Arms conversion for a sustainable society

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Presentation will cover...

- Changing security strategies?
- UK military industrial sector
- UK low carbon and environmental sectors
- Potential for conversion
- Factors relevant to Sheffield

Changing security strategies?

Non-Offensive Defence

- There has long been pressure for UK to adopt less aggressive foreign/ military policies, shrink its military industry, and cut its 'offensive' arsenal, especially:
  - Nuclear weapons
  - Long-range bombers, missiles etc
  - Long-range military ships and submarines

➢ Adopt a *Non-offensive defence* policy

• Under a Non-defensive defence policy, the armed forces retain the capability to defend national territory (and contribute to peacekeeping), but not to invade or mount a major attack

• The case for Non-offensive defence (although known under a variety of titles) has been made since at least 1982.

Reference: Civilisation 3000 (2010)

Sustainable Security

- More substantial shift
- Focus on tackling the roots causes of major security threats:
  - Climate change
  - Competition over resources
  - Marginalisation of the majority world
  - Global militarisation
- Some signs of shift in government thinking
  - National Security Strategies

References: Abbott et al (2006); HM Government (2010)

UK military industrial sector

UK remains major military spender/ arms exporter

- UK military budget is world's 4th largest
  - Up 28% since 2000
- UK is home to world's largest arms company
- UK is 5th largest arms exporter
- UK spending per person is twice that of Russia and more than 12 times that of China
- UK spending per person/ per unit GDP is much larger than EU average

• UK military budget is world's 4th largest behind USA, China and France

• UK is home to world's largest arms company – BAE Systems (has become largest following further takeovers of US companies)

• UK is 5th largest arms exporter behind USA, Russia, Germany and France

References: Stockholm International Peace Research Institute (2010a, 2010b)

Major UK military procurement

	Number	Estimated procurement cost
Typhoon fighter aircraft	232	£21 bn
Trident replacement (including submarines, nuclear warheads & infrastructure)	-	£15-20 bn
Aircraft supercarriers (including aircraft)	2	£12-14 bn
FSTA tanker aircraft	14	£13 bn
FRES armoured vehicles	3,500	£6 bn
Type-45 destroyers	6	£3.6 bn
Astute submarines	3	£3.5 bn

Government plans in 2009 **Total: *at least* £74 billion**

Government estimates as given in: Greenpeace UK (2009), p6

But...

- *"How can it be that it takes 20 years to buy a ship, or aircraft, or tank? Why does it always seem to cost at least twice what was thought? Even worse, at the end of the wait, why does it never quite seem to do what it was supposed to?"*

Ministry of Defence report

(leaked to The Sunday Times, 23 August 2009)

• Military procurement projects commissioned by Labour government were over budget by £35 billion in 2009, and arriving five years later than expected.
• Strategic Defence and Security Review 2010 confirmed this problem – see later.

Reference: Sunday Times (2009)

Lifetime cost estimates

- Trident replacement
  - Including 3-4 submarines, missiles, nuclear warheads, infrastructure, operation (30y)
  - About **£97 bn**
- Aircraft supercarriers
  - Including 2 carriers, fighter aircraft, surveillance aircraft, operation (50y)
  - At least **£31 bn**

Cost of Trident replacement estimated by Greenpeace UK (2009) (cost is undiscounted)
Cost of Aircraft carriers – government estimate from 2005.

Employment in military industrial sector

	UK employees (including supply chain)
Ministry of Defence equipment spending	150,000
Arms exports	65,000
Total	*215,000*

Source: MoD (2009)

- Only approx. 0.7% of total UK employment; 7% of manufacturing sector
- Most jobs in regions of high employment (e.g. South East England)

• Figures include direct and indirect (supply chain) employment (roughly 50:50)

Data from: Defence Analytical Services and Advice (2009), Table 1.10; Office of National Statistics (2009)

Strategic Defence and Security Review

- Prime Minister:
  - *"From a strategy over-reliant on military intervention to a higher priority for conflict prevention"*
- UK military spending will fall by 8% over next four years
- Existing, huge procurement overspend will lead to further equipment cuts

