

**Start date of project:** 2015/02/01

**Duration:** 30 Months

<b>Identifier:</b>	D5.2 (vFinal)_IVL_Policy brief
<b>Date:</b>	2017/06/13
<b>Class:</b>	Report
<b>Responsible Partner:</b>	IVL
<b>Annexes:</b>	
<b>Distribution:</b>	Public
<b>Title:</b>	Policy Brief

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 642231



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## NEW\_INNO.NET: POLICY RECOMMENDATIONS FOR UNLEASHING THE POWER OF CIRCULATING MATERIALS





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# NEW\_InnoNet policy recommendations for unleashing the power of circulating materials

Every year 2.5 billion tonnes of waste are generated in Europe<sup>1</sup>. A circular economy will lower this amount, decrease the EU dependency on the input of raw material and reduce loads on the environment. Actions designed to prevent climate change are urgently needed to enforce the change specified in the Paris Agreement, this includes actions supporting the more effective use of raw materials. Waste prevention and reuse should be top priorities, but more innovation in materials recycling is essential if we are to achieve a circular Europe. This policy brief summarizes the principal policy recommendations for enabling better circularity of materials, based on the NEW\_InnoNet project.

In 2014 less than half of waste generated was reused or recycled<sup>1</sup>. In addition, a considerable proportion of the recycling that took place did not allow for more than one recycling loop. This implies the existence of a significant potential for the increased circularity of materials.

The Horizon 2020 project NEW\_InnoNet envisions the advent of a circular economy in Europe by the year 2030, with a high rate of material recycling from end-of-life vehicles (ELV), waste electric and electronic equipment (WEEE) and plastic packaging waste (PPW), and where recycled material is used as input material for high-grade applications.

Innovation in material recycling requires collaborative efforts and joint actions of industry, policymakers and research. Material recycling – as a means for a more circular economy – crosses many borders between sectors and value chains. Only through collaboration, unobstructed by barriers such as (obsolete) regulations or lack of enforcement will innovation in material and recycling prosper. **The policy actions suggested range over several of the DGs of the European Commission hence co-operation also on policy level is needed to achieve a true circular economy.**

In addition to collaboration and innovation, a well-informed, mature market for recycled raw materials is required to ensure that innovations reach the exploitation phase. Measures have to be taken to achieve this market, especially interventions that target the price balance between raw materials with virgin or recycled origin and procurement initiatives.



Main recommendations on policy actions identified within the NEW-InnoNet project are presented below. More suggestions are presented in the enclosed "Further policy recommendations". In parallel with these policy actions, more research and innovations actions should be launched, as suggested in the document *Unleashing the power of secondary materials: A Strategic Research and Innovation Agenda for Effective Material Recycling in a Circular Europe*<sup>2</sup>.

## Main policy recommendations

Policy measures aimed to deliver sufficient supply of recycled material and generate demand for them. They should happen through innovative approaches, the right price for raw materials, design improvements, guidance to and enforcement of legislation and a well-functioning monitoring.

### More room for demonstration of innovative approaches.

The EC should provide more room for the demonstration of innovative approaches. "Red tape" for innovative projects should be removed. NEW\_InnoNet supports in this respect the EC initiative for innovation deals.

### The right pricing for raw materials.

Adjustments in price are needed to better internalize external costs of virgin raw materials and to stimulate the use of recycled materials and make it profitable. Actions may include: setting higher gate fees at landfills, implementation of tax-cuts or investment support for recycling technologies.

### Design for circularity needs incentives.

The EPR directive should be sharpened and widened to really deliver design that trigger new innovations and material circularity.

### Dissemination and implementation of good practices in combination with the enforcement of legislation.

There are good practices already available in support of circular economy existing within the targeted value chains and waste streams that represent upscaling potential. This information should be collected and better promoted as means supporting enforcement of legislation.

### Monitoring and traceability of materials.

It is a necessary step to ensure recycling quality and volume especially for plastics. The EC should support and enforce coherent and complete data collection. Only this coherence can make targets efficient and ensure the quality of recycled raw materials.

