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## Green Workers

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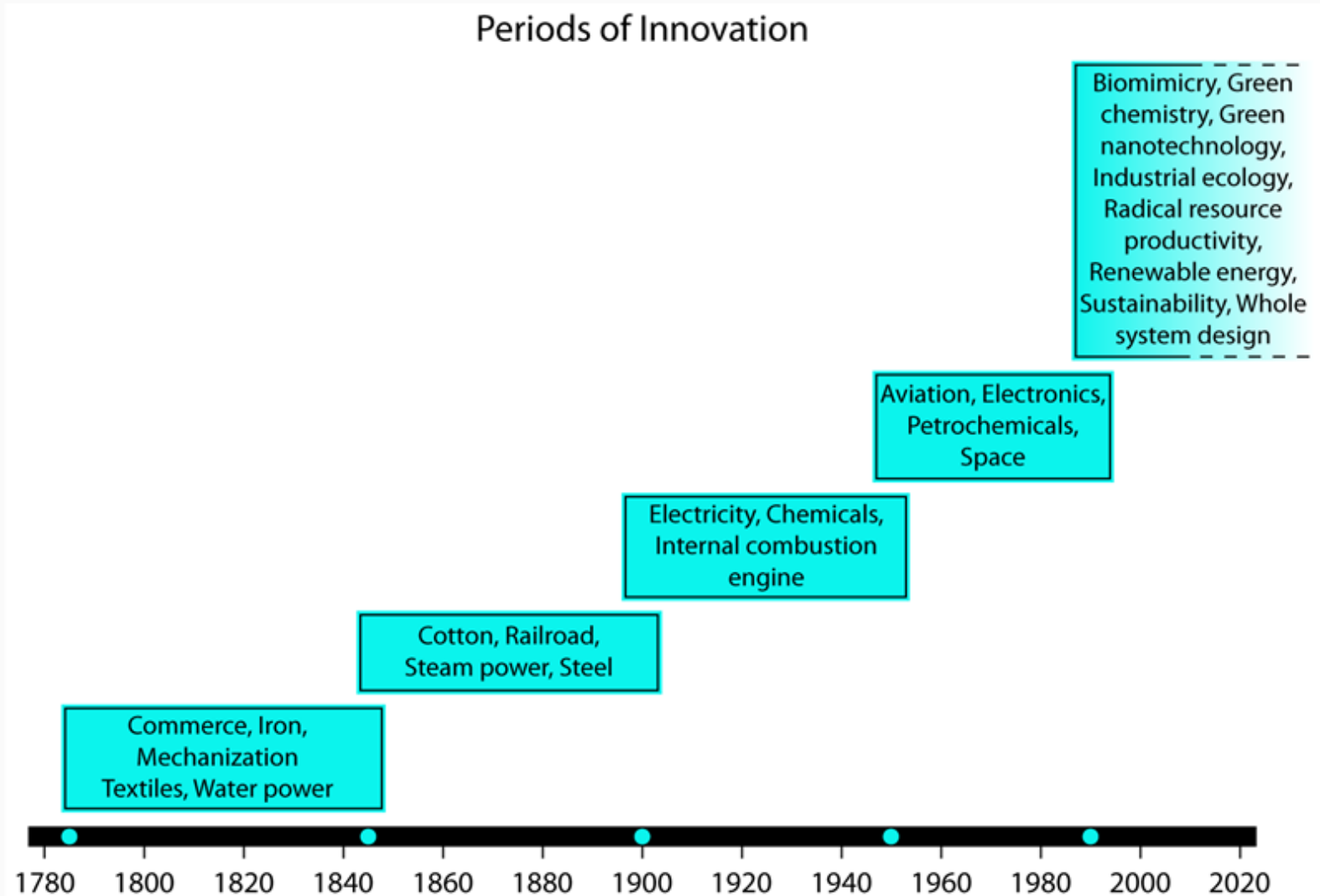
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# Each Year ...

