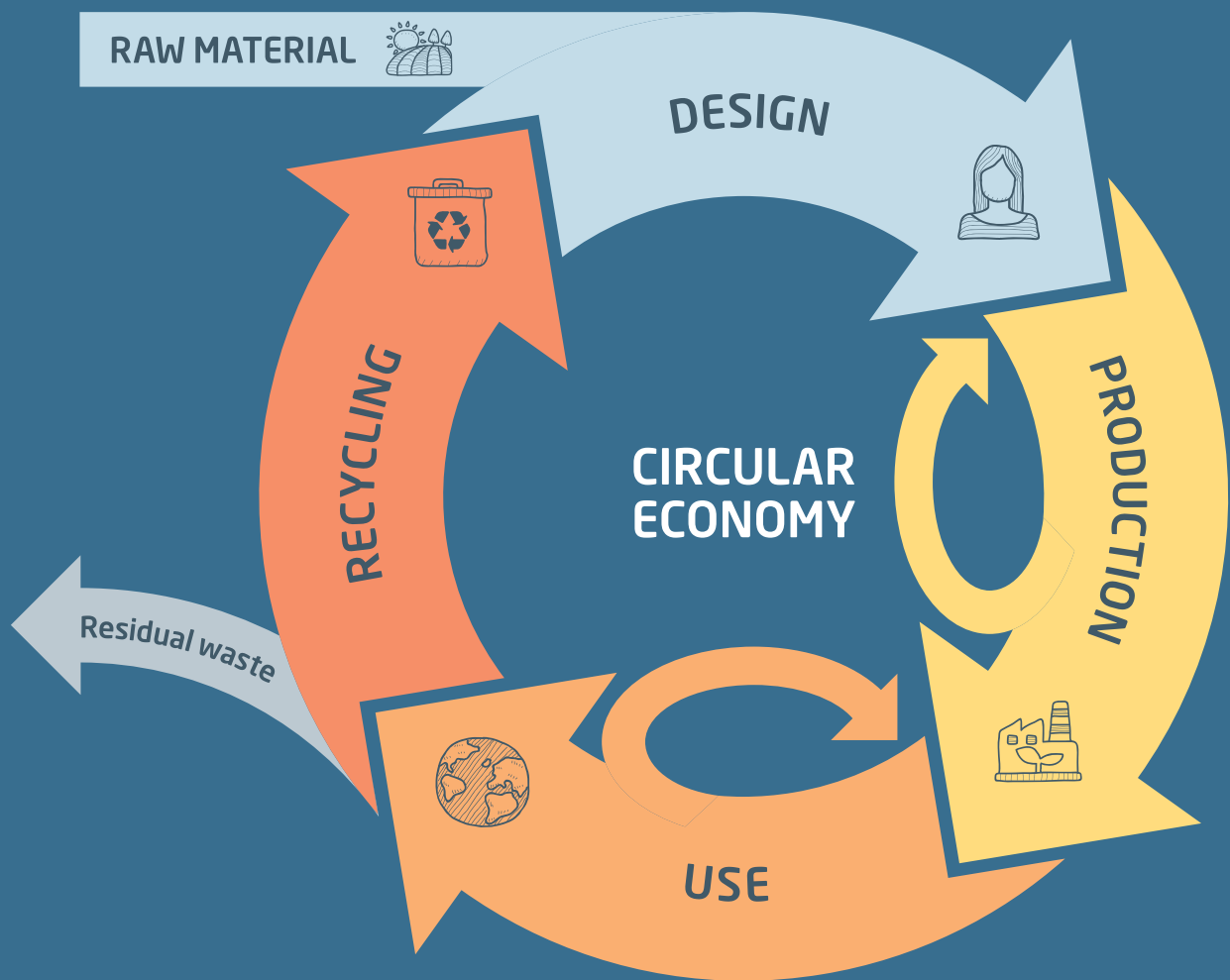


Sector-specific appendices to the Confederation of Enterprise document entitled: Circular economy for a competitive and sustainable business community in Sweden



Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

IKEM – Innovation and Chemical Industries in Sweden

1. The role of the chemical industry in the circular economy

1.1 The role of the chemical industry in the value cycle

Chemistry comes first in all value cycles. Using chemistry, we can produce pharmaceuticals, clothing, paints, artificial fertiliser, plastics, cleaning agents, cosmetics, electronics, human organs and an endless stream of other products that play a part in our everyday lives. Through working relationships with downstream users, the chemical industry plays a key role in a circular economy. And through making the chemicals circular in and of themselves, they can contribute to making the end products circular as well.

1.2 Materials, components, products

Our products are the smallest of all – the molecules. Chemicals are needed to help develop sustainable industrial processes, and to give materials and products their unique properties. That is why circular chemicals are a precondition for achieving a circular economy.

1.3 Trade and international perspective

The Swedish chemical industry is largely in the hands of international owners, operating on a global market. The majority of the chemicals produced in Sweden are sold to export. The chemical industry as a whole accounts for one-fifth of Swedish exports.

2. Opportunities and challenges

2.1 Instruments of control and incentives

Clear and uniform global regulations for evaluation, risk assessment, and risk management are essential in helping the chemical industry to navigate towards more circular chemicals.

When it comes to effective substitution, driving forces and demand from downstream users are more important than legislation. Substitution demands process transition among downstream users, so a close working relationship between the chemical industry and goods manufacturers is essential. Innovation and research must be promoted and the permitting process must be simplified.

2.2 Business models and profitability

A long-term, globally harmonised chemical policy is required. To switch from fossil-based to recycled and renewable raw materials in the manufacture of chemical products, it is necessary to adapt the production processes on an ongoing basis.

This can be done in existing production facilities, and opportunities must be created for gradually increasing the share of recycled and renewable ingredients to match the rise in demand – like the Green Electricity system, for instance.

2.3 Technology development and innovation

Intensive development is under way to produce circular products. This requires fast, reliable and cost-efficient risk assessment methods. It is also necessary to establish pilot plants for chemical recycling and for circular chemical production based on recycled and biobased ingredients.

3. Summary

The chemical industry is industry's industry and a precondition for transitioning to a circular economy. New, smarter materials and more efficient recovery processes require chemical products if the circles are to be closed. The chemical industry can and will play a driving role in the switch to resource efficiency, both through circular chemical production and by helping downstream users to make their products circular.

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

Jernkontoret

1. Role in a circular economy

1.1 Role in the value cycle

The iron and steel industry process iron-based raw materials into steel products that are used in more-or-less all value chains.

