

A practical path to

RESOURCE EFFICIENCY

November 2013

Transforming the way we think about resources

Sustainability has been on the board agenda for forward thinking businesses for some years. Even in the current difficult economic climate, sustainable resource use is really gaining traction. Leading organisations are increasingly asking themselves 'how can we make better use of our resources?' and concepts like 'the circular economy', 'closed loop' and 'cradle to cradle' are becoming second nature. These are not just buzzwords, they represent a shift in thinking and a realisation that there is real potential for economic growth based on these more sustainable business models.

There is potentially a huge prize for those who embrace the resource efficiency agenda. A recent study by the Waste and Resources Action Programme (WRAP) found that across the EU, there could be £330 billion economic growth potential from resource efficiency in just the next seven years.

"In the UK alone, we know that it would have a transforming effect. By 2020, we could be reliant on 30 million tonnes fewer material inputs into the economy, we would decrease the amount of waste we're creating by 20% and we could be recycling 40 million tonnes of materials back into the economy."

Liz Goodwin, Chief Executive, WRAP

There are inevitable risks associated with this agenda and companies need to be aware of these if they want to remain economically and environmentally sustainable in the future. Growing demand for products from increasing populations and rising living standards is fuelling price volatility and resource scarcity. This, in turn, is leading to increasing political and trade tensions, rising costs and more frequent incidences of supply chain disruption. In addition, a failure to produce or consume products efficiently means that this growth is also resulting in the generation of significant amounts of avoidable waste.

This scale of consumption and waste generation is unsustainable. There is increasing evidence to suggest that the era of cheap and plentiful resources is over and that we are now facing a significant resource crunch.



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Foreword

At LRS Consultancy and Burges Salmon, we believe that the efficient use of materials and energy is fundamental to helping organisations respond to today's market challenges such as maintaining profitability, ensuring supply chain resilience and maximising the environmental and social sustainability of operations.

There is mounting evidence, from our own work and from the work of others, that resource efficiency is becoming a fundamental business driver. Many leading organisations now consider this to be integral to their corporate strategy. They are actively seeking ways to use fewer and more appropriate resources to create and deliver a given product or service and to keep those resources in use for longer around the whole supply chain.

Yet, there still appears to be a disconnect between the substantial benefits being attributed to resource efficiency and the progress being made by individual businesses. In order to help address this, we have developed this report to showcase examples of how organisations are successfully improving their resource efficiency in terms of material and energy use. The report also provides practical guidance for companies looking to increase their resource efficiency and protect themselves against resource related supply chain risks.

What does resource efficiency look like?

There is no 'one size fits all' solution in terms of 'good' resource efficiency and this is part of the challenge in terms of the identification and implementation of resource efficiency initiatives.

Many organisations have made huge progress in improving their own resource use by embracing initiatives such as lightweighting, recycling, product backhauling and energy efficiency programmes. However, such activities tend to concentrate on internal improvement opportunities. As a result, many of the resource inefficiencies that occur when products are transferred between organisations or that are due to decisions taken in other parts of an organisation's supply chain are often not identified, let alone tackled. Similarly, opportunities to generate additional revenue, for example by selling off-cuts or by-products to other companies, or using such resources from other companies, also go unnoticed.

Fully circular or closed loop supply chains are often seen as the ideal model in terms of resource efficiency. However, they are only applicable in certain circumstances. While the adoption of these supply chain models need not be limited to a few well-funded and pioneering organisations, they can require significant effort, time and investment to set up and maintain. In many cases, less complex and lower cost approaches to improving resource efficiency can deliver huge benefits across the supply chain within relatively short timeframes. Analysis from the Department for Environment, Food & Rural Affairs (Defra) indicates that UK businesses could save up to £23 billion each year through low cost or no cost improvements in the efficient use of resources.

Case Study 1: Fortune Cookies

A Dutch manufacturer of specialist biscuits has recently been able to turn a process waste into a small, but growing revenue stream. During the biscuit manufacturing process, after the baking oven, the company trims off the outer edge of the biscuit in order to deliver a consistent unit size. For years the company disposed of this off-cut through a traditional waste management route. However, after researching potential uses of the by-product they have secured a long term supply agreement to provide sprinkles into a well-known fast food chain, which uses them in its ice cream and smoothie based desserts. From being a cost, the company now recovers several hundred thousand pounds of sales revenue.

