green alliance...

Green conservatism: Better resource productivity for a resilient economy

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Summary

> “The UK can maintain an open economy, tackle environmental impacts and be more resilient if it addresses resource productivity.”

Britain is a trading nation open to global markets. It has benefited from the comparative advantages of different nations, channelled through international trade, and has grown its economy using natural resources from around the world. The corollary of this inward flow is that the country is now more exposed than some economies to fluctuations in global resource prices, and the UK has a large global environmental footprint.

Between 2003 and 2013, world fuel prices rose four fold, metal prices trebled and food prices roughly doubled. In this pamphlet we argue that the UK can maintain an open economy, tackle environmental impacts and be more resilient if it addresses resource productivity. It can also do its bit to reduce the carbon emissions and other impacts caused by resource extraction.

This pamphlet makes practical proposals for how better resource recovery, remanufacturing and mission led innovation can reduce the UK’s dependence on virgin materials, lower input prices and increase the strength of UK-based business supply chains.

Better resource productivity has many benefits: it reduces waste and makes the UK more competitive. It decreases the nation’s global footprint and the environmental impact caused by resource extraction and it helps to strengthen UK manufacturing which is vulnerable to increasing resource prices.

Resources have been neglected by politics for too long. The efficiency with which we use them is a key determinant of the UK’s economic fitness. Resource efficient, closed loop systems, already pioneered by the best businesses, need to be amplified with smarter resource policy. Conservatives seek to promote sensible approaches which protect open markets and meet the challenges of a world in which competition for resources is only likely to increase.

Over the page we set out four commitments the government should make to address this, which are discussed in more detail in this pamphlet.

The government should commit to:

- a new Commission on Resource Responsibility to actively monitor resource risks, identify where the UK is vulnerable and outline the options available to address these risks;
- improve regulation, such as the Waste Electrical and Electronic Equipment (WEEE) directive, ensuring reuse is promoted over recycling;
- ensure incentives for remanufacturing are created through public procurement;
- support entrepreneurs to create the new technologies and start-ups that the UK and the rest of the world needs to cope with resource volatility.

1

Resource supply concerns

Since Sir Robert Peel took on the Corn Laws and made real his belief in free trade, the UK has been amongst the most consistent advocates of the view that the fewer the impediments to trade, the greater the prosperity of the nation.

The UK has had a trade surplus in services since 1966 and is the second largest exporter of services after the United States.[1] However, as the financial crisis of 2008 has shown, Britain cannot simply rely on services to pay its way in the world.

Prime Minister David Cameron called for a new emphasis on manufacturing in 2011,[2] and more recently pointed to evidence that this approach is beginning to bear fruit: one in ten SMEs have brought production back to the UK in the past year.[3]

> "The UK can also import vulnerability if it becomes more dependent on resources whose supply is subject to resource nationalism."

But Britain's successes in encouraging reshoring will be challenged in a world where demand for resources is sharply increasing. Open markets are the route to prosperity, but the UK can also import vulnerability if it becomes more dependent on resources whose supply is subject to resource nationalism.

Evidence cited by the Department for Business, Innovation and Skills shows that export bans on grains between 2005 and 2008 increased international wheat prices by 25 per cent, and rice prices by 45 per cent. Over the same time period, the rate of inflation in energy and unprocessed food was 4.9 times that of other goods.

Over the past decade, world prices of key resources have risen sharply and have been highly volatile. Between 2003 and 2013, world fuel prices rose fourfold, metal prices trebled and food prices roughly doubled. These sharp rises, affecting most commodity groups, are in marked contrast with much of the 1980s and 1990s, when real commodity prices generally declined.[4]

Since 2003, rising food and energy bills have pushed up the overall inflation rate by around 0.5 percentage points per annum and have made the task of controlling inflation more difficult for the Bank of England.[5]

In the coming years, the impact of climate change is likely to increase these commodity costs further while also making it necessary to reduce the UK's environmental footprint.

