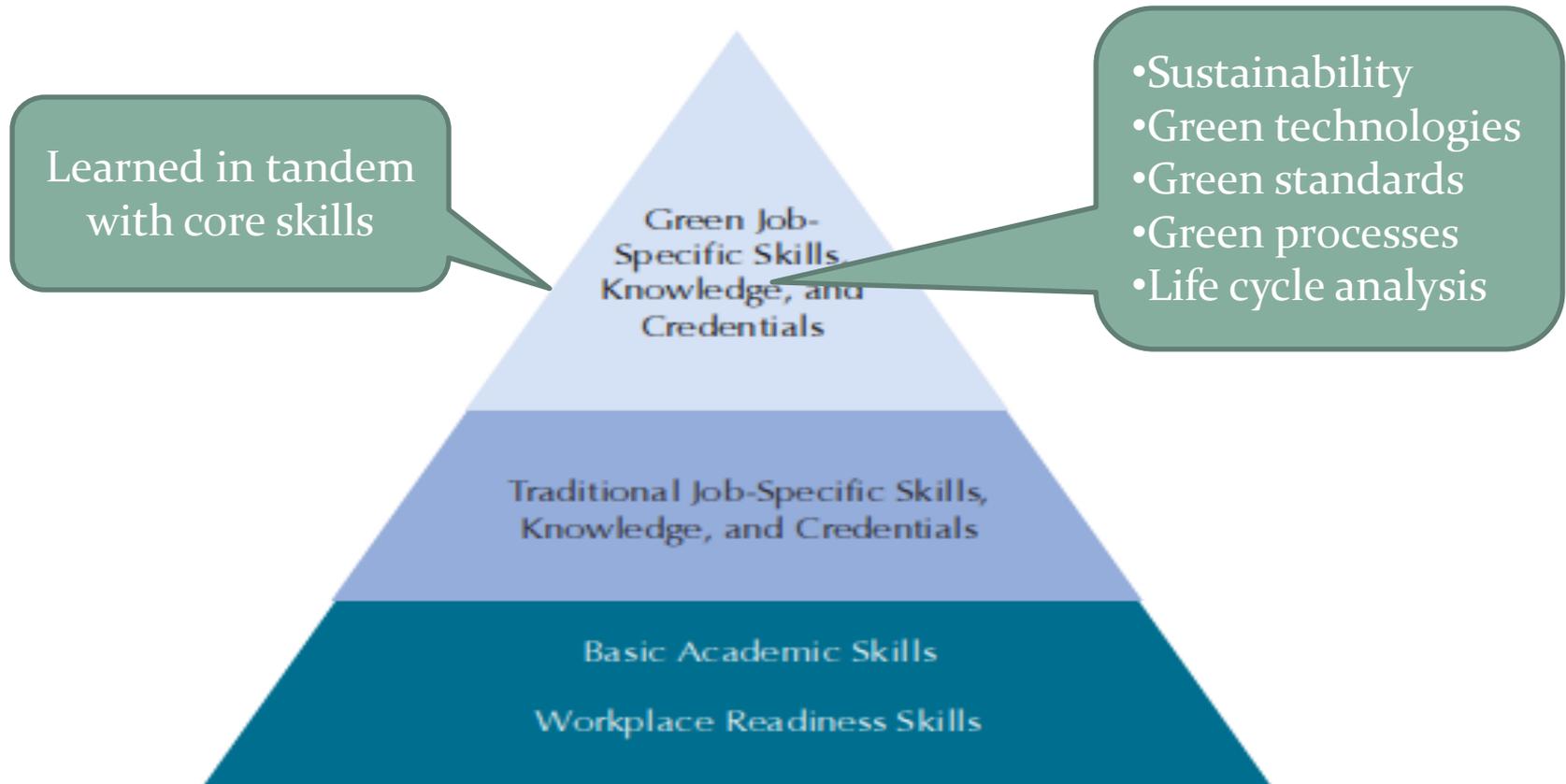
Denominators Matter

Green sector v. Total economy

Source: Pew Charitable Trusts, "The Clean Energy Economy" (2009)

Green Skills

Figure 2. Skills Sought by Green Jobs Employers



Source: John J. Heldrich Center for Workforce Development, 2009.

