We want the UK to have the fittest, most productive economy when the global recovery starts to gain pace, with the policies in place to drive up productivity, tackle waste in our economy, ensure the best use of resources and raw materials and significantly reduce energy waste.

_The Chancellor of the Exchequer, Rt Hon George Osborne MP_
Views of ‘Sweating our Assets’ from Industry and Stakeholders

“Anyone looking for an antidote to the current vogue for putting the environment and the economy at opposite ends of a see-saw need look no further than this excellent report. The race for the future will be won by those nations which fully embrace its ideas.”

Tom Burke – E3G

“The transition to a circular resource economy, with resource productivity and efficiency at its heart, will require new metrics to measure success. The Commission’s recommendations shine a light on how we can develop and evaluate progress and shape policy for a sustainable economy.”

Martin Baxter, Executive Director – Policy, Institute of Environmental Management and Assessment

“We see a pent up demand from business to move to circular business models to increase resilience to resource supply volatility and to create new customer benefits. This report provides excellent recommendations that could help accelerate the take up of this considerable business opportunity.”

Dr Michael Pitts – Technology Strategy Board

“This is an important report highlighting the significant potential that exists within the material efficiency and closed loop approach to the UK economy. Caterpillar are pleased to contribute to the report and to demonstrate the benefits of Remanufacturing, same or better than new performance backed by same as new warranty. This is Good for Customers, Good for Business, Good for the Environment, Good for Economies.”

Matthew Bulley – Caterpillar
These proposals represent an innovative approach to dealing with wealth creation through the redefinition of resources. In modern society, waste has to be redefined as a commodity if we wish to preserve our quality of life. We need to recognise that many materials classified as waste can actually be re-made into valuable products using processing technologies that are economically and environmentally more sustainable than going back to raw, and often scarce, raw materials. I fully support the approach covered in ‘Sweating Our Assets’.

Prof Peter Styring – University of Sheffield

There is intense current debate on how we can improve on GDP in measuring economic performance, increase resource efficiency, and deal with externalities that damage the public good, and this report makes a valuable and practical contribution to the discussion.

Prof Charles Godfray – Martin School, University of Oxford

We were delighted to be able to contribute to this report from Laura Sandys MP and the 2020 Productivity & Efficiency Commission and believe it could make a big difference to how businesses operate in the UK. If businesses can start to work differently by looking at productivity, profitability and resource use and viewing waste as a resource rather than a problem, then the UK could unlock enormous potential and could become a world leader in the development of a successful circular economy.

Dee Moloney – Managing Director of LRS Consultancy

This is a timely review that makes a strong economic case for the efficient use of resources. The UK has an opportunity to set the global template for a new economic approach to resources if we grasp the concepts the commission has identified.

Jacob Tompkins – Managing Director of Waterwise
Acknowledgements

The 2020 Productivity and Efficiency Group would like to say thank you to all those who have supported us in putting together this report. Without the help of the following people we would not have been able to put together such a forward-thinking and far reaching document.

Particular thanks in the development of this paper needs to go to Susanne Baker, the Senior Climate and Environment Policy Advisor at EEF whose professional advice, input and strategic advice has been invaluable. However the greatest thanks must go to Aidan Corley whose work in drafting, moderating, and developing the key recommendations has been remarkable, and whose instincts have guided us all the way. Without the help of these two people this report would not have been possible.

Alastair Harper, Green Alliance
Andrew Clifton, Manager of Sustainable Development, Rolls Royce
Andy Doran, Chairman of Novelis Europe
Angela Knight, Chief Executive, Energy UK
Ben Caldecott, Programme Director and Research Fellow at the University of Oxford’s Smith School of Enterprise and the Environment
Ben Dear, CEO of Osmosis
Ben Moxham, Capital Dynamics
Clare Whelan, WRAP
David Workman, Chief Executive, Confederation of Paper Industries
Dee Moloney, Managing Director of LRS Consultancy
Dick Searle, Packaging Federation
Dr David Gardner, Deputy Director, Environmental Sustainability Knowledge Transfer Network
Dr Greg Lavery, Lavery Pennell
Dr Liz Goodwin, Chief Executive, WRAP
Dr Mike Pitts, Sustainability Lead, Technology Strategy Board
Dr Richard Swannell, Director of Sustainable Food Systems, WRAP
Dustin Benton, Green Alliance
Dwight Demorais, UK Cement Industry
Graham Stace, Head of Climate and Environmental Policy, EEF
Guy Newey, Head of Environment & Energy, Policy Exchange
Jacob Hayler, Senior Economist, Environmental Services Association
Jacob Tompkins, Director, Waterwise
James Wilde, Carbon Trust
Jenni Staves, Environmental Manager, British Glass
Jeremy Oppenheimer, Director of Sustainability and Resource Productivity, McKinsey
Jon Kimber, Agility Eco
Julian Morgan, Chief Economist, Green Alliance
Martin Baxter, Director of Policy, Institute of Environmental Management and Assessment
Matt J. Bulley, Managing Director, Caterpillar Reman
Matthew Brown, Royal Society of Chemistry
Matthew Farrow, Director of Policy, Environmental Services Association
Matthew Spencer, Director of the Green Alliance
Michael Liebreich, Chief Executive of Bloomberg New Energy Finance
Nick Lakin, Head of Government Affairs, Kingfisher
Nick Morely, CEO of Oakdene Hollins
Paul Sanderson, Resource Efficient Business Magazine
Peter Hambly, Carbon Trust
Foreword

The significant challenges faced by government and business in a world of ever more limited resources is set out in stark terms in this report.