- The world digs up, crunches through various processes, throws away a half-trillion tons of stuff
- Good news: we can meet human needs, raise standard of living, still be profitable
  - Lower consumption
  - Raise resource efficiency
  - Circulate materials, not dump them
  - Mimic nature (biomimicry)

# Six Waves of Innovation

- Six periods of innovation—each based on new technologies that underpin economic prosperity



Adapted by CTLT from Natural Edge and Lovins, H. *State of the World 2008: Rethinking production*; Worldwatch Institute Report. *State of the World 2008: Innovations for a sustainable economy*, 1-2.

# Green Economy

- Goal = low-carbon global economy
- Efficient use of energy
- Reducing polluting emissions
- Use of renewable sources of power
- Investment in new technologies, equipment, buildings, and infrastructure
- Investment in opportunities, jobs, and stronger communities

# Green Jobs

- Contribute substantially to preserving or restoring environmental quality
- Help to protect ecosystems and biodiversity
- Reduce energy, materials, and water consumption through high-efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution
- May be in agricultural, manufacturing, research and development (R&D), administrative, service, and other areas

# Classification of Green Industries

Green Economy Area/Sector	Green Industries and Industry Clusters
I. Renewable Energy: Energy Generation, System Installation & Storage	<ul style="list-style-type: none"> <li>● Solar power (thermal &amp; photovoltaic systems)</li> <li>● Wind power</li> <li>● Water &amp; hydro-electric power</li> <li>● Geothermal power</li> <li>● Hydrogen</li> <li>● Energy storage</li> <li>● Energy transmission/ distribution</li> <li>● Energy services (ESCO)</li> <li>● Utility-scale renewable energy plants</li> </ul>
II. Green Building and Energy Efficiency	<ul style="list-style-type: none"> <li>● Green product manufacturing (Lighting; Construction materials; “Smart” systems and equipment; HVAC/R equipment)</li> <li>● Green construction materials wholesaling</li> <li>● Energy Services (ESCO)</li> <li>● Design and construction of new buildings</li> <li>● Retrofitting of existing structures</li> <li>● Retro-commissioning of existing buildings</li> <li>● Green building operations and maintenance</li> <li>● Deconstruction</li> <li>● Certifications (LEED)</li> <li>● Green landscaping</li> </ul>

Source: Chancellor’s Office, California Community Colleges Centers of Excellence, Economic and Workforce Development Program. (2009). *Green industries and jobs in California*. pp. 1-22. Additional classifications are available on page 3 of the report: [http://www.coeccc.net/green/documents/Emerging\\_Green\\_09.pdf](http://www.coeccc.net/green/documents/Emerging_Green_09.pdf)

# Possible Changes in Job Distribution

- Job creation, e.g., pollution control devices
- Job substitution, e.g., switch from truck manufacturing to rail manufacturing
- Existing jobs transformed and redesigned, e.g., plumbers, electricians, construction workers
- Job elimination without replacement, e.g., product banned and production discontinued

# Concerns

- Many are small businesses
- Not aware of hazards
- Can't afford controls
- Rapidly changing technologies, techniques
- New hazards
- No health and safety oversight

# Example - Production of Biofuel

- Transportation
- Chemicals
- Pressurized equipment
- Injury risks

**Table II.1-9. Estimated Employment in the Renewable Energy Sector, Selected Countries and World, 2006**

Renewable Energy Source	World*	Selected Countries	
Wind	300,000	Germany	82,100
		United States	36,800
		Spain	35,000
		China	22,200
		Denmark	21,000
Solar PV	170,000	China	55,000
		Germany	35,000
		Spain	26,449
		United States	15,700
Solar thermal	624,000-plus	China	600,000
		Germany	13,300
		Spain	9,142
		United States	1,900

# Green Jobs in Developing Countries

- Training in solar technicians, repair, maintenance in Bangladesh - 100,000 jobs