Case Study 2: Green Tomatoes

British Sugar's award-winning horticulture business produces around 140 million 'eco-friendly' tomatoes each year at Cornerways Nursery. A quarter of a million plants are grown in the UK's largest single tomato glasshouse, which covers an area of 18 hectares.

Cornerways Nursery benefits from its location close to the Wisington sugar factory. More than two hundred and forty miles of piping carries hot water from the factory's Combined Heat and Power (CHP) plant around the glasshouse, to maintain the balmy temperatures which suit tomato plants. This hot water would otherwise be destined for cooling towers, so the scheme ensures that the heat is used productively.

Another benefit is the productive use of waste carbon dioxide from the sugar factory, which tomatoes use during photosynthesis. At Cornerways, carbon dioxide (a by-product from the CHP boiler) is pumped into the enormous glasshouse to be absorbed by the plants, rather than vented into the atmosphere as waste emissions.

Key to creating a more resource efficient business community within the UK is the ability to move away from traditional material and energy intensive supply chains. It is about adapting and adopting supply chain models, where the focus on resource efficiency extends well outside an organisation's own four walls, where links between the various elements of the supply chain are much tighter and where waste is seen as a valuable resource rather than something to dispose of as cheaply as possible.

In an increasingly resource constrained world, resource efficiency is no longer just about minimising production waste and saving money. It is also about raw materials strategies, understanding which materials you use to manufacture your products and where these materials come from. And it is about product stewardship and what happens to your products once the consumer has finished within them.

The importance of supply chain collaboration

As the biscuit manufacturer and tomato grower examples highlight, unlocking resource efficiency opportunities can rarely be done in isolation. An organisation's resource efficiency is likely to be heavily influenced by the actions of its supply chain partners and vice versa.

Improving resource efficiency therefore requires a systems thinking approach to supply chain activities and needs different business functions and different supply chain partners to work together more closely. This moves the UK away from our traditional linear economy, where we take materials, manufacture a product, sell that product, use it and then throw it away, towards a more circular economic model where materials are regarded as valuable resources.

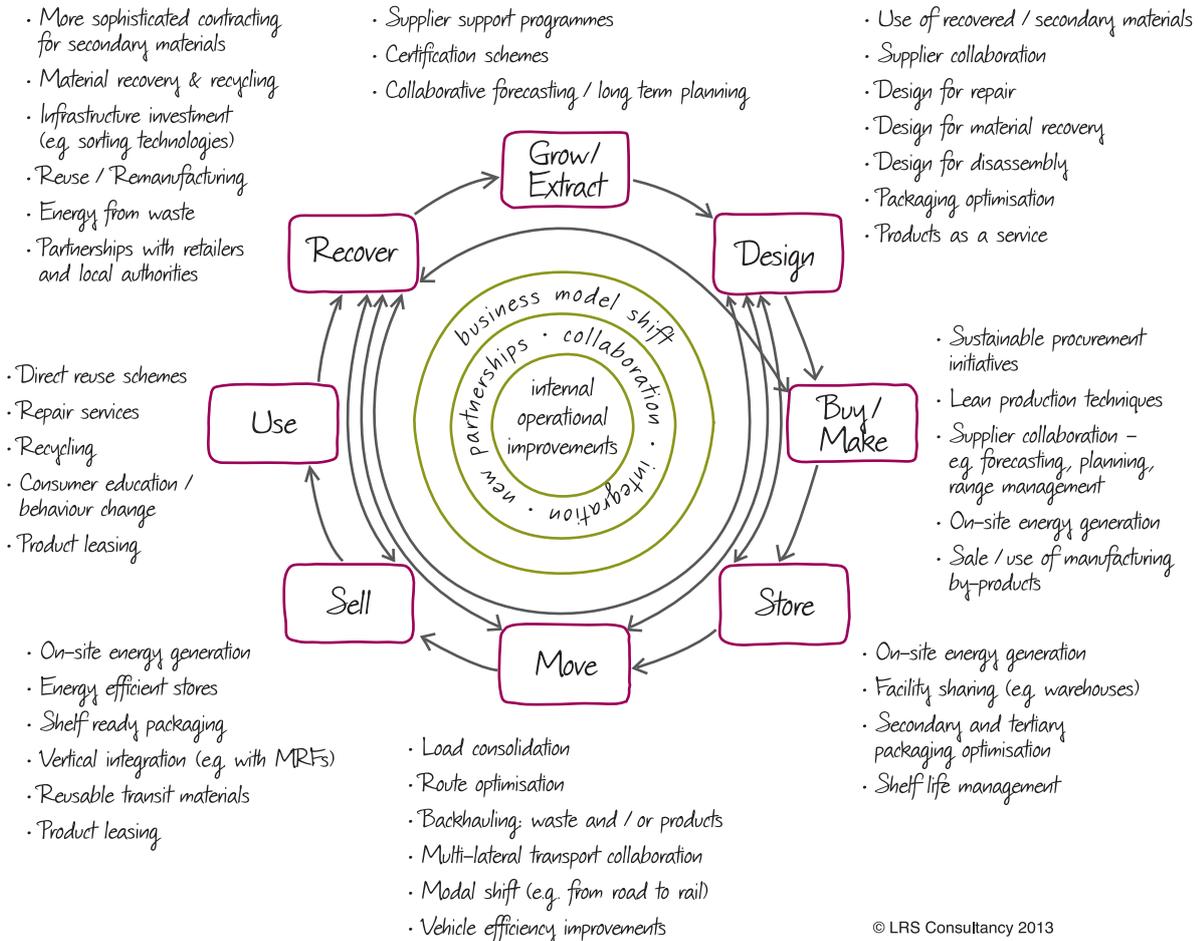
This could mean working with 'traditional' supply chain partners, including immediate suppliers and customers, but could also mean forging new strategic alliances and innovative partnerships with other supply chain stakeholders.