• Greater security co-operation with allies, especially USA, France

Reference: Cameron (2010)

Military equipment – major cuts

Equipment	2005 level	2010 level	2020 level
Aircraft carriers	3	2	1 (+ 1 in reserve?)
Destroyers and frigates	28	23	19
Submarines - conventionally armed	11	7	7
Battle tanks	~360	~330	~200
Heavy artillery	~140	~120	~80
Fast jets (fighters)	~250	~200	??
Maritime reconnaissance aircraft - Nimrod	14	0	0
Air support - VC10/ TriStar/ A330	24	18	Up to 14

Sources: MoD (2010); DASA (2010)

- Scale of changes 2005-2020 comparable with those at end of Cold War
- Aircraft carriers: 2 'super' carriers to be built (Queen Elizabeth class) – one to be held in reserve or sold off; helicopters only (no fast jets capability) from 2011 to 2020; carry Joint Strike Fighters from ~2020
- Destroyers: 6 x Type-45 replacing Type-42 by 2020
- Frigates: reduce to 13 x Type-23 by 2020 (phaseout of Type-22)
- Submarines (conventional): 7 x Astute class to replace Trafalgar & Swiftsure by 2020
- Submarines (nuclear) – see later
- Battle tanks: Challenger 1 & 2
- Heavy artillery: AS90 armoured artillery vehicles
- Fast jets: Harriers retired in 2011; Tornadoes phased out; by 2020 – only Typhoon and Joint Strike Fighter
- Nimrod: existing Nimrods grounded due to safety concerns; new Nimrods cancelled
- Air support: phased replacement of VC-10 and TriStars with A330 (adapted Airbus)
- Commensurate reductions in other smaller equipment holdings

References: Ministry of Defence (2010); Defence Analytical Services and Advice (2010)

Changes to nuclear weapons

- Warhead stockpile to fall from 160 to 120
- Warheads per vessel to fall from 48 to 40
- Delay in 'main gate' decision for successor until 2016
- Lifetime extension for existing Trident ('Vanguard') submarines
- Delay in decision on new warhead type
  - But AWE redevelopment continues

Ministry of Defence (2010)

Although, there are some increases...

- 12 new Chinook helicopters
- Expansion in numbers/ role of robotic aircraft
  - 'Unmanned Aerial Vehicles' (UAVs)
  - From reconnaissance to combat
- More focus on cyber-security and other 'unconventional threats'

Ministry of Defence (2010)

UK low carbon/ environmental sector

‘Green collar’ sector

- Low carbon and environmental goods and services (LCEGS) sector:
  a. Environmental
  b. Renewable energy
  c. Emerging low carbon
- Activities:
  - Maintain clean water, air and land
  - Tackle climate change
  - Improve energy security
  - Protect ecology

➢ Human society needs healthy environment

• *Environmental sector* - including 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* - 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* - including alternative fuels such as nuclear, and alternative fuels for vehicles, carbon capture and storage, building technologies, energy management and carbon finance.

• Many security benefits of tackling action to curb climate change and protect environment

Rise of the ‘green collar’ sector

- LCEGS sector is large and growing rapidly
- 100,000+ new jobs expected over next 5y

Sub-sector	UK employees (including supply chain)
Environmental	190,000
Renewable energy	260,000
Emerging low carbon	430,000
Total	***880,000***

Source: Innovas (2009)

- UK LCEGS sector is worth about £106 billion
- Global market for LCEGS estimated at ~£3,000,000,000,000 and growing fast

Reference: Innovas (2009)

UK low carbon plans 2009

- Low Carbon Transition Plan (over-arching)
- Low Carbon Industrial Strategy
- Renewable Energy Strategy
- Carbon Reduction Strategy for Transport
- Complemented by broader policies in other areas:
  - Energy, transport, building and construction, science and innovation, sustainable development etc

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 (very controversial)

• 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

Main reference: Department for Energy and Climate Change (2009)

Potential for conversion

Military v civilian job creation

- Military industry is capital-intensive
  - Expensive
  - Low job creation for investment
  - Highly specialised jobs
  - High use of materials and energy
- Civilian sectors
  - Generally more labour-intensive, including energy efficiency, public transport and some renewable energy sectors

There are some exceptions to this in the civilian sector, such as nuclear power.

