Sustainability in Defence

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Executive Summary

The UK Military currently burns approximately 1 billion litres of fuel per year and yet due to the unique nature of its activities should it be subject to environmental controls? This question is examined from various perspectives ranging from the individual combatant, the operational-level commander, the national government and the multi-national alliance. Whilst the multi-national organisation struggles to generate consensus and clear direction, the individual, commander and government are able to take increasingly longer term views and thus better accommodate environmental policy, though all have varying motivators. Government, and Ministry of Defence (MoD), sustainability policies are then examined and it is found that the MoD's strategy on sustainability is well developed. This assessment is covered by Annex A where the Vision 2050 Pathway is used as a yardstick against which to measure the maturity of the MoD's sustainability strategy.

Contents

Introduction

Having amassed over 2000 hours at the controls of front-line military fast jets I have long since given up the hope of ever being carbon-neutral as an individual. By my rough estimate during my flying career I personally burnt about 10,000,000kg of aviation fuel. CO2 Emissions from aviation fuel are 3.15 grams per gram of fuel (Carbon Independent 2009) and so I would need to plant 31,500 UK trees at a cost of £378,000 to offset my impact.

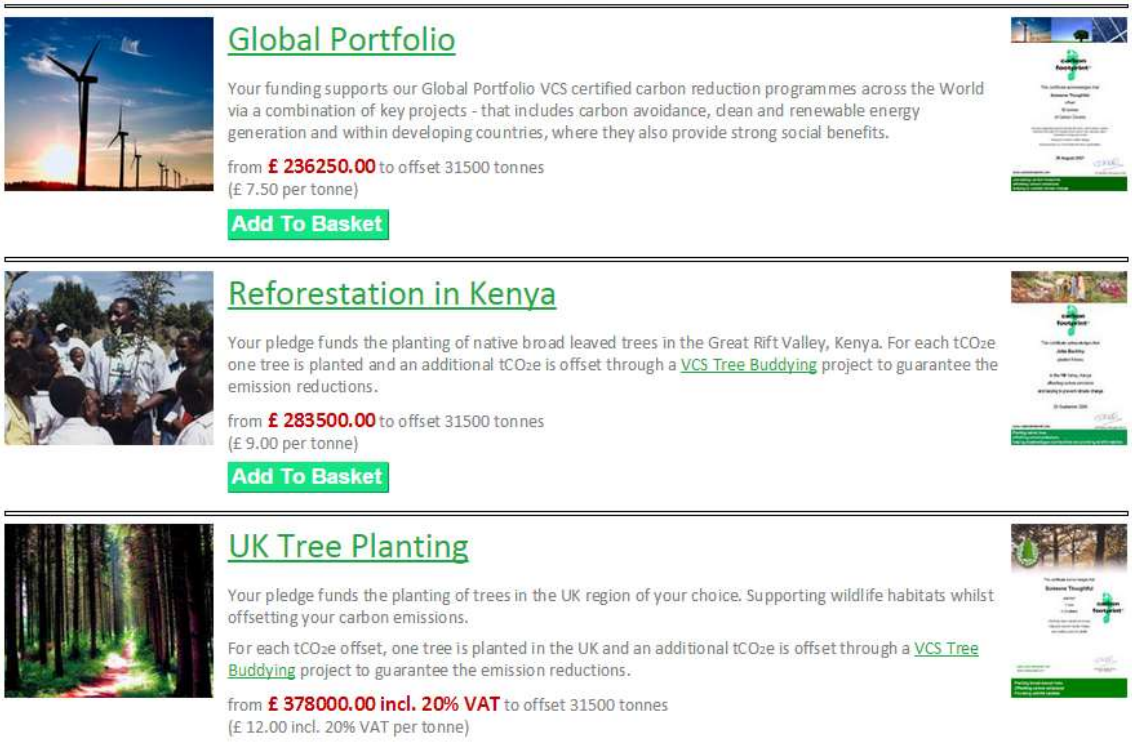

Figure 1 - Cost of offsetting 31.5 tCO2 at carbonfootprint.com

I manage to sleep at night because I have reasoned that I could not have generated all that CO2 of my own choosing; I was carrying out the will of the British people whilst working for a government department. But can a military be concerned about its environmental impact, and should a military try to be sustainable?

Can a military afford to be concerned?

