

A circular economy case study

Collaboration for a closed-loop value chain

Transferable learning points
from the REALCAR project



Novelis

Jaguar Land Rover

The UK's largest automotive manufacturing business, built around two iconic British car brands: Land Rover, the world's leading manufacturer of premium all-wheel drive vehicles and Jaguar, one of the world's premier luxury sports saloon and sports car marques.

Novelis

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Publication details

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How this case study came about: a story of collaboration

“Creating a space to collaborate, reflect, learn and share lessons from the REALCAR (REcycled ALuminium CAR) closed-loop project.”

This paper explores the lessons learnt from the REALCAR closed-loop value chain project between Jaguar Land Rover, Novelis, Innovate UK and other industrial, academic and funding partners, in the creation of new materials and production systems to introduce closed-loop aluminium into Jaguar Land Rover cars.

Its publication is the result of a further collaboration between Jaguar Land Rover and Novelis, facilitated by the Cambridge Institute for Sustainability Leadership (CISL). This took place via CISL's Postgraduate Certificate in Sustainable Value Chains (PCSV), a nine month, part-time Masters-level academic programme for individuals and groups seeking to embed sustainability into supply/value chains. The joint Jaguar Land Rover and Novelis team that produced this paper used the opportunity provided by the PCSVC course to document the key lessons learnt in the development of closed-loop aluminium for automotive use and subsequently accelerate that project's development.

Many of the challenges faced in the REALCAR project are applicable to the creation and transformation of all value chains,

not just to aluminium or the automotive sector but to other materials and sectors. Furthermore, if the world is to embrace 'circular' supply chains, which use resources more efficiently, other companies in other sectors can benefit from the understanding and application of the insights presented here.

The authors and I would like to acknowledge the important contribution of three colleagues who were instrumental in getting the REALCAR project up and running:

Dr. Mark White, Chief Engineer, Body, Jaguar Land Rover; Professor Julian Allwood, Professor of Engineering and the Environment, University of Cambridge; and Adrian Tautscher, Group Leader, Sustainable Aluminium Strategies, Jaguar Land Rover.

Ian Ellison,
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“The Cambridge Institute for Sustainability Leadership is pleased to publish this case study to share the transferable learning points, published as guidelines, for use beyond the automotive/aluminium value chain.”

The case study contributes to CISL's *Rewiring the Economy* plan and embodies its collaborative spirit. The plan, developed in consultation with CISL's 7,000 alumni, presents ten tasks for business, government and finance leaders to tackle collaboratively over the next ten years to lay the foundations for a sustainable economy.

Task 7 of the *Rewiring the Economy* plan invites business leaders to 'Set a bold ambition, and innovate to deliver greater value'. This task requires companies to work differently with partners and suppliers to understand the full lifecycle of their products and services in order to implement sustainable production and consumption models.

We hope this case study will contribute to the wider reduction of environmental impacts in the supply chain through so-called 'circular economy' practices. We're proud of the part our postgraduate course in Sustainable Value Chains played in creating the academic space for the authors to bring these insights to light and I hope that others will benefit.

Polly Courtice,
Director, University of Cambridge
Institute for Sustainability Leadership

Executive summary

To improve the environmental performance of its vehicles, Jaguar Land Rover needed to innovate and incorporate aluminium into their design and manufacture.

Incorporating aluminium would lower the vehicle body mass, improve fuel efficiency and, as a result, reduce the environmental footprint and running costs for customers.

However, Jaguar Land Rover wished to mitigate the energy and cost-intensive nature of using primary (virgin) aluminium in the production process. To do this Jaguar Land Rover worked collaboratively with its material

supplier Novelis, Innovate UK, the UK's innovation agency, and other partners. The result was a closed-loop value chain that minimised the use of primary material and maximised the use of recycled aluminium during manufacturing.

The following universally applicable learning points are explored in this paper:

1

Material Suitability and Innovation

There must be high confidence about the across-the-board suitability of the material selected for a closed loop.

