

# Greening of the World of Work: Implications for O\*NET-SOC and New & Emerging Occupations

Green Jobs Study Group  
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*“We will harness the sun and the winds and the soil to fuel our cars and run our factories. And we will transform our schools and colleges and universities to meet the demands of a new age. All this we can do.”*

President Barack Obama  
January 20, 2009

# Purpose

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- Impact of the **Green Economy** and it's related activities and technologies on the O\*NET System
  - Current O\*NET-SOC Occupations
  - New & Emerging Occupations

# Overview

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- Background
  - O\*NET Occupations
  - New and Emerging Project
- Green Research
- Results
- Methodology
- Next Steps

# O\*NET Occupations

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- O\*NET Occupational Classification System
  - Based on the Standard Occupational Classification System (SOC)
    - SOC mandated by US Office of Management and Budget
    - Developed by multi-agency initiative

# Key characteristics of U.S. SOC

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- Structured for comparability
- Unified classification structure
- Four hierarchical levels to enable data collectors to choose a level of detail corresponding to their needs and ability to collect data on different occupations

# O\*NET-SOC Classification

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- O\*NET-SOC provides a greater level of detail as needed
  - Currently data collected on 812 O\*NET-SOCs
    - 47 SOCS broken out to 123 O\*NET-SOCS

# O\*NET-SOC Example

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- 11-0000 Management Occupations
  - 11-3000 Operations Specialties Managers
    - 11-3071 Transportation, Storage, & Distribution Managers
      - 11-3071.01 Transportation Managers
      - 11-3071.02 Storage and Distribution Managers



# Occupation Definition

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- *Groupings of work roles that span multiple organizations but share common purposes and common requirements of incumbents*

# Future O\*NET-SOC Classification

- O\*NET-SOC is growing to include important new and emerging occupations (N & E), including **Green**
  - Currently 167 N & E occupations identified

# O\*NET New & Emerging Project

- Investigate 17 In-Demand Industries
  - Advanced Manufacturing
  - Aerospace
  - Automotive
  - Biotechnology
  - Construction
  - Education\*
  - Energy
  - Financial Services
  - Geospatial Technology
  - Green\*
  - Health Care
  - Homeland Security
  - Hospitality
  - Information Technology
  - Nanotechnology
  - Retail
  - Transportation

*\* Research completed, results being finalized.*

# O\*NET New & Emerging Project

- New & Emerging Occupations:
  - Significantly different work from existing O\*NET-SOCs
  - Not adequately reflected in current classification
  - Significant employment
  - Positive projected growth rate
  - Education, credentialing, certification programs
  - Related professional associations