Government, policy makers, manufacturers and the wider business community all need to consider a future where the demand for resources outstrips supply and where the security of that supply is of itself a critical and unstable factor.

We consider the impact of constrained resources at a time when there are strong signs of growth in the UK economy this year, but this is matched by the rising cost of materials and other input costs. These costs are potentially a significant threat to sustainable long term growth. And it is a threat that will increase.

Government must work together with business to plan ahead. With three billion people expected to join the ranks of the middle classes by 2030 the world’s material demands will increase. Alongside this, the basket of materials on which modern manufacturing depends is becoming more diverse and the supply of these materials has been increasingly politicised. Environmental constraints are expected to have an increasingly profound impact on the ability to extract raw materials.

Some of our largest manufacturers in the UK are already forging ahead with remanufacturing and other sophisticated business models that will deliver a step change in efficiency and resource productivity. However these excellent initiatives have so far failed to secure the attention and support needed from policy makers.

We need a policy framework in place that encourages and supports businesses to drive efficiency through their business models. To date there has been a real lack of vision and ambition and arguably a lack of foresight in identifying the challenges that lie ahead. Other strong manufacturing nations, such as Germany, the US, Japan and South Korea, have grasped the nettle and are preparing themselves. It is now time for the UK to pick up the mantle.

I am delighted to see that the focus of the Commission is on productivity and efficiency as a means of improving resilience and bolstering growth. The recognition in the report of the role of these business models in the future portfolio of UK manufacturing activity is very welcome.

Co-ordinated government action and support is an essential ingredient. As a first step we need to see waste redefined, both legally and as a business issue, by moving responsibility for waste policy to the Department for Business Innovation and Skills. Focusing on remanufacturing as a discrete sector will enable a fresh focus on the market barriers and regulation that is restricting its growth and help to focus innovation and support where it is needed. Moreover, we want to see a new financial incentive to encourage more investment in this area, driving further efficiencies and potentially providing help to shield companies from the price volatility in input costs they have experienced in recent years.

We have for many years called on government to demonstrate greater leadership in developing a more ambitious and informed vision of resources – its supply, its husbandry and efficiency in its use. By setting the framework conditions, government can unlock infrastructure and services that will be needed in an ever more resource constrained world. Today’s report is a positive step towards achieving this.

Terry Scuoler – CEO of EEF, the Manufacturer’s Organisation
Executive Summary

This report proposes a series of policies that can enhance our economy and increase its resilience, productivity and efficiency in the face of an ever changing and increasingly challenging global economy. The 21st century global race will not be won by those whose economic model was cast in the 19th century. Instead, it is the resource aware, efficiency focused and productivity driven economies that will set the new standard by which competitiveness will be judged. The UK has a long way to go to match our most efficient competitors – Japan; Germany; and China.

Key Findings

• **Focus on Profitability Crucial:** Currently there is no measurement of profitability, or any focused support to increase profitability within the economy – the words ‘profit’ or ‘profitability’ are not mentioned ONCE in the BIS corporate plan.

  How do we improve profitability? Improve margins, be more productive, and reduce volatility

• **Focus on Resource Productivity:** We focus on labour productivity, but have no interest in resource productivity – despite the fact that it is 2/3rd of the overall input cost of manufacturing.

• **Resource Insecurity Impacting Manufacturers:** Resource insecurity is one of the greatest concerns of some of our largest manufacturing companies.

  To become highly resource productive we should focus on a new business sector

• **‘ReMade in Britain’** : Significant improvement in resource productivity would offer the added opportunity to kick start a new industry sector – Remanufacturing/ reprocessing/ reengineering. ‘ReMade in Britain’ as a business sector could easily grow to return an extra £5bn per annum in profits for manufacturers and create thousands of jobs, with blue chip companies at the heart of the growth

• **Redefinition of Waste:** Business regards waste as a resource and if moved from DEFRA to BIS it would be viewed as an opportunity not a liability, creating new ideas and new businesses

“Declining productivity hits competitiveness and makes it harder for the UK to export its way back to growth. If low productivity is here to stay the UK has a long term growth problem. Understanding the causes of the productivity conundrum is vital to gauging the UK’s growth potential.”

Ian Stewart, Deloitte’s Chief Economist

“Declining productivity hits competitiveness and makes it harder for the UK to export its way back to growth. If low productivity is here to stay the UK has a long term growth problem. Understanding the causes of the productivity conundrum is vital to gauging the UK’s growth potential.”

Ian Stewart, Deloitte’s Chief Economist
Key Recommendations

Profitability Recommendations
Establish Profitability Metrics
The Government needs to measure the profitability of the economy, and not solely base decisions on top line growth metrics.

BIS Profitability Unit
We must focus on supporting companies to achieve higher margins.