> “At the height of the recent resource price shock in 2011, nearly a third of profit warnings issued by FTSE 350 companies were attributed to rising resource prices.”

Similarly, the recent tensions between Ukraine and Russia have caused European gas prices to rise sharply in the short term and to increase in volatility.[6,7] Even though the UK buys little gas directly from Russia, it has still affected UK consumers: one leading analyst noted that he “would be very surprised if we saw a reduction in [UK] retail prices until the Ukraine situation is sorted out.”[8]

At a macroeconomic level, half the letters written by the governor of the Bank of England since 2003 to explain why the UK overshot its inflation target cited imported price shocks as the primary cause of UK inflation. The effect on British workers is equally stark: despite the biggest recession in a generation, real median wages between 2003 and 2013 would have increased, rather than fallen, if imported energy and food prices hadn’t risen so sharply.

Vulnerability to resource shocks harms business too. At the height of the recent resource price shock in 2011, nearly a third of profit warnings issued by FTSE 350 companies were attributed to rising resource prices.[9]

As supply becomes tighter, these supply shocks will become both more common and more violent. To take just one example highlighted by Liam Fox last year, “as resources become more scarce, it is likely that conflict for control of water will become more common with demand likely to outstrip sustainable current supplies by 40 per cent.” His conclusion is that “water will replace – or at least join – oil as a primary source of conflict in the 21st century.”[10] Research from ASDA shows that this is not merely a national security concern: 95 per cent of ASDA’s fresh foods are vulnerable to water constraints. Water availability and other effects of climate change have put £370 million of value across ASDA’s supply chain at risk.[11]

Evidence from Germany highlights that, while around 20 per cent of European manufacturers’ costs relate to labour and ten per cent come from energy, 40 per cent arise from resources.[12] This suggests a focus on resources is overdue. In fact, the breakdown of costs underestimates the importance of resources to the UK, because it does not account for the

comparative advantages that some of the UK's major competitors enjoy. For obvious reasons, the UK is unlikely to compete on labour costs with Asian manufacturers. The United States enjoys a significant short term advantage on energy costs due to the rapid rise in shale gas and very limited interaction with global gas markets. So, if UK manufacturers do not increase their resource productivity, the risk is that their competitiveness will fall.

The UK's response to these risks should not be to withdraw into resource nationalism. We should continue to embrace free trade and focus on how to improve resource productivity.

Which raw materials are critical?

The range of raw materials used across diverse products has dramatically increased in recent years as products have become more complex. Greater reliance on often imported specialist elements, increasing demand and declining ore grades, has led to a growing concern about the security and management of the supply of minerals and metals at national, European and global levels.

Chief amongst these elements are the so-called 'critical materials' which are both economically important and subject to security of supply risks. Security of supply is assessed on physical factors, including scarcity and resource depletion; economic factors, including functioning of markets and the stability of production, material supply and demand; and political factors, including policy effectiveness, trade barriers and conflict.

Launched in 2008, the European Commission's 'Raw Materials Initiative' seeks to identify critical raw materials by understanding the security of supply issues associated with raw materials, and calculating the economic importance of these by assessing their importance to industrial megasectors at an EU level.

In 2013, the EU raised the number of critical materials for the region from 14 to 20. They are: antimony, beryllium, borates, chromium, cobalt, coking coal, fluorspar, gallium, germanium, indium, magnesite, magnesium, natural graphite, niobium, platinum group metals, phosphate rock, heavy and light rare earth elements, silicon metal and tungsten.

2

A strategy for resource productivity

> “What is needed is a hard headed plan for a resource efficient UK.”

The UK’s global competitors, including China, the US, Germany, Korea and France, have all developed resource risk mitigation plans, or have integrated resource risks into their industrial strategies. In contrast, a comparative analysis by EEF concludes that the UK has “no vision or programme to drive resource efficiency economy-wide.”[13]

What is needed is a hard headed plan for a resource efficient UK, which necessitates a clear and strong strategy, underpinned by data and analysis. This is an area where the UK has been particularly weak: there is very limited understanding of the UK’s particular exposure to resource shocks, especially compared to other countries. The evidence there is comes from work done by the EU to quantify the material security risks that the EU as a whole faces. Addressing resource risks in an intelligent manner demands detailed analysis of the UK context and smart policy to incentivise recovery and remanufacturing.