Individual Combatant

By the time a government chooses to use the military instrument of national power, normally once the diplomatic, economic and informational instruments have failed, any concern about global warming sounds trite if one side's fighters are attempting to kill the opposition as efficiently as possible whilst attempting to avoid being killed themselves, my own area of expertise. Having spent over 10 years flying on the front-line I could very clearly explain, with many historical examples, how a slight performance advantage over one's enemy can make all the difference. Put simply if my jet flies faster than my enemy's then hopefully I shall win any engagement, I will live and my enemy will die. If my jet flies 1% slower because an environmental lobby group had demanded a new greener fuel be used then I as the individual combatant might be more than a little unhappy to say the least. Fortunately for me bio-fuel has not yet reached Royal Air Force front-line fighters though the USAF has a long running experiment using plant sugar based fuel in its wide-body jets (BioFuelsDigest 2013). Similar examples of 'green' combat equipment are available in other areas of the military, for example there is debate in the USA about its Army's introduction of a new lead-free bullet claimed by some to be 'ineffective' (FrontPageMag 2013). At the level of the individual combatant I must seek to hold a performance advantage as I enter the fight and no amount of concern about the environment is going to convince me otherwise.

Operational Commander

If we consider the operational commander's perspective then there are clear advantages to commanding forces that are, for example, fuel efficient. One of the operational commander's biggest dilemmas is how to keep his/her forces resupplied. A fuel efficient fleet of tanks may have an increased overall combat effectiveness if they can cover more distance per day given a fixed quantity of fuel available due to the inevitable logistical constraints, or the fuel saved might be reallocated within the Commander's forces. The operational commander must consider the overall fighting effectiveness of his forces, not just the effectiveness of the individual combatant. Furthermore, the operational commander can, and must, take a longer-term view of a conflict, unlike the individual in the field.

We might draw parallels here with the world of business. In a perfectly competitive market the individual producer cannot give up any cost efficiency in order to be 'green' without being priced out of the market, to attempt to do so would cost the business. Here the many small firms without the ability to influence the overall market are like the individual combatant. Once we enter the realm of oligopolies where longer term decision making is possible and consumers are swayed by differentiation rather than just price then I might increase the cost of my product to make it environmentally friendly and at the same time increase sales if my customers are willing to pay a little extra to 'be green'. Perhaps my competitors are not offering a 'green' product and so I can create a clear market differentiation to increase my market share, until my competitors catch on. The oligopolies might be likened to the 2 opposing operational-level commanders.

We can take this comparison between business and military motivation to be green even further. If my oligopoly has created a 'green' based market advantage as previously described then I am not motivated to share it with my competitors. Likewise, military technology is not readily shared between potential adversaries. The spread of military technology is particularly stymied since the most advanced products are generally not sold on the open market so other producers will find it very difficult to acquire a copy of my technological advantage in order to attempt to examine and perhaps reverse engineer it. So what? Nations with defence industries must choose carefully where to focus their limited defence research and development budgets. Is it any surprise that the world's militaries are not leading the development of new green technologies?

Must a military be concerned?

Government

Ultimately, in a democratic society, the military is a department of government and so a reflection of the will of the people of that nation. If the people are concerned about global warming and the earth that their children will inherit then the government may be forced to be concerned with the environment regardless of what any operational commander or individual combatant may believe. In one internet based poll 78% of people believed that the military

should not be exempt from environmental regulations (Debate.Org), though I would suggest that in countries where the citizens do not feel so secure, perhaps currently the Ukraine, then the result of this vote might be reversed. As discussed later in this paper it appears that in the UK non-combat related activity is subject to ambitious governmental 'green' targets, but combat related equipment appears to fall outside of mandatory ministerial sustainability reporting.

Returning to the comparison of the military with the company, the voters who elect a nation's government, which controls the military, are perhaps further from the immediate effects of their vote than a shareholder voting at an annual general meeting. This perhaps allows a voter to elect ambitious long term goals such as sustainability rather than the shareholder who might reasonable chase short term profit.

We must also remember that the military of an established western country may have little 'output'. A military may spend all its resources on training and exercising without ever actually 'delivering' any visible effect such as a victory in combat against another nation. Clearly a strong military would be expected to have a deterrence effect but without a visible adversary a typical voter might reasonably be far more concerned with the quality of her local school or health services. Politicians must balance the provision of other possibly more visible government outputs with the broad acceptance that defence of the nation is an essential role of government; the US constitution considers it the only mandatory function of government. The forming of military alliances thus allows the politician to get more bang for their buck by sharing national defence across a collective of nations.

