Industry, Nonprofit, Consulting, Oh My!

Career Options for Engineers in the Green Economy

Presented by
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Hollister B14
My Education Background

- B.S., Mechanical Engineering, Cornell Class of 2002
  - Fluid Mechanics concentration
- M.S., Environmental Engineering, Virginia Tech Class of 2005
My Industry Experience

- 6 years of consulting experience
  - 3 firms
  - Majority with Woodard & Curran

- Water Quality Engineering
  - Work with ground water, drinking water, sanitary wastewater, industrial wastewater, and stormwater

- Worked for private industry, government, non-profits, and other consultants on small and large projects
What I hope to cover

- Career paths
- Ways engineers work in various sectors
  - The impact engineers have
- General description of variations in:
  - Work environment, career paths, internal and external pressures, sector
- How the “Green Economy” fits into each sector
  - How it might be implemented into your organization!
Some *caveats* that you should consider

- This is just food for thought
  - You should expect variability depending on the situation
- I am not a career counselor
  - This should be just one data point in your career search
- I am not a graphic designer
- This is at the 30,000 foot level
Value proposition of employment

- You do something → Your employer gives you money
- What you do has to be worth the money they are paying you
- In other words, you should be creating value for your organization
  - What that value is depends on your role in the organization
The “Green Economy”
What is the “Green Economy?”

- Employment in response to pressure of the environment, energy costs, and global competitiveness
  - Especially relating to increasing efficiencies, reducing costs, fixing past mistakes, or continuing to provide the core product or service in a way that responds to these pressures
  - This is NOT a narrow area of employment
The Green Economy is very diverse

- It is inclusive of almost all industries and sectors of the economy
  - The pressures, impacts, and resulting reaction to the Green Economy vary by sector
- Realize that it may not be focused on the traditional profit area of the organization, but has a defined value to the organization
Constraints on the Green Economy

- Tightening constraints and shrinking resources
- Increased input prices
  - Commodities and energy
- Increased waste disposal prices
  - On waste like solid waste, nitrogen, carbon
- We still need to adhere to the ideals of “sustainability”
- Heightened consumer awareness of environmental impacts
- Recession has caused shrinking capital markets
Economic sectors are quite diverse

<table>
<thead>
<tr>
<th>Sector</th>
<th>Core Business</th>
<th>Transfer of Money</th>
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<tr>
<td>Industry</td>
<td>Making a product or delivering a service</td>
<td>Fee from client to provider</td>
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<td>Government</td>
<td>Providing public services</td>
<td>Taxes</td>
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<tr>
<td>Academia</td>
<td>“Making” (research) and distributing knowledge</td>
<td>Tuition, grants</td>
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<td>Non-profit</td>
<td>Public advocacy and delivering services</td>
<td>Donations and grants</td>
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<tr>
<td>Consulting</td>
<td>Solving problems, distributing knowledge</td>
<td>Fee from client to consultant</td>
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Industry

- **External Pressures**
  - CONSUMER DEMAND
  - Resource availability
    - Limiting resources such as raw materials and energy
  - Regulations
    - Discharge of waste, materials storage, product recycling, remediation, property transfers

- **Internal Pressures**
  - Profit
  - Narrow focus of each area of the business
  - Resistance to change (pockets, not always large scale)
Typical roles in industry

- Product development/R&D
- Manufacturing/Process/Supply chain management
- Environmental compliance
- Environmental cleanup
- Health & Safety
- Property management/Property transfer
- Managing consultants
- Lobbying government
- Regulatory experts
An industry working environment

- In a large organization, you will see…
  - Heirarchy
  - Established roles
  - Larger offices/plants
  - Experts in each area
  - Large economic impact in the community
  - Competitive salary/benefits, more structured hours

- In a small organization or a start up, you will see…
  - Looser structure and more flexible roles
  - Smaller offices/plants
  - Experts usually only in the core business area
  - Compensation is more varied
Government

- External pressures
  - VOTES
  - Public interest
    - Concern for the environment, managing interests, growing general wealth
  - Industry lobbyists

- Internal pressures
  - Existing rules and regulations
  - Hierarchy
  - Resistance to change
    - There may be traditions, or a “way things are done around here”
Typical roles in government

- Research
- Policy making
- Managing consultants, contracts, and construction
- Reviewing applications
- Managing/Operating public works facilities
- May work at various levels
  - Town/Inter-municipal/County/State/Federal
The working environment in government

- Executing the vision from above
- Set pay rates, generally good benefits
- Public service exams
- Relatively defined hours (depending on role)
- Right now, a lot of older employees nearing retirement
Academia

- External pressures
  - REPUTATION
  - Tuition rates
  - Accreditation
  - Grant/Funding opportunities
  - Public need
  - Environmental compliance

- Internal pressures
  - Teaching
  - Publishing
  - Initiatives/Growth
  - Health & Safety
Typical roles and working environment in academia

- **Typical roles**
  - Professor
  - Research assistant
  - Administrator
  - Utilities management
  - Planning/Design/Construction/Program management
  - Health & Safety
  - Environmental compliance

- **Working environment**
  - **Academic**
    - Long hours, pressures produce results
    - Narrower focus than other areas
    - Good compensation
  - **Non-academic**
    - Similar to government or industrial support positions in some ways
Non-profit

- External pressures
  - FUNDING
  - Impacts of government regulations
  - Consequences of inaction
  - Political atmosphere

- Internal pressures
  - Flexibility of people in the organization (funding)
  - Accountability to donors
  - Lack of resources
  - Balancing fundraising and mission
Typical roles and working environment at non-profits

- **Typical roles**
  - Research/technical guidance
  - Regulatory specialist
  - Volunteer coordinator
  - Vendor/Consultant/Contractor coordinator
  - Organizer

- **Working environment**
  - Small or large
  - Grassroots or hierarchical
  - More casual
  - Idealistic, passionate, and dedicated
  - Fair compensation, can be significant for executive roles
Consulting

- **External pressures**
  - CLIENTS’ NEEDS
  - Government regulations
  - Desired direction the client wants
  - Competitive environment for new work
  - Innovative and cost-effective

- **Internal pressure**
  - Profit
  - Billable vs. non-billable work
  - Existing expertise vs. new demands
Typical roles and working environment in consulting

- **Typical roles**
  - Varied, but may serve as
    - Technical staff
    - Project manager
    - Client manager
    - Business manager

- **Working environment**
  - Varies widely with the organization
  - Hierarchy, technical depth in larger firms
  - Flatter, technical breadth in smaller firms
  - Pressure for results on a short timeline with limited resources
  - Long-term “career” projects vs. “short-burn” projects
  - Good to very-good compensation
Lets get back to the big picture

- There is a wide variety of options for engineers to be involved in the green economy.
- The sector of the economy that you work in will define some of the pressures, opportunities and challenges that you will face.
- Remember: These are pretty large generalizations.
Your impacts are likely larger than just the responsibilities of your position

- Think about the big picture of your role
  - Product design
  - Environmental Compliance Specialist
  - Corporate Environmental Coordinator/Analyst/Planner
  - Facility Maintenance
  - Department of Health
  - Environmental Consultant
“Green Engineering” is the same as “Good Engineering”

- Purposeful, efficient, and durable, no matter the economic sector