The purity and value of the scrap material must be protected from contamination by lower quality, lower value material, otherwise the commercial proposition may be compromised. Fresh thinking and new ideas, nurtured by committed stakeholders, are essential to find ways around the numerous hurdles that appear during the development process.

2

Establishing a Value Chain Network

Traditional transactional supply chain thinking must be replaced by a value chain approach in which partners work in true collaboration to achieve goals for all parties – and beyond. Material, financial, commercial and contractual issues must be understood in detail to deliver a winning business case.

It is essential that a thorough communications and engagement plan for each stakeholder is in place to keep everyone informed and motivated. Understanding the communications needs of each stakeholder enables a consistent and compelling narrative to flow, strengthening relationships and building trust.

3

Progressive Leadership

Unwavering support and advocacy at a senior level provides confidence and momentum – and a forum to help remove roadblocks.

In a circular economy, all parties must move towards shared values and broader project objectives, beyond the individual interests of each party. Support from a third-party organisation, such as a relevant industry body, can give projects focus and early momentum.

REALCAR has proven to be a resounding success, delivering financial and environmental benefits to both Jaguar Land Rover and Novelis, and contributing to the efforts of both companies to meet their environmental sustainability goals.

Crucially, the experience gained and lessons learned from the creation and implementation of a closed-loop value chain for automotive aluminium are potentially applicable to other materials and other industries.

Foreword

The most efficient processes are found in nature. Resources such as energy, light and water are all utilised optimally – nothing is wasted. So, why do man-made processes not follow the same rules?

Jaguar Land Rover needed to reduce the weight of its vehicles while still delivering class-leading products. In 2002 it started using aluminium in the vehicle’s body to reduce weight, improve fuel consumption and tailpipe emissions and reduce costs to the user. However, aluminium is more energy-intensive to produce and hence more expensive than steel, both environmentally and economically. So, Jaguar Land Rover needed a way to reduce both cost and environmental impacts during production of the material.

Meanwhile Novelis has a long standing commitment to increase its use of recycled aluminium year-on-year. Since 2011, the company has increased its recycled inputs from 33% to nearly 50% and continues to pursue this goal, reducing the amount of primary material required, and reusing material (‘closing the loop’) where possible during production. But it needed a like-minded customer with a similar appetite for improving its sustainability performance.

This vision, shared by Jaguar Land Rover and Novelis, and a willingness to tackle the technical challenges together, inspired the REALCAR project that started in 2007. REALCAR required plenty of figurative blood, sweat and tears, mixed with pioneering chemistry and commercial activity.

The results are impressive. REALCAR represents a landmark; an industry benchmark that contributes to both organisations’ efforts to improve sustainable business performance and offer credible financial payback periods. In addition, it also contributes to international efforts to reduce the potential for global warming and meet wider sustainability goals.

If this can be achieved with automotive aluminium then it must be possible to apply the same principles to other industries and commodities.

Mark White
Chief Engineer, Body,
Jaguar Land Rover

Pierre Labat
Vice-President and General Manager,
Novelis Automotive Europe

If we can achieve this with automotive aluminium then it must be possible to apply the same principles to other industries and commodities.

13.8%

REALCAR is one of the innovations that has helped reduce the global warming potential of a Range Rover TDV6 by 13.8% over its lifetime.

>30k

From August 2014 to July 2015, over 30,000 tonnes of press shop aluminium scrap were recovered into Jaguar Land Rover’s UK closed-loop recycling.

Closed loops and the circular economy

In a traditional linear supply chain, value is often lost. Such a linear chain might be:

Material extraction > Product fabrication > Usage > Disposal

A **closed-loop value chain** takes a fundamentally non-linear approach. The basic concept for implementing a closed-loop value chain is predicated on the notion of a circular economy, combining both forward and reverse supply chains, and where product waste is incorporated in the production of new versions of the products¹.

Not all waste is economically, or even environmentally, viable for a closed-loop process, but opportunities are lost when companies and society fail to ‘close the loop’ – even when the product, part or material meet the scale and quality required.

‘Closed loop’ sits alongside established developments such as lean manufacturing or resource efficiency. However, material closed-loop implementations are a deeper response to sustainable value chain challenges², where collaborative action and shared benefits deliver wider, more sustainable societal outcomes.