Military Alliance

The concept of alliance raises our discussion to the highest, multi-national level having started from the individual combatant and considered the operational-level commander and national government. An alliance represents the people of many nations, a cross section of the entire world, and arguably the level at which the major global environmental issues need to be tackled. But what if various contributing nations have differing opinions of the need to be environmentally friendly? Is it OK to be in an alliance with a nation that pays no

heed to environmental concerns, or even rejects the idea of global warming if you are investing some of your limited defence budget in green technology? Since “NATO partnerships are not designed for operational cooperation only, but also to strengthen ties on the strategic and political level” (Pankovski) surely this is an ideal platform upon which to influence other governments and members. Unfortunately neither sustainability nor concern for the environmental are on NATO’s official list of dialogue and consultation priorities and they are unlikely to get much attention until they trigger a crisis requiring the support of security services (NATO 2014). A 2010 NATO report (Vitel 2010) suggested that energy security ultimately falls at the national level since there was no alliance level agreement on how to secure energy supplies in both peacetime and in times of conflict. Part of the difficulty is the broad spectrum of energy-dependency within the alliance. Countries such as Canada and Norway which are essentially energy self-sufficient are in allegiance with countries such as Slovakia, Hungary and Greece, and a slew of east European countries, that depend on energy imports from Russia. In 2010 at the time of the VITEL report there were no clear ideas on how to develop energy security beyond the establishment of a Centre of Excellence for Energy Security. This centre of excellence does now exist, operating out of Vilnius, Lithuania, and conducts research on NATO energy policy. It is currently establishing a study to plan how energy management systems/models can be applicable in the military expeditionary environment, implementing energy use control, improving energy efficiency and better energy performances (Energy Security CoE 2014).

With the benefit of the latest research we can now question the assumption in the VITEL report (Vitel 2010) that a transition to a ‘green economy’ is comparable to the transition from agricultural to industrial economy, a change so big that it will “require strong political will and resolve as it is a costly one” (Vitel 2010). A recent article in The Economist (The Economist 2015) suggested that stringent environmental policies do not harm productivity growth, contradicting the traditional assumption that green rules must be justified by a perceived need to save the planet and that significant immediate economic costs are inevitable. Three possible explanations of why ‘green’ might not be as expensive as previously thought are offered. Firstly, that the economic cost of environmental regulations is not great enough to affect overall productivity. Secondly, those strict environmental policies do as much good as harm by

forcing companies to invest in efficiencies and innovation that they might otherwise not have done. Thirdly, it is suggested that the type of green policy imposed, be it market-based (such as carbon-pricing), or not (such as bans or regulations), can explain the difference in long term costs with competition-friendly economies coping much better with green policies than bureaucratically burdened or anti-competition economies. If we try to translate this new thinking back to defence could we argue that imposing green policies would in the long term actually improve military capability? Unfortunately one might reasonably argue that buyers of Defence products look for a wide variety of attributes, such as maintaining sovereign capability and workshare, that are not competition-friendly, and given the current geo-political environment do we have the time to wait for long term benefits?

UK Government Sustainability

Moving beyond the notion of 'environmentally friendly' or 'green' we will now examine sustainability. Military headquarters are after all knowledge based organisations trying to outmanoeuvre and outwit an opponent whilst using an available set of previously procured equipment that may or may not be appropriate for the job at hand. Much like the division of a corporation this military headquarters needs to be constantly trying to optimise the utility of its allocated resources. The corporate headquarters needs to consider the big issues and offer direction and guidance just as the government directs the military.

The UK government produces an annual report titled 'Greening Government Commitments' (DEFRA, HM Government 2013). This report provides a scorecard for each of the 21 UK Government departments and several arms-length bodies for performance in five key target areas representing the Greening Government Commitments. These indicators are intended to show the impact of the operations of each of the government departments though the report does not appear to discuss the operation of military combat vehicles, only those vehicles and activities associated with non-combat related activity such as paper use, water use, and the leasing of rental vehicles.