For example:

- product designers working with reprocessors to develop products that can be easily disassembled
- retailers and brand owners investing in collection, waste treatment and/or reprocessing facilities
- manufacturers working with energy management companies and developers to deliver on-site energy generation projects
- retailers working with logistics providers to optimise packaging systems and ensure effective utilisation of pallet space and vehicle deliveries
- end users working with designers to create products that respond more fully to customer requirements

Regardless of the type of partnership or alliance identified, the main objective of these joint ways of working is the same - to help to ensure that materials can be retrieved and reused effectively elsewhere within the supply chain.

Resource efficiency within a circular supply chain - an illustrative example



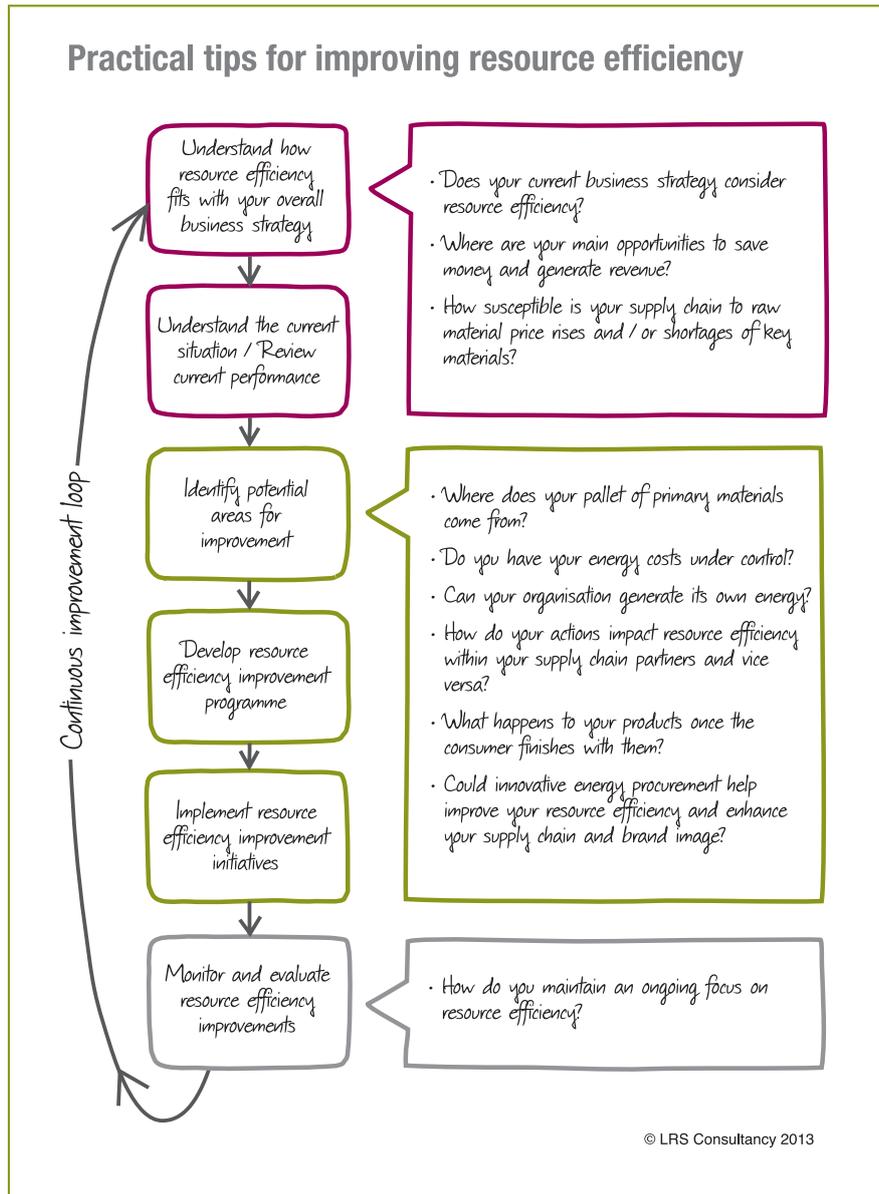
Where to start?

Experience shows that actions to improve resource efficiency should focus initially on internal performance.

As skills and experience develop, organisations can then begin to work more collaboratively with supply chain partners to deliver further improvements. In some instances, it might also be possible for organisations to move to completely different and more resource efficient business models, for example, leasing rather than selling products.

The first step to improving and embedding resource efficiency should be to understand current performance, define a future aspiration and to then map a path between the two.

In support of this, we have developed a simple methodology based on standard business processes and have outlined some of the main considerations for organisations looking to move towards a more resource efficient future.



What types of questions should be asked?

Does your current business strategy consider resource efficiency?

Understanding your supply chain risk is fundamental to shaping your overall resource efficiency strategy and ensuring that your supply chain is sustainable. In order to optimise resource use, you need to make sure that resource efficiency considerations are an integral part of your overall business strategy and that there is no conflict between these and other business priorities. While tweaking some processes may help, the biggest benefits from resource efficiency come from identifying your resource related risks and then taking a strategic view to determine whether a different way of working will allow you to gain greater financial and environmental benefits in the long term.