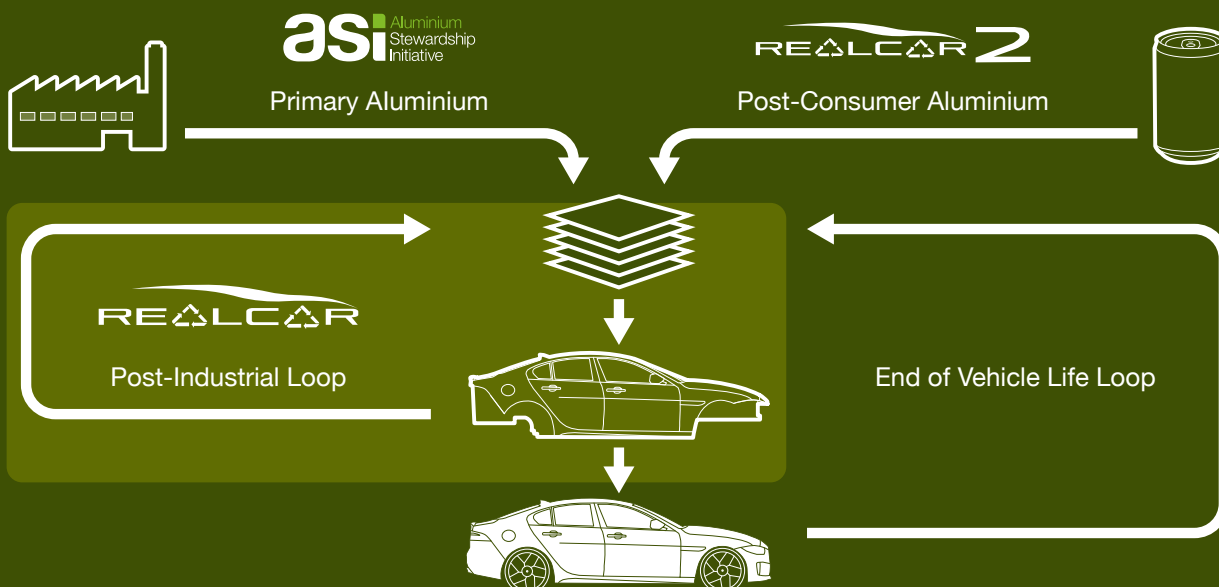
The loop can be closed at the post-industrial stage (manufacturing) or the post-consumer stage (the end of a product’s life). This paper focuses on the lessons learnt

from the post-industrial aspects of Jaguar Land Rover and Novelis’ closed-loop aluminium project, REALCAR.

Following a gradually-expanded scrap segregation pilot programme, REALCAR was launched in 2007 as a research project, partly funded by the UK Government’s Technology Strategy Board (TSB), now Innovate UK. The TSB awarded funding and co-ordinated partners Stadco, Norton Aluminium, Innoval, Zyomax, Brunel University and Novelis, along with the lead partner Jaguar Land Rover. If the project was successful Jaguar Land Rover recognised the potential for the approach to be rolled out across its future product lines, dramatically increasing volumes – and the scale of the benefits.

REALCAR took the post-industrial waste from aluminium body panel stamping and recycled it back to the supplier (Novelis) to be incorporated into new body panels (see Figure 1 below). This involved technical innovations, such as the creation of a new aluminium grade that would be best suited to the closed-loop process, and business culture innovations amongst key stakeholders, most notably the principle partners.

Figure 1: Jaguar Land Rover / Novelis’ vision for a sustainable aluminium value chain



REALCAR is the first stage of the Jaguar Land Rover / Novelis vision for a sustainable value chain which ultimately includes a post-consumer loop, a post-industrial loop, the end of vehicle life loop and material stewardship across the entire value chain.

Essential steps to create a closed-loop value chain

The following sections of this paper explore how Jaguar Land Rover and Novelis tackled the essential steps for the creation of a closed-loop value chain and the learning points that resulted.