Most products in modern society contain steel or are made using steel. The sector is strongly linked to the mining industry for iron ore and alloys, as well as with the recycling industry which collects scrap and sorts it into various classes. Steel production also creates residual materials (by-products and waste) that are used internally at the plant or serve as raw materials in other value chains. Residual energy in the form of process gases and heat is also used internally, by other companies or for district heating.

1.2 Materials, components, products

The Swedish iron and steel industry is a global, highly specialised supplier of high-quality products such as high strength steel, iron powder, stainless steel and special alloys. This entails a wide range of technical properties, and many end products provide additional benefit to society through more efficient resource utilisation. Internal scrap is recycled directly in the production process, while scrap from the manufacturing industry is collected in separate flows. When products reach the end of their service life, they become scrap. Product design can create opportunities for the re-use of steel components and help to facilitate the separation of different materials, thus improving the conditions for a more efficient recycling of steel scrap. The amount of residual materials is linked to the steel production volume¹. The largest amounts are industry-made minerals (i.e. metallurgic slag). The properties of the different types of slag have been carefully researched, and the societal values comes from specific technical properties, as well as by reducing the use of virgin material such as gravel and aggregate.

1.3 Trade and international perspective

Steel products are sold on a global market, and the majority of the Swedish steel production is exported to around 150 countries. The steel used in Sweden is largely imported. Raw materials (ore, scrap, limestone, coal and alloys) are traded on both a national and a global market. Sector-specific rules cover different scrap qualities, and there is a well-functioning market for scrap. Free and fair global trade is crucial to the Swedish steel industry, as are equal environmental requirements. By-products are primarily sold on the domestic market.

2. Opportunities and challenges

2.1 Instruments of control and incentives

Materials should be assessed on the same bases – irrespective of whether or not they come from a virgin source. Requirements for progressing towards reduced environmental impact and increased circularity must be based on science and accepted methods, and must incorporate a life cycle perspective. Different societal goals must be balanced against one another – for example, current and future needs for different materials and resources². Steel is 100 % recyclable. However, access to scrap is dependent on factors such as the service life of the steel products, global steel production, and how scrap is collected and sorted. Demand for

¹ The steel industry does more than make steel. Manual for residual products 2018.

² Agenda 2030 compass – Swedish initiative to achieve Agenda 2030 goals

steel is currently higher than access to scrap material. A tax on metallic raw materials or requirements concerning the share of recycled material in products would therefore not increase the recycling of steel.

Lifting the existing exemption on landfill tax for some types of process-related waste from the steel industry would neither result in a reduction in landfill. The environmental or climate footprints of materials and products constitute an important tool in evaluating different options from an environmental perspective. For fair assessment, it is essential to take the entire life cycle into account – i.e. including the final phase of the products' service life. Therefore, materials should be assessed from two complementary perspectives: both the recyclability of the material while retaining the quality and the content of recycled materials. The Swedish steel industry is actively supporting standardisation to allow comparison of materials and their use in a product with regards to environmental impact and energy efficiency. Separate standards for the parallel process-made residues are not required. Instead these materials should be incorporated on equal terms in existing product standards for the applications where the materials are used.

To achieve the goal of a non-toxic and resource-efficient cycle, a material should be assessed on the exposure of the component substances, and whether this constitutes a risk to people and/or the environment. The technical properties and the knowledge about the chemical composition of a steel product is the same, irrespective of whether the steel originates from virgin raw materials or recycled scrap. The actual source of the raw material is irrelevant from this perspective. From a risk perspective, it is important not to focus on the concentration of the substances in steel products. The properties of a steel alloy are not the same as the properties of the metals it contains. To increase the use of by-products, it is essential to ensure that they are always assessed as products. If provisions concerning by-products in the waste legislation are fulfilled, they should be assessed on equal terms with other products. In the implementation of the new waste directive, Sweden should follow the EU's wording and ensure its application.

2.2 Business models and profitability

The business models in the steel industry utilise the value of metals used, and recycling has long been powered by business acumen. The Swedish industry is heavily “niched” in order to be competitive on the global market. The industry supplies products with technical support and service that contribute to resource efficiency and improved product performance among customers. The industry is striving to make use of the value of by-products in a variety of applications.

2.3 Technology development and innovation

The Swedish steel industry's vision 2050 assumes that the sector will take the lead in technology development¹. This requires continuous innovation of the production processes, products and services. The industry is currently working on joint research activities to fulfil these goals. Digitalisation is being developed, and in future it will be possible to have information linked to a specific steel product throughout its service life. The sorting of steel scrap can be further refined to achieve an optimised utilisation of the alloying elements in the scrap. The shortage of scrap will result in a need for primary iron ore production during the foreseeable future, and the transition to a carbon dioxide-free iron production process entails major research challenges. As long as steel is produced, process-related residues will be generated as well. New steel and processes are bringing new properties to the residual materials – and thus new research challenges.

3. Summary

The iron and steel industry is fundamentally circular. Metals can, in theory, be recycled innumerable times, and steel is the most recycled material in the world. When steel is produced, process-related residual materials are generated as well. Completely different conditions and needs should apply to these two flows if they are to become more circular, and this must be considered when measures are proposed. An obvious starting point should be that all materials must be subject to the same requirements, irrespective of their origin in a given application/use.

¹ Vision 2050. Steel shaping a better future. <https://www.jernkontoret.se>

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

The Swedish Forest Industries

1. Role in a circular economy

1.1 Role in the value cycle

The forest and the products of the forest industry have a key role to play in the context of the climate and circular bioeconomy (Figure 1). The transition from a fossil economy to a biobased economy is crucial in the work to stop global warming. The basis for this is the nature’s cycle, in which carbon dioxide is bound through photosynthesis in the living, growing forest.

- **Circular cycle.** The forest industry is a part of the cycle. The growing forest absorbs carbon dioxide in the trees. Wood from trees is used to make products. Once the product has served its purpose, it can be recycled. Finally, it becomes bioenergy and rejoins the overarching cycle. By-products and waste from the manufacturing processes are utilised within own or other businesses.
- **Resource-efficient.** The forest industry makes use of all parts of the tree. Nothing is wasted.
- **Renewable raw material.** The Swedish forest industry plants two new trees for every tree harvested, and there is twice as much forest in Sweden forest today as there was a century ago.



Figure 1. The circular bioeconomy..

