

# National Research Center

University of Louisville

James R. Stone III

Director

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

# Part of a larger POS agenda

- A Longitudinal Study of the South Carolina Personal Pathways to Success Initiative
- Rigorous Test of Student Outcomes in CTE Programs of Study
- Programs of Study: A PS Longitudinal Analysis – Backward Mapping

# 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

# The Green Context

**Demand is growing for products and services that:**

- Leverage renewable energy sources
- Conserve energy and natural resources
- Reduce greenhouse gas emissions and pollution
- Repurpose waste

**The drivers of this new business activity include:**

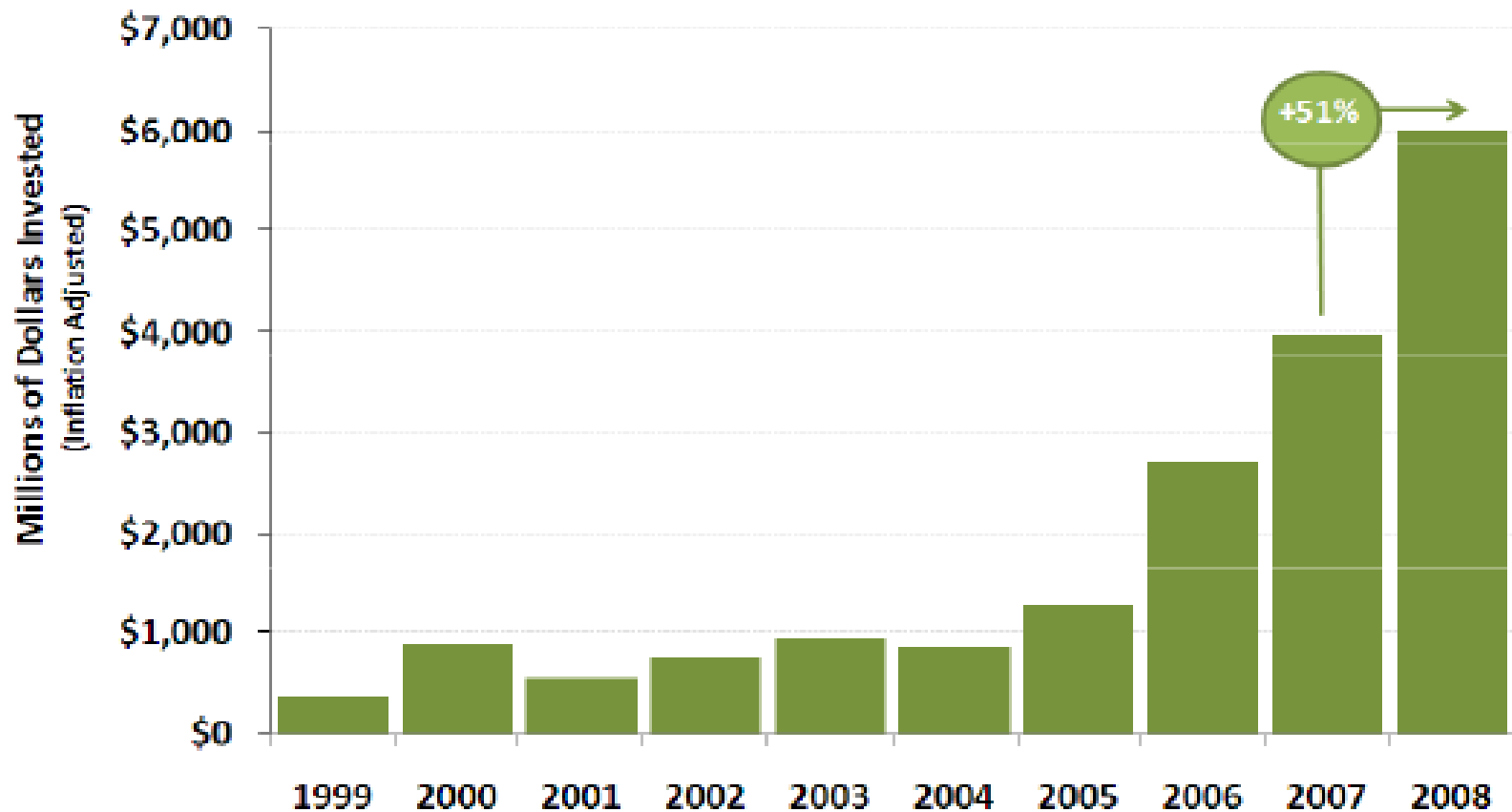
- Public policy: new standards and incentives
- Volatile fuel costs
- Conservation efforts as a recession buffer
- Growing concern about global climate change
- Reduce dependence on foreign, non-renewable energy sources