Productivity Recommendations
Establish Resource Productivity and Efficiency Metrics
We need to stop using labour productivity as a proxy for total factor productivity and start to report resource productivity more effectively.

Demand Reduction
The Government should support the formation of demand reduction policies, which would drive greater utilisation of resources and reduce the exposure of businesses to expensive resources.

Extension of Enhanced Capital Allowances from energy to resource efficiency measures
The Government should extend the existing ECA scheme to resource efficiency and productivity measures and equipment, rename it the Efficiency and Productivity Allowance and publicise it far more extensively.

Resource Security Recommendations
‘Remade in Britain’: A New Business Sector
Government needs to recognise the reuse and remanufacturing sectors as important commercial opportunities. By redefining waste as a business opportunity, a new stream of exciting businesses will emerge.

Relocate the Policy of Waste
‘Waste’ as a government policy area should be renamed ‘resources’ and moved from DEFRA to BIS.

Council Tax Payer “Pay-Back”
Local Authorities who retrieve and resell their waste effectively could offer the taxpayer a rebate. This could incentivise increased, better-quality and targeted recycling, providing reprocessors with greater retrieval options for their desired recyclate and a more secure “feed stock”.

Landfill Bans
The UK spends £1 billion a year in landfill costs just to dispose of plastics, wood, textiles and food - and in the process destroys these valuable commodities. If a landfill ban was introduced just on these products and materials, £1 billion worth of costs would be avoided and a further £2.5 billion of value would be recovered for reuse.
Introduction

This report proposes a series of policies that can enhance our economy and increase its resilience, productivity and efficiency in the face of an ever changing and increasingly challenging global economy. As we emerge from a global economic downturn that has impacted developed countries more significantly than most emerging economies it is crucial that we examine the economic models that we have employed in the past and question whether they are appropriate or desirable for the future. The 21st century global race will not be won by those whose economic model was cast in the 19th century. Instead, it is the resource aware, efficiency focused and productivity driven economies that will set the new standard by which competitiveness will be judged.

Facing greater global labour cost convergence, as well as higher and fluctuating resource costs, developed economies will have to compete with more aggressive economies which are less encumbered by old-fashioned economic models and inefficient resource processes. If we are to compete in the 2020s we need to be smarter than our competitors, adopting policies to build a modern, progressive and resource efficient economy.

Greater global competition will demand higher corporate competitiveness, as well as a much greater focus on productivity and efficiency throughout our infrastructure. The direct and indirect costs of doing business in a country, including all the externalities a company faces, will be assessed by the most competitive and innovation focussed businesses. Those countries that are not top performers in delivering a 360 degree efficient and resilient infrastructure will find their attractiveness to inward investors significantly reduced.

This Commission has aimed to provocatively question existing economic norms, metrics and business approaches. It is proposing that if we are to meet the challenges of the mid 21st century, we must at the very least ensure that new thinking sits alongside the older approaches to measuring economic prosperity and resilience. While we considered very radical proposals, such as transferring taxation from labour to resources, as advocated by Professor Walter Stahel, the Commission has instead made a series of recommendations that are incremental and practical to implement and that take us to the first stage of building the modern and resilient economy we need.

We have divided the document into three sections:

1. **Profitability**
   - Why do we not measure it?
   - Why is it never discussed or considered?

2. **Productivity**
   - Why do we only think of labour productivity?
   - Resource productivity could deliver a significant increase in profits.

3. **Resource Security**
   - ‘ReMade in Britain’ – Why do we not double our efforts and our profits by focusing on the remanufacturing and reprocessing sector?

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Section 1: Profitability as a Core Economic Metric

As high increases in GDP become more elusive for developed countries, British businesses will need to increase margins, ‘sweat’ their assets and drive up profits.

In a world that is becoming increasingly competitive our analysis of the economy needs to be more sophisticated, nuanced and informative. The metrics that we use need to help us manage the present and inform the strategies of the future: driving greater profitability; increasing resource efficiency and productivity; and significantly improving margins.

For those of us who come from a business background, it is always surprising that government rarely considers the profitability of the UK economy. Currently the vast majority of political discourse and macroeconomic analysis centres on GDP, but a business would never focus on the top line and ignore the bottom line – businesses focus on profit rather than turnover for good reason.

In the commercial world and across the economy ‘margin’ and ‘profitability’ are given equal consideration to ‘sales’, yet this is not reflected in public policy discourse. As UK policymakers do not currently focus on profitability, there are few policies in place that truly support margin enhancement. This is illustrated by the fact that there is no mention of the words ‘profit’ or ‘profitability’ in BIS’ Business Plan.³

While the Office for National Statistics (ONS) does assess the UK’s profitability,⁴ it only surveys 1,650 companies – a sample size which is far too small from which to extrapolate any meaningful information at anything other than the most aggregated, general level.


Profitability Recommendations

Recommendation One

Establish Profitability Metrics

The Government needs to measure the profitability of the economy, and not solely base decisions on top line growth metrics.

Profitability metrics would provide a foundation for more sophisticated policies related to driving greater resource productivity, improving margins, assessing embedded value and incentivising high quality growth.

Important metrics that would emerge from profitability would include ‘good’ and ‘bad’ consumption.