1.2 Materials, components, products

Material exchange or substitution is positive for the climate. This involves using renewable products from the forest to replace products made from fossil oil, or whose manufacture entails the consumption of large amounts of fossil energy. Construction materials, paper products, hygiene products, packaging, biofuel, chemicals, textiles and composites are all examples of products from the Swedish forest industry.

In the Nordic region, pulp, paper and board are principally made from new fibre. Other parts of Europe do not have the same access to forest materials, so the manufacture of paper is based to a higher extent on return recycled fibre. For technical reasons, paper fibre can be recycled 6–7 times before it is reused one last time as bioenergy. The input of Nordic new fibre therefore plays an important role in the European cycle.

1.3 Trade and international perspective

The Swedish forest industry accounts for 9–12 per cent of Swedish industry's jobs, exports, turnover and value added. It is highly export-oriented, and as the raw material is principally domestic and imports of forestry products are relatively low, the forest industry makes a significant contribution to Sweden's trade balance. Almost 90 per cent of the country's production of pulp and paper is exported, as are around 70 per cent of sawn wood goods. This places Sweden's forest industry second on the list of global exporters of these products.

2. Opportunities and challenges

2.1 Instruments of control and incentives

Instruments of control and incentives – at either global or national level – should promote development towards a circular economy. A helicopter perspective of the forest industry cycle and the contribution it makes to the circular bioeconomy are crucial factors to take into account before implementing instruments of control and incentives. Consequence analyses based on facts and dialogue with players involved, and the parameters of sustainable environment and economy should always be included as basis.

The opportunities the bioeconomy creates for greater competitive strength and environmental sustainability should be accorded an even bigger role in the development towards a circular economy in Europe.

2.2 Business models and profitability

A fundamental precondition for a thriving bioeconomy is access to raw materials, competitive enterprises and a robust working relationship between companies in different regions and different phases of the supply chain. From a global perspective, there is appreciable potential in planting more forest. In Sweden, the area of forest cannot be expanded significantly, but growth and harvesting can be increased within the framework of sustainable utilisation of the forest resource, i.e. profitable forestry that shows consideration for environmental aspects such as biological diversity, water quality, impact on the soil and social factors.

2.3 Technology development and innovation

In principle, anything made from oil can also be made from the forest. The potential in this fact is enormous, as it opens up opportunities for replacing materials with a greater climate impact and chemicals with biobased alternatives from the forest. The development of new materials and products demands major emphasis on research and innovation at universities, colleges, research institutes and commercial enterprises.

The forest industry's research agenda 4.0¹ is a compilation of the sector's common research and development needs. Research and innovation are to contribute to increased growth in sustainably utilised forests, strengthened competitiveness in existing processes and products, new biobased products, and an increase in industrial wood construction. Sweden is devoting 200 Million euros annually to forestry and forest industry research at universities, colleges and institutes, and the enterprises in the forest sector are annually investing another 200 million euros in their own research.

¹ <https://www.skogsindustrierna.se/siteassets/dokument/forskningsagendan/skogsnaringens-forskningsagendan4.0.pdf>

3. Summary

The bioeconomy, based on the renewable and sustainable raw materials from the forest, is a natural part of a circular economy, and biobased products from the forest can already replace numerous fossil-based products in society. Renewable raw material from the forest is refined in resource-efficient production processes that provide sustainable products.

Material recycling extends the service life of the fibres and improves resource efficiency in society. Both fresh and reclaimed fibres are needed as raw material in a future biobased economy.

In our opinion, Sweden – in the same way as many other countries – should formulate a strategy for conversion into a circular, biobased economy. The transition to a bioeconomy is not governed exclusively by the world of politics. The industry has to take the lead in this development.

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

The Swedish Trade Federation

1. Role in a circular economy

1.1 Role in the value cycle

The Swedish Trade Federation represents importers, wholesalers, retailers and e-commerce enterprises from a wide range of sectors: everything from staple goods to electronics, clothing, furniture, construction supplies and industrial consumables. Conventionally, the principal task of trade has been to mediate goods and services, functioning as the link between manufacturers and customers. With the advent of digitalisation and the development of e-commerce, globalisation has become a fact and the retail sector is being challenged by a new, increasingly tough, competitive situation. At the same time, appreciable opportunities exist for developing new business models and for expansion. A transformation is currently taking place in the Swedish retail sector, where roles are changing and where consumers are becoming increasingly digital and global. The classic wholesaler, which has traditionally occupied a clear position between manufacturer and retailer, has disappeared in many sectors, where manufacturers and retailers are increasingly interacting directly with one another. It all has to do with achieving economies of scale and improved control.¹ Consumers have also become better and better informed as regards both price and product properties – which has in many cases resulted in powerful pressure on prices. Digitalisation and the “always on-line” consumer will continue to grow in importance. In the immediate future, smartphones are sure to become the most important tool in all areas of the purchase journey, where research on the phone prior to a purchase or shop visit, and/or payment using the phone are set to become the most natural thing in the world.²

1.2 Materials, components, products

The Swedish Trade Federation has members in most sectors and areas of trade, selling goods under their own and/or others’ brands. With few exceptions, Swedish trading companies do not own production facilities themselves, preferring to outsource production or to purchase goods directly from the factory or via an intermediary. Digitalisation has not just increased the efficiency of production and expanded opportunities to make sales via the internet, it has also, in many cases, actually replaced physical products with digital services. Today, for instance, Spotify subscriptions have replaced physical CDs, Netflix and similar streaming services are taking over from DVDs, and audio books and e-books are reducing demand for physical books³

1.3 Trade and international perspective

The Swedish Trade Federation is dependent on global, open trade. The majority of the products consumed in Sweden stem from outside the country, coming primarily from other countries in the EU and from Asia. Components and materials feature in a complex global value chain, are assembled into products in one country before being consumed in another – Sweden, for example.

¹ Partihandelns roll i värdekedjan - idag och imorgon, HUI Research (The role of wholesaling in the value chain – today and tomorrow, HUI Research)

² Shopping centers in a digital world 2018, Svensk Handel (The physical commercial centre in a digital world 2018, Swedish Trade Federation)

³ Det stora detaljhandelsskiftet 2018 (The Great Retail Change, 2018), The Swedish Trade Federation

The principal market for members of the Swedish Trade Federation is the Swedish market, but more and more retail companies are now making the jump, exporting to and expanding into new markets (principally the Nordic region and the EU). Digitalisation and the constantly-expanding ecommerce have also given Swedish retailers the opportunity to establish a presence on new markets outside Sweden.