Ministry of Defence Sustainability

Rather more enlightening is the Ministry of Defence's Sustainable Development Strategy (UK Ministry of Defence 2011) that provides a plan out to 2030. This is a sub-strategy to the higher-level 'Strategy for Defence' that is derived from the government's Defence Strategic Direction and the Defence Plan. This sub-strategy uses The Brutland Report definition of Sustainable Development (SD): meeting the needs of the present without compromising the ability of future generations to meet their own needs, but then refines the concept into 2 Defence SD principles and begins to develop a Defence specific lexicon:

> Principle 1: Defence must be resilient to current and future environmental, social and economic threats (*adaptation*).
>
> Principle 2: Defence must realise the positive and minimise the negative impacts that Defence activities can have on the environment, people and the economy in the UK and overseas (*mitigation*).

It is clearly stated that the drivers for this strategy are legislation, Government Policy and the benefits of SD to Defence. These appears to mirror the drivers of sustainability in commerce, legislation, corporate 'green' goals (perhaps motivated by a deep-seated philosophy or just a desire to appear 'green' for the benefit of consumers) and the efficiency benefits brought by operating in a sustainable way. Of these 3 drivers of sustainability the first 2 receive just a few sentences of explanation whilst the third, the "overwhelming business case for SD in Defence" receives a whole page of discussion. The interesting point for me is that legislation does not really motivate people. One must of course follow legislation but if there is any room to 'interpret' a rule one might choose the 'easier' route. Thinking at the level of the individual combatant I may choose to disregard legislation if I am making real-time combat decisions. The second motivator, that government has 'a policy' of sustainability is even easier to ignore should I wish to do so. The third driver of sustainability, the overwhelming business case, is much harder to ignore since it actually spells out how I can be more efficient in my primary role, and which combatant would not be motivated by this?

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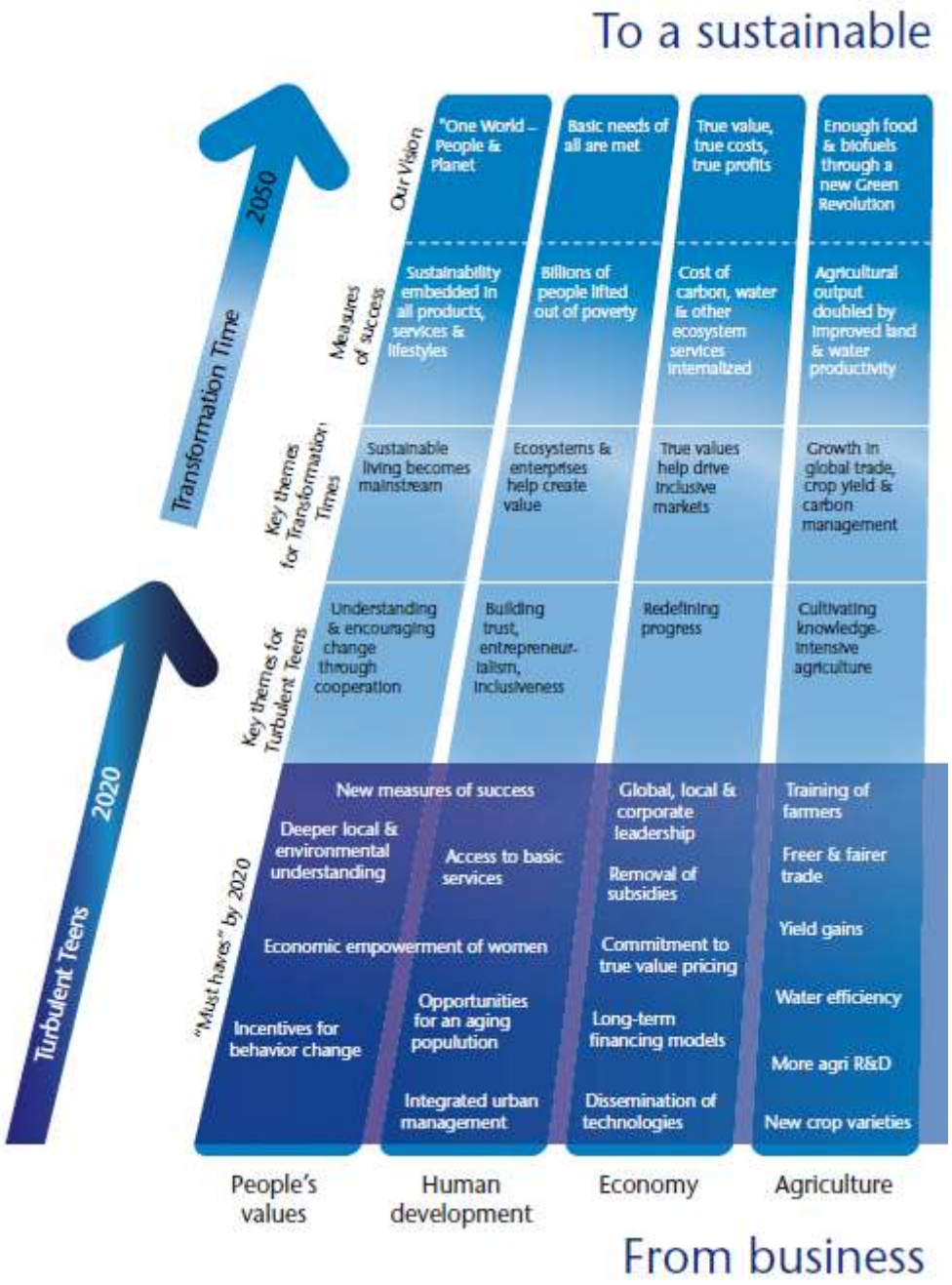
Annex A - UK Defence Sustainability compared to Vision 2050