As we move away from a binary ‘GDP economy’ to a more subtle and modern economy, we can start developing metrics that can help differentiate from good and ‘less good’ GDP.

For example:

- **Value to the UK economy of a ‘Unit of Energy Saved’**
  This may show reduced GDP, but enhanced profitability to UK PLC. In addition, the total of the fully loaded costs saved by a lack of certain types of growth could also be significant. Funds that would have been spent on associated infrastructure, distribution, balance of payments, carbon emissions, volatility and hedging mechanisms could then be invested in alternative projects.

- **Value to the UK economy of a ‘Unit of Waste Remade’**
  The remanufacturing ‘waste’ sector currently turns over £5 billion per annum – this has the potential to be increased by a factor of 10, therefore increasing its percentage of total manufacturing turnover from the current 1% to 10%. Moving to a more circular UK economy has the potential to increase the UK’s net exports by more than £20 billion and reduce business costs by over £50 billion a year, so the reuse of resources can enhance economic profitability, while lowering balance of payments deficits and expensive externalities.

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Recommendation Two

Build Profitability Strategies to support UK businesses

Once the profitability metrics are in place, a series of strategies can be implemented to promote greater economic profitability, incentivise efficiencies, and reduce barriers to increasing margins across the economy.

**BIS Profitability Unit:** We need to take strong leadership to drive greater profitability in the UK. This could be done by establishing a unit within BIS which could cross-cut the economy and promote profitability and margin enhancement.

The establishment of a ‘Profitability Unit’ should become a priority for BIS – currently the words ‘profit’ or ‘profitability’ are not mentioned once in its Business Plan. The government ought to ensure that businesses are aware of all the profit maximising opportunities available to them and are given the tools necessary to access these opportunities on a business wide and sector specific basis.

This Commission would also recommend that the Unit had a particular focus on SMEs in the UK. SMEs are huge generators of growth in our economy and major employers and we should be ensuring that they have every support that they need. An SME ‘Profitability Initiative’, managed by the Profitability Unit, could specifically focus on measures that would help drive down on their costs and increase SME efficiency.

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Section 2:
Putting Resource Productivity and Security on the Map

By becoming more resource efficient manufacturers could increase their profits by 12% every year.⁸

As part of our need to increase our economic competitiveness, resource efficiency and productivity will play a key role in driving higher margins, particularly in the context of the global race.

There are three dimensions, all interrelated, that require new policy priorities reflecting the challenges of a competitive global market place:

- Wider focus on total productivity;
- Enhanced support and incentives around efficiency;
- Greater focus on resource security.

Resource Insecurity: Rising Prices and Increasing Volatility

During the 20th century progressively cheaper resources underpinned global economic growth. Whilst demand for energy, food, water and materials grew, this was offset by expanding their supply and increases in labour productivity.⁹

However this era appears to have come to an end. As McKinsey¹⁰ state in their seminal report, “the past decade has reversed a 100-year decline in resource prices as demand for commodities has surged. With the exception of energy in the 1970s, the volatility of resource prices is at an all-time high”. Both McKinsey¹¹ and Chatham House¹² agree that while brief periods of volatility are not uncommon, the sustained high levels of volatility across commodity markets since the beginning of the 21st century mark a new trend.

Analysts are highlighting that resources should become the focus for greater efficiencies for several important reasons:

- Global demand is growing significantly, driving up the costs and demand for resources;
- Accessing certain resources¹³ will expose business models to much greater volatility and insecurity than labour costs;
- Due to a rise in “resource nationalism”, resources are becoming much more politicised and access has started to become used as a political tool in some producer countries.¹⁴

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¹³ For the EU’s list of Critical Raw Materials see Appendix 2.
The Institute of Actuaries painted an even bleaker picture in 2013. Using standard modelling techniques, it concluded that resource constraints will, at best, increase energy and commodity prices over the next century and, at worst, create an uncertain and unstable economy. Tom Delay, the Chief Executive of the Carbon Trust, agrees, arguing that the use of our increasingly scarce natural resources presents the most “fundamental risk” to the stability and success of our economy.

In addition, there will be a greater focus in developing countries on resource efficiency, husbandry and security, as they aim for greater income convergence. China, for example, aims to increase incomes in rural areas by 40% as part of its economic remodelling; an essential step if China is to remain politically stable. This will be matched by a greater focus on resource efficiency, husbandry and security by those countries that need to maintain their competitiveness as they manage their labour forces up the ‘value food chain’.

**Worldwide production concentration of critical resources**

Driving Competitiveness From Both Ends: Inputs and Outputs

The UK has a long way to go to become as resource efficient as the world leaders in this field, but there are some easy wins that would deliver immediate bottom line benefits to UK plc. Lavery and Pennell point out that the UK economy has spent 40 years focused on efficiency in the labour market, but has not made the same degree of progress on resource efficiency, unlike our international competitors.
By focusing on government policies that help businesses bear down on resource input costs, new efficient processes will be generated and new technologies and innovations will emerge – including ensuring that resource efficiency is ‘designed in’ to our products and services. If successful, the reward for British businesses will be to increase competitiveness on a global scale, grow profitability and return greater value to shareholders.\(^{21}\)

As Table 1 illustrates, labour costs in the UK manufacturing sector represent just a quarter of non-labour costs.\(^{22}\) All the metrics that are widely used, all central policy formulation, and the resulting legislation, is focussed on labour productivity and measures to increase labour flexibility. While an important factor, pushing labour efficiency to the extreme in the manufacturing sector, rather than balancing it with an equal focus on resource productivity, risks ignoring an important element of productivity that could have a very positive impact on the economy and society.