Where are your main opportunities to save money and generate revenue?

In order to generate support and internal commitment for improving resource efficiency you need to be able to demonstrate tangible benefits. A resource efficiency assessment or hotspot analysis will allow you to determine the root causes of resource inefficiency and enable you to identify the best places to achieve return on investment and/or deliver 'quick wins'. Useful techniques include mapping your main supply chain processes, identifying key touch points with your supply chain partners, conducting waste audits and analysing performance data, for example category spend and forecast bias.

Resource inefficiency is often hidden and allowances for 'acceptable' levels of material and energy wastage may be

priced into your contracts. But even a small percentage of waste on a large volume of sales could have a significant financial impact on your business.

How susceptible is your supply chain to raw material price rises and/or shortages of key materials?

Globalisation has led to complex supply chains that span many parts of the world. While this delivers wide-ranging benefits for many organisations, the length and complexity of today's supply chains significantly increases the risk of supply chain disruption. It also means that businesses need to fully understand the impacts of, and risks associated with, the activities of their extended supply chain.

In 2011, exceptional rainfall in Thailand led to severe flooding. At the time, Thailand was responsible for 25% of the world's hard disk drive manufacture and a major base for Japanese vehicle manufacturing. The severe disruption that occurred as a result of these floods meant that many leading computer brands were unable to supply computers to customers and there was a shortage of new vehicles in Asia. While the floods had a dramatic impact on major brands, events such as natural disasters, strike action, supply restrictions and competition for valuable resources can affect businesses of every size, anywhere across the world.

