PAPERS PRESENTED AT THE EUROPEAN FORUM FOR MANUFACTURINGS ROUNDTABLE & DINNER DEBATE

‘CIRCULAR ECONOMY & THE WASTE PACKAGE’

WEDNESDAY 27 JANUARY 2016

Room ASP 1H01 - Members salon
European Parliament - Brussels
Good evening Ladies and Gentlemen, dear colleagues. I would like to welcome you most warmly to the European Parliament

My name is Jo LEINEN. I am a German Social Democrat Member of Parliament and have taken a keen interest in this policy area since I was Chairman of the Parliamentary Environment Committee.

For those of you attending the European Forum for Manufacturing for the first time, it was established by the former Chair of the Parliament’s Internal Market Committee, Malcolm Harbour.

It is
- a cross party,
- pan European platform
- set up to debate economic, employment and environmental policies having an impact on manufacturing.

As you know, the European Commission recently published their new Circular economy package. I believe a resource efficient circular economy can become a real 21st century growth project for Europe. It can provide solutions to environmental as well as labour market problems. When using less primary resources, businesses may save money and the environment is better protected. A range of new jobs will be created at the same time both for engineers as well as for workers.

A circular economy will help us shift from a throw-away society to a culture of recycling, reusing and remanufacturing - with a lot of business opportunities emerging.

Tonight, to debate the content of this package, we are very pleased to welcome back to this Forum the European Commission’s Director for the Green Economy Kestutis SADAUSKAS.

Kestutis’ role is to support the transformation of the European Union into a Circular Economy that uses its resources efficiently and decouples economic growth from environmental impact and resource use.

His Directorate aims at enhancing competitiveness through eco-innovation, promotion of recycling and progressive waste management.

I therefore would like to invite him now to address us on the Commission’s Package.
Closing the loop – An EU action plan for the circular economy

The European Commission has adopted an ambitious new Circular Economy Package. The broad measures for changing the full product lifecycle go beyond a narrow focus on the end-of-life stage and underline the Commission’s clear ambition to transform the EU economy and deliver results. Key actions adopted or to be carried out include:

- Funding of over €650 million under Horizon 2020 and €5.5 billion under the structural funds;
- Actions to reduce food waste including a common measurement methodology, improved date marking, and tools;
- Development of quality standards for secondary raw materials to increase the confidence of operators in the single market;
- Measures in the Ecodesign working plan for 2015-2017 to promote reparability, durability and recyclability of products, in addition to energy efficiency;
- A revised Regulation on fertilisers, to facilitate the recognition of organic and waste-based fertilisers in the single market and support the role of bio-nutrients;
- A strategy on plastics in the circular economy, addressing issues of recyclability, biodegradability and the presence of hazardous substances in plastics;
- A series of actions on water reuse including a legislative proposal on minimum requirements for the reuse of wastewater;
- A clear timeline for the actions proposed and a plan for a simple and effective monitoring framework for the circular economy;
- The revised legislative proposal on waste sets clear targets for reduction of waste and establishes an ambitious and credible long-term path for waste management and recycling.
• To ensure effective implementation, the waste reduction targets in the new proposal are accompanied by concrete measures to address obstacles on the ground.

• Key elements of the revised waste proposal include:

• A common EU target for recycling 65% of municipal waste by 2030;

• A common EU target for recycling 75% of packaging waste by 2030;

• A binding landfill target to reduce landfill to maximum of 10% of all waste by 2030;

• A ban on landfilling of separately collected waste;

• Promotion of economic instruments to discourage landfilling;

• Simplified and improved definitions and harmonised calculation methods for recycling rates throughout the EU.

• Concrete measures to promote re-use and stimulate industrial symbiosis—turning one industry's by-product into another industry's raw material;

• Economic incentives for producers to put greener products on the market and support recovery and recycling schemes (e.g. for packaging, batteries, electric and electronic equipment, vehicles).

Andreas QUETT, Senior Manager, Design for Environment, Bosch

The Circular Economy Package II of December 2015 is the first comprehensive approach to tackle the economy in its circularity and it will have a large influence for further business activities of the European Industry and of course also for Bosch.

As the energy efficiency of appliances in important sectors is reaching its physical limits, RB sees a competitive advantage in circular economy for new business models involving re-use, repair & remanufacturing, recycling as well as upgrading.
It will be a competitive advantage for Bosch in extending functioning reverse logistics and remanufacturing concepts (today eXchange Program with 2.7 mio parts p.a) as well as spare parts availability.

Since these business models extend a product’s life time, planned obsolescence and durability are out of question for RB.

However, we need to have in mind, that each activity has to go in line with trade offs in quality, safety, consumer choice, technical feasibility and economic aspects.

Therefore the development of a smart resource efficiency framework is of utmost importance. Instead of integrating it in an overall-approach into Ecodesing and the Energy Label, such a smart framework should only – if necessary – lay down basic and standardised requirements reflecting specific needs of each product category or sector (a PT is different to a heating system) supporting the innovation of manufacturer.

In addition, we advocate for a strict implementation of the waste hierarchy, harmonization with other regulation like REACH for establishing Market signals for secondary raw materials. In this respect, the repair-as-produced principle should apply as general rule.

In order to develop a healthy market for secondary raw materials, RB supports the Commission’s proposal to develop minimum standards, especially on recycled content such as plastic.

To sum up, we think, the consideration of a product’s entire life cycle is the next step industry has to take. Let’s roll up our sleeves and get to work and discuss how to wisely integrate it in functioning regulatory framework to enable new business models.

Bruno VERMOESEN, EU Affairs Manager, BSH

Mr Vermoesen gave the following presentation
BSH Reverse Logistics and collaboration with the re-use sector

Circular Economy & the Waste Package

EFM & ZVEI Roundtable & Dinner Debate

27 January 2016

Bruno Vermoesen

The ordinary supply system of new appliances to the traditional retail
The ordinary collection system of WEEE from the retail

Start with empty trucks

Recycler

Full trucks

Sorting center
Reverse logistics and collaboration with the re-use sector
Back in 2005 first thoughts came up in Belgium on how BSH could increase its contribution to the WEEE-collection in combination with an increased service to its customers. The concept of reverse logistics was born: the use of the ordinary supply mechanism of new EEE to the retail as a collection system of WEEE. It was set in place in 2007.