Bearing down on resource inputs has a positive multiplier impact on the wider economy in terms of balance of payments and greater liquidity. While companies must always remain free to make their own judgements on how to enhance their productivity, government can, and should, distinguish between desirable and less desirable corporate actions. It is therefore perverse that governments have favoured promoting policies around labour productivity, without also encouraging ever increasing resource productivity as well.

**Table 1: Difference between labour and non-labour costs**\(^{23}\)

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\(^{21}\) Osmosis Investment Management (MoRE UK), 2013. http://www.osmosisim.com/

\(^{22}\) Lavery, Pennell et al, 2013. Next Manufacturing Revolution.

‘Sweating our Assets’ – Productivity and Efficiency Across the UK Economy

Productivity Recommendations

Greater resource productivity offers UK businesses, and in particular the manufacturing sector, an easy ‘win’. There are many pathways to greater productivity, but currently we have virtually no policies driving resource productivity. This situation needs to be rectified.

Recommendation Three

Establish Resource Productivity and Efficiency Metrics

We need to stop using labour productivity as a proxy for total factor productivity and start to report resource productivity more effectively. Currently ‘resource productivity’ is crudely measured by Eurostat. This is not adequate and is regarded by many key commentators as “nonsense” – Global Environmental Change believes that these results could be ‘out’ by “up to 200%”.

The Government has also previously acknowledged the dangers of not having proper metrics to measure the nation’s resource efficiency. In 2009 the UK Government stated in an EU survey that it was lacking “indicators” and a way to measure “resource efficiency”. To rectify this problem British resource efficiency and productivity metrics should be established.

Recommendation Four

Capacity Market Demand Reduction Enhancement

The Government should support the formation of demand reduction policies, which would drive greater utilisation of resources and support the exposure of businesses to expensive resources. Demand reduction measures are being introduced into the energy capacity market and, in principle, could be extended into the water sector. These measures will start to build greater managerial and technical expertise around efficiency and productivity in these sectors.

Recommendation Five

Extension of Enhanced Capital Allowances from energy to resource efficiency measures

The Government should extend the existing ECA scheme to resource efficiency and productivity measures and equipment. It should be renamed the Efficiency and Productivity Allowance and be much more extensively publicised.

Tata Steel, a world leader in a highly energy-intensive industry, regards the reform of Enhanced Capital Allowances as “fundamental”. They make the case that ECAs do not cater for the inevitably more bespoke investments that need to be made by big, energy-intensive, industries.

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The ‘Top Runner Program’
Japan has “stimulating continuous improvement” in energy efficiency and has established itself as a world leader in this field, through the ‘Top Runner Program’. This sets the energy efficiency standards of 21 major products by making the most efficient product the baseline standard every five to six years, forcing its competitors to become more efficient. This program alone is estimated to have reduced Japanese household energy consumption by 11%.

German Resource Efficiency Initiative
This initiative highlights resource efficiency as a business opportunity and helps companies realise resource efficiency opportunities. This has contributed to German industry becoming 40% more resource efficient since 1998.

Royal Society of Chemistry, 2013

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26 Tata Steel, 2013. Personal Communications.
Section 3: ‘Sweating Our Assets’ – ReMade In Britain

The Prize: Increase in sales of remanufactured products by a factor of 10,\(^{27}\) at a reduced overall cost; the creation of new secondary markets for British businesses; and £3 billion savings in landfill.\(^{28}\)

If we are to take competiveness and productivity seriously across our economy we need to go beyond just measuring and improving our resource productivity – we also need to ‘sweat’ our resources more aggressively.

Currently the UK is not extracting the full value from the resources it currently uses. The potential gains from innovative methods of reuse, remanufacture and demand reduction are not recognised in the UK as an opportunity, unlike in other countries.\(^{29}\) Business sectors such as reprocessing and remanufacturing are less developed than the equivalent markets in Japan.\(^{30}\) Good work is being done, by organisations like WRAP and the Technology Strategy Board, but much more is needed. If we are going to remain competitive in the 21st century, we need to catch up with the world leaders in maximising the value and life of our resources.

The gains are potentially significant:

- £5 billion of additional profits per annum for manufacturers.\(^{31}\)
- Over 300,000 new jobs in the remanufacturing sector.\(^{32}\)
- Improving our balance of payments by £20 billion by 2020\(^{33}\) as a large percentage of finite resources are imported.
- £3 billion in savings from avoiding landfill costs and retaining resource value.\(^{34}\)

If the UK is going to succeed in benefiting from these potential gains there needs to be a significant policy focus on how to extract total life value from resources.

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\(^{28}\) Green Alliance, 2013. Why we need landfill bans.

\(^{29}\) Lavery, Pennell et al, 2013. Next Manufacturing Revolution.


\(^{33}\) ESA, 2013. Going for Growth.