<http://www.onetcenter.org/reports/NewEmerging.html>

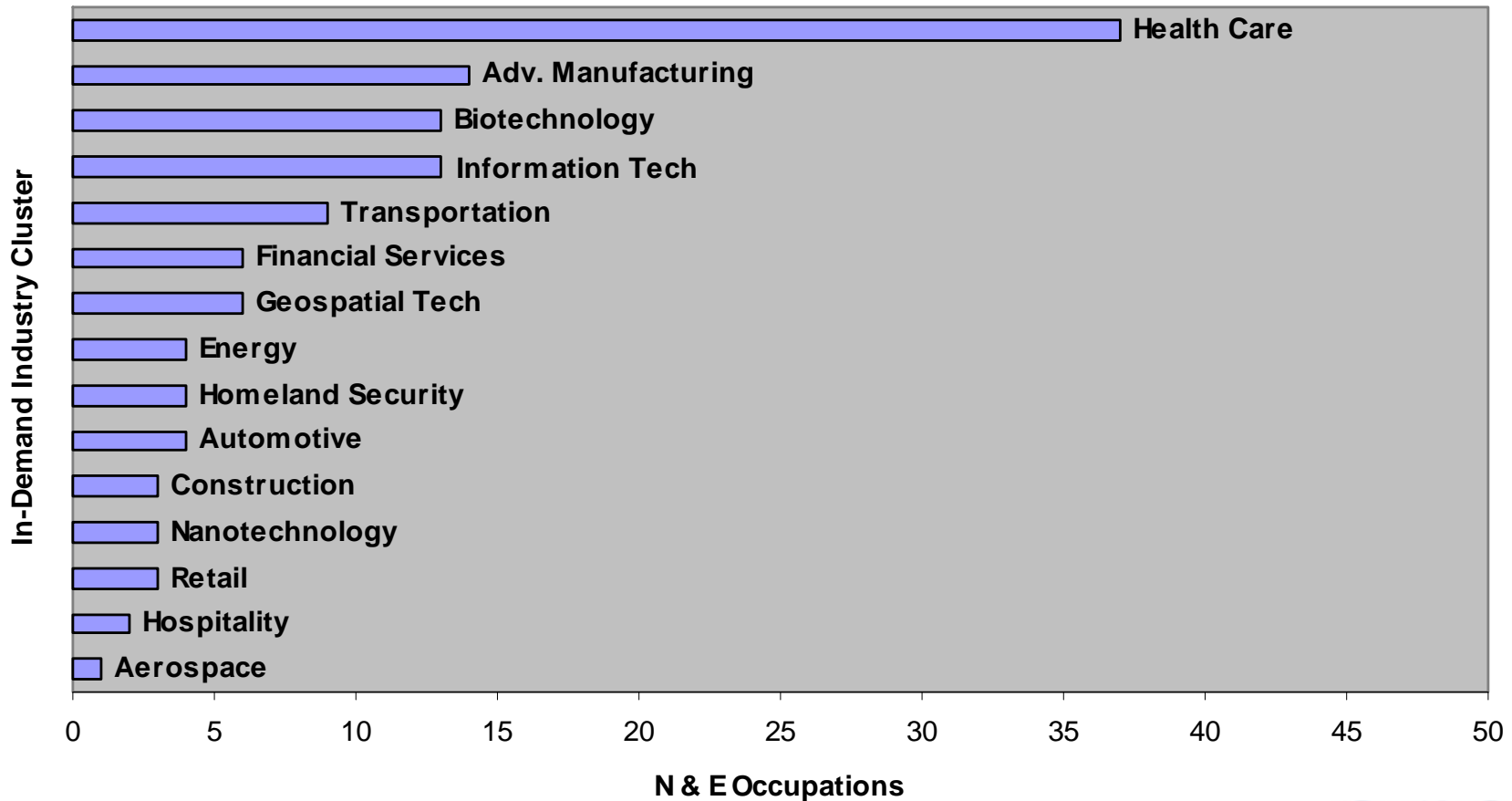
# Results to Date

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- Research on 15 of the 17 In-Demand Industries is completed
  - Education and **Green** currently being processed
- Currently 167 N & E Occupations have been identified
  - Data collection complete for 21 N & E Occupations
  - Data collection initiated for 114 N & E Occupations