<h3>1 Material Suitability and Innovation</h3>	<h3>2 Establishing a Value Chain Network</h3>	<h3>3 Progressive Leadership</h3>
<ul style="list-style-type: none"> • Ensure that materials are suitable for loop closure. You must have high confidence about the across-the-board suitability of the material selected for a closed loop. • Have a rigorous and consistent waste segregation system. The purity and value of the scrap material must be protected from contamination by lower quality, lower value material, otherwise the commercial proposition may be compromised. • Encourage innovation at every stage. Fresh thinking and new ideas, nurtured by committed stakeholders, are essential to find ways around the numerous hurdles that appear during the development process. 	<ul style="list-style-type: none"> • Collaborate for shared values and mutual opportunities. Traditional transactional supply chain thinking must be replaced by a value chain approach in which partners work in true collaboration to achieve goals for all parties – and beyond. • Understand the entire value chain. Material, financial, commercial and contractual issues must be understood in detail to deliver a winning business case. • Manage stakeholder complexity. It is essential that a thorough communications and engagement plan for each stakeholder is in place to keep everyone informed and motivated. • Tell the story in stakeholder terms. Understanding the communications needs of each stakeholder enables a consistent and compelling narrative to flow, strengthening relationships and building trust. 	<ul style="list-style-type: none"> • Identify strategic champions. Unwavering support and advocacy from senior stakeholders provides confidence and momentum – and a forum to help remove roadblocks. • Promote shared values. In a circular economy, all parties must move towards shared values and broader project objectives, beyond the individual interests of each party. • Involve a third-party catalyst. Support from a third-party organisation, such as a relevant industry body, can give projects focus, early momentum and potentially funding.

¹ Ellen MacArthur Foundation. (2014, January 24). *Towards the Circular Economy Vol. 3: Accelerating the scale-up across global supply chains*. Retrieved from: <http://www.ellenmacarthurfoundation.org/publications>

² World Business Council for Sustainable Development. (2011, December). *Collaboration, innovation, transformation ideas and inspiration to accelerate sustainable growth – A value chain approach*. Retrieved from: <http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=14257>

How to create a closed-loop value chain

1: Material Suitability and Innovation

1.1 The ability to close the loop

A key initial requirement of a closed-loop study is to determine the suitability of the material or range of materials to be processed through a closed loop. The complexities of manufacturing processes, combined with a closed-loop system, can introduce a degree of mixing different types and grades, which the material needs to tolerate.

REALCAR defined a number of aluminium grades that were focused on testing the effects of differing additions during the recycling process. Laboratory and full production trials resulted in the development of a new aluminium grade that met all of Jaguar Land Rover's criteria. Material development accounted for a significant part of the REALCAR project budget and was funded in part by a £1.3m grant from Innovate UK.

New material solutions can take considerable time to develop due to the level of complexity and challenge requiring technical innovation. The REALCAR project extended beyond its original three-year funding period with technical development taking around five years.

REAL learning:

Ensure the material for which you intend to close the loop is technically suitable for the purpose, before you enter into significant commitments. Be prepared to develop special material grades to reconcile quality and recyclability needs.

1.2 The value of segregation

A sustainable value chain is one that avoids downcycling, where products are reused, or recycled into a new product of lesser quality or lower added value³.

In REALCAR, waste aluminium from Jaguar Land Rover vehicle production is sold back to the supplier (Novelis) rather than entering the general aluminium recycling system, where the high purity and high-quality Jaguar

Land Rover/Novelis alloy would be blended with other, potentially lower purity, materials.

However, to implement a closed-loop project like REALCAR, the segregation of 'scrap' is key to ensure purity and therefore the greatest value recovery. Nonetheless scrap segregation requires significant effort, appropriate production planning, specific tooling, co-ordination and

stakeholder buy-in to ensure that everyone is aligned to the same goals of segregation. Due to the complexity and cost involved in scrap segregation for an existing product or facility, it is far easier to build in segregation from the start, rather than retrofitting.

Without appropriate scrap segregation, impurities will negatively affect product performance, quality and value.