\(^{34}\) Green Alliance, 2013. Why we need landfill bans.
‘Sweating our Assets’ – Productivity and Efficiency Across the UK Economy

The 4 ‘Rs’
Replace
• Replacing expensive or rare resources with cheaper and more accessible ones.
Reduce
• Dematerialisation.
• Shared Ownership.
• Service.
Reuse
• Lifetime extension.
• Simple reuse.
• Repair.
• Remanufacturing.
• Leasing schemes – as pioneered by Rolls Royce.
Recycle
• As well as preserving valuable resources that could be used again, this would also save on landfill costs.

Chinese Economic Plans
The 18th Party Congress stated that “eco-civilisation” needs to be established by putting in place policies to “conserve resources”. This has become a key principle of China’s economic plan.

‘Sweat the Asset’: ReMade in Britain
To take resource productivity to the next level we must realise that resources have an afterlife. There are huge opportunities to grow further a new UK business sector, as well as improving existing companies margins, by adopting the 4 “R’s”. Replace, Reduce, Reuse and Recycling.35 This is a whole new industry sector based on enhanced resource husbandry that should be called “Remade in Britain”.

There are several leading companies that are already at the cutting edge of remanufacturing and reuse such as Rolls Royce, Caterpillar, Xerox and The Berkeley Group. However in public policy circles, used resources are still largely regarded as waste. Waste is typically treated as having a negative value and recycling is being driven by an environmental agenda, rather than as a business opportunity that can drive higher profits for UK businesses.

If we are going to be both entrepreneurial and build greater resource resilience in our economy we can and should be ‘sweating’ much more value out of ‘waste’. Other nations are leading the way and we run the risk of falling behind – in Japan the circular economy and low carbon sector was worth £128.1 billion in 2011/12 alone.36

Waste reuse is one of the largest prizes in the resource productivity and efficiency paradigm – reducing inputs and then reusing inputs that otherwise would have cost money to dispose of. Value enhancement through life extension and new business sector developments are really exciting and a great opportunity for the UK.

ReMade in Britain: An Industrial Policy
The UK has the opportunity to build a strong business sector in remanufacturing and reuse. However there needs to be some readjustment in how government views and values the waste sector. There are central policy areas that could deliver real added value to UK plc.

**Resource Security Recommendations**

**Recommendation Six**  
**Redefinition of Waste**

As the legislation and regulations around the definition of waste outdate the modern remanufacturing sector by many years our leading remanufacturing companies are being unnecessarily constrained. Legislation defines waste as “…any substance or object which the holder discards or intends or is required to discard…” and has been used for over three decades.

Once a substance or object becomes waste, some reprocessing is normally required for it to cease to be waste. Depending on the circumstances, this can vary from something relatively minor to quite extensive processing. Establishing that a material is no longer a waste is increasingly important to many UK businesses as it allows them to transparently turn waste directly into valuable products, without an interim step, and exploit new business opportunities in the UK and abroad.

Good progress has been made in the UK, in conjunction with the EU, on protocols but more needs to be done to improve regulation around greater utilisation of waste, reducing regulatory barriers, and other barriers, to reuse. The UK should recommend that the 2008 Waste Framework Directive is reformed in order to recognise the significant progress that has been made in the remanufacturing sector and in the developments of new markets for ‘waste’ materials.

**Recommendation Seven**  
**Relocate the Policy of Waste**

‘Waste’ as a government policy area should be renamed ‘resources’ and moved from DEFRA to BIS. From BIS it could be given strong sectoral support as a commercial opportunity.

DEFRA will only ever look at waste from an environmental point of view but, while environmental considerations are extremely important, reusing, remanufacturing, recycling and reducing landfill use will only be encouraged if waste is seen as an economic opportunity.

This would also alleviate the longstanding conflict of interest faced by DEFRA around the regulatory response for a potential business sector.

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**Carbon dioxide Capture and Utilisation (CCU)**

CCU is not being pursued as energetically as it should be as the current focus is on Carbon Capture and Storage (CCS). CCS is very expensive in both capital and operational costs. Many governments are now reducing or even abandoning CCS projects.

Rather than treating CO2 as a waste which is expensive to dispose of, carbon dioxide could be utilised to create a vast array of consumer chemicals including:

- Polymers (polyurethanes, polycarbonates, etc.)
- Mineralisation (cement manufacture, clinker, construction materials)
- Fuels (methanol, kerosene, diesel).

In the case of fuels, integration with renewable power sources will allow us to store energy in manageable forms such as liquids or gases.

*Professor Peter Styring, University of Sheffield*

“[There will be an] 80% rise in steel demand from 2010 to 2030.”

*McKinsey, 2012*

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38. WRAP, 2013.
Recommendation Eight

‘Remade in Britain’: A New Business Sector

Government needs to recognise the reuse and remanufacturing sectors as important commercial opportunities. This is a sector offering real growth potential, domestically and internationally.

By redefining waste as a business opportunity, a new stream of exciting businesses will emerge. There are numerous examples of world leading businesses – from Caterpillar to Kingfisher – who are already extremely innovative remanufacturers, but the sector needs more support in terms of sharing best practice and identifying international best in class.