# Results to Date (Cont.)

Total N & E Occupations Identified by In-Demand Industry



# 37 New Health Care O\*NET-SOCs

- 13-1199.02 Patient Representatives
- 19-3039.01 Neuropsychologists and Clinical Neuropsychologists
- 21-1019.01 Genetic Counselors
- 29-1069.01 Allergists and Immunologists
- 29-1069.02 Dermatologists
- 29-1069.03 Hospitalists
- 29-1069.04 Naturopathic Physicians
- 29-1069.05 Neurologists
- 29-1069.06 Nuclear Medicine Physicians
- 29-1069.07 Ophthalmologists
- 29-1069.08 Pathologists
- 29-1069.09 Physical Medicine and Rehabilitation Physicians
- 29-1069.10 Preventive Medicine Physicians
- 29-1069.11 Radiologists
- 29-1069.12 Sports Medicine Physicians
- 29-1069.13 Urologists
- 29-1129.01 Low Vision Therapists, Orientation and Mobility Specialists, and Vision Rehabilitation Therapists
- 29-1199.01 Acupuncturists
- 29-1199.02 Informatics Nurse Specialists
- 29-1199.03 Acute Care Nurses
- 29-1199.04 Advanced Practice Psychiatric Nurses
- 29-1199.05 Clinical Nurse Specialists
- 29-1199.06 Critical Care Nurses
- 29-1199.07 Nurse Anesthetists
- 29-1199.08 Nurse Practitioners
- 29-2099.01 Cytogenetic Technologists
- 29-2099.02 Cytotechnologists
- 29-2099.03 Electroneurodiagnostic Technologists
- 29-2099.04 Hearing Instrument Specialists
- 29-2099.05 Histotechnologists and Histologic Technicians
- 29-2099.06 Ophthalmic Medical Technologists and Technicians
- 29-2099.07 Orthoptists
- 29-2099.08 Nurse Midwives
- 29-9099.02 Midwives
- 31-9099.01 Anesthesiologist Assistants
- 31-9099.02 Endoscopy Technicians
- 31-9099.03 Speech-language Pathology Assistants

# Greening of the World of Work

- Investigated the implications for the O\*NET System
  - Current O\*NET-SOC Taxonomy
  - N & E Occupations
- Extensive literature and web review
  - Define **Green Economy** and **Green Sectors**
  - Develop concept of **Greening of Occupations**
  - Identify **O\*NET Green Occupations**



# Green Economy

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- “Green Economy”

*economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy*

# Green Economy Sectors

- **Research, Design, and Consulting Services**

- *“Indirect jobs” to the green economy which includes activities such as energy consulting or research and other related business services*

- » *NAICS: 54 Professional, Scientific, & Technical Services; 55 Management of Companies & Enterprises*

- **Manufacturing**

- *Industrial manufacturing of green technology as well as energy efficient manufacturing processes*

- » *NAICS: 31-33 Manufacturing; 42 Wholesale Trade*

- **Renewable Energy Generation**

- *Developing and using energy sources such as solar, wind, geothermal, and biomass*

- » *NAICS: 21 Mining; 22 Utilities; 23 Construction; 31-33 Manufacturing*

# Green Economy Sectors (cont.)

## • Green Construction

- *Constructing new green buildings, retrofitting residential and commercial buildings, and installing other green construction technology*
  - » *NAICS: 23 Construction; 31-33 Manufacturing; 54 Professional, Scientific, & Technical Services; 56 Administrative & Support & Waste Management & Remediation Services*

## • Environment Protection

- *Environmental remediation, climate change adaptation, and ensuring or enhancing air quality*
  - » *NAICS: 31-33 Manufacturing; 54 Professional, Scientific, & Technical Services; 56 Administrative & Support & Waste Management & Remediation Services; 81 Other Services*

## • Transportation

- *Increasing efficiency and/or reducing environmental impact of various modes of transportation such as trucking, mass transit, or freight rail*
  - » *NAICS: 23 Construction; 48-49 Transportation & Warehousing*

# Green Economy Sectors (cont.)

- **Governmental and Regulatory Administration**

- *Activities by public and private organizations associated with conservation and pollution prevention, regulation enforcement, and policy analysis and advocacy*

- » *NAICS: 54 Professional, Scientific, & Technical Services; 92 Public Administration*

- **Energy Efficiency**

- *Increasing energy efficiency (broadly defined), making energy demand response more effective, constructing "smart grids," etc.*

- » *NAICS: 23 Construction; 31-33 Manufacturing; 54 Professional, Scientific, & Technical Services*

- **Agriculture and Forestry**

- *Using natural pesticides, efficient land management or farming, and aquaculture*

- » *NAICS: 11 Agriculture, Forestry, Fishing, & Hunting; 54 Professional, Scientific, & Technical Services*

# Green Economy Sectors (cont.)

- **Recycling and Waste Reduction**

- *Solid waste and wastewater management, treatment, and reduction, as well as processing recyclable materials*
  - » *NAICS: 22 Utilities; 56 Administrative & Support & Waste Management & Remediation Services; 92 Public Administration*

