Finding an Ethical Career

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http://www.sgr.org.uk/

• Slides of a presentation given at York University, 10 February, 2011
• Main focus will be science and technology careers, but much of the information will be relevant to others.
Scientists for Global Responsibility

- Independent organisation of 1000 natural scientists, social scientists, engineers, architects, IT workers
- Promotes science, design and technology which contributes to reduction of conflict, environmental protection, social justice
- Ethical careers publications and website
- Education and support network

http://www.sgr.org.uk/
Why an ethical career?
Current global problems
Social/ health problems

• Social justice
  – 1.4 billion people live in extreme poverty
    • Most malnourished, inadequate supply of clean water & sanitation etc
  – People in high-income countries live 20y longer than those in low-income countries

• Disease & ill-health
  – Major killers (1 million+ per year) include:
    • heart disease; cancers; AIDS; diarrhoea; tuberculosis; malaria; road crashes

• Extreme poverty – defined as living on less than $1.25 a day; amounts to 1 in 5 of world’s population - World Bank (2008).
• Life expectancy figures - World Bank (2009).
• Disease – heart disease & cancers more prevalent in wealthier countries; infectious diseases prevalent in less wealthy countries - WHO (2004).
Environmental problems

• Climate change
  – Of 29,000 environmental data sets, 89% show changes consistent with a warming world
  – Kofi Annan’s think-tank estimates 300,000 additional deaths per year
  – Wide range of other impacts

• Biodiversity loss
  – ‘Sixth major extinction event’
    • Extinction rate is 100-1,000 times that in fossil record
  – Humans very dependent on ecosystems

• Climate change – environmental datasets from IPCC WGII (2007); additional deaths: increases in weather related disasters; increase in ranges of infectious diseases; heat stress etc from Global Humanitarian Forum (2009)

• Biodiversity loss - Human activity has caused between 100-1,000 times more extinctions in the last 100 years than would have happened due to natural processes alone (Millennium Ecosystem Assessment, 2005; UNEP, 2007). Half the world’s forests, half the world’s wetlands have been destroyed by human activities; over-fishing has caused 90% of large ocean predators to be lost (Worldwatch Institute, 2004, p17)
Security problems

• War and weapons
  – 1/3 million people die each year in wars and other armed violence
  – 17 wars ongoing
  – 23,000 nuclear weapons
  – Global military spending
    • $1,500,000,000,000 per year

• Casualty figures - Control Arms campaign (2011).
• Nuclear weapons – >90% held by USA and Russia; more than 2000 on ‘high-alert’; UK holds nearly 200 – enough to cause global devastation - Federation of American Scientists (2010).
• Figures for global military spending and number of wars - SIPRI (2010).
Future projections

• Population
  – From nearly 7 billion now to 9 billion by 2050
• Energy consumption
  – 45% increase by 2030
• Food consumption
  – 40% increase by 2030
• Water consumption
  – ~35% increase by 2025
• Climate change, biodiversity loss accelerating
• Depletion of fossil fuels, minerals

• These figures are from mid-range ‘business as usual’ scenarios (based on stats from international organisations such as IEA and UN FAO) - Beddington (2009).
• ‘Peak oil’ and other mineral depletion problems will compound Beddington’s concerns
A ‘Perfect Storm’?

• Prof John Beddington, UK Chief Scientific Advisor, warns about:
  – threat of a ‘perfect storm’ of global shortages in food, water and energy by 2030

Beddington (2009).
Science and technology can help us tackle these problems or can make them worse
**Example of ethical concerns:**

**Arms sector**

- **UK foreign/military policy**
  - Major military spender (4th in world)
  - High ‘offensive’ capability
    - nuclear weapons; long-range ships/ aircraft
  - ‘Illegal’ Iraq war

- **International arms trade**
  - Sales support ‘oppressive regimes’ & fuels conflict
  - Diverts funds away from development programmes

- **Corporate misbehaviour**
  - BAE Systems fined over £280 million
  - Revolving door

- High military spending and large offensive weapons capability increases international tensions, fuels arms races and diverts funding from other needs.