# What is decent work?

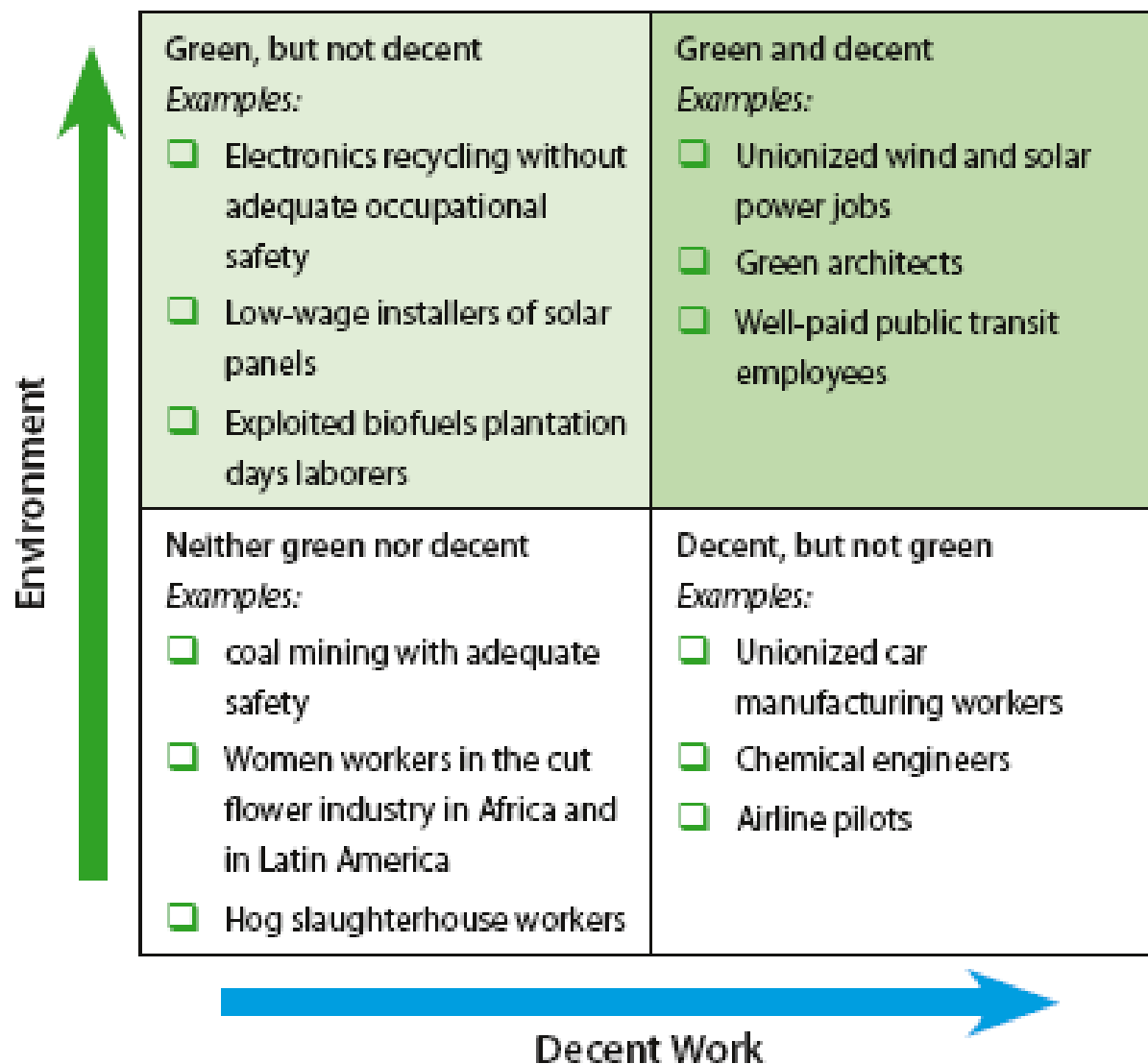
- Jobs that are respectful of environment and workers' health, human needs and rights
  - adequate wages
    - ▶ Safe conditions
    - ▶ Job security
    - ▶ Reasonable career prospects

# What work is Not Decent?

- Poor practices, exposing workers to hazardous substances, e.g., electronics recycling in Asia
- Problems such as forced labor & child labor
- Examples -
  - workers on sugar cane and palm oil plantations  
Brazil, Malaysia, Columbia, Indonesia
  - China - more jobs, poor pay

# Shades of Green

Figure I.1-1. Green and Decent Jobs? A Schematic Overview



# What can be done?

- Quality job training
  - Help transition from “old” industries
  - Support wages while training
- Link company incentives with job quality and training standards
- Devise sustainable production systems and work practices - with workers' input
- Agreements across nations