Green enhanced-demand existing occupations

Increased employment demand for an existing occupation:
changed context but no change in skills

Blue today; Green tomorrow

Blue Collar

- Mfg: working on an SUV in a Ford plant
- Mfg: welding a boiler for a coal fired energy facility
- Truck driver
- Electrician
- Computer tech?
- Many others...

Green Collar

- Mfg: working on a hybrid in a Ford plant
- Mfg: welding the components for a wind energy machine



Green enhanced-skills for existing occupations

Significant change to the work and worker requirements of
an existing occupation

Changing the work requirements

Old tech

- Roofer
- HVAC
- Salesperson
- Pool installer
- Travel planner/tour guide
- Architect
- Coal company attorney

Green tech

- Solar & PV Installer
- Solar hot water installer
- Solar radiant heat installer
- Solar sales
- Solar-thermal installer
- Eco-tour guide
- LEED certified architect
- Environmental lawyer

New & Emerging Green Occupations

Creation of unique work and worker requirements; new generation of a new occupation OR one born of existing Occupation.

New Green Jobs

- “Green” jobs should “contribute *substantially* to preserving or restoring environmental quality”. (UNEP, 2008)
- (Elements) Provide products/services that promote renewable resources, reduce pollution; exist in skilled trades and professional occupations; provide a fair, living wage and support local economy (NASDCTEC, 2009)
- (most) Green jobs are “middle skill” jobs-cannot be outsourced.

(A few) Examples of New Green Jobs

- Solar operations engineer
- Solar lab technician
- Photovoltaic fabrication testing technician
- Energy retrofitting
- Waste composting
- Green landscaping
- Whole home performance analysts
- Hybrid car maintenance

**Three green effects on the
workplace**

**Three green responses
from CTE**

Greening CTE Programs

Greening Programs of Study

Greening CTE Curricula

Creating NEW green CTE programs

Green *Programs of Study*: Sample of Certification Providers

- Association of Energy Engineers (HVAC, Geothermal)
- North American Board of Energy Practitioners (Photovoltaic & solar thermal installers; enhanced construction and trades)
- Building Performance Institute (Building analysts, systems design, energy efficiency, renewable energy)
- Energy Star (Building contractors-efficient building design)
- Solar Energy International (Renewable Energy)
- Green Building Certification Institute (LEED Accreditation)

State Technical Assistance Academy for Career and Technical Education *Green-Focused Programs of Study*

- Georgia
- Illinois
- New Jersey
- Ohio
- Oregon



Example from one state

Energy and Alternative Fuels

- Solar, geothermal, wind, biofuel, hydro, fossil
- Research and development
- Site selection, acquisition and preparation
- Business management & operation
- Industry Partners Include:
 - American Electric Power
 - Solid Waste Authority
 - Department of Agriculture
 - POET Biorefining

Example 2

Bio-Products

- Products based on agricultural feedstocks
- Paints, adhesives, plastics, packaging
- Industry Partners Include:
 - Univenture
 - University Bioproducts Innovation Center
 - Channel Bio Corporation

Example 3

Precision Agriculture for Sustainability

- Sustainable production practices
- Production efficiency
- Energy Reduction
- Reduce dependence with demand growing
- Industry Partners Include:
 - Agricultural Research and Development Center
 - Farm Bureau
 - Agriculture Technical Institute