2. Opportunities and challenges

2.1 Instruments of control and incentives

The Swedish Trade Federation has identified challenges in both Swedish and European legislation when trading companies are to develop circular business models to the fullest possible extent. Waste legislation needs to be modernised; products and materials must be viewed as resources and not automatically classed as waste. More enterprises active in the field of trade would be able to take responsibility for products that arise in their business to increase the level of recycling and recovery. One obstacle to this is that Swedish waste legislation only permits operators approved as waste processors to handle resources that have been classified as waste.

In addition, the municipal authorities in Sweden have a monopoly on processing what is considered to be *household and comparable waste*. The majority of the waste generated in trade operations and in consumers' homes falls into this category. This evidently places an obstacle in the path of trading companies that are looking to contribute to closing the loop.¹ In addition to modified waste legislation, better incentives are required to encourage households to prioritise repairing, renting and selling on consumer products. The current regulations need to be reviewed to ensure that they support this. The incentive structure and legislation today still follow a linear model, in which it will usually prove unprofitable to take a circular approach. Moreover, companies often encounter a conflict of interest between the demand for “non-toxicity” and the increased use of recycled materials. Harmful chemicals must be phased out, but requirements on recycled materials, for example, must not be higher than those on virgin materials.

2.2 Business models and profitability

For companies operating in the world of trade to achieve their ambitions in the field of circular economy, opportunities need to be transformed into profitable, resource-efficient business models. Among the Swedish Trade Federation's major member companies, 3 out of 4 state that they see new business opportunities within circular economy. In addition to improved resource efficiency, business opportunities comprise: *Products and materials made of recycled material, repairs/upgrades and collection of products, and services such as hiring, subscriptions and leasing.*² A range of measures are being implemented in the world of trade to promote circular economy. Over and above growth in second-hand sales, measures in this area include stores taking back clothes and domestic fabrics, expanded and voluntary deposit systems in the retail sector, take-back and second-hand sale of furniture, an increase in spare parts and repair services, as well as leasing and take-back of machinery and components in the B2B sector.

2.3 Technology development and innovation

There is appreciable potential for reusing more products and materials and converting them into new products. For this to happen on a large scale, however, it is necessary to apply more stringent demands on the design and shaping of products, and to promote development of new materials. Above all, however, it is necessary to invest heavily in research and development of new recycling technologies that can handle more materials, separate mixed material and remove unwanted chemicals. In partnership with academia, the sector is involved in a number of different research projects, including projects centred on development of more durable textiles and improved sorting and recycling of clothes. The sector has also invested in a new sorting facility for more efficient recycling of plastic packaging, etc.

¹ Obstacles to increased circularity – A mapping process among the Swedish Trade Federation's member companies, 2018, The Swedish Trade Federation /2050

² Obstacles to increased circularity – A mapping process among the Swedish Trade Federation's member companies, 2018, The Swedish Trade Federation /2050

3. Summary

The retail sector is keen to contribute to the establishment of a resource-efficient, circular economy. This can be achieved through actions such as preparing sustainable, profitable and efficient business models. The majority of the Swedish Trade Federation's member companies are actively involved in sustainability issues and are willing to take on a greater responsibility for their value chain, but they are encountering a variety of obstacles in their efforts to reuse and recycle their products. What is needed involves both some kind of incentive to make it more competitive to sell products from recycled materials, and the passing of better legislation that promotes circular economy across national borders. Trade is international, with long value chains where products and materials are purchased and sold on global markets. The markets for recycled materials and components must likewise become truly global. Several major trading companies are of the opinion that circular economy is a mission-critical issue for the future. Shortage of resources and materials in the future require transition to a more circular and sustainable production today.



Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

The Swedish Aggregates Industry Association

1. Role in a circular economy

1.1 Role in the value cycle

Aggregates producers are raw materials suppliers who sell refined, CE-labelled materials and materials backed by a declaration of performance to building and construction companies. The biggest companies (Skanska, NCC, PEAB and Svevia) all have their own quarries, but purchase products from/sell them to competing building and construction companies as required.

Today, the sector primarily uses virgin materials to create its products. There are appreciable opportunities in the future to produce a much higher proportion of qualified products from recycled material such as excavated soil and rock, demolition waste and surplus material generated from building and construction work.

1.2 Materials, components, products

Aggregate material is an indispensable local Swedish raw material. It is necessary for the establishment of well-functioning infrastructure in the form of housing construction, roads, railways, ports and airports, and thus for the development of the business community and employment. Every year, almost 100 million tonnes of aggregate are produced and delivered, which makes this the biggest industrial product in Sweden calculated by weight.

Quarries are ideal places for the recycling of major material flows, such as excavated rock, surplus material, concrete and asphalt from the reconditioning of roads. The quarries are licensed and tested in accordance with the Swedish Environmental Code for drilling, blasting and crushing of the rock broken down in the quarries. They are appropriately positioned close to the sales areas, and have space and resources on site that can be used for recycling – in the form of personnel and machinery, for example.

1.3 Trade and international perspective

The market for the aggregate industry is heavily regional in its nature. Excessively long transports will quickly result in transport costs becoming a disproportionately large share of the total cost of the product. At distances as short as 20–40 km, the transport costs as much as the material itself. Only a tiny amount (< 1%) of the aggregate industry’s products is exported.

2. Opportunities and challenges

2.1 Instruments of control and incentives

In today’s legal systems, major questions exist regarding the recycling of aggregates, asphalt and concrete. One obstacle to increasing circular material flows is the fact that excavated rock is often erroneously classified as waste. There is significant financial jeopardy associated with taking in a material that risks being classified as waste in the quarry.

Moreover, different supervisory authorities and municipalities apply different assessments regarding what actually qualifies as waste. Different inspectors within the same local authority may also make different assessments. Considerable uncertainty exists regarding legal status, given that the same material can be assessed as waste or as a product, depending on who performs the assessment.

Clear instructions from the authorities are required with regard to what is not covered by the framework of the definition of waste, so as to ensure uniform assessments throughout the country.

The industry believes that the Swedish Ministry of the Environment should commission the Swedish EPA to prepare End-of-Waste criteria for ballast material. Ballast material is mentioned in Article 24 of the Waste Directive as being suitable for End-of-Waste criteria.

Well formulated regulations concerning licence- and notification obligations for handling waste, as well as clear and functional criteria regarding when waste ceases to be waste (End-of-Waste) could increase the number of operators willing to accept recycled material, and contribute to a rise in recycling within the sector.