Every day full trucks leave from the BSH warehouse for the delivery of new EEE to the retail, returning empty.

For the collection of WEEE, empty trucks leave the collection center, collecting WEEE from the retail (and other collection points), returning full.

The new concept is combining the two: full trucks leave for delivery of new EEE, collecting WEEE from the visited retailers. By doing so a (partially) filled truck returns to the warehouse, where the collected WEEE is sorted by category directly into the Recupel containers. Recupel is the Belgian takeback scheme (Producer Responsibility Organisation).

This system saves trucks for the pickup of WEEE, thereby reducing CO2-emissions and contributing to the reduction of air pollution and road congestion. Furthermore, as the WEEE is properly sorted and sent for recycling according to the highest standards, BSH is contributing to the achievement of collection and recycling and recovery targets.

From the collected WEEE, BSH-appliances which could be used by the re-use sector are sorted out, and are checked for functionality by a BSH service technician. Those waste appliances which are still functional, or which can be repaired with minimum effort, are sent to the re-use organisation SOFIE, nearby BSH's warehouse.

Besides waste appliances, BSH also collects appliances with transport damages or returns from customers; the so-called “Bappliances”.

A selection of those B-appliances are checked and send to the re-use organisation SOFIE.

SOFIE is in charge of the preparation for re-use of all the waste appliances made available to them (besides the preparation for reuse they perform on own collected WEEE and other WEEE streams). The level of successful preparation for re-use from appliances made available by BSH is between 70 and 80% whereas it is only a few percentages for the other WEEE streams.

Besides this practical collaboration with SOFIE, BSH has a general collaboration with the whole re-use sector in Belgium (RESSOURCES and KOMOSIE) by providing information, access to spare parts, repair manuals, training…
Intervention on Ecodesign: challenges and opportunities

It is not the first time I have the pleasure of being invited by the European Forum for Manufacturing to discuss topics that are so important for us and for our future generations. Thank you for the opportunity.

2015 ended with two big positive news for the environment. One of them was the approval of the Paris Agreement on climate change, what enabled a very ambitious and meaningful result. The other one was the adoption of the Circular Economy package by the European Commission, as Mr Kestutis Sadauskas has already mentioned. This package offers an opportunity to reinvent our economy, making it more sustainable and also more competitive.

It is estimated that the circular economy model can contribute to reduce from 2% to 4% the total annual emissions of greenhouse gases. It is also estimated that Ecodesign, waste prevention, re-use and similar measures could bring net savings of €600 billion for businesses in the EU.

Ecodesign thus comes as an essential tool for the circular economy model. How long a product will last, and whether it is repairable or recyclable can make such a difference on how much this product will impact the environment. It has been long estimated that as much as 80% of a product’s environmental impact is in fact determined at the design stage and that the stages of resource extraction and manufacturing of products can use as much energy, and emit as much CO₂ as during the entire use stage. For instance, laptops have a raw material consumption of 270 kg for every kilogramme of the final product’s weight.

We know that much of today's environmental problems were caused by engineering, design, and traditional manufacturing that have dismissed any subsequent environmental impact when it comes to projecting, packing, transporting and selling goods and services.

Therefore, it can be said that Ecodesign emerges as a solution to the negative impacts of products manufacturing. But to what extent is this true? Has Ecodesign already been applied in a proper way or are companies only interested in attracting consumers appealed by the ecological aspect of their products? How much of an economic incentive do companies see in Ecodesign? These are some of the main questions that require the attention of policy makers and industry.

The current legal framework includes the Ecodesign Directive of the European Commission. It sets out minimum mandatory requirements for the energy efficiency of products such as household appliances, information and communication technologies. This directive, together with the Energy Labelling Directive, is expected to deliver 45% of the EU’s 2020 energy efficiency target, generate €54 billion in extra revenue by 2020 and help create 800,000 jobs.

There is though still room for much more improvement. There need to be clear requirements that ensure that products can be more easily repairable and longer-lasting, and that the materials and components...
can be more easily re-used, refurbished and recycled. In addition, they should ensure that products are free from hazardous or problematic substances, which can hamper re-use or recycling efforts. For instance, currently 24% of plastics packaging cannot be recycled. If the situation stays the same, it will be impossible to reach ambitious targets.

There could be huge benefits in addressing resource conservation in Ecodesign. For example, using design options to have more durable parts in laptops, printers and washing machines and, therefore, extend their lifetime could lead in the EU to savings in greenhouse gas emissions of over 1 million tonnes per year. That is the equivalent of taking four hundred and seventy seven thousand cars off the road for one year, according to a report release by the European Environmental Bureau.

Regarding the recycling issue, one of the biggest challenges in the Member States is to reduce the disparity between them, since recycling rates vary from a few percentage points, in some countries, to 70% in others. There is good room for learning and exchange best practices among each other.

At last, there is a challenge related to the fact that the manufacturer can only guarantee the potential ecological advantages in the production phase along the whole supply chain up to the sale of the product. Once the product or service is sold, “control” over the good is transferred from the producer to the consumer and a large share of the product’s potential ecological advantages move beyond the manufacturer’s reach. This was mentioned already by Mr. Bruno Vermoesen, who gave us a fine example of a practice used by BSH in Belgium back in 2009.

Therefore, the challenge is binding for all citizens, who need to be made aware and conscious of their own responsibility. Education must play an important role, here! Only then can we harmonize our relationship with the planet and not compromise its ability to meet the needs of future generations.

Thank you.

John T. DISHAROON, Director Market Access, Caterpillar Inc.