Potential for supporting low income workers

NJ Place Program

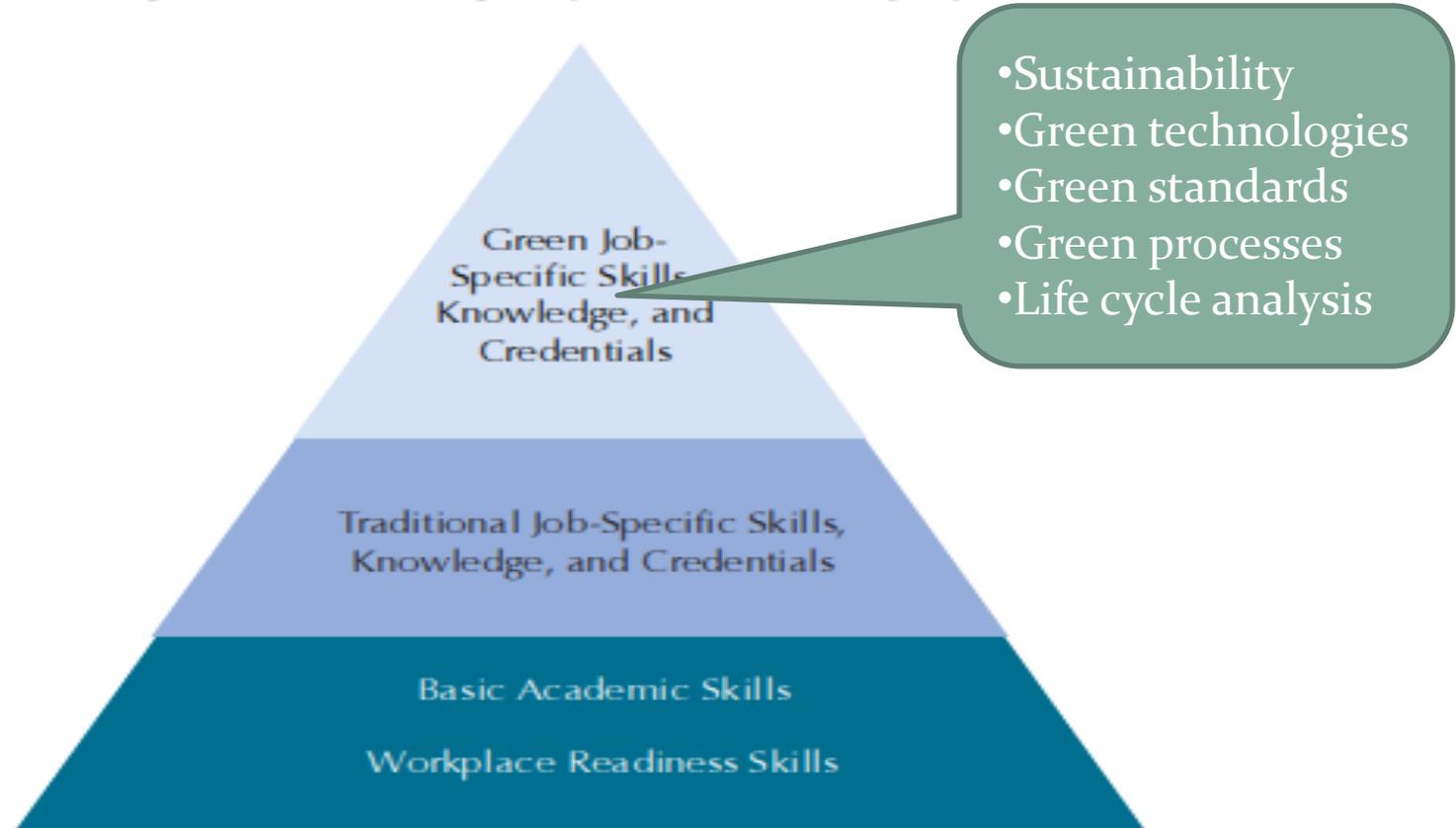
- NJ Council of CCs & NJ DOL
- CCs and Unions developed program to obtain national accreditation of union apprenticeships to build “stackable” credentials leading toward Associates degree

Los Angeles

- Green Careers Training Initiative
- Apollo Alliance & City’s Green Retrofits program
- Creation of Green Career Ladders

Greening CTE Curricula

Figure 2. Skills Sought by Green Jobs Employers



Source: John J. Heldrich Center for Workforce Development, 2009.

Potential NEW green CTE programs

Adapt Existing

- Plumbing (retrofitting)
- Bio-diesel production
- Green landscaping (Xeriscaping)
- Air conditioning specialist
- Green building/LEED certification
- Horticulture/environmental technology

Create New

- Home energy auditor
- Pollution control technician
- Home solar power
- Home weatherization management
- Lighting efficiency
- Energy management tech
- Sustainable design
- Alternative fuels tech

Green Challenges

- Ownership
- Evangelical spirit
- Green collar inflation

Final thought

For more information,
contact:

James R. Stone III
Director NRCCTE

James.Stone@nrccte.org
www.nrccte.org