A government strategy should include the following:

An independent commission on resource responsibility

As a first step the government should undertake a study of resource risks to identify where the UK is vulnerable and the options available to address these risks.

This study could be delivered by a new Commission on Resource Responsibility, modelled on other successful commissions, such as the 2005 Pensions Commission. The commission should follow the example of Scotland’s *Raw materials critical to Scotland’s economy*, by considering the exposure of the UK economy to materials with supply risk concerns, on a sector by sector basis, testing the resilience of supply against future scenarios.[14] The commission should set out the risk mitigation options for business and government, based on identified risks to key economic sectors.

In addition to the commission, following are a number of parallel, no regrets policies which should be implemented.

Better systems for resource recovery

Businesses want to use recycled materials to meet consumer demand for greener products, offset rising material costs and secure resource supplies. For instance, where plastic bottles are separated, reprocessors pay around £300 per tonne to purchase and reprocess them in the UK. They then sell the recycled plastic for over £1,000 per tonne, offsetting imports.

Doing this makes good financial sense. But current UK recycling systems are blocking market demand for materials, preventing it from stimulating the building of new reprocessing infrastructure, because the reprocessors cannot secure supplies of recyclable materials from local authorities.

> “Businesses want to use recycled materials to meet consumer demand for greener products.”

The result is that the UK only has five closed loop plastics facilities, but could support around 45. The current system is incoherent: a plastic bottle is the same, whether it is in Glasgow, Teeside, Winchester or London, but it is collected and sorted in such different ways by the UK’s 376 municipal waste collection authorities that two thirds of collected bottles are simply exported as unsorted, low value mixed plastics. Exporting is the best option for the UK’s mixed, often contaminated waste streams, but more value could be retained if collections were standardised to make more uncontaminated material available for higher value reprocessing here in the UK.

Another example of the fragmented character of the system can be seen in Greater Manchester, where there are six different colours for the same recycling bins within a 12 mile radius.[15] This confuses the public unnecessarily, and is the result of poor incentives for local authorities to co-operate. The numbers tell the story: Germany, Belgium and Switzerland all have more rational collection systems. They recover over 90 per cent of aluminium cans compared to the UK’s 55 per cent.

This is not because UK councils are unable to co-operate. Instead, ‘bin localism’ reflects a lack of genuine localism. Because councils have not had the power to set local economic priorities, and have found their control of planning highly contested, they have focused on a highly visible differentiator: bin colour. This has a hidden cost: a lack of joint procurement has meant that councils have spent £200 million more on bins than if they had jointly purchased the same type.[16]

Greater devolution to local areas for substantive issues, combined with a reform of waste regulations so councils are obliged to deliver more usable materials to businesses, could address this problem.

Smarter regulation for reuse

In other areas, the solution should be to unwind cumbersome regulation which penalises systems that retain resource value and create new smarter regulation that encourages reuse. For example, it is clear that the current, official system for waste electronics is overcomplicated and stands in the way of the more valuable recovery which the market is already choosing.

> "The UK's implementation of the WEEE directive perversely rewards lower value recycling over higher value reuse."

For example, if a business wishes to dispose of an old computer, an unregulated computer refurbisher can collect it for free and sell it on to be used again. It can do this because the value of the old computer, when reused, justifies the cost of collection.

But the official scheme for dealing with old computers, led by EU Waste Electrical and Electronic Equipment (WEEE) regulations, is funded by manufacturers and requires a collection charge to be paid. The UK's implementation of the WEEE directive perversely rewards lower value recycling over higher value reuse. The value of the separated recycled materials in a computer is much lower than if it is refurbished for reuse, which means a collection charge is necessary to make it viable.