Caterpillar is pleased the European Commission, in its communication to the European Parliament, the Council, The European Social and Economic Committee and the Committee of the Regions on an EU action plan for the Circular Economy (COM(2015) 614/2) specifically mentions “remanufacturing” as a “high potential area” to promote innovative industrial processes. The communication clearly demonstrates the need for product design, production and production processes and consumption. These are all key factors in both remanufacturing – and the circular economy. Machinery and engine product types have lent themselves naturally to the particular loops of a circular economy framework because they enjoy a longer history of remanufacturing. Complex, durable parts and components remanufactured by Caterpillar range from engines, turbines, gas compressors, locomotives and railcars to hydraulics, drivetrains, turbochargers and fuel systems. Caterpillar does not remanufacture the entire machine, but rather key parts and components for machine repair, offering a lower owning and operating cost for their customers. Remanufacturing is an exchange business, where a core, or end of service
life component is exchanged for a remanufactured component. Through the remanufacturing process, the core is completely disassembled, down to its individual constituent parts, including every last piece of hardware, and inspected against engineering specifications for salvageability. Those components that are within remanufacturing guidelines are thoroughly cleaned and undergo additive manufacturing processes to bring them back to original, if not better, engineering specifications and tolerances.

While the connection between the circular economy concept and restoring performance to end of service life components seems simple enough, there are still many opportunities for improvement. In the 2012 report, “Towards the Circular Economy” the Ellen MacArthur Foundation highlighted some significant opportunities with regards to product design and remanufacturing processes and technology. Caterpillar is often viewed as a leader in remanufacturing processes and technology that enable greater value to be recovered during the remanufacturing process. By replacing products before they fail and remanufacturing them with a mixture of new parts and cores that have been returned to original engineering specifications, Caterpillar’s remanufacturing business has continued to show gains in all three pillars of Sustainability – Economic, Social and Environmental.

The circular economy framework emphasizes the importance of designing effective products and systems and not just focusing solely on efficiency. Rather than just aiming to use less material, Caterpillar employs a design-for-remanufacturing process to ensure new parts and components are able to be remanufactured for multiple service lives. All of Caterpillar’s remanufactured parts and components are also held to the same strict engineering standards to ensure that performance and reliability are the same-as-when-new. “Caterpillar helps make sustainable progress possible. Designing products for one life cycle may allow you to sell that first unit more easily and at a lower cost, but it doesn’t help form a relationship with the customer in the long term and help him reduce his lifecycle owning and operating costs.”

In order to remanufacture products before failure, real-time diagnostic capabilities of the key components in the field is critical. While historically this process has been maintained between the dealer and the customer, Caterpillar is now beginning to use digital technology to add a ‘Product Link’ service to units in the field.

Through this new innovation, the company is now able to monitor operating conditions in real-time, allowing for closer, and more detailed tracking capabilities of the assets. This adds tremendous value by lowering owning and operating costs while more accurately predicting service needs.

Caterpillar customers benefit by receiving significantly lower prices on remanufactured parts when compared to new parts. Since remanufacturing is an exchange business, an important part of the pricing structure is the core deposit. A core deposit is charged to the customer when he purchases the remanufactured product, and the deposit is refunded when the core is returned (as long as it meets core return criteria). The core deposit is generally the difference between the remanufactured part price and the new part price, thus incenting the customer to return the core and repair before failure.

The high rate of core returns – 94% in 2014 – enables Caterpillar to salvage more parts from returned cores, driving down remanufacturing costs. Cores are essential to the remanufacturing process by representing the raw material for remanufactured goods. Cores are not waste. True to the definition of remanufacturing,

Caterpillar’s remanufactured products meet original tolerances and specifications and are tested to ensure performance is the same as when new, if not better. All Caterpillar remanufactured products are sold with the same warranty as new Caterpillar parts. “Some companies may wash, repair, and paint, but true remanufacturing requires complete disassembly, inspection against engineering criteria, and additive manufacturing or replacement to ensure the original specifications are met, including the latest engineering changes relevant to the product. The form, fit and function will equal the corresponding new part.”

Other than increasing recovery rates for cores, which is a continual opportunity for improvement, one of the key obstacles with the practice of remanufacturing globally, is the ability to import and export cores and the ability to sell remanufactured components. Many developing countries do not fully understand the benefits of remanufacturing and have customs regimes that prohibit the ability to sell remanufactured parts. Fortunately, the EU does not impose these burdens on remanufactured products. Let’s ensure that new regulations do not impair the ability of companies employing true remanufacturing processes from succeeding.
Caterpillar customers throughout the EU, regardless of their location, desire and need to realize the sustainability benefits of Caterpillar Remanufactured products. The following example is illustrative of some of the benefits of Caterpillar Remanufacturing.

Remanufacturing conserves most of the energy consumed in the original manufacturing process, and has many other advantages for the circular economy. When we compare a remanufactured cylinder head with a new one, we have a:

• 82% Safety Advantage
• 61% Less Greenhouse Gas
• 86% Less Water Used
• 85% Less Energy Used
• >85% Less Landfill Space
• >85% Less Material Used

Thank you

Dennis KREDLER, Head of Brussels Office, DOW Chemical

About Dow

Dow makes more than 6,000 different chemical products that go into a vast number of goods (including solar panels, wind turbines, cars, airplanes, packaging, smartphones, televisions, water filters and agriculture). Dow is headquartered in Michigan, and employs around 53,000 people worldwide, of which around 11,000 in Europe. We have 43 manufacturing locations in Europe, including 6 major R&D hubs. 90% of what we sell in Europe is made here. For further information, please visit www.dow.com.

Dow’s 2025 Sustainability Goals

Last year, The Dow Chemical Company announced a new set of ambitious Sustainability Goals. Dow’s 2025 Sustainability Goals introduce the notion of a collaborative blueprint for sustainability, building upon previous ten-year commitments that successfully focused on the company handprint (2015) and footprint (1995). The 2025 goals will drive unprecedented collaborations to develop a societal blueprint that will facilitate the transition to a sustainable planet and society. The seven goals are:

• Leading the Blueprint
• Delivering Breakthrough Innovations
With the Advancing a Circular Economy goal, Dow committed to advance the circular economy by delivering solutions to economically close resource loops in key markets. Full details on Dow’s 2025 Sustainability Goals are available at http://www.dow.com/en-us/science-and-sustainability/sustainability-reporting