Where does your pallet of primary materials come from?

Optimising resource efficiency without knowing where your primary materials come from will be almost impossible. As recent supply chain scandals, such as the clothing factory collapse in Bangladesh and horsemeat in the UK food supply chain illustrate, understanding how and where your materials are produced is fundamental to maintaining your business reputation and brand integrity.

Once you have identified your sources of supply, you should then review your raw materials strategy and evaluate options for improving resource efficiency. This might include considering whether you can increase the use of recycled content in your products or replace the use of certain virgin raw materials altogether. Using recycled content may present different supply chain challenges (such as initial cost, availability and technical specifications). However, it may also offer longer term price stability, help to reduce exposure to supply chain disruption, provide a source of competitive differentiation and help to achieve your sustainability objectives.

Do you have your energy costs under control?

Energy is an increasing cost to businesses and many organisations are looking at ways to reclaim control over costs, better understand their own energy mix and improve energy security to make themselves more resilient should energy supply become more volatile.

A big concern is also the rising cost of 'non-energy' charges. These include the so called 'green and social taxes' levied on

energy supply companies for using the grid network and to pay for renewable energy policy regimes (like the Renewables Obligation and the Feed in Tariff) and are recovered by suppliers from business and domestic customers. Such charges are expected to rise further given the level of investment that is required in grid infrastructure and the cost of implementing the UK's energy policy.

While off-grid generation may never replace traditionally supplied power for large energy consumers, serious savings and other benefits can be achieved by sourcing even a small percentage of supply from off-grid sources.

Giacinto Patellaro, Head of Energy Supply & Risk at Marks and Spencer, says that M&S is seriously considering the benefits that localised off-grid generation projects could provide to M&S. In addition to 100% renewable generation (which is consistent with M&S's Plan A commitments) at a predictable price, off-grid projects could deliver energy which is free from non-energy charges, which M&S considers could rise to between £25 and £30/MWh by 2016 (an increase of nearly 30% on current equivalent charges).

Can your organisation generate its own energy?

Many organisations are looking to decarbonise their operations and the generation or procurement of renewable energy is often high on the agenda. Large corporates like Ikea, Google, Microsoft and British Telecom and also smaller organisations are choosing to invest their own resources in renewable generation. However, some businesses are more constrained by shareholder requirements for returns on capital investment. If core business activities provide a higher return, it is easy to see why playing the developer role is not for everyone.

Fortunately there are a number of developers and energy management companies that will deliver projects on an off-balance sheet basis and can help move organisations towards a more sustainable approach to energy supply.

Whether investing in a renewable energy plant on your own or working with a developer or energy management company to deliver a project on an 'off-balance' sheet basis, it is important to consider:

- the location of the plant as this will influence the availability of a fuel source whether it is biomass, wind or solar. 'Natural' fuel types, such as solar PV and wind may provide intermittent and less predictable energy yields. Undertaking robust modelling and testing should give a reasonable level of predictability of overall output
- the cooperation of any neighbouring landowners that may be required for the installation, operation, maintenance and eventual decommissioning
- the credibility of the technology provider and the reputation of the technology proposed you are considering together with the scope and length of any warranty offered, deposit required and lead-in time for supply

“On-site renewable energy generation provides what many forward thinking organisations are now after – a locally generated source of baseload heat and power at a competitive, predictable, long term price. Energy users like the benefit and security of an off-grid supply arrangement which retains the flexibility to export surplus power to grid. The fact that it’s renewable is yet another tick in the box.”

Max Aitken, Director, Estover Energy

- whether planning permission is required and who is responsible for obtaining it
- whether electricity and heat generated on-site will be consumed at the same location, at neighbouring premises or by third parties and if so, are there any regulatory issues to consider? If electricity will be exported the grid or if a heat network is going to be developed then additional infrastructure and installation costs, land availability, planning constraints and operation and maintenance requirements will also need to be taken into account
- energy from waste might be an option once waste prevention, reuse and recycling have been considered. On-site anaerobic digestion of food waste is being used in the dairy sector for example where dairy wastes are used to power the facility and provide a fertiliser for use on farms

How do your actions impact resource efficiency within your supply chain partners and vice versa?