Recommendation Nine

Securing the supply: Consumerising the Value of Waste

One of the biggest challenges to the remanufacturing sector is the secure access to the supply of specified waste. With a sector that is embryonic, the supply of the required ‘waste’ in the quantities, condition and segregation required sometimes creates commercial insecurity.

However the UK unnecessarily disposes of goods worth £2.5bn every year. Harnessing this unnecessary waste of resources would not just benefit our businesses, but councils and consumers too: reduced landfill and retrieval costs plus enhanced revenue return for some ‘waste’ products. This is not necessarily a new idea, in some ways it is the modernisation of traditional practices – a ‘rag and bone’ system for the 21st century.

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40 Green Alliance, 2013. Why we need landfill bans.
Council Tax Payer “Pay-Back”

Local Authorities who retrieve and resell their waste effectively could offer the taxpayer a rebate. This could incentivise increased, better-quality and targeted recycling, providing reprocessors with greater retrieval options for their desired recyclate.

Greater sharing of recycling ‘best practice’ across different Local Authorities could help to ensure recycling rates are constant throughout the UK, but as a further incentive to bring waste ‘to life’ councils could focus on key products that are in particular demand by introducing ‘Rubbish of the Month’ campaigns. These would directly reward households for recycling certain products or components. This would also boost supply chain certainty as the amount of goods available for remanufacture would increase, as well as offering some financial return to householders.

Reusing Asbestos – Thermal Recycling

UK Case Study

In the UK, asbestos that is legally disposed of currently has to go to landfill. Thermal Recycling UK aims to provide an alternative solution by recycling asbestos and converting the toxic waste into a functional product, whilst simultaneously creating jobs in areas that need them.

Their recycling process will supply silicate aggregates at market prices as the natural end-product post-process to both national operators and local companies for use in their aggregates market.

“By focusing on “reducing, reusing and recycling”, Imperial Tobacco have reduced their waste in 3 key areas and therefore made efficiency savings worth by £7.5 million per annum.”

Osmosis, 2013
Recommendation Ten

Landfill Bans

Currently certain products with valuable components, including mobiles, are being diverted from landfill by legislation. This legislation has improved collection and processing systems, and helped to recover the resources, such as indium, gold and cobalt, which are worth more than £6000 per tonne. The UK spends £1 billion a year in landfill costs just to dispose of plastics, wood, textiles and food – and in the process destroys these valuable commodities.\(^41\) If a landfill ban was introduced just on these products and materials, £1 billion worth of costs would be avoided and a further “£2.5 billion [of] value” would be recovered.\(^42\) The Ellen MacArthur Foundation estimates that the UK could save £676 million per year in landfill costs just by keeping the food alone out of landfills.\(^43\)

Table 2: Value recovered and saved from extending landfill bans\(^44\)

<table>
<thead>
<tr>
<th>Material</th>
<th>Value Recovered</th>
<th>Value Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>£229m</td>
<td>£79m</td>
</tr>
<tr>
<td>Plastics</td>
<td>£1,083m</td>
<td>£363m</td>
</tr>
<tr>
<td>Textiles</td>
<td>£646m</td>
<td>£181m</td>
</tr>
<tr>
<td>Food</td>
<td>£693m</td>
<td>£508m</td>
</tr>
</tbody>
</table>

This is how much we would gain per year:

\[
\text{Value recovered} = \text{£2.5bn} \\
\text{Avoided landfill costs} = \text{£1bn}
\]

\(^{41}\) Green Alliance, 2013. Why we need landfill bans, p. 2.  
\(^{42}\) Green Alliance, 2013. Why we need landfill bans, p. 5.  
\(^{43}\) Ellen MacArthur Foundation. Towards the Circular Economy 1, pg. 7.  
\(^{44}\) Green Alliance, 2013. Why we need landfill bans.
Conclusion

As the global criteria used to assess economic competitiveness becomes more sophisticated, we must start distinguishing between productivity that creates a more resilient macro-economy, and one that merely focuses on productivity in terms of unqualified top-line growth and output per man hours used, regardless of other profit made, margins enhanced and resources used.

We need to drive greater value from the resources that we utilise and ensure that we are using them effectively to modernise our economy – after all, the industrial revolution was not because of mining coal, but because we used that resource to “deliver higher value products and services”. 45 We must do the same again.

Moreover, supply chain requirements for resources will expose UK business to higher resource prices and increases in price volatility. Geopolitical factors present an additional set of risks and potential vulnerabilities, with a predicted 3 billion more middle class consumers entering the market by 2030, 46 therefore hugely increasing global consumption. This is prompting concern amongst business about the UK’s vulnerabilities: UK manufacturers have consistently highlighted that high material prices and security of supply is a threat to growth. 47

Table 3: Resource related options for business 48

There are several resource-related value-creation levers for businesses

SOURCE: McKinsey analysis

45 Wrigley, (2013), cited in Wallace et al, Material Efficiency: providing materials services with less material production.


Coca-Cola Case Study
Coca-Cola Enterprises have pledged to reduce the amount of material they use for packaging by 25% by 2020. 95% of their packaging is easily recyclable and their PET bottles include 25% recycled PET (rPET), making them the largest user of recycled plastic bottles and cans in the UK.