Job creation potential

Overall Employment Effects of Spending $1 Billion for Alternative Spending Targets in U.S. Economy, 2005

Sector	Number of jobs created	Number of jobs relative to defence/ military spending
Defence/ Military	8,600	-
Tax cuts	10,800	+26%
Health care	12,900	+50%
Education	17,700	+107%
Public transport	19,800	+131%
House construction & efficiency improvements	12,800	+50%

Source: University of Massachusetts (2007)

- Figures for number of jobs created rounded to nearest 100

Reference: Pollin and Garrett-Peltier (2007)

Military v climate spending

- Some example figures from UK (2008):
  - Sector
    - Military equipment budget: £13.4bn
    - Renewable energy subsidies: <£1.0bn
  - Research & development (publicly funded)
    - Military: £2,220m
    - Renewable energy: £66m
  - Technology
    - One eurofighter typhoon costs ~£90m
    - For this cost, a 90 MW wind farm could be built

Sector figures from: Defence Analytical Services and Advice (2009), Table 1.4; Department of Trade and Industry (2006), p61

R&D figures from: Defence Analytical Services and Advice (2009), Table 1.8; International Energy Agency (2009)

Technology figures: Eurofighter costs based on slide 8; Onshore wind farm – capital costs ~£1000/kW – converted from figures in GWEC (2008). UK figures are probably lower.

Proposals for factory conversion

- 1976 – Lucas Aerospace alternative plan
  - Decline in military orders led to workers' proposals for diversification, including 'green' tech
- 1987 – Barrow Shipyards alternative plan
  - Plan to diversify away from nuclear submarines to renewable energy, including wind and wave tech
- Both proposals rejected by companies

➢ Conversion of individual factories very difficult to bring about

Reference: Schofield (2007)

Resistance to change

- Highly specialised industrial workforce
- Committed to standards and procedures required by Ministry of Defence
- Working to specific technical requirements which are not generally applicable to other industrial areas of work
- Jobs directly and indirectly dependent on government policy

But...

- *"This is a perfect opportunity for [defence industry] diversification and renewable energy presents a massive new market"*
- *"A [wind] turbine blade is not dissimilar to a helicopter blade. It's electrical and mechanical engineering"*

Barry Warburton
West of England Aerospace Forum
November 2010

Insider Media Ltd (2010)

Main shifts from military to civilian industry in UK

- Post-conflict demobilisation
  - e.g. After World Wars
- Closure of (US) military bases
- As Cold War drew to a close
  - 215,000 jobs in military/defence sector lost in 10y from 1985/86

➢ Broader shifts in economy successful

➢ Similar shift could take place now, with decommissioning (e.g. Trident) providing some jobs during the transition period

- Jobs in military/defence sector fell from 625,000 in 1985/86 to 410,000 in 1995/96
- Employment figures include MoD non-equipment spending

Employment figures from: Defence Analytical Services and Advice (1998)

Potential job creation in UK from arms conversion

Study	Policy change	Number of jobs relative to defence/ military option
York University (2001)	Cut arms exports by 50%	+37%
BASIC (2007) – scenario 1	Cancel aircraft super-carriers	+50%
BASIC (2007) – scenario 2	Cancel Trident replacement	+62%

- Figures in table calculated from those in the references
- A cut in arms exports would have a short-term cost to the UK economy, whereas cancellation of Trident replacement and/or aircraft carriers would have a net benefit.