## Innovation, investment and other horizontal measures

### Funding for innovation and demonstration.

In order to speed up development, innovation is needed. Difficulties in moving from innovation scale to full scale should be acted on. Funding of larger demos to support that technologies become ready for market exploitation is crucial. Elimination of red tape for innovation projects to enable experimenting and wider dissemination of all the values, lessons and results emerging from these projects. In the SRIA systems development of recycling methods for composites and multi-layered materials, application of fibrous and mineral residues from ELV's, and the development of biological plastic upcycling methods are examples of research and innovation actions that may benefit from demonstration to upscale from innovation at a later stage. This economic support should partly be targeted towards SMEs since many solutions are to be found there (the existing Horizon 2020 calls are too much of an administrative burden).

### The right pricing for raw materials.

Today, the prices of some critical metals and plastics are low but the extraction of virgin raw materials causes pollution and imposes health and clean-up costs on the whole society. As long as these costs are not completely included in the price formation, the market prices of virgin raw materials do not reflect all aspects and thus are too low. As a consequence of this the recycling industry does not develop or invest in the technology needed to sort or recycle these materials. Recycled materials generally follow the pricing of virgin materials, when, for example, the price of raw-oil is low the price of recycled plastic falls. However, the recycling process remains unchanged but all of a sudden is no longer profitable. Adjustments to stimulate the use of recycled material and to make it profitable are needed. These actions might include to set higher landfill rates and to implement tax-cuts or investment support for recycling technologies. These actions are suggested in order to stimulate the use of recycled material and thus the investment and innovation in material recycling.

### Traceability.

To be able to recycle plastics to a larger extent it is necessary to increase the traceability of component materials – hence letting information on additives etc., follow a product through the value circle. This way the recycler can guarantee that the materials provided meet the quality demands set by the producer. Policy actions should be taken step-wise to make demands on traceability in products but also to address the links between product/waste legislation. Difficulties being that it is hard to create traceability in a more industrialised recycling process (which is favourable for other reasons). Research and innovation on ways of working with different labelling or sorting will by this be encouraged. The rise of big data will help the monitoring of recycled raw materials, if traceability practices are implemented. In the SRIA actions are directed towards e.g. chemical markers and high capacity sensor-based sorting.

## Product design

### Make use of EPR- directives as basis for design for circularity.

Although promotion of eco-design is one of the Extended Producer Responsibility (EPR) objectives, most of the current EPR systems do not incentivize design for recyclability, reusability or longer-lasting products. There are a few possibilities e.g.: implementation of eco-design related targets, higher levies on non-recyclable products / materials or introduction of a recyclability bonus. In this context, questions pertaining to hazardous substance content, requirements for product labelling and traceability, etc., could be evaluated, as well as possible mandatory use of circulated materials in products. NEW-InnoNet SRIA proposes a coordination and support action to improve EPR for encouraging the production of recyclable products.

## Waste Management

### Enforce achievements of the recycling targets and implementation of EPR-legislation.

The EPR legislation (Extended producer responsibility) is implemented unevenly across the EU Member States. To ensure higher levels of recycling efforts should be taken by the European Commission to enforce existing legislation in each Member State. Additionally, actions should address, in parallel, waste management practices for the circularity of materials from new products as well as the legacy of older products that do not meet current chemical legislation. Eventually, more focus should also be put on recycling quality to ensure that materials are retained in a high-quality loop for as long as possible. However, actions in that respect should be carried out gradually in order not to hinder recycling.

### Achieve coherent and relevant data.

Efforts should be undertaken to improve and better enforce the EU legislation in order to ensure adequate monitoring coverage, the comparability of data between countries and the possibility to track actual recycling rates. Regulation on Waste Statistics ((EC) No 2150/2002) as well as the EPR-legislations leave considerable leeway for the interpretation of definitions and provide little guidance on which methods to use. This entails that the data presented is not comparable. A harmonized measurement methodology is needed. Moreover, to advance further the transition towards a circular economy data is needed on reuse, remanufacturing etc. Unregistered collection of and treatment of waste lead to poor data and statistics, complicating both political planning and the evaluation of the feasibility of specific recycling actions.