**Dow’s priorities in the EU Circular Economy Package**

1. **The key to the Circular Economy policy’s success is resource efficiency**
   - A product’s use may save more resources than its production consumes
   - Recycling may consume more energy than it saves
   - For Circular Economy policy to achieve its aim, the net impact of a product on resource efficiency must be positive
   - This requires a waste policy framework that:
     - Maximises resource efficiency and environmental benefit
     - Recognizes that recycling is the preferable option as long as it is the resource maximizing option, but that this may not be the case for all materials at current technologies
     - Retains all options of resource recovery in the waste hierarchy, including incineration with energy recovery for use where this is the most resource-efficient option available
     - Relies on Life-Cycle Analysis (LCA) to ensure that the most resource-efficient approach is identified
     - Allows for technological innovation that are likely to change current recyclability characteristics
   - **Key messages for the policy debate:**
     - Recycling is not always the best option
     - Incineration with energy recovery is the most resource-efficient option in certain cases
     - Ongoing and future innovation may well change this picture in the future. Materials that are difficult to recycle resource-efficiently today are likely to get easier to recycle in the not-too-distant future. EU funding for this is important, but a regulatory framework that fosters innovation and reduces time-to-market is even more important.

2. **Industrial symbiosis is about more than redefinitions**

   The chemical industry is a champion of devising production processes that use the waste streams from one process as resource streams for other processes. This integration helps to realise synergies while minimising waste – i.e. maximise resource efficiency at the level of an industrial plant.

   Thanks to innovation, it is now becoming technologically feasible to extend this concept to the industrial sector at large, for example using carbon emissions from one production process (e.g. in steel-making) as feedstock for petrochemicals production. Putting this into practice would reduce carbon emissions from energy-intensive production and reduce fossil fuel demand in manufacturing, in particular in the energy-intensive industries.

   Policy can help to turn industrial symbiosis into a driver to achieve a Circular Economy as follows:
   - Supporting emerging technologies to reach the market faster
Technologies that have been proven at lab scale need to be scaled up to demonstrate their suitability for industrial-scale use. As with all undemonstrated technologies, the business case for the required investments is difficult to make. EU funding support for the establishment of pilot projects to demonstrate the viability of the technology, could become a key driver in promoting more circular production processes across the manufacturing sector. Demonstration funding for such projects can be an important accelerator in bringing these new technologies to the market. The Horizon 2020 Work Programme for 2016-17 provides a good platform for this.

- Significant regulatory obstacles can be addressed through ongoing policy dossiers

Industrial symbiosis can be hampered by existing regulation in unexpected ways. For example, the business case for projects seeking to capture carbon emissions from heavy industry and to transform them into chemical industry feedstock (both reducing carbon emissions and also the intake of hydrocarbons in chemical production) could be improved if the Commission’s monitoring guidelines actually allowed for the captured carbon to deducted from the calculation of total carbon emissions for which emissions certificates have to be purchased. This is currently not the case; the Commission’s monitoring guidelines should be changed to unambiguously allow Carbon Capture and Use (CCU) projects.

- Large-scale industrial symbiosis requires new pipeline infrastructures

The major obstacle to the deployment of existing industrial symbiosis technology is the difficulty in connecting the producer of the waste stream (one manufacturing plant) to the potential user (another plant) because they tend to be located at a distance from each other. For many waste streams, the only feasible mode of transport is via pipelines. More consideration needs to be given on how the development of the required infrastructure can be stimulated so that the ‘market entry’ costs to industrial symbiosis are reduced.

Bjorn BROVIK, Director Environmental Affairs, Volvo

The Volvo Group vision is to become the world leader in sustainable transport solutions and the measures addressed in the European Commission’s Circular Economy package are therefore to be welcomed as important elements in the strive towards that vision. It is however important to carefully design those measures in order to ensure taking all aspects of sustainability into account to avoid any counterproductive measures being introduced.

The Volvo Group is working very actively in many of the areas identified in the Circular Economy package and is welcoming proposals that would improve the continued efforts to strengthen areas such
as reuse and recycling, which minimize the need for raw materials and limit the depletion of the earth’s resources.

As an example, it can be mentioned that Volvo is putting great efforts into strengthen the offerings in remanufacturing of components to its products. Remanufactured components are offered to Volvo Group customers worldwide. Engines, gearboxes, exhaust filters and rear axle transmissions can all be renovated to the same condition as new parts, and customers benefit from the same quality and a full warranty, delivered at a considerably lower price.

Remanufacturing engines and spare parts is a growing global industry trend and a growing part of the Volvo Group’s activities. In 2014, total Volvo Group sales of remanufactured components increased by 18%, compared with 2% in 2013. We offer refurbished spare parts as a way of extending the useful life of our products and resources, and to reduce costs for our customers.

Research indicates a great potential in terms of reduced environmental impact from remanufacturing where for instance a remanufactured engine reduces emissions of greenhouse gases by more than 70%. In addition, resources in terms of metals and chemicals are saved and jobs created.

Another example relates to a full scale test of re-using batteries from the Volvo Electric and Hybrid Buses as accessory energy sources in residential buildings where they act as energy storage for in-house solar panel generated electricity and as additional power source when for instance loading electric vehicle batteries.

The automotive sector is in the forefront in many areas related to Circular Economy such as recycling and phasing out hazardous chemical substances, reparability and remanufacturing of products and components. In our case, a Volvo truck is designed in a way that makes it possible to separate and recycle the materials included in it. Approximately 87% of a truck is made from metal, mainly iron and aluminium. If plastic components and rubber are added, 85%-95% of the vehicle is recyclable.

In order to promote the continuation of the progress in the automotive sector there are a number of factors that we would suggest to be considered when going forward with the Circular Economy package.

As examples, the following areas can be mentioned:

1. Facilitate availability and use of secondary resources

Raw material and product flows – including secondary raw materials – are global. To make best use of circular economy it should be viewed from a global perspective instead of limiting it to single countries or regions. European industry strongly depends on the import of raw materials and global material cycles. The circular concept should also aim at securing more access to and quality of secondary and primary raw materials. It should be acknowledged that for the foreseeable future, recycling alone cannot provide all the resources that EU society and economy needs.

In order to stimulate the continuation of these activities it would be beneficial to lessen the administrative burden associated with EU import and exports of secondary resources such as components that has reached “the first end” of their useful life cycle.