Authorities currently have a tendency to be too restrictive in their assessments of where recycled material may be used, which translates into major costs for society, unnecessary transports and an obstacle to circular flows of material. Circular society needs to demonstrate greater acceptance of location-specific assessments that are based on appropriate principles that promote circular flows of material, and which feature reasonable weighting with regard to protection of the surroundings.

Clearer guidelines from the authorities are required regarding the interpretation of threshold values, decisions concerning where recycled material may be used, etc. in order to ensure uniform assessments throughout the country.

2.2 Business models and profitability

It is costly to dispose of demolition material and excavated soil and rock. The large-scale resource recycling that is possible within the framework of the aggregates industry is thus considered to be a circular business model that should be applied to an appreciable extent – unless the financial and legal risks are excessive – and if the client (primarily state and municipal authorities) were to choose to use recycled material as soon as it fulfils the technical requirements for the given area of use.

Recycled concrete, asphalt and excavated rock can compete with virgin aggregate. The price of the recycled material must be lower if customers are to choose to buy recycled rather than virgin aggregate. If the price cannot serve as the driving force for an increase in recycling within the industry, other incentives are required to boost the market for recycled material, such as requiring projects to use a given proportion of recycled material.

If recycled material is to be able to compete on equal terms – or even be favoured in relation to the use of virgin material – the measures applied must not be too restrictive as regards where the material that can be used, nor must the analysis procedure be too complicated and expensive.

2.3 Technology development and innovation

In many heavily built up countries in Europe, aggregate is in short supply because access to virgin material is significantly more restricted than in Sweden. For many years, these countries have been operating under conditions that oblige them to utilise aggregate more efficiently. There are examples of advanced technology in countries that recycle aggregate for highly qualified purposes. For Sweden, there is great development potential in learning from these countries and replicating their way of working.

Increased traceability is a key precondition for recycling in the future, and new opportunities for efficient tracking are opening up with the ongoing digitalisation of society. Increased traceability translates into increased control.

3. Summary

The aggregates industry processes huge volumes of material every year, and there is significant potential for improving the circular material flows in the sector. The following are necessary to boost circular material flows in the aggregates industry:

- Clearer instructions from the authorities regarding interpretation of threshold values, conservation values, etc. so as to assure uniform assessments.
- Clearer instructions from the authorities concerning when waste ceases to be waste – and about what is not considered waste – so as to assure uniform assessments.
- Increased acceptance of location-specific assessments regarding where recycled material may be used, based on appropriate principles and with circular economy as the goal.

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

Swedish Association of Mines, Mineral and Metal Producers

1. Role in a circular economy

1.1 Role in the value cycle

Sustainable societal development is dependent on the raw materials produced by the mineral and metal sector. Global demand for minerals and metals is increasing due to the growth of the population, because more and more people are enjoying a higher standard of living, and because metals and minerals are required for the energy transition needed. Solar panels and wind power, more efficient batteries, distribution of electricity and modern electronics are all examples of technologies that will demand more – and to some extent, new – metals and minerals. Within the foreseeable future, the circular economy will require a significant input of primary resources.

Metals are elements that can be recycled over and over again without losing their properties. For some metals and goods that incorporate metals, well-functioning systems for collection and recycling have been in place for decades. For others, properly functioning recycling systems still need to be developed. Companies in the metal and mineral sector are key players in the development of more efficient and competitive technologies for the recycling of additional metals.

Minerals and metals mark the start of long value chains branching out into society.

1.2 Materials, components, products

We are a raw material sector that produces metal concentrate for the manufacture of metals; iron ore pellets for steel production; finished metals such as copper, zinc, lead, gold and silver; limestone and cement and a range of other minerals.

Mining operations generate large volumes of waste which, in principle, consist of barren rock – known as “waste rock”, which is “left over” from the extraction of metals. This waste may, however, constitute a resource. Crushed aggregate can, for example, be sold for construction purposes, while other types of waste could, with the assistance of new technology, be used for the extraction of phosphorus and rare earth metals. In cement, industrial residual material can be used as a substitute for primary raw material to some extent.

1.3 Trade and international perspective

Limestone and cement are principally produced for a national market, while metals are traded globally. A special feature of the mining and metal sector is that the prices of metals are set on international raw material exchanges. This means that Swedish mining and metal producers are unable to raise prices unilaterally to cover increases in costs. In order to cope with international competition, enterprises must run cost-efficient production, but they must also be given the opportunity to operate on competitive terms.

Metals and metal products constitute an important export product for Sweden (10–15% of the export value). The Swedish mining and metal industry also play an important role in Europe, accounting for 95% of European iron ore production and significant shares of the production of base metals and gold. From a broader international perspective, however, Sweden is only a small producer, accounting for less than one per cent of the global production of these metals.

2. Opportunities and challenges

2.1 Instruments of control and incentives

It is important that instruments of control/incentives introduced to boost recycling do not have negative effects on the international competitiveness of the Swedish mining and metal industry. We take a positive view of incentives intended to improve market conditions for recycled material. However, placing extra costs on domestic primary production stifles the competitiveness of Swedish mining companies, and benefits importers of raw materials instead.

It is also important to safeguard and develop recycling systems that are functioning smoothly today. One example of a measure which, if implemented as planned, will complicate processing and entail significant extra costs for electronics recycling in Sweden, for example, is the proposed waste incineration tax.

Today, the utilisation of residual products and waste is limited by an unnecessarily restrictive set of regulations. This applies, for example, to the use in construction of waste rock from the mining industry and of slag from the metal industry.

In order to allow significant progress to be made towards a circular economy, investments will have to be made in expanded recycling capacity, infrastructure and new technology for recycling. The fact that it can also take an unreasonably long time to obtain environmental permits for new or expanded operations is a problem that is highlighted in many other contexts, but which may eventually prove an obstacle to the desired development towards a more sustainable and circular economy.

2.2 Business models and profitability

Recycling constitutes an important and growing share of the raw material base for the Swedish metal and mineral industry. The sector has the stated aim of continuing to supply the markets with sustainably manufactured material, based on both primary and recycled raw materials.

A precondition for achieving this ambition in practice is to be profitable in competition with raw material producers in other parts of the world.

2.3 Technology development and innovation

One important area for technology development comprises mineral-technical solutions for optimised resource utilisation of the materials extracted from mines and quarries, i.e. how to optimise returns from the substances that are already being extracted, and how to make use of more substances that are currently contained in waste and deposited in landfills.

Another area is the development of technology for recycling more of the substances used in today's often highly complex products. This applies in particular to electronic products.