- **Energy Trading**

- *Buying and selling energy as an economic commodity, as well as carbon trading projects*
  - » *NAICS: 22 Utilities; 52 Finance & Insurance*

- **Energy and Carbon Capture**

- *Capturing and storing energy and/or carbon emissions, as well as technologies related to power plants using the integrated gasification combined cycle (IGCC) technique*
  - » *NAICS: 21 Mining; 22 Utilities; 56 Administrative & Support & Waste Management & Remediation Services*

# Greening of Occupations

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- *The extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work and worker requirements*

# Greening of Occupations (cont.)

- **Green Increased Demand Occupations:**
  - increase in the employment demand for an existing occupation
  - changes in work context
  - few if any significant changes in work (tasks) and worker requirements of the occupation
- **Green Enhanced Skills Occupations:**
  - significant changes in work and worker requirements
  - essential purposes of the occupation remain the same, but tasks, skills, knowledge, and external elements, such as credentials, have changed
  - may or may not result in an increase in employment demand for the occupation
- **Green New & Emerging Occupations:**
  - impact of green economy activities and technologies creates unique work and worker requirements, which results in the generation of a new occupation relative to the O\*NET taxonomy.
  - The new occupation could be new or “born” from an existing occupation

# O\*NET Green Results

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- **Green Increased Demand Occupations:**

- 68 O\*NET-SOC occupations

- Geological and Petroleum Technicians; Locomotive Engineers; Architectural Drafters; Chemists; Natural Science Managers; Agricultural Inspectors [Green Increased Demand](#)

- **Green Enhanced Skills Occupations:**

- 57 O\*NET-SOC occupations

- Power Plant Operators; Electrical Engineers; Heating and Air Conditioner Mechanics and Installers; Roofers; Nuclear Engineers; Construction Managers; Farmers and Ranchers; Hazardous Materials Handlers [Green Enhanced Skills](#)



# O\*NET Green Results (cont.)

- **Green New & Emerging Occupations:**

- 90 total N & E Occupations

- 45 O\*NET-SOCs previously identified through research on in-demand industries

- Logistic Engineers, Fuel Cell Engineers, Energy Auditors, Precision Agriculture Technicians, Photonics Engineers, Robotics Technicians, Manufacturing Engineering Technologists