2. Ensure availability of spare parts

The availability of spare parts is very important in order to facilitate the transition to a more circular economy. Since the supply of spare parts is also regulated at a national level, a long-term availability obligation must be fulfilled. Spare parts for vehicles must meet the quality requirements and performance demands of the original part and function. In order to ensure road safety, modified vehicle components may need to be extensively tested, both as individual parts and in the assembly together with other associated components.

In order to ensure the availability of spare parts the EU needs a balanced approach with respect to substance regulations. The resource needed to re-design and validate a spare part is extensive and this must be viewed in the perspective of overall risk of using a substance.

3. Pave the way for new innovative Business Models

Public sector should take the lead in developing business models that stimulate Circular Economy in e.g. Public Transport sector. This could provide the biggest benefits if it included service and functional (performance) economy concepts.

Thank you all for your attention.
Martin PLUYMEYER, Environmental, Health, Safety Officer, Siemens Healthcare

Siemens Healthcare Refurbished Systems & the EU Circular Economy Package 1 January 2016

Siemens Healthcare welcomes the discussions on the Circular Economy at EU level and has been active in the consultation regarding the roadmap to create a Circular Economy Strategy. The following policy paper has been exclusively written to highlight the growth challenges faced within the refurbishment business at Siemens Healthcare.

Medical device refurbishment at Siemens Healthcare is a business at the heart of the Circular economy

- Refurbishment at Siemens Healthcare is a business for more than 15 years. Already in 2001 Siemens Healthcare founded an own business unit and made efforts to maximise the functional and economic lives of medical devices to save resources and raw materials.
- Siemens Healthcare Refurbished Systems deals with medical devices for professional use in all healthcare segments, including magnetic resonance, computed tomography and x-ray applications.
- Siemens Healthcare Refurbished Systems produces safe and effective medical devices, confirming an existing, valid declaration of conformity, the CE mark (Conformité Européenne).
- Refurbishment has a definition provided by DIITTA, the Global Diagnostic Imaging Healthcare IT and Radiation Therapy Trade Association. For Siemens Healthcare this means:

  We carefully assess pre-owned systems based on their condition, service history and age.

  We have systems disassembled by qualified personal in a non-destructive manner and ship them to one of our refurbishment facilities – the systems are still in a working condition.

  We then recondition them, which includes disassembly, cleaning, painting, replacement of worn parts, software updates, the same quality tests as for new systems, and confirming valid licenses (e.g. CE mark).

  We install the refurbished systems and perform a start-up and system performance check just as we would for any new system.

  We offer a one-year warranty and spare part availability for a minimum of 5 years for our refurbished systems.

  ⇒ We need a clear understanding of medical device refurbishment among policy makers.

Our contribution to the Circular Economy – bringing benefits for the environment, economy and society

⇒ Environment: Refurbishment prevents waste generation and saves energy, resources and raw materials.
⇒ Economy: Refurbishment extends the economic life of medical devices and contributes to new jobs, growth and investment within the EU.
⇒ Quality/Reliability: Refurbishment strongly contributes to increased access to affordable healthcare; offering healthcare providers high quality, durable equipment and improving the overall quality of healthcare for EU citizens.

Critical barriers prevent the growth of our Circular Economy business

1. Too much medical devices being considered as waste
2. The linear approach of EU legislation, e.g. Radio and CE marking rules
3. Market access and trade barriers to several countries outside the EU

⇒ The EU Circular Economy Package has the potential to remove existing growth barriers if the logic is appropriately addressed.
Siemens Healthcare Refurbished Systems & the EU Circular Economy Package | January 2015

Removing growth barriers (1/3): used medical devices for refurbishment. A refurbished device is not waste but should not be treated as waste.

- Siemens Healthcare’s refurbishment of medical devices is not a waste management activity.
- During discussions on the EU Directive on Waste Electrical and Electronic Equipment (WEEE), the medical device refurbishment business faced some barriers regarding the shipment of previously used medical devices (Annex V, 2 (b)).
- The Technical Guidance on Transboundary Movement of WEEE under the Basel Convention could limit the transboundary shipment of used medical devices for refurbishment from OECD to non-OECD countries and vice versa. It needs to be ensured that refurbished medical devices can be sent from country A to country B anywhere in the world without being treated as waste.

→ Any actions taken in the context of the EU Circular Economy Package need to ensure that used medical devices for refurbishment & refurbished devices are not treated as waste. In addition, EU institutions should promote the circular approach and its implications in international forums, such as the Basel Convention.

Removing growth barriers (2/3): further EU legislation needs to be adapted to the circular approach and take into account that refurbished devices have a global market, e.g. India and China.

- Since the implementation of the EU Directive on Restrictions of Hazardous Substances (RoHS), Siemens Healthcare has been confronted with different prerequisites and requirements for identical refurbished medical devices - depending on whether they were placed on the market for the first time inside or outside of the EU before July 2014.
- The demand for refurbished medical devices in the EU is higher than the availability of eligible used equipment for refurbishment. The only way to satisfy the needs of both hospitals and citizens is to source used medical devices destined for refurbishment from outside the EU. RoHS creates a shortage of refurbishment medical devices within the union, which has a negative impact on healthcare for EU citizens. In only one year, the European market for medical devices (Original Manufacturers) witnessed a rapid decline of approximately 31% from 131 million euros to 90 million euros. The global market is worth approximately 440 million euros (source: COCOR).

→ RoHS and the CE mark do not currently take the fact that the medical device business operates according to a circular approach into account. In future, refurbishment medical devices should have to meet at least the requirements at the time when this medical device was originally CE marked - but not those requirements which are valid at the time the refurbished medical device is placed on the European market. Regardless of whether a refurbished medical device was first placed on the market inside or outside of the EU, a CE-marked refurbished medical device should not be excluded from trade or sale on the European market. Any valid CE mark should be seen as a lifetime passport for the relevant refurbished medical device, assuming that the original requirements are still met.

Removing growth barriers (3/3): market access for refurbished medical devices and other Circular Economy products needs to be promoted to third countries.