The Vision 2050 agenda for business (World Business Council for Sustainable Development 2010) is a collaborative product that involved hundreds of representatives from business, government and civil society and should thus be considered to offer a credible guide against which to consider how mature an organisations attempts to be sustainable are. It is not intended to be a prescriptive plan or blueprint for businesses, rather it is intended to raise the questions that need to be asked, to be a 'platform for dialogue' and in this report the assessment will remain qualitative rather than attempt to quantify 'sustainability'.

Vision 2050 offers a pathway that encompasses 9 key areas that should be addressed to reach a sustainable world in 2050. We shall examine each key area in turn.

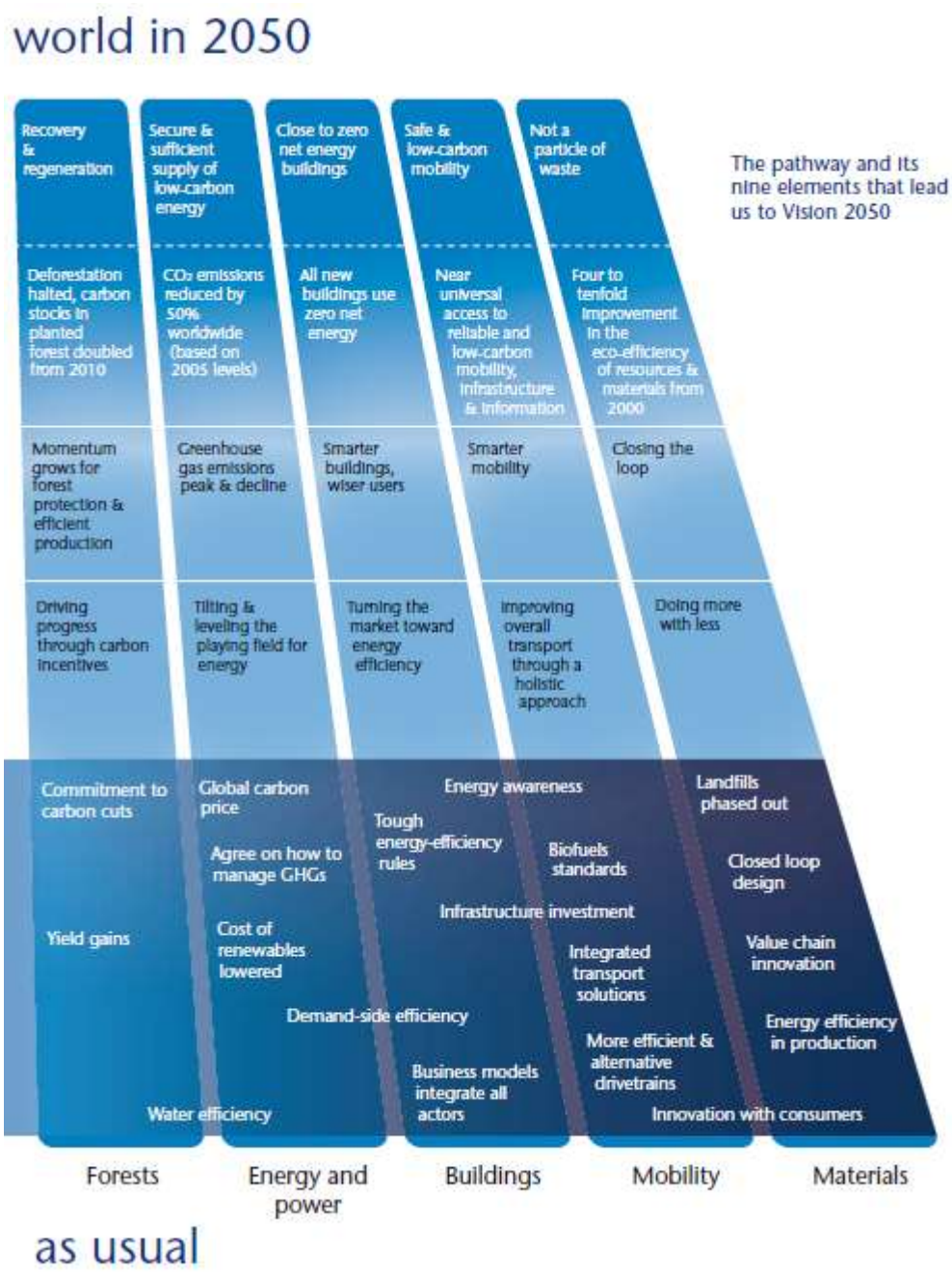


1. **People's values**. Incentives for change have already been discussed in this paper and it was felt that Defence had found convincing incentives, especially in the 'business case' for sustainability. Although some areas of Defence still remain closed to women, such as front-line ground troops, and no woman has yet reached the very highest ranks UK Defence employs many women in many roles and there is legislation to protect gender equality that should drive economic empowerment of women.

2. **Human development**. Defence is currently in the process of changing its employment policy to raise the age of service thus presenting more opportunities for an aging population of military personnel. Ultimately Defence's measure of success is set by its civilian masters. But within Defence the sustainability strategy demands, in para 1.8.3, that annual performance reporting against the strategy and plan objectives, and annual assurance reporting, are required.

3. **Economy**. This is perhaps the weakest area for Defence. Major procurement projects are controlled by politicians that are concerned with broad measures of success, such as jobs and the protection of certain sovereign defence capabilities, for example the complex weapons pipeline. This is unlikely to lead to dissemination