In addition to reviewing resource efficiency within your own organisation, you should also think about resource use in other parts of your supply chain. For example, how do your actions impact on your supply chain partners and how do their decisions impact your business and your sustainability objectives? Care should be taken to ensure that resource efficiency initiatives improve overall supply chain performance and do not simply move resource inefficiency and cost between organisations.

“At Pret à Manger, we are committed to increase the amount of food waste diverted from landfill. Whether it is through sending ‘end of day’ unsold products to the homeless; or our bread ends, tomato ends or coffee grinds to compost or anaerobic digestion.

There are challenges to find appropriate services, but our aspiration is to send all food waste to anaerobic digestion. We are working with suppliers to achieve this goal, and to find the best ways to overcome challenges, and implement food waste collections in the remaining minority of our shops.”

**Thomas Nichol, Sustainability Projects Coordinator,
Pret à Manger (Europe) Ltd**

Case Study 3: Generating Regeneration

Estover Energy is a renewable energy company embracing the circular economy and developing a number of small-scale, locally-fuelled biomass combined heat and power (CHP) plants in Scotland and England.

The plants will be ‘off-balance sheet’ and operated independently, but will supply neighbouring industrial sites with renewable energy under long-term supply arrangements. Projects currently under development include a biomass CHP plant at The Macallan distillery in Morayshire. This plant will use clean low-grade wood harvested locally and will generate up to 15MWe of renewable electricity as well as renewable steam for the distillery. Estover’s projects support the local domestic forestry industry as well as providing local jobs operating the plant and in the supply chain.

The latest project under development is at Discovery Park in Kent - the site of an old Pfizer plant which was closed in 2011 with the reported loss of 5,000 jobs. The site is now under new ownership and has been redeveloped as a science and technology park. Planning permission for Estover’s project was granted in October 2013.

What happens to your products once the consumer finishes with them?

Producer responsibility no longer ends when a product is sold or a service delivered. Understanding what happens to your products once the consumer has finished with them is key to identifying where resource savings can be realised and is also an important element of being a sustainable and responsible company and achieving product stewardship objectives.

“For years, we’ve been working on reducing our environmental impact - we see that as part of our role as a responsible company. We are responsible for putting products and materials into the market and it is inevitable that some of those will become waste.

We have a corporate commitment to reduce the impact that our products have when they become waste, and as a result we’re keen to work with other specialists and experts to understand how to capture them and increase their recycling.”

**Louis Lindenberg, Sustainability Director,
Unilever Global Packaging**

At first glance, you might identify a material that is difficult to recycle and there might not be an obvious recycling solution. But new businesses and technologies keep emerging and creating new possibilities for recycling. One waste stream that, until recently, did not have a traditional recycling outlet was flexible packaging, often used for food pouches and toothpaste tubes. But now there is a recycling solution from Enval that extracts the valuable aluminium and makes best use of the plastics in the packaging.

“Recycling of aluminium-containing flexible packaging represents a significant resource saving opportunity. Our estimates are that there is ~160,000 tpa of this kind of packaging in the UK market place, which would generate ~16,000tpa of additional aluminium into the secondary commodity market.

Our Consortium partners, Nestlé, Kraft Food and Mondelez International saw the potential to work with us to establish a new recycling facility to extract the aluminium and generate oil from the plastics in this material stream.”

Carlos Ludlow-Palafox, Director & CTO, Enval

Could innovative energy procurement help improve your resource efficiency and enhance your supply chain and brand image?

Technological developments, process innovation and new ways of working can all deliver significant improvements in resource efficiency and sustainability performance.

In terms of energy procurement, one new way of working which has become increasingly popular, both in the UK and overseas, is using a direct power purchase agreement (PPA) structure as a way of meeting the customer’s requirement for green energy and long-term price certainty.

For some organisations, social responsibility programmes have become an integral part of their brand. A common aspect of many programmes is a commitment to reduce energy usage, increase energy efficiency and procure at least some energy from renewable sources.