- Siemens Healthcare refurbishes systems increasingly faces barriers to entry into other markets, with import formalism or restrictions in Brazil, China, Turkey, South Africa, Vietnam, Indonesia, Thailand and Ukraine, to name but a few. Other countries, including India, are considering similar legislation.
- Such trade barriers cannot be justified on the basis of quality considerations - refurbished medical devices are of high-quality, i.e. they meet all the relevant requirements from the time the system was CE-marked and are mostly sold in the USA and Germany, followed by e.g. Japan, Russia and the UK.

→ The EU’s Circular Economy approach also needs to be promoted to countries seeking to become more economically and ecologically advanced to assure that Circular Economy products, such as refurbished medical devices, are granted market access in these countries and can be traded on a global scale. EU trade agreements should be used to facilitate trade in refurbished medical devices. Bilateral and regional dialogues should be used to promote a wider understanding of refurbished products (e.g. APEC Pathfinder on remanufactured goods).
Thesis: Steel and its by-products are the perfect example to demonstrate, that circular economy in the steel industry is current practice!

Steel is 100% recyclable and the most recycled material in the world. Its by-products can be used for many industrial applications, e.g. cement production, road and shoreline construction as well as fertilizer. This utilization contributes substantially to Circular Economy by saving natural resources.

Application: Steel can be produced in thousands of different qualities and can be made available for many final applications, improving the use-phase efficiency of products in those applications and thereby reducing environmental impacts. For example, reducing the weight of cars through high quality steel brings driving emissions down and supports e-mobility.

thyssenkrupp InCar®plus is aimed at helping to manage these challenges and makes a major contribution to automotive efficiency. The focus is on eco-friendly solutions. Whether it’s weight, cost-efficiency, sustainability or functionality: Each of our InCar®plus innovations is superior to the current state of the art in at least one of these points. InCar®plus solutions offer savings of up to 30 percent on weight and up to 28 percent CO2 emissions.

Durability is an added value naturally afforded to steel-made products. Steel is a very long lasting material with constant performance during its use phase. Buildings and other structures made out of steel can last from 40 to 100 years and longer if proper maintenance is carried out. Therefore, around 75% of steel products ever made are still in use today.

Recovery: Since the very first production of steel, there has always been a strong incentive for society to collect steel scrap, due to its sustained economic value and the ease and low costs associated with its collection. Thus, a highly developed and mature steel recycling infrastructure has emerged over time.

Recycling:
With its 100 per cent recyclability, steel has a fundamental place in the Circular Economy. It is losing none of its unique properties when properly processed. Typically, the half of EU steel production (177 million tonnes per year) is made from scrap, which does not result in any significant structural degradation of steel properties.

Because of the durability of steel products, there is not enough scrap available to satisfy society’s increasing demand for steel. Driven by a growing population and increased living standards, there will always be a need to introduce new steel from virgin production.

In any case, iron ore is one of the most abundant resources in the earth crust. Moreover, primary production is a transformation step making iron available in a more practical form to be used in the
recurring steel applications (endless life cycle). Steel is a multiple recyclable material through the proper combination of steel scrap qualities and metallurgic processes.

Steel is never consumed but continuously transformed through recycling processes that do not degrade its inherent properties. Thus, it perfectly fits with the concept of “permanent material”, which is the basis of a Circular Economy. The recycling rate of 94 percent for manufacturing steel packaging in Germany demonstrates this clearly. thyssenkrupp Steel Europe

**Primary Production:**

Within our integrated steel works for primary steel production, there is a complex combination of individual facilities. This produces almost no waste. By-products such as dust, sludge and scale, containing outstanding shares of iron and carbon, are processed and used in the plants directly again as input materials.

Among other things by-products like granulated slag from the blast furnace are a substitute for clinker in the cement industry. The use of this material saves approximately more than 500 kg CO2/ t cement. Air cooled slag are used for road- and shoreline construction and saves resources of natural stones. Additional special fractions of BF-slag are applicable as fertilizer. Many by-products of the steelmaking are used in other industries as feedstocks. Thus, the use of primary materials is avoided. Also, tar, sulfur, and benzene from the coke plant can be recovered as by-products of the steel making.

In addition to these solid by-products we also create process gases, which be used further. We use a part of the process gases as natural gas substitute for generating thermal energy in our facilities. The other part is converted into electricity in the company-owned power station. This enables us to be 100% energy self-sufficient. Often we are even able to generate a power surplus that can be fed into the public power grid. By this highly efficient use of the primary energy sources via intelligent coupling of different productions steps by a large energy network, we reach efficiency rates of nearly 60 %.

The waste heat from our processes is also used internally for preheating and for communal heat supply. We cover the heat demand of 20,000 households in the area.

The water, which we need to cool, is recirculated to 98%. The other 2% evaporate. The process water can run up to 40 cycles before it is processed in our own wastewater treatment plant.

**Carbon2Chem:**

One of the few remaining substances from our steelmaking is CO2, for which we undertake intense R&D effort in order to tackle process gases. To solve this problem we have initiated a large R&D project, which deals with the use of carbon dioxide - Carbon2Chem.

The aim of this cross-industry future project is to research and utilize the capture and use of carbon dioxide and waste gases as feedstock for the chemical production.

**Conclusion:**

Circular Economy is an integral part for steel production and practiced by us for decades. As an endless product, steel is 100% recyclable and never degrade its inherent properties. In steel production, only a small proportion of our residual materials and by-products cannot be further used. We are constantly working on new technologies in order to make these last remains usable. This can impressively demonstrated by our OXY-CUP furnaces technology. Key to a Circular Economy is a healthy, well-linked and geographically closed value chain.
Different from the withdrawn proposal in 2014, the new Circular Economy Package is not focused only on the revision of waste management legislation, and for the first time, EU defines common goals at EU level according to globally accepted UN Sustainable Development Goals. This approach sends a loud message worldwide that EU is ready to transform its economy to sustainable, low-carbon and resource efficient economy.

But how will we successfully manage this transformation of our economy? How to be more successful in the implementation by improving multi-level governance in Member states? How to establish EU market for secondary raw materials? How to increase the competitiveness of SMEs in the circular economy? How to find a solution for youth unemployment? How can our industry become global solution provider and exporter of technologies for the circular economy?