REAL learning:

Rigorous processes for the consistent segregation of scrap must be in place at the outset of closed-loop projects to maintain scrap purity, quality and value for recycling.

³ McDonough, W., & Braungart, M. (2002) *Cradle to Cradle: Remaking the Way We Make Things*. New York, NY: North Point Press

1.3 Embracing innovation

A research project has a degree of inherent unpredictability due to the number of unknowns and novel solutions that require initial development time.

In REALCAR, multiple research workstreams were established to develop technical knowledge and wider organisational understanding. As the project progressed, further innovations were needed. For example, an essential technical innovation was the development of material chemistry to create

a revised aluminium grade. This involved complex studies evaluating small changes in chemistry that could have a significant impact on the material's performance. But this new grade of aluminium could only be implemented following practical studies into its recyclability, and identification of potential applications. The workstreams also extended into the commercial arrangements between Jaguar Land Rover and Novelis, and, ultimately, into a revised purchasing model for the closed loop. Flexibility

within the project allowed new sub-innovations to be explored, potentially as separate projects.

The implementation of a closed-loop system for post-industrial aluminium waste is now established between Jaguar Land Rover and Novelis. However, changing material grade will still require new, unique solutions to be developed and this has the potential to drive further sub-innovations in the value chain.

REAL learning:

Innovation and fresh thinking are essential at all stages of the project, from creating new materials and identifying potential applications, to developing new commercial arrangements and purchasing models.

2: Establishing a Value Chain Network

2.1 Collaborating

Sustainable business solutions often lie outside the scope of a single organisation. To embrace these opportunities, companies have to look beyond their own value-adding processes and collaborate to capture wider value chain benefits.

The multi-stakeholder REALCAR project enabled Jaguar Land Rover and Novelis to view their activities as a value chain, rather than as a traditional transactional supply chain. By doing so, both companies were able to think beyond the incremental and traditional improvements to their own social and environmental impacts.

This more collaborative approach helped the companies recognise win-win opportunities to achieve their longer-term sustainability goals and benefit from reduced exposure to fluctuations in commodity market prices, in addition to experiencing improvements in material handling and logistics. However, it should also be recognised that not all companies at all levels in a value chain will benefit equally from the transformation. This is due to the inherent necessity to change the nature of the value flow within the chain.

Creating shared values within such projects can enhance supplier relationships, inspire innovation and build trust. The evidence from the REALCAR project is that sustainable value chain or closed-loop projects will deliver the most benefits and foster greater collaboration if they focus on areas of greatest scale, environmental, social and financial benefits.

Although by acting alone you might go faster, by acting together you will go further.

REAL learning:

The best collaborations – and the best results – can come from moving away from traditional transactional supply chain relationships, towards a shared vision and mutual opportunities to achieve sustainable, long-term goals.

2.2 Value chain mapping

A sustainable value analysis and mapping tool* can help with value chain planning and transformation. For example, it can identify where and when investments are needed, where and when returns will materialise and, if necessary, how to connect stakeholders to realise the value created.

One example of where this may lead is a tolling contract, where returned material is netted off against the original purchase value, which can be an effective method for reducing cash flow impacts. In tolling, the customer only ever pays for the material they use and not the material moving around the value chain.

The mapping of whole value chains, economically, environmentally and socially, encourages the identification of win-win situations and can often point to groups of stakeholders with aligned interests who may not have been brought together by simple market methods and bipartite transactions.

*An example of such a tool is: www.industrialsustainability.org/tools/sustainable-value-analysis

REAL learning:

Mapping the key stakeholders and the subsequent material and financial flows allows identification of closed loops that deliver the greatest value, giving the business case added strength and weight.

2.3 Managing stakeholder complexity

Transforming a value chain requires existing stakeholders to act in a manner that is likely to be different to their existing day-to-day jobs. In addition, the number and breadth of stakeholders will be larger in a closed-loop scenario compared to a linear chain, necessitating effective stakeholder communications and engagement.

Stakeholders should be identified and engaged as early as possible to educate them about the changes to be made and their responsibilities within the closed loop.