Naturally, few businesses will choose to pay for collection when a free alternative is available. So computer companies have to set up producer responsibility schemes which are processing very small numbers of electronics, creating an unreasonable burden on business.

For instance, in 2013 one supplier of commercial imaging equipment put 35,334 units on the market, and paid £2,155 in producer compliance fees. Yet, because their products still have a value when they are replaced, only three products were processed by their WEEE compliance partners, at a cost of £718 each.[17]

The WEEE system, as currently constructed, loses huge value to the UK economy by encouraging very crude recycling of electrical goods, which shreds sophisticated products, rather than disassembling or remanufacturing them.

A smarter solution would be to redesign regulation to reward good outcomes, such as the high value reuse being delivered by the private sector. Reform would require legislators and regulators to understand when the market is delivering these good outcomes, and only to regulate heavily when market incentives undermine greater resource productivity.

“Remanufacturing retains much of the value of the original product and saves at least 70 per cent of input materials compared to new goods.”

Remanufacturing stimulated by public procurement

The government could play a more positive role in increasing resource productivity. In addition to reforming regulation, it could support good practice in remanufacturing, a process which involves disassembling, replacing worn or obsolete components and recertifying complex mechanical or electronic goods.

Leading companies already remanufacture 50 per cent of their products, including high value, safety critical equipment such as jet engines and cars, as well as high tech electronics like photocopiers. Remanufacturing retains much of the value of the original product and saves at least 70 per cent of input materials compared to new goods. The government is a major customer for these types of equipment and can use its power as a purchaser to support remanufacturing.

Many large scale public infrastructure projects can be designed to support remanufacturing. For example, faulty equipment on high speed trains is currently disposed of but remanufactured equipment could be explicitly requested. Similarly, already mandatory take-back schemes could be required to protect the integrity of the products recovered to ensure their value is preserved.

Mission led innovation

Smarter regulation will enable businesses to take up the quick wins that they already see. However, in the longer term, we know that innovation and entrepreneurialism will be essential to increase resource productivity.

As with Tech City, the government's industrial strategy and innovation bodies could help to fund and facilitate the technologies and start-ups in the reuse, remanufacturing and recycling that the UK and the rest of the world needs to cope with resource volatility. Innovate UK, with its network of catapults, provides a strong foundation to support innovative businesses, but UK innovation policy can also learn from the enterprising private sector.

> "Many highly successful US innovation programmes work on the basis of expert guided, challenge led innovation."

An excellent example of how to encourage radical innovation comes from the paper industry. The industry is facing serious challenges: demand for paper is falling, manufacturing is exposed to raw material price increases and incremental innovation isn't keeping up. It's response was to issue a challenge to itself: to cut CO_2 emissions by 80 per cent while creating 50 per cent more added value. The method mixes competition and collaboration, which has been particularly effectively at unlocking innovation (see over for more details about this project).

The government can learn from this example, and reform its innovation policy in two ways. First, it should adopt a 'mission led' model. This would mean setting a stretching goal for new areas of work, and using experts to collaborate over the many different ways a goal could be achieved. Many highly successful US innovation programmes, like ARPA-E (the Advanced Research Projects Agency-Energy), work on the basis of expert guided, challenge led innovation.

Second, it should link the outcomes of the mission led innovation process to the government's industrial strategy. Not every new idea will prove successful but, by helping to support new, resource productive technologies, the government would be helping businesses to become more competitive in a resource constrained future.

The European paper industry's two team project

The Confederation of European Paper Industries (CEPI) oversaw what became known as its 'two team' project, designed as an open innovation process. All the intellectual property created during the innovation process was licensed by the confederation to its members so they could develop new, innovative technologies. This encouraged participation and rewarded those who could develop the early stage ideas into products.