I will quote the Vice-president of the European Commission, Mr. Katainen, from the Friends of Europe Conversation event: “Business will look where the profit is coming from”, which means that market economy, especially the internal market for secondary raw materials, will be the main driver of the circular economy. Partially, I agree with the statement of Vice-president, but I must add that this is not enough for the success of the circular economy. Without economic and social welfare of the society, profit for itself will not be enough because expected contribution of the citizens and expected change in their behaviour will be disregarded.

The legal and regulatory basis for the success already exist in Seventh Environmental Action Plan and we must not forget that waste management hierarchy framework is also the main principle of action in the circular economy. Waste prevention, both in production and consumption is important, and reusing of materials or products are some of the major pillars.

Recycling is important but it is not purposed for itself. Therefore, wise usage of Horizon 2020 will benefit in the development of the new and non-toxic materials for which recycling will be more energy and resource efficient.

Creativity and innovation are major drivers for designing the new products to be more durable, upgradable, repairable and finally easier for disassembling in order to recover valuable materials and components. This will be a major challenge for the manufacturing industry in the following years. The shift from products to services that are usually more labour intensive (and we must care about unemployment issue), development of new business models, will cause a pressure to the producers.

Education of the entrepreneurs and citizens requests development of social innovations for the circular economy. We must provide adequate training for entrepreneurs and SMEs to be able to develop new business models and make their business more “greener”.

Davor SKRLEC, Member of the European Parliament
An important driver of transformation to the circular economy is public sector. Therefore, integration of circular economy principles in already existing Green Public Procurement will be the key to the success in the Member States.

Finally, I like very much a phrase I heard recently – education of the “customers of the future” – very well defined message stating that we must invest in a change of the behaviour of our citizens and society at as a whole. After all of that, do we need to worry should we fulfil legislative binding targets to reduce landfilling?

Circular economy and the waste package against climate change

Let us not delude ourselves: within a couple of years, half of the world could be boiled if we don’t make any steps! The legislations and agreements regarding climate change are extended to all stakeholders. In my opinion, no one can remove themselves from the actions!

In relation to the broader climate issues, we know well that not all of the interested parties are at the table yet. The climate change agreement between the governments is a first step, but –regarding to the experiences-- it can still be an action with limited effects. Climate change leads back to human factors, therefore the companies, communities, settlements designated to act should know more about the necessary steps.

We, as European Union have to have a leading role in all these processes! This part should not be too difficult, as the EU is already the most prominent actor, a real landmark. It is important to ensure that the emerging countries would never wander into the road of our mistakes, even accidentally. They should avoid the polluting effects of the growth; and here, we need to do a lot including technological investments in these countries.

The irresponsible activities lead to more waste, more pollution, more climate change and more climate migration. We need active dialogue offering opportunities - and this event is also part of this.

The main solution lays in the circular economy, besides the European Energy Union or the other perspectives of the combat against climate change.

The circular economy and the waste package will play a significant role in our quest against climate change. However, our goals will only be successful if we involve all stakeholders. We need common but feasible objectives, without which all these efforts will only be phrases.

Waste is a shame, so don't waste the waste!

One of the most effective tools in the fight against climate change will be waste management. Despite of the fact that waste management has been improving massively in the last years, there are still huge
differences among Member States. The basic concepts and definitions of waste management are available (such as definitions of waste, recycling, and recovery), but unfortunately there is still a lack of consistency in practical terms. We still face certain misinterpretations of categories by Member States, e.g. what is hazardous or recyclable waste?

Waste covers a wide range of materials and will be covered by more legislative acts, therefore it was a bold step from the Commission withdrawing and then introducing renewed elements. I would also say that the new proposal is a very good one, because it sets an ambitious vision and roadmap, in which a comprehensive and multi-disciplinary approach prevails. Circularity should be promoted in all policy areas as it will improve productivity and create new jobs.

The awareness of the necessity of recycling has to be raised at the EU level, but there is one kind of reprocessing that is pointless: in case the recycling process causes more environmental stresses, we have to step back a bit. Used rubber tyres, for example, can be reused, but dismantling with electrolysis of these wastes can generate further environmental stresses. Unrecyclable waste has to stay in reservoirs as long as the technological improvements are not yet there.

Of course, there are already many reservoirs, which still have to be exploited. Obviously, this part will be targeted by the landfilling directive, but technological improvement should be kept in the main focus.

The only way forward is to find new solutions, invest in R+D and in innovation; companies have to take part in this and we have to provide incentives!

Resource efficiency from one crucial perspective

Resource efficiency is a flagship initiative with a multitude of layers. We have to start a transition towards an economic model that reduces waste and promotes re-use, efficiency, durability and recycling. It supports the shift towards sustainable growth via a resource-efficient, low-carbon economy. I agree that increased resource efficiency is crucial to securing growth and jobs for Europe.

We could start peeling down all of these layers, but I would only refer to one part of it, specifically the basic question in relation to low-carbon economy:

What should be the main source of energy? Do we need energy from fossils and nuclear?

Co2 is stored under the surface, and the exploitation means unnecessary emission stress on the environment. Sun produces more energy, why should we mine extra Co2?

This is only one area of sources to be better exploited and we cannot allow the discouragement of renewables by any of our Member States.

In my opinion, resource efficiency starts here, and again, without companies and communities we will never be successful! Resource efficiency, through technological innovation could generate major economic opportunities, could improve productivity and boost competitiveness. It is expected to increase employment in the fast-developing ‘green technology’ sector and open up new export markets.
The broader EU policy agenda and challenges

At the end of our Dinner debate, and following the exchange of many presentations and views on the different aspects of the EU Circular Economy approach, let me stress a few main essential for a successful implementation of the package and put the discussion into the broader political context.

As you have seen today, ZVEI supports key aspects of the EU Commission’s action plan “Closing the loop – An EU action plan for the Circular Economy”, which was presented on 2 December 2015 – but we do have some concerns.

With the Energy Union, the Digital Single Market, the forthcoming Internal Market for Products and Services, the Circular Economy is one of the core pillars, which if it is well-designed and part of a coherent policy approach, can contribute towards the core overall jobs and growth objective of the present Commission, and as outlined in the roadmap of President Juncker. It is our industry – the European engineering industry – that is the main enabler of these EU policy goals.