A third related area centres on how products can be designed so as to facilitate recycling. The manufacturers themselves are responsible for product design, but this is an area that should be developed through a working relationship involving material suppliers, manufacturers and recyclers. Here, our enterprises are to be found at both the start and end of the value chain.

3. Summary

Given a growing population and a rising standard of living, global demand for metals and minerals is set to continue increasing for the foreseeable future. The development of more-efficient resource utilisation and circular material flows is highly appropriate, but will not be able to replace new mining.

The Swedish mining, metal and mineral industry is – and intends to continue to be – a key producer of primary raw material, but also plans to play a significant role with regard to the recycling of raw materials and components. The opportunities for recycling more metals from the increasingly complex electronic products that are being placed on the market constitute a challenge and an important area for technological development and innovation.

In order to meet future challenges, it is necessary to ensure that our operations can be run competitively at international level, and that there is latitude to carry out the comprehensive investments needed for the adaptation and development of new technologies.



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Teknikföretagen

1. Role in a circular economy

1.1 Role in the value cycle

Teknikföretagen is The Association of Swedish Engineering Industries and one of the biggest employer organisations in Sweden with more than 4,000 member companies. Together they account for one-third of Sweden’s exports. While our members do include a number of global companies such as Ericsson, Scania, ÅF, ABB and Volvo, most are significantly smaller. Traits they all share are that they develop world-class goods and services, and that all sales are subject to global competition. The export industry features customers and suppliers all over the world; this means that the views and development of other markets with regard to these issues are crucial if deals are to become circular on markets outside Sweden as well.

1.2 Materials, components, products

The biggest flows comprise complex products and the components used in them. The materials used are primarily metals, plastic, glass and composites. For products featuring a high content of metal(s), it is often possible to recycle 90 per cent (by weight) of the materials. Many of the hi-tech products has a high material value even when they reach the end of their service life, which is one of the reasons why it is extremely unusual for these products to end up in landfills.

Plastic is an important component in advanced technical applications. Members of Teknikföretagen are active in this area, too. Targets and ambitions to increase the use of recycled material are on the rise. For example, Electrolux utilised more than 5,000 tonnes of recycled plastic in 2017. Another example is Volvo, which recently published the news that at least 25 per cent of the plastic used in new Volvo models is to stem from recycled material starting in 2025.

1.3 Trade and international perspective

The circular economy is not a local matter – it is a global issue. For hi-tech, innovative enterprises active on a global market where a large proportion of customers and markets are outside Sweden, international trade is hugely important; this also applies to return flows of products.

Free trade is a precondition for circular economy and resource efficiency. Shutting down free trade would hinder and obstruct the circulation of all forms of resources. Products are largely used their whole product life on the markets to which they are sold, and are not returned to Sweden for scrapping.

In 2017, Sweden exported technological goods valued at more than SEK 600 billion, which corresponds to 47 percent of the country’s total exports of goods. Several of the nations at the top of the list – Germany, Finland, the Netherlands and the UK, for example – also belong to the group of countries that have prepared plans or strategies for increased resource efficiency and circular economy. What happens to a product in other countries depends on a variety of factors, such as differences in the business climate and access to materials in the local economy.

2. Opportunities and challenges

2.1 Instruments of control and incentives

In the long term, the rules of the EU internal market must apply to all resources – including waste. The reason for this is to ensure that the market for recycled material can develop, and that access to recycled material of appropriate quality can improve. European laws and regulations should be reviewed to check that they benefit more circular and sustainable solutions, based firmly on the principles of free trade.

Public sector players in Sweden should invest in solutions that are circular, climate smart and resource efficient. In this context, national instruments of control can be used to define procurements. Product regulation is a roundabout route to a circular economy, however, given that regulatory requirements on resource efficiency have to be measurable.

Working relationships between start-ups and established industrial players need to be promoted. Incubators, together with universities and colleges, can partner with the strategic innovation programmes in encouraging established industrial players to work with ranges of products and services that challenge linear business models.

2.2 Business models and profitability

A circular business model can result in the material resources remaining in the company's possession, which would naturally affect financing solutions. New business models may involve linking customers more closely to the seller – through packages including both a product and an associated service, for example. This could provide Swedish companies with competitive advantages in the face of countries with low production and manufacturing costs. Enterprises can make their business more circular by offering customers supplements such as maintenance, repairs, software updates and new types of services; they could even offer to take back products.

As long as the linear economy remains highly profitable, companies will only work with circular business models to a limited extent – through idea projects and innovation projects, for example, and via demonstrations of future circular business set-ups. In order to develop the concept of circularity within the industry, it is necessary to implement complex change processes with significant business opportunities. There are new opportunities for industry to take a more circular approach, but even today it is often hard to inject sufficient profitability into new models. A number of challenges have to be overcome in the context of new business models – from the perspective of accounts, for example.

2.3 Technology development and innovation

R&D, technology development and innovation are important not only in promoting more circular products and the associated services, but also in developing recycling technologies for certain materials.

3. Summary

Making long-term plans for circular economy presents an opportunity to achieve greater profitability, improve competitiveness and present new, innovative products and services in the future. A clear Swedish vision of a resource-efficient society sends an unambiguous signal regarding the development of industrial solutions that are attractive at international level. It is also important to establish and develop global agreements and international standards for products traded globally. The global working relationship under the auspices of Agenda 2030 is a key platform for industrial development in the field of resource efficiency and, in the longer term, circular economy.

To find out more and see examples of innovative circular solutions from members of Teknikföretagen, read our report online at <https://www.teknikforetagen.se/globalassets/in-english/circular-economy--business-with-new-values.pdf>

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

TEKO, Swedish Textile and Clothing Industries` Association

1. Role in a circular economy

1.1 Role in the value cycle

TEKO, the Swedish trade and employers` association for companies working in the textile and fashion industry, stems from the Swedish textile and clothing manufacturing industry which has been comprehensively restructured since the time of the textile crisis. The textile and fashion sector have developed from an industry that employed a great many people both in sewing and textile production to its current form, where domestic production consists of higher-quality textile products, and where it considers itself to be highly innovative, with strong belief in the future and elevated emphasis on sustainability. Our members` product ranges span a broad spectrum encompassing domestic fabrics, furniture fabrics, rugs, clothes for fashion, sports, work and protection, hospital textiles, greenhouse weaves, automotive upholstery, roller blinds, tents and more.