of technologies for the reasons already stated, has historically suffered from myopic budgeting (Harding 2012), with vague pricing models and arguably subsidies for the private firms that are being supported. That said attempts have been made to reform the process since the current coalition government came into power and so there is an opportunity for Defence to meet the "must haves" by 2020.

4. **Agriculture**. Not applicable.



5. **Forests**. Not applicable.

6. **Energy and power**. As discussed in the Greening Government Commitments the UK Government does mandate that all departments reduce greenhouse gas emissions, though the MOD appears to be a laggard on the Greenhouse Gas Emissions table on page 8 of the report.

7. **Buildings**. MOD's buildings account for 94% of its CO2 emissions (DEFRA, HM Government 2013) and so this should be an area of focus. But with baseline year CO2 emission almost 3 times larger than the next

nearest government department, and a substantial cut in funding since that baseline year, it is difficult to see how the MOD will improve the energy efficiency of its estate in a significant way.

8. **Mobility**. The MOD's non-combat fleet of vehicles is low-end but modern and so should be expected to improve in-line with the broad market. Continued rationalisation of the Defence estate should also reduce the logistics footprint. The MODs military vehicles currently use approximately 1 billion litres of fuel per year generating 3 million tonnes of CO2, roughly double the emissions from buildings. More efficient drivetrains will improve the combat effectiveness of these vehicles but procurement cycles are slow and reliability and dependability are likely to preclude extensive use of alternative drivetrains and biofuels for the foreseeable future (accepting the USAF continues to experiment with biofuels for jet engines).

9. **Materials**. As a provider of a service, Defence of the Realm, it is difficult to imagine what value chain innovation would look like and how a closed loop design would be incorporated except were the MOD's own suppliers instigate such methods.