The process started when CEPI set up two teams of scientists and business people and asked them to start building a common knowledge base, drawing on their own expertise and ideas from other sectors with carbon reduction targets, including the steel and chemicals industries. The teams were then asked to compete to develop four technology ideas each, with a view to being judged on their carbon reduction, value added, innovation and feasibility potentials.

The ideas presented ranged from using deep eutectic solvents to dissolve wood, rather than mechanically grinding it; to waterless paper production using supercritical CO2. These ideas are just starting to work in the laboratory, but have never been applied to the paper industry. All would dramatically reduce emissions and very substantially reduce water and other resource demands, and would shift the paper industry from being focused solely on paper production to become a sophisticated producer of biochemicals and biomaterials, only one of which would be paper.[18]

The key factor was that the process fostered creativity: the technology options were developed to meet a specific goal, and the participants drew on their disparate sources of expertise to come up with new ideas.

In conclusion, environmental constraints and obligations, an insecure global resource market and increasing international competition in manufacturing should not mean an end to the UK's enthusiasm for an open market. Instead, by being prepared to tackle the most significant risks, by ensuring regulation helps businesses to be more resourceful and by promoting the next wave of entrepreneurial innovation, the government can ensure the UK's economy is ready for the challenges to come.

Endnotes

[1] *The Economist*, 9 February 2013, 'Better out than in'
[2] World Economic Forum, (Davos) 2011, speech by David Cameron: 'A confident future for Europe',
[3] World Economic Forum (Davos) 2014, speech by David Cameron on the opportunities of reshoring
[4] Green Alliance, 2014, *The great resource price shock*
[5] Ibid
[6] www.worldoil.com/European-gas-prices-surge-as-Ukraine-crisis-deepens.html; and *Bloomberg BusinessWeek*, 20 August 2014, 'European gas reverses biggest drop since 2009 on Ukraine'
[7] Bloomberg, 8 August 2014, 'Gas price swings signal Ukraine supply threat: chart of the day'
[8] *The Times* 16 June 2014, 'Gas prices soar as Russia-Ukraine dispute threatens supplies'
[9] www.businessgreen.com/bg/news/2281127/business-leaders-urge-resource-scarcity-review
[10] *The Daily Mail*, 7 September 2013, 'Ten global nightmares that should keep us all up at night'
[11] ASDA, 2014, *The challenge of a changing climate,*
[12] Greenovate! Europe, 2012, *Guide to resource efficiency in manufacturing*
[13] EEF, 2014, *Materials for manufacturing*
[14] Scottish Environment Protection Agency, press release 15 February 2011, 'New report highlights raw material risks for Scotland's economy'
[15] www.recycleforgreatermanchester.com/clientfiles/File/2a%20Stick%20it%20Right%20Answer%20sheet.pdf
[16] D Benton and J Hazell, 2014, *Wasted opportunties: smarter systems for resource recovery,* Green Alliance
[17] Kyocera Document Solutions (UK), 2014, personal communication
[18] CEPI, 2013, *Unfold the future:The two team project*

"Britain is a trading nation and has benefited greatly from globalisation. But can we continue to do so while simultaneously contributing to the mitigation of global warming and addressing resource constraints? This pamphlet provides some imaginative ways in which this can be achieved. I commend it as a constructive addition to the debate."
Lord Howard of Lympne CH QC

"With the cost of resources sky rocketing in recent years, and no sign that trends will or can be reversed, there is no responsible alternative to becoming more efficient with the resources we use. This will be a defining challenge, and those companies and nations that fail to meet it will be left at a huge disadvantage."
Zac Goldsmith MP

"This pamphlet clearly highlights the importance of strengthening our understanding and management of our natural resource use and dependency. It is not only the right thing to do for the environment, but for business and national security too."
Dan Byles MP

"World fuel prices have gone up 400 per cent, metal prices 300 per cent and food prices have roughly doubled between 2003 and 2013, so resource security will inevitably become more important in future. This pamphlet is a welcome addition to the debate, and offers a fresh perspective on how to deal with one of the biggest challenges of our times."
John Penrose MP