A direct PPA is a contractual structure which brings electricity consumers and generators together irrespective of location, generating capacity and supply requirement. In conjunction with its supply arrangements with its licensed electricity supplier, a direct PPA structure can enable a customer to enter into long-term supply arrangements with an identifiable renewable energy generator fixing the wholesale power price element of their energy costs.

Key points to consider include:

- do any members of your supply chain own renewable energy plants that you could contract with and do you control a source of feedstock they require for that plant (for example, food waste or combustible waste streams)?
- do the sums add up? If the benefits do not outweigh the costs, think about doing something else. Who will take the risk of generator imbalance costs?

- do you have (or can you get) a willing electricity supplier and a compatible electricity supply agreement? Both are essential.
- how will renewable benefits be dealt with and is there an opportunity to make further savings on your energy costs by sharing some of these benefits?
- how will the process work within the context of your supply arrangements and your business?

How do you maintain an ongoing focus on resource efficiency?

The success of any resource efficiency programme will, to a large extent, be determined by the level of senior management support and accountability. You therefore need to understand who is responsible for optimising resource efficiency within your organisation. Where several different people are involved, you need to agree how resource efficiency actions should be identified, approved and delivered for example, through a resource efficiency forum or plan.

Optimising resource efficiency is not a short-term, one-off activity and resource use needs to be monitored and evaluated on an ongoing basis. Your resource efficiency business metrics need to align with and support your overall business objectives and key performance indicators (KPIs). Resource efficiency targets should be agreed at a senior level and responsibility for achieving these targets should be assigned across the corporate hierarchy. You should also think about reviewing and, where appropriate, refocusing your existing resource related KPIs to ensure that your resource use is clearly visible, for example, by removing ‘acceptable’ waste budgets and amending contract clauses.

Successfully embedding resource efficiency in day-to-day operations is essential to ensure your business optimises material, energy and water use. Creating a resource efficient culture is likely to require significant behaviour change and you may also need to develop new skills and capabilities within your supply chain teams. This could include providing additional training to help your teams to collaborate more effectively with your supply chain partners. As with all business improvement initiatives, the importance of good change management, people development and communications should not be overlooked.

Looking to the future

Supply chain disruption and increasing raw material costs are likely to have a significant negative impact on business performance. However, organisations that recognise and respond quickly and appropriately to these challenges are likely to see significant increases in productivity, profitability and sustainability performance.

Resource efficiency, therefore, makes good business sense and there is nothing to stop organisations working with their supply chain partners now to understand the extent to which they are collectively exposed to risks associated with resource scarcity and price volatility. Businesses should take appropriate actions now to ensure that they remain economically, environmentally and socially sustainable into the future.

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About our organisations



LRS Consultancy is a specialist consultancy that focuses on materials resource efficiency and the development of the resource efficient materials economy.

We work with organisations across the supply chain, to address the risks and opportunities that relate to resource scarcity, secondary material market development, sustainable business model development and future-proofed production and consumption methodologies. We provide strategic support as well as deliver hands-on, action-based project management and expertise to ensure the successful implementation of change and sustainable behaviour.

As industry specialists, our team uses its knowledge and experience to guide clients through the following core areas: sustainable supply chains and sustainable procurement, product stewardship and the materials circular economy, behaviour and systems change management, waste and recycling collections and resources management, waste treatment and technology market development.

To find out more

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Greater resource efficiency and helping others to achieve this will provide significant opportunities to the organisations that are able to deliver better ways of doing business. To capitalise on these opportunities you need lawyers who are experienced in bringing resource efficiency projects to fruition and who have a deep understanding of the relevant policies, financial incentives and regulation. Your advisors need to be responsive, able to work as part of a wider team and to develop their advice as your business grows.

Burgess Salmon LLP is a leading UK law firm helping clients deliver and invest in resource efficiency projects, advising across a range of solutions, processes, technologies and service delivery models. Excellent client service underpins all that we do and is our priority at all times. Our unique working culture is open, collaborative and strongly client-focused. We provide the highest standards of legal and business advice to clients and offer all the major practice area disciplines. We work with clients of every size and type, from global organisations, government and non-profit businesses, to smaller entrepreneurs and private individuals.

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