In Sweden, we have companies that knit, weave, dye, print and finalise textiles and fabrics through a variety of processes – although to a lesser extent than previously. Other enterprises have their own production facilities or purchase production outside Sweden. They may also purchase textile products from countries both within and outside the EU.

At global level, the textile and fashion industry is a highly resource-intensive industry that has a major impact on the environment, and as a sector in Sweden we can help contribute to change. We were quick to start working together to phase out hazardous chemicals and to minimise the consumption of water and energy in our textile processes, and we are currently participating in the EU work to promote sustainable textile production. Many of our members are small and medium-sized enterprises, several are suppliers to the public sector, and through their and TEKO`s involvement in research projects, authorities` reference groups and the like, we can contribute experience in the context of the work to make our industry more sustainable and circular.

Irrespective of the type of textile enterprise, there is always the opportunity to contribute in different ways to increasing sustainability in the value cycle. Issues we are actively occupied with today include working from the very start to design products to have extended lifetimes and to facilitate their subsequent processing, as well as making sustainable choices of materials and processes, new business models, etc. These are also areas where we as a sector organisation are supporting our members.

1.2 Materials, components, products

Textile materials are made of fibres – natural or synthetic – which are subjected to various processes to turn them into yarn, fabric, clothes and other products. Different types of fibre are mixed in the textile materials to achieve different functional properties and a prolonged service life. The raw material for the fibres may come from a variety of sources; for example it may be cultivated or stem from the forest, it could also be oil-based or animal-based. Environmental impact differs between the different fibres, both as regards the raw material and the subsequent processes. However, recent research indicates that the nature of the fibre may have less impact on the environment than, for example, the issue of which factory produced it.

There are no large-scale fibre spinning operations in Sweden today, but we do have companies that weave and knit, even though the really large quantities of fabrics for clothes, bathroom textiles, etc. are made in other countries either within or outside the EU. The same applies to the dyeing of yarn and fabrics. Moreover, we no longer have any large clothing manufacturing factories, and sewing skills are in short supply. The manufacture of textile products often involves long, complex processes where the production facilities for one and the same product may often be located in different countries or even on different continents.

1.3 Trade and international perspective

Our textile enterprises operate on a global market where players buy yarns, fabrics, dyes, chemicals, accessories, etc. for further processing, or purchase finished products. In addition, some companies have their own production facilities or purchase production capacity elsewhere. Many of the enterprises are heavily dependent on the global market, with an export percentage that is often 75% or more. All in all, this means we are a sector in great need of globally harmonised legal requirements and regulations if we are to be able to work in a sustainable and transparent manner, and to achieve a circular system for textiles. We must also work across national borders to create opportunities to reuse and recycle used textiles in a commercially viable manner. Several countries have stopped importing second-hand textiles today, which was previously one way to reuse textiles from Sweden. The EU Waste Directive is also complicating the process.

2. Opportunities and challenges

2.1 Instruments of control and incentives

TEKO and the sector were some of the first players to become involved in encouraging the EU Commission to press for tougher chemical legislation for textile products. We consider it to be important to the industry that legislation be introduced at EU rather than national level if our companies are to be able to compete on equal terms in a truly global arena.

The most important environmental parameter for a textile product is to ensure it has a long service life – at the same time as making sure it fulfils its functional properties – given that the production phase accounts for the greatest environmental impact by far. However, production itself must also be performed in a sustainable manner. It is therefore important to make sure that any product regulation introduced does not counteract this. Through increased purchases of sustainable textiles, and via innovation procurements, the public sector has an excellent opportunity to help make more products available on the market – but it must do so without micro-managing. The next aspect centres on the capacity to recycle used products, but technology is not yet sufficiently advanced to allow us to sort and recycle textiles. In this context, we therefore need to introduce a different type of extended producer responsibility (EPR) than the traditional format, so that we can work together to find solutions to collection and recycling issues. It is also essential to review legislation regarding waste so that textile resources are not incorrectly classified as waste.

When discussing taxes and legal requirements, the starting point must be that ecommerce should be regulated to the same extent as private import.

2.2 Business models and profitability

Creating textile products with the longest possible service life allows space for different types of business models such as clothing libraries, subscriptions, exchanges of items of work clothing, repair service, sewing for redesign, and so on. One problem, however, is that many of these services are labour-intensive, which leads to profitability issues. What is more, sewing skills are in short supply today as we no longer have a clothing manufacturing industry. Higher vocational education has an important role to play in this context.

2.3 Technology development and innovation

The Swedish textile industry today is a sector focused on high-quality products and sustainability. TEKO and many of our member companies are therefore becoming involved in a variety of research projects that support innovative solutions and the establishment of a circular system for textiles. The Foundation for Swedish Textile Research (Stiftelsen Svensk Textilforskning) is helping make funds available for projects and equipment, but to overcome the issues we are facing, we still need appreciable support for research and development through state financing.

3. Summary

The Swedish textile and fashion sector has major potential to contribute to a more sustainable global textile industry. We have both the capacity and the will to do so by working actively with the issues identified, cooperating with public authorities and other players in different types of projects and initiatives, and working across sector and national boundaries – but this is dependent on us, as a sector, being assured the conditions we need to make a contribution at the same time as ensuring our survival.

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

The Swedish Federation of Wood and Furniture Industry (TMF)

1. Role in a circular economy

1.1 Role in the value cycle

TMF’s member companies manufacture products with high refinement value, such as industrial production of wooden houses and furniture, as well as products intended for further refinement – for the building and furnishing sectors, for example. The wood and furniture industry plays an important role in refining wood goods from the sawmill industry. Many products have very long life cycles. The customer base is made up of private consumers, public procurement and business-to-business operators.

1.2 Materials, components, products

TMF represents companies active in the industrial production of wooden houses, kitchens, bathroom furniture, wooden components, special furnishing solutions, wooden stairs, wooden flooring, windows, doors, furniture and joinery products. Raw materials, components and intermediate goods comprise materials such as wood, metal, fabrics, leather, upholstery, plastic and composite, as well as paint, varnish, stain, adhesive and the like. A significant proportion of the companies use wood or wood-based materials as the predominant raw material.

1.3 Trade and international perspective

The wood and furniture industry is dependent on smoothly functioning trade. A large number of intermediate goods and raw materials are purchased internationally, from the EU or Asia, for example. The customer base comprises operators on both the domestic market and the international export market. The furniture industry and some specialist joineries sell a large proportion of their production for export, while the domestic market is largely distinguished by industrial enterprises and manufacturers of kitchens, windows, staircases and other construction goods. As the sector’s suppliers and customers are spread over large geographical areas, interaction with other players and industrial symbiosis are essential in closing material flows and increasing the degree of circularity.

