

VEHICLE LIGHTWEIGHTING: A POTENTIAL SOLUTION FOR SUSTAINABLE MOBILITY

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At the end of 2012, Mirova and the University of Cambridge Programme for Sustainability Leadership (CPSL) unveiled a partnership. A central goal of this collaboration was the joint publication of research focused on issues or technologies related to sustainable development that would enrich the work of Mirova's investment teams. The first study focuses on the topic of mobility, and more specifically, the lightweighting of passenger vehicles, currently a key theme in the transport sector.

A single goal unites all our teams at Mirova, the Responsible Investment arm of Natixis Asset Management: to identify potential levers for sustainable growth as a way of generating the ideas that inform our investment strategies. To better understand the technological, political, regulatory and social changes taking place in the world, Mirova has chosen to collaborate with teams at the University of Cambridge dedicated to researching these subjects, thus helping to more broadly share the knowledge of world-renowned academics and other professionals.

Sustainable mobility is a key issue for the transport sector

Today, access to mobility is considered a right as essential as a place to live. However, our current means of transport are costly and energy intensive. Whether seen in terms of innovation or technological and behavioural change, the transportation sector broadly speaking faces profound changes due to the social and environmental challenges it raises. The concept of sustainable mobility has become not only *de rigueur* for public policies, but also essential to the industrial strategies of economic actors. In the struggle to reduce environmental impact, vehicle lightweighting is a particularly effective solution, because it affects every form of transportation, all types of propulsion, and offers genuine concrete economic advantages.

Granted, maritime and rail transport remain minimally touched by issues of weight, because the total mass of goods frequently outweighs the vehicle. However, road and air transport modes are faster and more energy intensive, and thus stand to profit considerably from lightweighting. Two main avenues for shedding vehicular mass are possible: one involves changing product

design, while the other consists of using materials that offer a better resistance/mass ratio. These include Advanced High Strength Steels (AHSS), aluminium, magnesium and carbon fibre composites.

Reducing the mass of components creates a virtuous cycle. By diminishing the useful energy needed to move the vehicle, it is possible to achieve the same result with a less powerful motor. Scaling back the engine's power provides additional mass savings that are compounded in turn by the potential lightening of several other elements.

Design, however, is subject to various contingencies, including consumer inertia, whereas the need to find alternatives to conventional steel is immediate and pressing. The four possible substitutes for conventional steel identified above will likely constitute 60% of a passenger vehicle by 2025, compared to 35% today.

Our analysis of the advantages and drawbacks to development for each of these materials has led us to the following conclusions:

In the short-term, largely due to a significant cost advantage, **AHSS stands to gain the most from pressures to lighten vehicles.** Well before 2020, AHSS is likely to represent between 15% and 20% of a vehicle's total weight, assuming a constant proportion of steel, compared to 10% in 2012. The other materials mentioned, while offering greater savings of mass, are likely to be confined to high-end vehicles due to cost considerations. **The actors poised to benefit from an expanded role of AHSS in the automotive industry are manufacturers, large-scale steelworkers, and companies involved in hot stamping.**

In the medium term, technological advances in the production of carbon fibre reinforced plastics (CFRP) should reduce production costs for this material by 30% before 2020. In addition to shorter cycle times, progress has been made toward recycling this material, reducing its ecological impact and making it more attractive compared to AHSS. These various factors should act to promote the integration of CFRP on a broad scale within the automobile industry in ways that increase efficiency (elimination of painting, rust coating, etc.). **The actors likely to profit from this opportunity are automobile manufacturers and the producers of CFRP as well as its precursors.**

Automobile and equipment manufacturers are meanwhile rethinking vehicle design (architecture review, resizing, removing parts, thinning structures, integration of ribs, use of crumple zones, monocoque structures etc.) in addition to integrating new materials. Some manufacturers have already begun reimagining their production processes or business models in order to market vehicles made with carbon fibre composites. BMW's i3 exemplifies the first case, Tesla Motors the second approach.

To read the unabridged study, visit www.mirova.com and go to the Mirova Research Library

For more information about the University of Cambridge Programme for Sustainability Leadership, visit www.cpsl.cam.ac.uk

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Jens Peers,

CIO Mirova Sustainable Equities

How does the equities team use this study?

Our investment process is based on a long-term strategic vision. This study made asset managers aware of issues surrounding vehicle lightweighting and helped them identify future beneficiaries of technological changes ahead. We now have a better understanding of the financial, environmental and technological stakes involved, as well as greater knowledge of the primary actors in this arena. This information is crucial for engaging in more constructive dialogue with companies in the sector in order to determine whether they are prepared for the technological challenges ahead.

What is a real-world application of this study in the domain of portfolio management?

Two kinds of actors involved in lightweight carbon materials are highlighted here: pure plays, meaning small, focused businesses, and big conglomerates (like Andritz, which we currently hold in our portfolios) whose exposure to this theme remains limited by its relatively small contribution to total sales. We have been very attentive to Japanese group Toray's tender offer on 16 September 2013 for Zolteck (a small company with a turnover of \$185M). This operation demonstrates that the sector is active and that pure play carbon fibre companies have caught the attention of heavyweight chemical groups. The study has served as a basis for establishing a market watch for potential IPOs in the sector.

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