## From waste to resources

### Guidance on existing and coming legislation and the dissemination of good practice.

Stakeholders point out that the legislation as such (waste legislation as well as product legislation) is difficult to understand and interpret, and that for this reason more guidance is needed<sup>3)</sup>. Lack of clarity regarding legacy materials in REACH is a direct 'show stopper' when it comes to jacking up recycling levels; at the present speed of implementation COP21 goals will not be met. For this reason, the creation of easy-to-understand explanations/guidelines on how to interpret the legislation, its meaning in practice, and the steps actors are required to take to assure that they are in compliance is needed. This can be complemented with highlighting and dissemination of good practises. Many companies have limited knowledge regarding the extent to which policies and regulations impact other actors in the value circle, which means that they may unintentionally complicate things for them. Furthermore, it is difficult to anticipate coming legislation and demands and thus prepare for it<sup>4)</sup>. Guidance and increased communication may be able to alleviate problems in this regard.

### Monitoring and enforcement of current legislation.

To discourage illegal activities increased monitoring of the level of fulfilment of current legislation is required – as is more resolute enforcement. Inefficient monitoring of waste collection and treatment means that materials are diverted to unknown destinations and unregistered treatment plants, which in worst case scenarios severely damages both people and the environment. It is, for example, estimated that more than 25 per cent of total WEEE is illegally exported and that about 30 per cent ends up in non-compliant treatment facilities<sup>5)</sup>. Increasing monitoring and making sure that existing regulations are complied with would increase the amount of material following stipulated pathways in the system, which in turn means that an increased amount would be recycled. A concrete action to take is to define the meaning of "equivalent conditions" for treatment to ensure that waste collected within EU is always treated at acceptable (and equivalent) conditions.



NEW\_InnoNet is a European project and stakeholder platform within the context of Horizon 2020. Between 2014 and 2017, the project conducted bottleneck analyses, drafted roadmaps and identified promising use cases for circular economy in the automotive, electronics and plastic packaging sectors. The analyses – and close interactions with 175+ stakeholders – resulted in a Strategic Research & Innovation Agenda (SRIA). The NEW\_InnoNet SRIA emphasizes the need for more innovation in recycling in order to quickly and effectively unleash the true power of the circularity of materials, in addition to necessary actions on waste prevention, reuse and remanufacturing. The SRIA proposes research and innovation actions to be taken. The agenda is supported with this policy brief, where policy recommendations are given to provide for a context where innovation in recycling can thrive and develop.



## Further policy recommendations

This part of the document has a similar structure to the Circular Economy Package<sup>8)</sup>. Due to the scope of the NEW\_InnoNet project some of the sections are as yet unpopulated. However, we have chosen to keep headings for the sake of clarity.

For many of the steps below there are also R&I suggestions mentioned in the SRIA<sup>2)</sup>.

### Production

#### Product design

Some aspects of product design, among these its complex and fast-changing nature, were identified as major obstacles to recycling and remanufacturing<sup>6,7)</sup>. Today product design is largely driven by performance requirements, the improvement of cost-efficiency, and consumer expectations, all of which do not emphasize recyclability or reusability. This means that there are no compelling incentives for producers to design for recycling, reuse, disassembly and remanufacturing. Policy makers could create those incentives.

A shift towards design for circularity concerns *developing products for which the end-of-life treatment has been taken into account already at the product design phase*, as well as seeing to it that *circulated materials are actively included in product designs*. This can contribute to high recycling efficiency with minimum losses in the recycling chain and also enable high-grade applications for recycled materials. Important aspects to consider include, for example, the choice of materials and how these materials are combined and joined together, the identifiability and accessibility of hazardous parts, components and fasteners etc.. Design predicated on circularity means that both the supply of and the demand for recycled materials will increase. A wide range of issues need to be considered in the overall design process, and circularity should be one of these. Other issues are for example safety, energy use and comfort.