In 2012 they opened, in partnership with Eco-Plastics, the Continuum Plastics reprocessing site in Lincolnshire. This was a £5 million investment which has now developed the world’s largest and most sophisticated plastic bottle reprocessing plant. It has more than doubled the total amount of rPET reprocessed in the whole of this country. This direct investment in the market has not only given a security of supply, but also delivered a significant improvement in this country’s waste management infrastructure.

Rising commodity prices increase manufacturers’ input costs, impacting the cost of living, as we have already seen with the rise in food prices. Volatility is equally as damaging as it can dampen economic growth by increasing uncertainty and the cost of capital, which may discourage businesses from investing, or prompt them to delay investment, increasing the cost of hedging against resource related risk.\(^{49}\) This has an amplified impact on SMEs.

While the UK is not the worst OECD country in this area, there are a lot of potential improvements, as Table 4 highlights.

**Table 4: International comparisons of the policy responses to resource security risks\(^ {50}\)**

<table>
<thead>
<tr>
<th></th>
<th>R&amp;D</th>
<th>Fiscal measures</th>
<th>Stockpiling</th>
<th>Information provision</th>
<th>Resource efficiency</th>
<th>Enhanced cross government focus</th>
<th>Diplomacy</th>
<th>Recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>US</td>
<td>X</td>
<td>X</td>
<td>Defence</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Japan</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td>China</td>
<td>X</td>
<td>X</td>
<td>Defence</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>UK</td>
<td>£200k</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

This report has outlined a number of the central challenges our economy faces, and has begun to suggest ways in which they can be addressed. Our recommendations are not the final solutions – in many ways they open up more questions about the future. However they do begin to lay the basis for the modern economy we need in the 21st century – a more resilient, profitable and productive economy that would greatly improve our competitiveness.

\(^{49}\) McKinsey & Company (2012) Resource Revolution: Meeting the world’s energy, material, food and water needs.

Appendix 1: Stakeholders and Advisors

Roundtable 1 – Key academic experts from the University of Oxford
Prof Sir John Beddington – Chief Government Scientific Adviser 2008-2013
Prof Charles Godfray – Chair of the Lead Expert Group of the Foresight Report, member of NERC Council
Prof Lord John Krebs – President of the British Science Association, previously Chief Executive of the Natural Environment Research Council
Prof Myles Allan – Head of Climate Dynamics at Oxford University
Prof Sir Chris Llewellyn-Smith – Physicist, previously Director General of CERN
Prof Alex Rogers – Professor of Conservation Biology, currently a Commissioner for the International Commission on Land Use Change
Prof Robert Hahn – Director of Economics and a Professor at the Smith School of Enterprise and the Environment, University of Oxford; previous Executive Director of the Sustainable Consumption Institute at the University of Manchester

Roundtable 2 – “Resource vulnerabilities to supply chain”

Attendees
• Angela Knight – Chief Executive, Energy UK
• Jacob Tompkins – Director, Waterwise
• David Workman – Chief Executive, Confederation of Paper Industries
• Tom Burke – Founding Director, E3G
• Simon van der Byl – Executive Director, Mineral Products Association
• Andrew Clifton – Manager of Sustainable Development, Rolls Royce
• Susanne Baker – Senior Climate & Environment Policy Adviser

Roundtable 3 – “Opportunities that greater efficiency and resource husbandry can offer”

Attendees
• Dr Greg Lavery – Lavery Pennell
• Liz Goodwin – Chief Executive, WRAP
• Dick Searle – Packaging Federation
• Dr David Gardner – Deputy Director, Environmental Sustainability Knowledge Transfer Network
• Professor Roland Clift – University of Surrey, Professor of Environmental Technology
• Martin Baxter – Director of Policy, Institute of Environmental Management and Assessment
• Andy Doran – Chairman of Novelis Europe
• Dr. Mike Pitts – Sustainability Lead, Technology Strategy Board
• Matt J. Bulley – Managing Director, Caterpillar Reman
• Matthew Spencer – Green Alliance
• Matthew Farrow – Director of Policy, Environmental Services Association
• Susanne Baker – Senior Climate & Environment Policy Adviser

Roundtable 4 – “Economic assessment of potential financial gains for resource productivity”

Attendees
• Julian Morgan – Chief Economist, Green Alliance
• Jacob Hayler – Senior Economist, Environmental Services Association
• Jenni Staves – British Glass’ Environmental Manager
• Susanne Baker – Senior Climate & Environment Policy Adviser
Appendix 2: Critical Raw Materials

List of raw materials that the European Union\textsuperscript{51} regards as ‘critical’ as they are crucial to manufacturing in Europe, but their supply chains are under threat due to increased demand and rarity.

- Antimony
- Beryllium
- Cobalt
- Fluorspar
- Gallium
- Germanium
- Graphite
- Indium
- Magnesium
- Niobium
- PGMs (Platinum Group Metals)
- Rare earths
- Tantalum
- Tungsten

The Platinum Group Metals (PGMs) comprises platinum, palladium, iridium, rhodium, ruthenium and osmium. Rare earths include yttrium, scandium, and the so-called lanthanides (lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium).

\textsuperscript{51} European Commission, 2010. Critical raw materials for the EU