It is advisable to stagger the engagement of these stakeholders so that those key to implementation are fully engaged earlier than

those for whom the project is less disruptive.

This early warning also allows stakeholders to flag any potential issues and ensures they can be overcome in a timely manner, which builds momentum, and ensures peers within the organisation can become advocates for the change.

REAL learning:

Transforming a value chain involves commitment from a wide range of stakeholders. It is essential that a thorough stakeholder communications and engagement plan is in place from the outset.

2.4 Telling the story in stakeholder terms

Those involved in value chain transformation are more likely to understand the importance of their role in the process if there are clear, concise communications and a strong narrative explaining the measurable benefits across economic, environmental and social factors. In this way, perception of transforming the value chain moves from an altruistic activity to one that demonstrates value creation for that stakeholder.

Without clear explanations of why a system is beneficial, individuals and departments can misinterpret why the system is being established and may believe that it is not worthwhile. It can take time to verify the economic benefits of a closed-loop system in comparison to the cost of a traditional linear system. This, in turn, delays communication and decision-making.

Similarly, an over-emphasis on communicating one element of

improved performance, for example economic benefits or altruistic activities, can disengage other stakeholders.

Therefore, when transforming a value chain, it is essential that a communications plan is developed alongside the technical delivery to provide tailored communications from the outset. Doing so will ease project delivery, as resources are not consumed by continually justifying the ongoing changes.

REAL learning:

Understanding the motivations and communications needs of each stakeholder enables the creation of a strong and compelling narrative for each audience, strengthening commitments and relationships.

How to create a closed-loop value chain cont

3: Progressive Leadership

3.1 Strategic champions

Securing senior stakeholder engagement is critical to the success of any value chain transformation. It ensures that there are strategic champions and escalation routes for project roadblocks.

Increasing the amount of recycled aluminium in its sheet aluminium is central to Novelis' core business strategy. This clear strategic direction and leadership at Novelis helped both initiate and maintain broad stakeholder engagement within the business, including in its manufacturing plants. For

Jaguar Land Rover, it was Dr. Mark White, Chief Engineer, Body, who championed the need to move to an aluminium body construction and the requirement to address the increased environmental burden of acquiring the material. This led Mark and the Materials Engineering team to develop the recycling strategy as a research proposal, which ultimately became the REALCAR project.

From this shared vision within Jaguar Land Rover's engineering teams, other areas of the business had to be convinced and engaged one by one,

including purchasing, manufacturing, finance and product development.

Due to different strategic origins and organisational structures, Jaguar Land Rover and Novelis had differing levels of senior management engagement in REALCAR. However the common lesson learnt was that fully engaged senior stakeholders were key to ensuring that value chain transformation was part of the core, long-term business strategy and championed in senior decision-making forums.

REAL learning:

Securing early buy-in from senior stakeholders is vital if transformational closed-loop projects are to gain the necessary momentum and internal support.

3.2 Adopting a shared-value mindset

Within a traditional linear value chain model the flow of value creation is generally from supplier to customer and the relationship is managed on a transactional basis. However, in a closed-loop model the value flow is more complex, such that customers can end up supplying their own supplier. This modification in the relationship requires a real shift amongst stakeholders, moving

from a transactional mindset to one based on shared value.

REALCAR provided a unique opportunity for Jaguar Land Rover and Novelis to understand the intricacies of the circular economy and how significant value can be achieved by all participants, beyond just the purchase cost.

Different areas of the participating organisations gained different knowledge at differing rates. For example, technical knowledge on material grades was achieved sooner than the mental shift from being 'purchasers of components' to becoming 'value chain managers'.

REAL learning:

Ensuring an early and shared understanding of the circular economy, its difference from a transactional mindset, and how new roles and relationships emerge, will accelerate decision-making and speed up the achievement of project goals.

3.3 Third-party catalyst

The natural infrastructure supporting established processes tends to deliver a linear (open-loop) model. Moving to a closed-loop approach is disruptive and necessitates infrastructural change and thus investment. This can present risks that a business may not be willing to entertain without direct support from external stakeholders.