In the SRIA a coordination and support action on collaborative design for circularity is proposed, where relevant actors are connected, cases are tested and potential means for institutionalising the communication between designers, manufacturers and recyclers are to be proposed. In addition, another coordination and support action is proposed in the SRIA, aiming to establishing an intra-sector and cross-sector knowledge community supporting a market for circulated materials. In addition to the recommendations above the following actions should be taken:

- **Design for circularity – expand and enforce the eco-design directive.** In the Circular Economy Package<sup>8)</sup> the Eco-design directive is highlighted as one area of action and although work has already started, one of the challenges is that the Eco-design legislation currently focuses solely on energy-related products. If we are to successfully promote design practices for circularity it will be necessary to broaden the scope of Eco-design legislation. Here, best practices, learning and collaboration can be first steps.
- **Investigate the possibility of increased inclusion of circulated materials in production.** To increase recycling a pull from the market side is needed, hence efforts should not only focus on collecting material and calculating recycling rates, but a demand and a market for the collected materials is also required. To impose demands on producers to use circulated material in new products is one way to support the strengthening of this market. Another option is to make the product quality regulations open for circulated materials.
- **Creation of design guidelines for material recycling and reuse of components.** With guidelines manufacturers and designers can act on design for circularity in a more structured way. The creation of these guidelines should involve actors throughout the value circle and would thus also contribute to increased opportunities for collaboration. The use of such guidelines could further be encouraged when it comes to, e.g., public procurement.
- **Enforce and encourage work with developing standards.** E.g. the relevant standards for plastic recyclates (e.g. EN 15342 et seqq. standard series for plastics – plastic recyclates) should further include parameters to indicate the pollutant contents as well as methods for their determination. Efforts are already underway. The European Commission has contacted the European Standardisation Organisations (ESOs) and requested horizontal/generic methodologies to illuminate material efficiency aspects of eco-design<sup>9)</sup>. CEN and CENELEC have initiated procedures and created the CEN-CENELEC joint working group to address this (JWG10)<sup>10)</sup>. Their goal is to have methodology standards ready by March 2019. This standardization work also aims to address product groups other than those in the electronics sector. The undertaking is underpinned by initiatives taken by national authorities and industry associations that are focussing on the development of methodologies and fundamentals of standardization.



## Production processes

No specific policy recommendations have been issued by the NEW\_InnoNet project, due to the scope of the latter. However, current production processes for raw materials and parts are based on homogeneity of input. Improvements of production processes to deal with the specific characteristics of circulated materials are a cornerstone of the circular economy.

## Consumption

No specific policy recommendations have been issued by the NEW\_InnoNet project, due to the scope of the latter. However, consumption and consumer practices are acknowledged to be of paramount importance to the circular economy.

## Waste Management

The Circular Economy Package<sup>8)</sup> states that waste management “plays a central role in the circular economy: it determines how the EU waste hierarchy is put into practice. The waste hierarchy establishes a priority order ranging from prevention, preparation for reuse, recycling and energy recovery to disposal practices, such as landfilling. It is important not to see the extremely important task of prioritizing the waste hierarchy order and the measures that need to be taken to achieve this as the sole province of waste management. All parts of the value circle should share responsibility for this and the major challenge for policy makers at this stage is to problematize the waste hierarchy for designers, manufacturers, trade and procurement.

In this section of the policy brief we focus on collection, sorting and recycling, and the monitoring of these. Other parts of the value circle are dealt with under other headings.



## Effective separate collection

**To enable circular material flows, effective collection concerns utilizing appropriate, easily available and cost-effective collection systems where user behaviour has been taken into consideration.** For most waste streams well-functioning separation routines are a crucial component of the collection system, both with respect to the volume and quality of the collected materials/products.

## Optimized sorting and recycling technologies

**For optimized recycling of materials, the realization of effective and flexible sorting and recycling techniques adapted to process discarded products entering the end-of-life chain are necessary.** In addition, losses are minimized, removal of hazardous materials and components is efficient and minimum losses in quality of the recovered materials are achieved. This is to a large extent supported by R&I actions that explore new technologies etc., suggested in the research and innovation agenda.

