Digest of Green Reports and Studies

Title	***Clean Technology Job Skills Inventory***
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URL	http://www.sdicregionalconsortium.org/Newsletter/July%207/Cleantech%20Minigrant%20Final%20Report%20May%202008.pdf
Summary	Several hundred Silicon Valley area "cleantech" employers were surveyed or interviewed to determine important and shared skills and values. The industry sectors were: Renewable energy, Biofuels, Green building, Transportation (EV), Batteries and fuel cells, Smart grid (demand response), Advanced materials, Water technology, GHG management, and Environmental careers. According to the author, and without exception in all ten industry sectors, employers looked for candidates who had strong technology backgrounds combined with an enthusiasm that comes with environmental values and a core sustainability ethic. The report delineates the skills and values needed for these forward-thinking firms that include Google, NASA-Ames, Stanford, and Sand Hills Road. There are roughly a dozen KSA clusters (competencies) within the Cleantech sector, several of which overlap job and industry categories. **1. Power systems, electricity, and energy fundamentals** a. Batteries and fuel cells, electric vehicles b. Energy industry, utilities, power infrastructure **2. Analytics and informatics tools, computational modeling, data aggregation and analysis** a. Informatics and computational tools, data mining, and computational analysis b. Data aggregation, management, statistical analysis, trending and reporting **3. Electrical engineering, mechanical engineering, and computer engineering** a. Integration and systems engineering competency b. Electric vehicles, integrating power, mechanical, and computer systems **4. Civil engineering, building and permitting process, building codes, general contracting** a. Solar energy and solar thermal design and installation b. Water systems (solar thermal and gray water plumbing) **5. LEED design principles, energy systems integration, materials and supply chain** a. New building design and renovation, LEED certification b. Energy efficiency audits and projects, regulations and programs c. Materials and supply chain management, materials selection and cycling **6. Chemistry (organic, analytical, biochemistry, environmental), biology (molecular and cell)** a. Chemical engineering and bioengineering (biofuels) b. GMO and bioengineering of novel organisms, genome reengineering **7. Materials science, materials engineering, process engineering** a.Thin films engineering and manufacturing b.Nanomaterials development, testing, and analysis c.Rapid prototyping and advanced manufacturing (R&D) **8. GHG accounting principles and methods, carbon trading markets** a. Chemistry, biology, and environmental fundamentals b. Business process and supply chain methodology c. Accounting principles (managerial and financial)

	d. Legal – corporate, markets and trading, contracts e. Data aggregation and analysis, reporting, consulting **9. Computer networks, computational systems, software, hardware and firmware** a. Integrating informatics and power networks (smart grid) b. Integrating computers, software, hardware, analytics, and power systems / devices c.Everything is controlled by a computer, integration and security are critical **10. Project management, business and legal knowledge** a. Project management of building, energy, and systems engineering b. Business and financial management, including accounting and supply chain c. Legal knowledge, business and contract law **11.Environmental and sustainability, EMS and SMS training** a. Environmental science, environmental biology b. Sustainability principles (environment, social, and economic) c. EMS and SMS training, ISO 14000, sustainability management **12. Water systems and analysis, soil analysis, water and soil remediation** a. Planning and design of water supplies, metering, irrigation, gray water, recycling b. Water and soil analysis, especially for compliance and or monitoring contamination c. Remediation projects and management of remediation and contamination
Key Findings	These surveys and conversations found that a STEM foundation, and particularly knowledge of energy, energy systems, utilities and electricity, was highly valued, and often missing among otherwise strong candidates with technical backgrounds. This study found that there is tremendous need for talent in each industry sector, and that these sectors are linked by new innovations which play critical roles as foundational technologies in larger arenas. Results of the study are encouraging for community colleges, especially in the California Silicon Valley and surrounding regions. Each of the areas not only showed strong growth potential, but also significant interdependencies between and among many of the categories, which suggest growth will be buoyed from synergistic innovation, and that migration between and among these job concentrations will likely be possible. More significantly, while each of these sectors requires highly specialized knowledge and skills, the foundation knowledge is strongly rooted in traditional STEM (chemistry, physics, engineering, and mathematics). Specialized knowledge also taught at community colleges can help transitioning workers into these new careers. These topics include power systems, electricity and energy, analytics, LEED building principles, organic chemistry, molecular biology, materials science, computer networks and applications, and environmental science and sustainability. This is good news for colleges looking to develop and or reposition programs to deliver specific knowledge to people interested in entering the cleantech field.
Recommendations	Cleantech will have a significant and long-lived impact on California Community Colleges for three reasons: • First, 'Cleantech' is a significant and emerging phenomenon • Second, the jobs that will be created in cleantech span almost a dozen industry sectors, and are all built on a science and engineering foundation, with specialization in one or more key technologies. • 80% of the KSA foundation for these jobs already exists in most California Community Colleges in the form of STEM (Science, Technology, Engineering, and Mathematics), and much of the 20% that is specialized can be developed through new programs, and additionally through partnerships with four-year colleges.
Definition of "Green"	Clean tech refers to any product, service, or process that delivers value using limited or zero nonrenewable resources and/or creates significantly less waste than conventional offerings.
Methodology	Survey and Interview
Data Sources Cited	Apollo Energy Alliance Management Information Services American Solar Energy Society Renewable Energy Policy Project (REPP)
Report Geography	Silicon Valley (Santa Clara and surrounding counties), California
Green Occupations	• Biofuels Engineers

Cited	- Biofuels Research Scientists - Environmental Technologists - Environmental science and protection technicians - Smart grid technicians - Thin Film Manufacturing Technician
Green Industries Cited	- Renewable energy - Biofuels - Green building - Transportation (EV) - Batteries and fuel cells - Smart grid (demand response) - Advanced materials - Water technology - GHG management - Environmental careers
Keywords	Clean tech; green skills; community college; cleantech; silicon valley
Legislation Cited	California's SB-1 -- Solar roofs bill AB 32 – California Clean Air Act
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