References: York University study: Chalmers et al (2001); BASIC study: Dunne et al (2007)

Factors relevant to Sheffield

Yorkshire and Humber employment

Sector	No. of employees (incl. supply chain)
Ministry of Defence spending (equipment and non-equipment)	3,000
Low carbon/ environmental sector	66,700

Sources: DASA (2009); Innovas (2009)

- Military industrial employment likely to shrink following Strategic Defence and Security Review
- Low carbon/ environmental is growing rapidly

• MoD jobs – full-time equivalent jobs directly dependent on either equipment or non-equipment budgets

References: Defence Analytical Services and Advice (2009), Table 1.11; Innovas (2009)

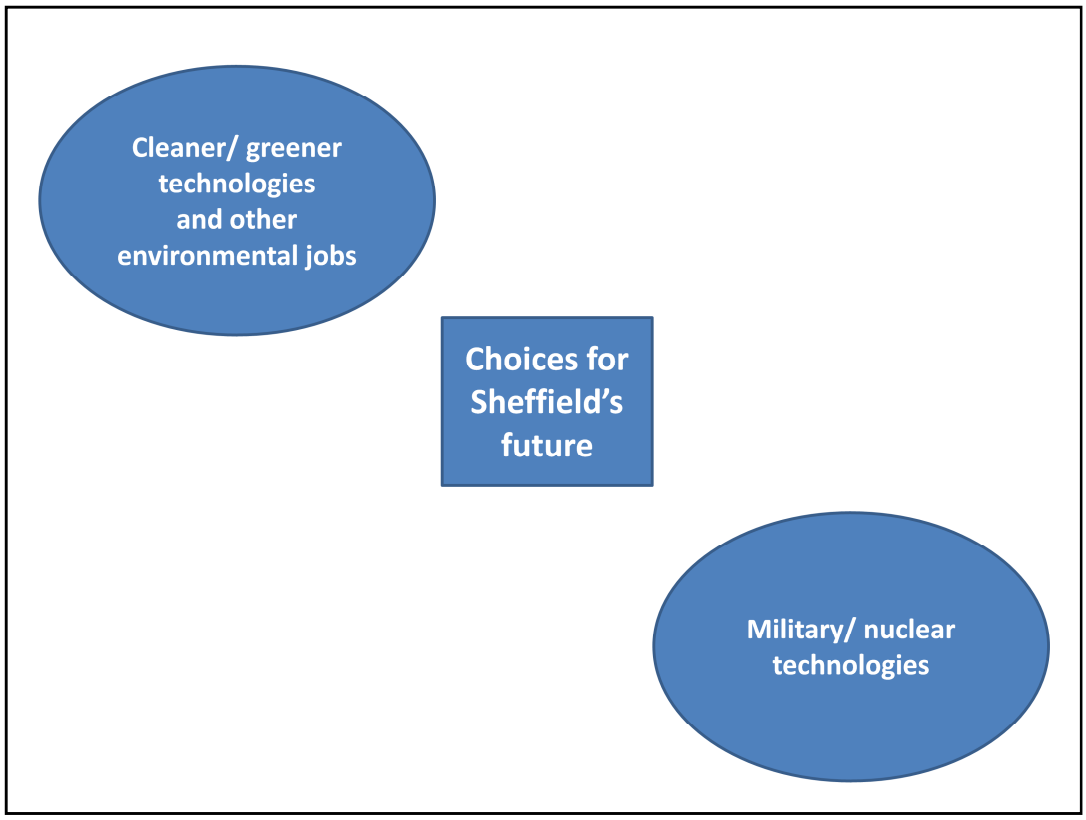
Military/ nuclear connections in Sheffield

- Sheffield Forgemasters
  - specialist in steel castings and forging
  - major customers include military (e.g. components for Astute class submarines) and civil nuclear industry
- Advanced Manufacturing Park
  - AMRC: joint Sheffield University/ Boeing
    - Applications in military aircraft
  - Factory of the Future: Rolls Royce
    - Applications across military industry

References: Sheffield Forgemasters International (2010); Advanced Manufacturing Park (2010)

Alternatives

- Energy efficiency – specialist materials for power stations/ aircraft
- Renewable energy – specialist materials/ components for wind/ marine energy
- Rail – materials/ components



• Cleaner/ greener future – tackling global environmental problems; creating lots of jobs; security benefits (more secure energy supplies/ less political instability due to climate change)

• Military/ nuclear industries – nuclear weapons proliferation; radioactive waste issues; nuclear plant safety; concerns about contributing to arms race/ arms exports and associated problems

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