If a third party can be engaged to fund some of the initial research, foster collaboration and help demonstrate the value to all participants, or to provide hard deadlines for implementation, faster progress and more focused discussions on the disruptive closed-loop proposals can result.

Within the REALCAR example, Innovate UK (formerly Technology Strategy Board) undertook that role. It is acknowledged that due to the unstable wider economic environment during the early days of REALCAR, the project would have been unlikely to continue without Innovate UK's support.

REAL learning:

Interest, involvement and even investment from a third-party catalyst organisation can give projects focus, early impetus, credibility and stakeholder communications value.

Transferable learnings from REALCAR – our conclusions

The REALCAR project from Jaguar Land Rover and Novelis has delivered a range of experiences and learning points. Many, if not all, have applications far beyond the world of automotive aluminium at Jaguar Land Rover.

These points can be summarised in three categories, firstly, **material suitability and innovation**, secondly, the need for a **value chain network**, and finally, the role of **progressive leadership**.

Material suitability must be established definitively, and as early as possible, before making any significant investments or commitments. A rigorous and consistent waste segregation system must be defined to ensure that the purity and value of the scrap material in question is protected from contamination. Certainty on material selection and segregation is essential if the commercial proposition that underpins everything else is to have strength and weight.

In our experience, new ventures such as these rely on innovation. Fresh thinking and new ideas must be nurtured and encouraged to find new ways of solving problems and adding new layers of value.

New relationships are needed, moving away from traditional transactional supply chains towards true collaboration in which the needs and opportunities of all partners are transparent and understood by all. This mindset streamlines decision-making and speeds up the achievement of key milestones.

Fresh approaches to understanding where the greatest value is to be gained, and the consequential financial, commercial and contractual arrangements, are essential for these new relationships and ways of working to prosper. The needs and sensitivities of each stakeholder – in a more crowded stakeholder landscape than usual – must be understood in detail and fully catered for, not least in clear, consistent communications that speak directly to each partner.

Business transformation will always need great leadership, from champions who see the big picture – and the rewards that can come from taking carefully calculated risks. Their unswerving advocacy and support is essential.

Finally, having the right third-party supporters, organisations or industry bodies that share your ambition, can provide sponsorship and early momentum. REALCAR has worked, the evidence is clear. We hope our experience informs and inspires others to follow our journey.

REALCAR delivered wide-ranging benefits.

Recycled aluminium requires up to 95% less energy during production than primary material⁴, contributing to a significant reduction in the overall lifecycle impact of Jaguar Land Rover vehicles.

Specifically, for a 2013 Range Rover TDV6 model, REALCAR is one of the innovations that have helped reduce the global warming potential by 13.8% over a typical vehicle's entire lifecycle⁵.

By making aluminium more accessible, Jaguar Land Rover is able to further exploit the lightweight properties of the material in its aim to achieve a 30% reduction in key environmental impacts during the vehicle's entire lifecycle by 2020, from a 2007 baseline⁶.

Meanwhile Novelis is able to make progress by reducing its absolute greenhouse gas emissions (Scope 1, 2 and 3) by 13% from a baseline, which is an average of their emissions in the financial years 2007-2009⁷.

⁴ The International Aluminium Institute. (2012). *Aluminium Recycling – Environment*. Retrieved from <http://recycling.world-aluminium.org/resources/environment.html>

⁵ Jaguar Land Rover. (2013). *Sustainability Report 2012/13*. Whitley: Jaguar Land Rover

⁶ Jaguar Land Rover. (2015). *Sustainability Report 2014/15*. Whitley: Jaguar Land Rover

⁷ Novelis. (2015). *Capturing Opportunities: Novelis Sustainability Report 2015*. Atlanta: Novelis



Recycled aluminium requires up to 95% less energy in production than primary material.



REALCAR has helped Novelis reduce its greenhouse gas emissions by 13%.

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The University of Cambridge Institute for Sustainability Leadership (CISL) brings together business, government and academia to find solutions to critical sustainability challenges.

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HRH The Prince of Wales is the patron of CISL and has inspired and supported many of our initiatives.

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