- 45 additional candidate N &E occupations

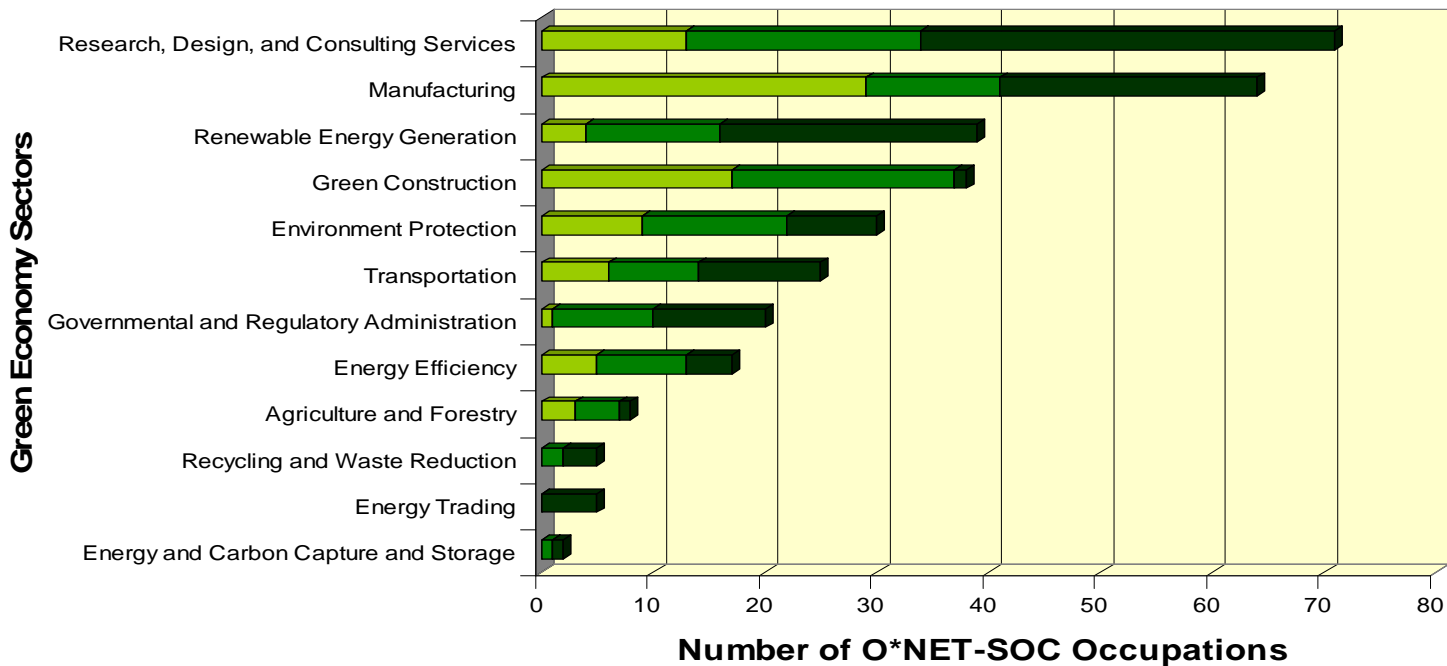
- Wind Turbine or Farm Engineers, Wind Turbine Service Technicians, Biofuels Plant Operators, Solar Power Plant Technicians, Solar Sales Representatives/Assessors, Weatherization Technicians/Installers, Carbon Credit Traders

[Green New and Emerging](#)

# O\*NET Green Results (cont.)

## Distribution of Green O\*NET-SOC Occupations Across Sectors

■ Increased Demand 
 ■ Enhanced Skills 
 ■ New & Emerging



# O\*NET Green Methodology

- Sector focused
- Extensive literature and web review conducted by trained occupational analysts:
  - Industry associations and organizations
  - Educational programs
  - Local, state, and federal programs/agencies
  - Job posting sites
- Information gathered, documented, and detailed criteria for inclusion applied

# Identify

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- Trained occupational analysts conduct extensive web searches to investigate each sector
  - Background of sector (i.e., when sector started changing)
  - Major innovations
  - Employment trends
  - New products
  - Government regulations (e.g., Automotive Emissions Standards)

## Identify (cont.)

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- **Identify potential N & E Occupations within each sector**
  - Review collected literature and websites to investigate each sector
    - Industry associations, organizations, educational institutions, local/state/federal governments, job search engines and posting websites

## Identify (cont.)

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- For each potential occupation:
  - Gather and document supporting information
  - Develop initial title and definition

# Evaluate

- Each potential occupation is evaluated in terms of specific criteria:
  - Significantly different work performed from other O\*NET-SOCs
  - Not well-reflected in O\*NET-SOC classification structure
  - Appropriate occupation level
  - Significant employment (at least 5,000+ job incumbents)
  - Positive projected growth
- Each potential occupation is evaluated within the context of its related sector
  - Stems from identifiable sector trend
  - Education, licensure/certification
  - Professional associations and journals/publications

## Incorporate

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- For each approved **Green** N & E occupation:
  - Finalize and publish title and definition
  - Confirm placement within the Revised O\*NET-SOC Taxonomy



## Incorporate (cont.)

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- Develop a task list for each approved **Green** N & E occupation
  - Implement existing task development procedures
    - Researching relevant websites
    - Reviewing available task lists provided by industry/occupation experts
    - Information obtained during the investigation and evaluation stage of the N & E process serves as strong foundation for developing task lists

# Questions, Feedback, Additional Input?

[www.onetcenter.org](http://www.onetcenter.org)  
[online.onetcenter.org](http://online.onetcenter.org)

or

Customer Service

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