To bring these technologies to the market, incentives are needed to create, establish and strengthen the market as described earlier.

## Effective monitoring

Due to deficiencies in the monitoring system, variations in monitoring coverage, different monitoring points, etc., it is difficult to compare national rates and to determine both how much waste is available and what is actually recycled.

**Effective monitoring is all about having relevant and common methods for measuring overall performance** in order to create transparency and credibility for stakeholders. There is a need to create common methodologies for calculating and monitoring recycling rates between member states and related material flows in different parts of value chains. Some of this work is already taking place, for example, the Commission’s proposal for amending ELV directives (2000/53/EC), battery (2006/66/EC) and WEEE (2012/19/EU) (COM(2015) 593 final). This amendment already proposes some improvements to the current legislation with the aim of improving the quality, reliability and comparability of European battery, WEEE and ELV statistics. The existing amendments include laying down a methodology and format for data reporting, introduction of a data quality check report and Commission review and assessing national reports and reporting methodologies every third year.

In addition to the above suggestions the following actions need to be taken from a policy perspective:

**Development of material-specific recycling targets for products.** Many materials are co-mingled in the overall bulk of the waste material – for example, what is the weight-ratio of plastic to metal in a car or how much rare earth metals are there on a printed circuit board? Developing specific targets for these materials can

potentially enhance the recycling of critical and precious metals and plastics, inter alia.

hence be in position to focus on these aspects. This could be handled within producer responsibility systems.

## From waste to resources

### 🔄 Harmonization of legislation and implementation of extended producer responsibility systems

In the bottleneck analysis of NEW\_InnoNet<sup>6)</sup> poor harmonization of legislation and implementation between different EU-countries was highlighted amongst legislative bottlenecks. Currently there are significant differences in the implementation of extended producer responsibility between EU member states, because EU legislation provides only the global framework and member states are responsible for more detailed regulation and implementation. This leads to large differences in implementation of legislation and unequal demands being placed on actors. Although EPR schemes have significantly improved waste collection there are large differences in performance levels between member states.

The amendment of EU legislation based on the experience of current EPR implementation is essential for a more harmonized implementation, and for improved overall performance. This fact has also been identified in the BioDeloitte study on the development of Extended Producer Responsibility (EPR) guidelines<sup>11)</sup>. Among other things, the report proposes that the definition of EPR and its objectives should be clarified, and the responsibilities and roles of each actor should be clearly defined throughout the whole product life cycle. The conclusions of this study have been taken into account in the proposed amendment of Waste directive (2008/98/EC), which presents general requirements for EPR implementation. The aims of the proposal are to reduce cost, boost performance, ensure a level playing field, and create incentives for producers to pay more attention to recyclability and reusability.

The amendment of the directive is a clear improvement over the current situation. However, it only provides the framework, and more information about good practices is still needed to help national authorities and actors discover practical solutions and proceed towards a more harmonized implementation of the legislation.

In addition to the suggestions above the following actions need to be taken from a policy perspective:

🔄 **Annual binding reporting requirements for producers regarding recyclability, reusability and share of recycled material.** An investigation of the possibility of annual binding reporting requirements for producers regarding recyclability, reusability and share of recycled material in the products should be made. By forcing producers to report data on recyclability and reusability means that they will become familiar with the data and

## horizontal measures

### 🔄 Well-functioning market

If we are to succeed in creating an overarching materials flow, all parts of the thought circle need to work. What we see now is a focus on collection and sorting, but in fact there is also a lack of market avenues, so no matter how much waste is collected it will not find its way back to products.

A well-functioning market for circulated raw materials concerns the *accomplishment of an effective and established market including innovative business models for recycled materials* able to compete with virgin raw materials, as well as with landfilling and energy recovery. A well-functioning market also concerns the absence of noncompliant actors and the illegitimate handling of circulated raw materials.