Sources: SGR (2006a, 2007); SIPRI (2010); BBC News (2010).
York University connections

• FLAVIIR
  – £6.2m research programme on robotic aircraft with BAE Systems
  – 10 universities including York
• Total military/ arms industry funding of £7.7m from 2001 to 2006
• Pension funds

• FLAVIIR – ‘Flapless Aerial Vehicle Integrated Interdisciplinary Research’; aircraft is called the ‘Demon’; first test flight in September 2010
• Main arms companies involved with York: BAE Systems; QinetiQ; Rolls-Royce
• York University has an ethical investment policy (adopted in 2009), but its pension funds are still partly invested in the arms industry

Sources: FLAVIIR (2011); Drones Wars UK (2010); The Engineer (2010); Campaign Against Arms Trade et al (2007); The Yorker (2009)
Broader ethical concerns

- Irresponsible behaviour of global financial sector
- Economic goals given priority over social and environmental goals
  - in most industries
  - in many universities
- Driven by government’s 10y science and innovation plan

- Numerous more detailed strategies have been enacted since 2004.
Social/ environmental career options
Rise of the ‘green collar’ sector

• Low carbon and environmental goods and services (LCEGS) sector
• Global market for LCEGS estimated at ~£3,000,000,000,000 and growing fast
• In UK, LCEGS sector employs nearly 900,000 people
• About 2.3 million work in renewable energy industries worldwide

• Environmental sector (190,000) - including energy, carbon and broader environmental consultancy, air pollution control, environmental monitoring, marine pollution control, waste management, recovery and recycling; as well as the service industries that support environmental management.
• Renewable energy sector (260,000) - including wind, wave and tidal, biomass, geothermal, hydro and photovoltaic energy generation and the services that support them, including renewables consultancy.
• Emerging low carbon sector (430,000) - including alternative fuels such as nuclear, and alternative fuels for vehicles, carbon capture and storage, building technologies, energy management and carbon finance.

• NB: figures in brackets refer to employment
• Estimated UK market value is total of £106 bn
• Sources: Department for Business, Innovation and Skills (2009); UNEP/Worldwatch Institute (2008).
Main points:
• 34% cut in greenhouse gas emissions by 2020 (from 1990 level)
• 15% of energy from renewable sources by 2020 (tenfold increase)
• New nuclear power stations*
• Efforts to substantially improve building energy efficiency
• Working for major improvements in transport efficiency, including cars, trains and aircraft
• Economic measures (eg carbon trading*) to encourage energy efficiency across the whole economy
• R&D especially on marine energy, and efficient cars and aircraft
• Over 100,000 new jobs by 2015
*Most controversial

Main source: DECC (2009).
Recent developments

• UK world leader in deploying offshore wind
• ‘Green Deal’
  – National programme for major improvement in energy efficiency
• New manufacturing, e.g.
  – Wind turbines
    • Glasgow & Dundee – Gamesa
    • Hull – Siemens
  – Solar panels
    • Wrexham – Sharp

Jowit (2010); DECC (2010); BBC News (2011a); The Guardian (2011); BBC News (2011b).
Green jobs – some examples

- Research
  - e.g. climate scientist, ecologist, computer modeller
- Engineering
  - e.g. renewable energy (manufacturing & installation), energy efficiency in homes/industry
- Project management
  - Key in making things happen
- Environmental consultancy
  - Advice to industry & government on reducing emissions
- Education and campaigning
  - Including use of distance learning, websites, social networking, email
UK health sector

• National Health Service
  – Employs 1.7 million people
• Numerous health charities
• Strong R&D
• Social sciences as important as biological sciences in (e.g.):
  – Encouraging healthy lifestyles, improving mental health, improving health services