What are the key challenges that need to be addressed by one coherent EU policy, to which Circular Economy is one element:

**European Single Market and International Competitiveness:** The EU Single Market has been one of the main sources for jobs, prosperity and affordable goods and services for Europeans in the past. The Single Market for products, which has been largely completed, has underpinned the growth of the engineering industry both on Europe’s home markets in Europe, but also from this, on the world markets. We need to make sure, that the new ideas as presented by the European Commission on the Future Single Market foster this development and strengthen the global competitiveness of the EU and our industries.

**Digitalisation and Industrie 4.0:** The biggest change and the biggest challenges for us is the digitalization of the manufacturing environment. The Fourth Industrial Revolution, the making of the Internet of Things and Services, is happening right now – everywhere in the world – at high speed. We may have lost the digital consumer markets but we are strong at the digitalization of the industrial processes – if we do it right and if we do it fast. Digital transformation will capture all sectors of the economy – it will be the biggest opportunity for Europe’s manufacturing companies – both large and small. We need a regulatory environment ready for the “Industrial Internet of Things and Services”. First good elements can be seen in the Digital Single Market package and in Commissioner Oettinger’s initiative “Digitising European Industry”. The answers to these digital challenges need to be jointly developed by policy makers and industry.
We therefore believe that these overarching goals and global challenges must be the guidelines for the policy agenda and the regulatory framework on Circular Economy.

Let me address a few aspects of the CEP in more detail.

**Resource Efficiency**

The efficient use of resources in both, production processes and products manufactured by our companies is a constant preoccupation of our companies for very good economic reasons: resource inputs usually account for between 30 and 60% of total input costs. Better using these makes sound business sense. Therefore our industry has always invested heavily in materials research, in energy efficiency, better use of water, etc.

A market-oriented approach that leaves scope for innovation as well as fair competition are the key to developing a circular economy. ZVEI’s member organizations, of which there are approximately 1,600, already enable the transition towards a circular economy through innovative products that save energy and resources.

Any new resource efficiency requirements must provide clear, immediate additional benefits for the environment and society. Companies’ freedom to develop innovative products must not be restricted or even prevented by (horizontal) requirements.

In the future, manufacturers must still be able to specify the design of their products independently and find a balance between the use of raw materials (modern materials), efficiency during the use phase, durability, reparability and recycling capability.

**Ecodesign – in the context of CEP**

The prominent place given to the Ecodesign Directive and its application in the electrical and electronic sector as THE solution for Circular Economy without starting to close the loop end of pipe appears overoptimistic in terms of effectiveness and prompt delivery of sustainable environmental and economic results (works on product lots take several years).

From the Commission’s perspective, the Ecodesign directive can be considered to have been successful, around ten years after it came into force. This is justified by the fact that the directive and the implementing regulations have a clear focus on robust, verifiable measurable and product-specific parameters.

When it comes to aspects such as recycling capability, reparability, expandability and durability, there are no suitable benchmarks for checking compliance. Equally, these aspects need to be examined carefully and, above all, on a product-specific basis with a view to the anticipated positive impact on the environment.

It is also important to carefully analyze the extent to which resource efficiency requirements are already being addressed through existing (European) regulations and associated aspects, such as material policy or the handling of old equipment.

For all considerations relating to impact assessment and the discussion regarding potential expansion of eco-design requirements, ZVEI calls for consistent application of the “SMERC” principle to potential new parameters:

- Specific
- Measurability
- Enforceability
- Relevance
- Competition friendly
Waste – in the context of CEP

While a product's end of life impacts are also influenced at the design phase it is the end of life stage that will decide if the loop is closed and the circular economy can develop.

Old electrical equipment is very valuable and that there is competition with regard to the collection and handling of this equipment.

The European electrical industry is currently faced with the situation that only 35 percent of old electrical equipment is returned to official collection and recycling systems.

Two thirds of old electrical equipment is handled by actors who are not covered by the system of extended producer responsibility (EPR) according to the WEEE Directive.

As long as existing waste legislation is incorrectly implemented, additional requirements regarding the handling of old electrical equipment will not be effective.

A landfill ban for recyclable waste and consistent efforts to combat illegal disposal of old electrical equipment as well as harmonized handling standards that are anchored in the legislation of every member state, and therefore binding, are indispensable requirements for a circular economy.

Industry 4.0 – in the context of CEP

We regret that potentials offered by innovative technologies in the context of “Industry 4.0” are not properly addressed by the European Commission.

The key challenge is how we can get more productivity from manufacturing while using less raw materials and energy resources. The use of smart and digital technologies can play a core role in this context.

Internet of Things technology has the potential to address many major needs, including improved resource productivity and infrastructure management. Smart grids for electricity, water, and transportation networks are examples.

With increasingly sophisticated Internet of Things technologies becoming available, companies can not only track the flow of products or keep track of physical assets, but they can also manage the performance of individual machines and systems.

Examples:

Lasers for cutting and welding can easily be adapted to the type of material to be treated by software updates directly from the producer without having to send service staff to the client. Materials can be used more efficiently and failures which means wasting resources can be avoided.

Technologies such as advanced robotics and 3D printing can foster increased productivity and growth in the manufacturing sector. Additive manufacturing is improving and 3D printing can reduce the amount of material wasted in manufacturing. 3D printing has the potential to address concerns about the waste and environmental impact of traditional manufacturing processes and supply chains. Direct product manufacturing using printing can reduce the number of steps required for parts production, transportation, assembly, and distribution. It can reduce the amount of material wasted in comparison with subtractive methods where a block of material is carved away until the part appears. No moulds or dies have to be designed and produced, which can save a significant portion of manufacturing time and cost. In addition, raw materials are not wasted along the production cycle.

Conclusion

To conclude: Circular Economy requires a holistic, integrated, collaborative approach throughout the entire economy based on the EU growth and jobs objective, taking into account international competitiveness and single market aspects and the digital transformation at its heart.

Against the background of many years of experience in implementing substance restrictions, taking back end-of-life products, Ecodesign, measures and systems for resource efficiency, ZVEI is prepared to contribute to the Circular Economy package in a constructive and goal-oriented manner.