In addition to the above suggestions the following actions to be taken from a policy perspective in relation to this are:

#### 🔄 Develop material specifications for recycled materials.

Legislation, standards and guidelines are developed for virgin materials and are not always suitable for recycled materials, and thus need to be further developed/renewed. Another obstacle is that producers set high demands on material performance, often unnecessarily high, which creates problems when replacing virgin materials with recycled ones, since it is difficult for the circulated raw material to guarantee these set demands. The action will facilitate increased trust in circulated materials quality and thus increase the use of circulated material.

#### 🔄 Work and develop strategies in procurement.

Through procurement both demands on recycled materials/ reusable products etc., can be set as well as using innovation procurement to increase the use of circulated materials. In order to strengthen the market, public actors could take the first step and examine their procurement routines. By ensuring a long-term market for recycled materials and circular flows can grow interest in investments and innovative initiatives will become more attractive.

#### 🔄 Guidance, monitoring and enforcement of current legislation

*Supporting policies and legislation are needed to stimulate material recycling and their reiterative utilization.* This also concerns harmonized legislation and policies and the enforcement of these to create fair conditions across

EU, and preferably globally. It also includes effective monitoring, utilizing common methods for measuring the overall performance and fulfilment of legislation, such as recycling rates for different value chains in order to create transparency and credibility for stakeholders. This will create a “levelled playing field” in EU.

In addition to the above suggestions the following actions should to be taken:

**🔄 Redefine the definition of waste and provide guidance for the use of it.** The current definition of waste is not suited to the circular economy. In the borderline between waste and products there are many uncertainties about when a product becomes waste and vice versa. Different interpretations are sometimes made on local levels and this makes it difficult for companies (both producing and recycling companies) to develop methods to increase circularity. Developing end-of-waste criteria is one option, creating clear user recommendations is another. Further guidance is also needed on the differences between by-products and waste.

## Cooperation

Many stakeholders see cooperation as key to achieving the circular economy<sup>4,7 and 12</sup>). Cooperation between producers, recyclers and reusers is one thing, but cooperation between government, industry, municipalities, researchers etc., is also needed. Continuous knowledge transfer is necessary in our rapidly transforming world. Creating a common language and understanding each step in the value circle is also crucial.

Policy makers can *push and facilitate the cooperation process*<sup>4</sup>), especially by incentivizing producers to cooperate with recyclers. For the recycling industry the need is already evident. Policy makers can act as catalysts when it comes to facilitating the dissemination of good product design examples, reuse initiatives etc., and by supporting platforms focusing on these issues.

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# NewInnoNet

**Project title:** The Near-zero European Waste Innovation Network

**Project acronym:** NEW\_InnoNet

**Grant Agreement No.:** 642231

**Starting date:** 01-02-2015

**Duration:** 30 months

**Website:** [www.newinnonet.eu](http://www.newinnonet.eu)

**Project Coordination:** Tjerk Wardenaar, PhD  
PNO INNOVATION

Schorpioenstraat 65; 3067 GG Rotterdam; Netherlands  
[tjerk.wardenaar@pnoconsultants.com](mailto:tjerk.wardenaar@pnoconsultants.com)

## Project Consortium:

 PNO CONSULTANTS BV (PNO )	 Van Gansewinkel Groep B.V.	 Inspiring Business FUNDACION Tecnalia Research & Innovation
 VTT Technical Research Centre of Finland	 IVL Swedish Environmental Research Institute	 <b>SINTEF</b> STIFTELSEN SINTEF
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NEW\_InnoNet is a European project and stakeholder platform within the context of Horizon 2020. Between 2014 and 2017, the project conducted bottleneck analyses, drafted roadmaps and identified promising use cases for circular economy in the automotive, electronics and plastic packaging sectors. The analyses and close interactions with 175+ stakeholders resulted in a Strategic Research & Innovation Agenda (SRIA). The NEW\_InnoNet SRIA emphasizes the need for more innovation in recycling in order to quickly and effectively unleash the true power of the circularity of materials, in addition to necessary actions on waste prevention, reuse and remanufacturing. The SRIA proposes research and innovation actions to be taken. The agenda is supported with a policy brief, where policy recommendations are given to provide for a context where innovation in recycling can thrive and develop ([www.newinnonet.eu](http://www.newinnonet.eu)).





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