2. Opportunities and challenges

2.1 Instruments of control and incentives

The wood and furniture industry has identified challenges to developing circular business models in both Swedish and European legislation. For example, the General Product Safety Directive must be clarified so that equal requirements are imposed on remanufacturing as on new production. The prevailing chemical legislation with its requirements on verification of detailed chemical content risks hindering development of circular solutions, as it is highly challenged to perform tracing related to recycling. Regulations within the EU must be developed so that equal terms apply and businesses can be run on equal conditions within the union. Public procurement has a significant role to play in stimulating development of circular solutions, where increased collaboration between the public sector and the business community is warmly welcomed.

2.2 Business models and profitability

The wood and furniture industry features appreciable breadth in both enterprises and types of products; as a result, different business models are being developed and tested to increase the level of circular flows: everything from the work of the furniture industry with leasing, certified renovation, upgrading and upcycling, to the construction and building material industry which is developing solutions for remanufacturing and extended life cycles.

2.3 Technology development and innovation

Potential exists for developing technology for increased remanufacturing on an industrial scale, where products or components taken back constitute new intermediate products in production processes. In cooperation with academia, the industry is involved in multiple research projects intended to develop technologies and business models for increasing the level of circularity and circular business models.

3. Summary

TMF represents various branches of industry with different prerequisites for developing circular business models. Wood is a common factor for many companies, and this material is well suited to circular economy. Given that certain obstacles can be bridged, the wood and furniture industry has excellent opportunities for developing its range of products and services, with products distinguished by modularity that facilitates upgrading/repair/take-back and a high degree of remanufacturing.

Sector-specific appendix to the Confederation of Swedish Enterprise document entitled: “Circular economy for a competitive and sustainable business community in Sweden”

The Swedish Recycling Industries’ Association

1. Role in a circular economy

1.1 Role in the value cycle

The recycling industry plays a crucial role in the transition from linear to circular resource flows. Research indicates that carbon emissions from industry in Europe could be halved by introducing more circular flows of materials. Recycling is essential in achieving this development and saving the climate.

Recycling companies have a key role to play in all areas of the value cycle and contribute everything from assisting manufacturers in designing their products, to collecting waste, processing it and converting it into new raw material. The Swedish Recycling Industries’ Association is the sector organisation for private sector recycling companies. The members generate turnover of approximately SEK 25 billion, primarily through collecting residual products and generating new raw materials that facilitate circular material flows in all parts of society. Around 20 million tonnes of material is processed in our 500 installations, which are spread throughout Sweden. This is not enough. Recycling companies want to increase circularity, not only because this will allow the sector to expand and create jobs, but also to help Sweden cut both costs and emissions considerably through increased use of recycled material.

1.2 Materials, components, products

In principle, recycling companies can recycle all kinds of products and materials. Increased use of recycled material is essential, given that it can help cut carbon emissions appreciably, both nationally and internationally. Recycled raw materials are climate-smarter than virgin materials; in some cases, carbon dioxide savings can be as high as 95 per cent when recycled materials are used instead of new ones. Research also demonstrates that it is financially profitable to increase the use of recycled material. We need to manufacture products from recycled material, and to design them so that they can be separated, sorted and recycled again.

1.3 Trade and international perspective

The recycling sector is dependent on international prices for raw materials, and for cross-border trade in raw materials. A number of Swedish recycling companies run comprehensive international businesses. Swedish recycling companies also have appreciable growth potential on the international market. Global infrastructure needs to double by 2050, and a breathtaking increase is expected in global consumption of products. The production of various types of base material accounts for almost one-fifth of carbon emission in the world today. The increasing global population and rising standard of living demand a major expansion of infrastructure. Without construction and manufacture based largely on reused and recycled materials, we will never meet the terms of the Paris Accord.

2. Opportunities and challenges

2.1 Instruments of control and incentives

The business community has an important role to play, and with their ambitious goals and business models, many Swedish companies are already at the cutting edge of circularity. At the same time, politicians must facilitate a circular economy by setting targets and establishing tangible incentives for profitability and markets. The Swedish Recycling Industries' Association would like to see more powerful measures for boosting demand for recycled raw materials.

- Introduce national targets for the share of recycled material in products released onto the Swedish market. Today, there are targets linked to collection and recycling, but not to the actual use of the recycled material
- Prepare an action plan for increasing the use of recycled material.
- Introduce financial incentives that make recycled material more competitive on the market, and which encourage demand for recycled material.
- Introduce requirements that recyclable material must be sorted from waste destined for incineration or use as landfill.
- Establish conditions for circulating material through flexible and efficient systems, without being obstructed by municipal monopolies on waste processing.
- Commission procurement authorities to develop criteria for prioritising products containing recycled material by making this a requirement in legislation concerning public sector procurements.
- Introduce requirements that products and materials released onto European markets must be designed to facilitate recycling.

2.2 Business models and profitability

Recycling companies are working actively on the development of new circular business models. One example of this centres on product design that facilitates recycling. Sweden has the opportunity to earn billions through increasing resource efficiency. This is one of the findings of the research report entitled *Ett värdebeständigt svenskt materialsystem* (A Swedish material system that retains its value) which charts how much financial value is lost through our failure to apply resource-efficient treatment to our worn and fatigued materials and products. The report also touches on how large a proportion of the multi-billion-kronor sums that are lost annually could be claimed back; this is a major industrial opportunity and challenge for both the business community and the world of politics. Only a quarter of the material value of steel, aluminium, cement, plastic and paper remains following one cycle of use, despite the fact that much of this material could be recycled to a high level of quality. Fully SEK 42 billion is lost every year from these five materials alone. A precondition for more profitable resource-efficiency is the stimulation of demand for recycled material.

2.3 Technology development and innovation

The waste and recycling market today is largely a service market with a growing number of enterprises that are creating innovative recycling solutions, and which are working increasingly closely with the manufacturing industry. In order to accelerate the development of sorting and recycling technologies – in the area of plastic and fabrics, for example – there is a significant need for research funding close to the businesses.

3. Summary

It is time for a paradigm shift: from linear to circular material flows. In order to achieve this, products have to be designed to facilitate recycling and more utilised products and materials must be collected, sorted and converted into new raw materials that are in demand on the market. Increased use of recycled materials is quite simply essential if Sweden is to reduce emissions and achieve its aim of “net zero emissions” – and of becoming an international role model in the field of circular economy.