# Growth in Green Investment

## Venture Capital Investment in Clean Technology

### UNITED STATES

Millions of Dollars Invested



# 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

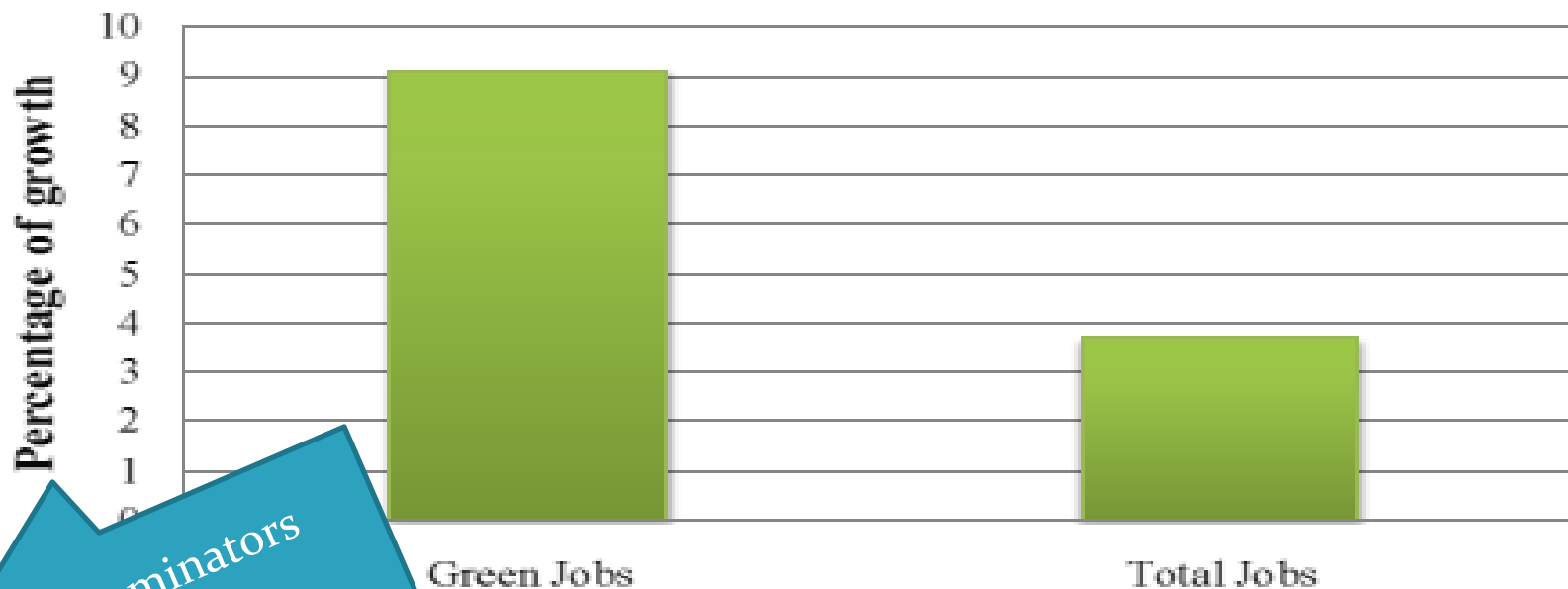


# Career Categories: Claiming Turf

- 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