NHS (2010).
Arms control/ disarmament

• Key treaties
  – Nuclear non-proliferation treaty; Test ban treaties; NWFZ treaties; US-Russian treaties
  – Chemical weapons convention; Biological weapons convention
  – Conventional forces in Europe treaty; Mine ban convention; Cluster bomb convention; Arms trade treaty*
  – Outer space treaty; PAROS treaty*

*proposed

• NWFZ – Nuclear weapons-free zones; PAROS – Prohibition of an arms race in outer space
• Sources: UN Office for Disarmament Affairs (2010a); Federation of American Scientists (2005).
Arms control/ disarmament

• Arms control treaties operate through mechanisms for monitoring, verification and decommissioning
• These carried out by UN offices/ treaty secretariats/ country officials/ military
• Support also from academics, NGOs
• UK examples:
  – UK Mission on Arms Control & Disarmament
  – Vertic

• Sources: UN Office for Disarmament Affairs (2010b); UK Mission on Arms Control and Disarmament (2010); Vertic (2010)
International development

• Dept for International Development
  – UK government ministry
  – Funding increased
  – Employs engineers and scientists

• Practical Action
  – Aid organisation specialising in ‘appropriate technology’ in developing countries

• Engineers Without Borders
  – Volunteer aid projects overseas

Dept for International Development (2011); Practical Action (2011); Engineers Without Borders UK (2011)
A tale of two sectors...

**UK arms industry**
- Current employment: 215,000
- Shrinking following Defence Review

**UK low carbon/env sector**
- Current employment: 880,000
  - including 260,000 in renewable energy
- Rapidly expanding

Defence Analytical Services and Advice (2009); Innovas (2009)
Steps towards an ethical career....
Example profile from SGR (2006b)

- Interested in environmental issues at school
- Took a year out volunteering before university
- Became interested in engineering – chose it as degree subject
- Did MSc in environmental sustainability
- After university, took a junior office post in renewable energy company
- Then got a job in building services engineering – energy efficiency is big part
Guiding principles

1. Apply precautionary principle
   - e.g. health/ environmental concerns
2. Guard against malicious use
   - e.g. weaponisation, criminal use
3. Follow democratic principles
   - e.g. corporate benefits before public benefits?
4. Consider distributional effects
   - e.g. improvement for low income communities?

- Precautionary
  If possibility/ likelihood of significant health/ environmental harm, must put in place safeguards – sometimes this means not developing the technology. Uncertainties are important and should be investigated. Hi-tech solutions (based on cutting-edge science) are inherently more uncertain.
  Consequences: work for organisations with clear environmental/ health goals, or actively applying the precautionary principle through, eg, assessing new technologies for health/ environmental effects, or assessing whether intermediate technology or non-technological options offer a better solution
- Malicious use
  How easy is it for your work to be intentionally misused, eg weaponised? Particular concern is military work, eg is it encouraging a focus on military solutions to political problems? Are arms/ equipment being sold to countries with bad human rights records?
  Consequences: look at military policies of governments which are funding the work; easiest to avoid working for military or taking military funding, or only working on, eg, disarmament projects
- Democracy
  Vested interests such as big corporations and military can direct scientific and technological work in their favour – which is not necessarily in the best interests of society. Public involvement in decisions on science and technology is generally very limited.
  Consequences: work for organisations with clear social/ environmental goals and rather than narrow economic/ military ones, and/ or who actively engage with the public over scientific controversies
- Distribution
  New technologies can exacerbate social inequalities rather than help tackle them. Hi-tech solutions tend to be expensive, and hence intermediate technologies or non-technological options may be fairer.
  Consequences: work for organisations with clear goals in terms of equitable development, and involve public dialogue over technologies
- Look for contribution to peace, social justice, and environmental sustainability
## Which Employer?

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Tips on being successful...

- Educate yourself on the wider social/environmental issues affecting your field
- Don’t be fooled by ‘greenwash’
- Incrementalist or revolutionary?
- Develop your ‘transferable skills’
- Get voluntary/vacation experience beyond science & technology
- Get support

You can make a difference!!
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