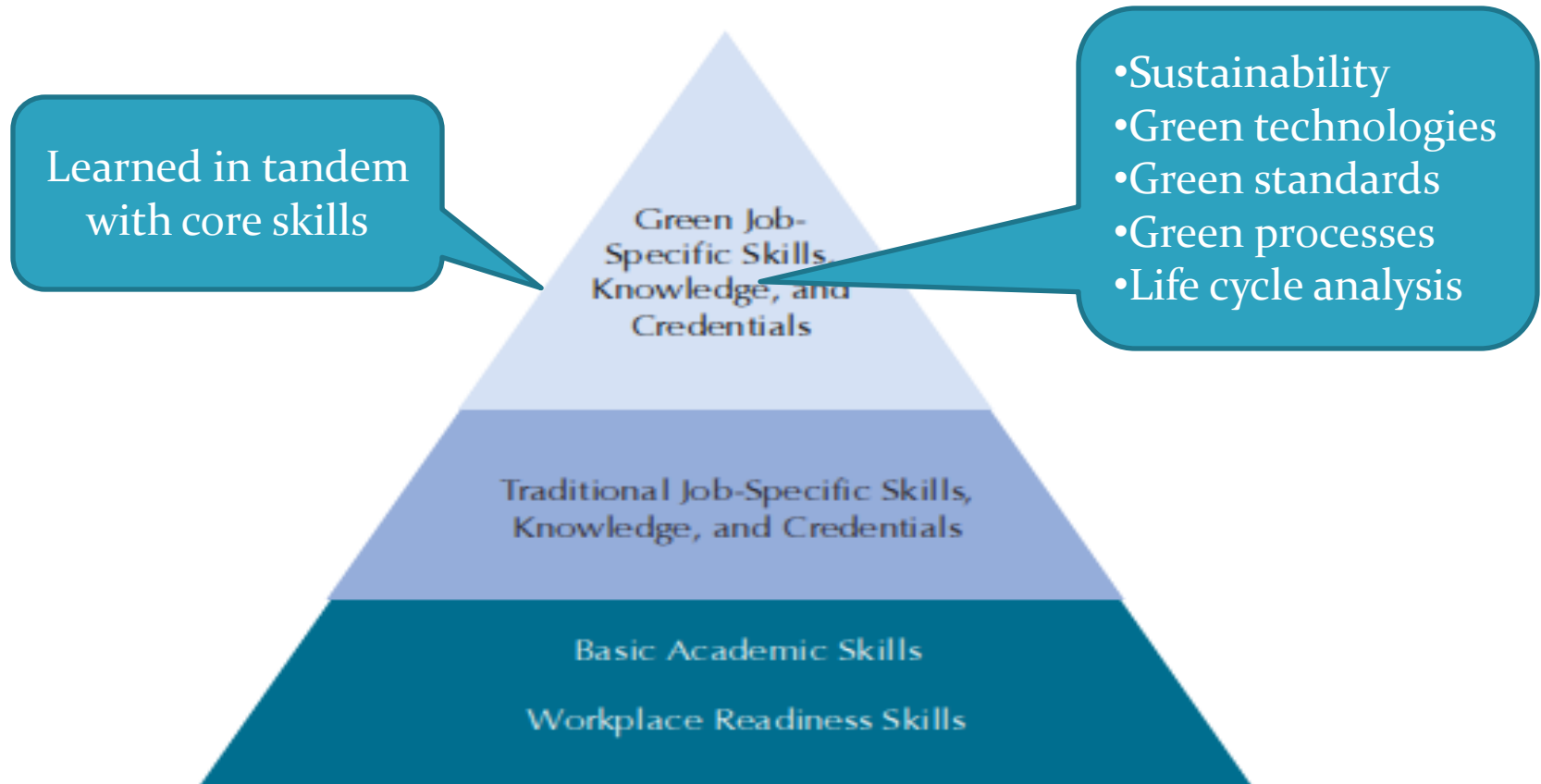
Denominators  
Matter

**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

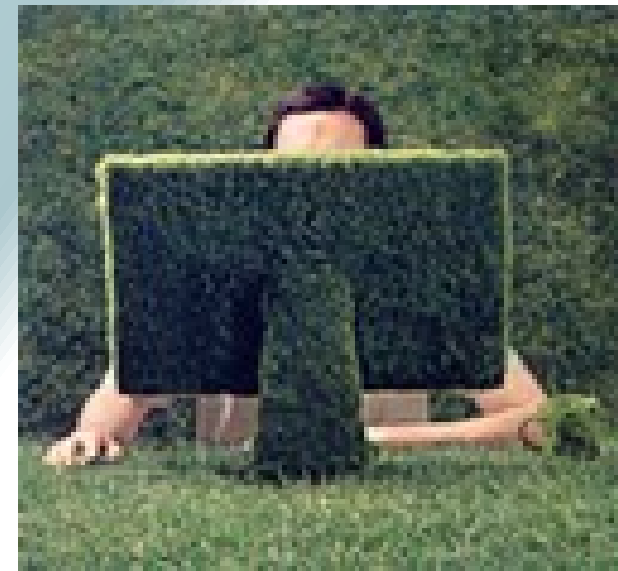
# Blue today; Green tomorrow

## 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

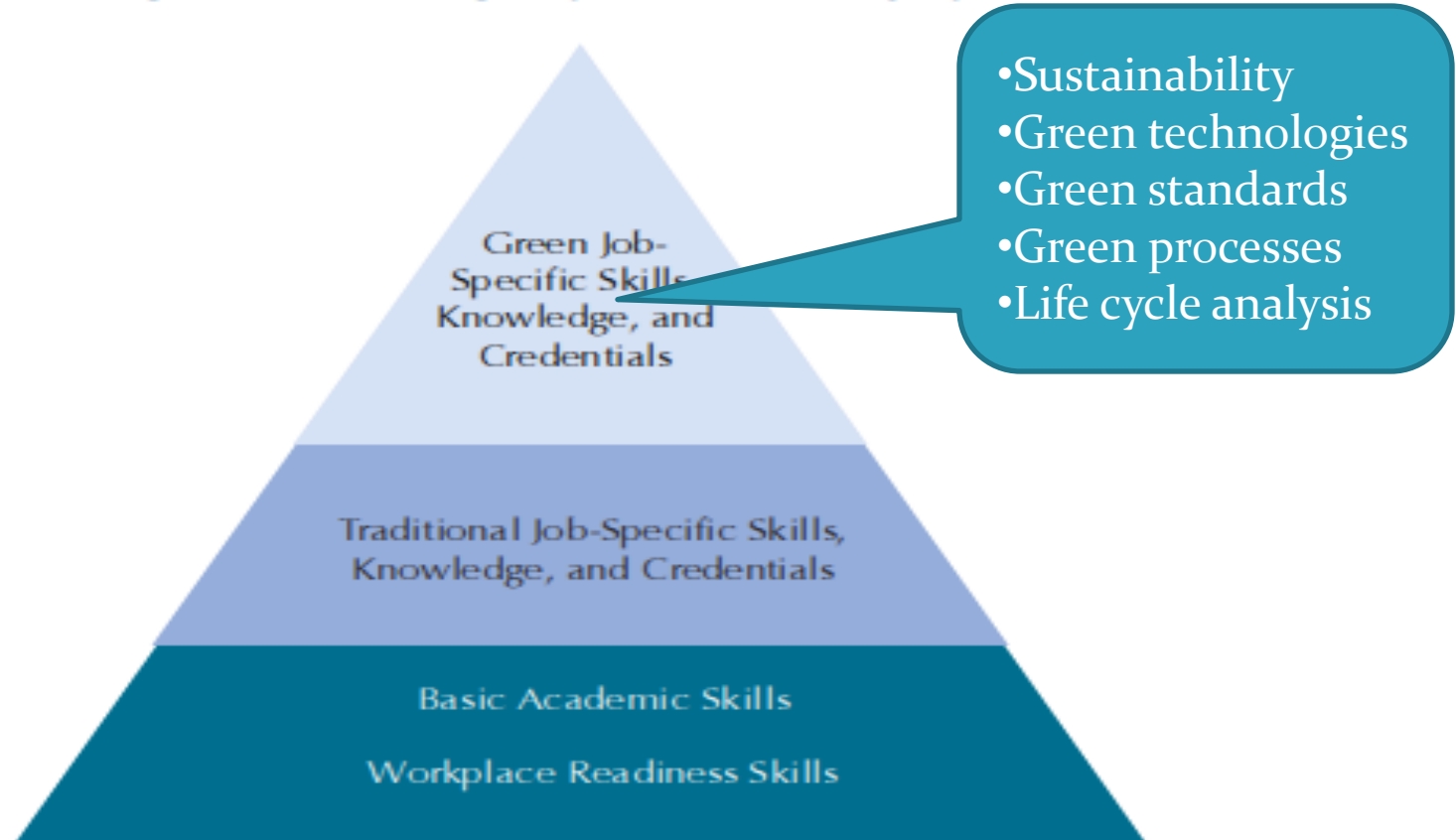
- NJ Council of CCs & NJ DOL
- CCs and Unions developed program to obtain national accreditation of union apprenticeships to build “stackable” credentials leading toward Associates degree

## 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](mailto:James.Stone@nrccte.org)

[www.nrccte.org](http://www.nrccte.org)