

Guidance

PPI4Waste lessons for PPI uptake in the waste sector

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Table of Contents

1.	Introduction to PPI and barriers to its implementation	4
1.1	Public Procurement of Innovation (PPI)	4
1.2	Policies and opportunities	4
1.3	Barriers to PPI.....	5
2.	Specific challenges to PPI in the waste sector and how to address them.....	7
2.1	Assessing common needs and market engagement.....	7
2.1.1	Bio-waste management	7
2.1.2	Plastic separation	9
2.1.3	Bulky waste management.....	10
2.1.4	Separate collection for specific waste streams at collection points.....	11
2.1.5	Decision support system for waste management.....	13
3.	Approaches to PPI in waste - lessons from successful cases	15
3.1	The dual approach to waste management in Apeldoorn/Netherlands	15
3.2	Solar powered, compacting waste bins in Ireland.....	17
3.3	Rotherham NHS Foundation Trust: The People Centred & Low Carbon Food Hospital	18
3.4	Doncaster Reuse – win-win social entrepreneurship on bulky waste problem.....	19
3.5	Parma’s pay-as-you-throw: convenient waste management towards Zero waste.....	20
4.	Recommendations for EU policy makers on PPI in the waste sector	22

THE PPI4WASTE PROJECT

The PPI4Waste project has been based on an integrated approach which has involved setting targets, defining needs and improvements of functional performances and completing the cycle of preparation activities to implement Public Procurement of Innovation (PPI) processes in the waste sector; making know-how on procedures for procurement of innovation widely available through the establishment of a purchasing community; making state-of-the-art solutions accessible to a considerable number of procurers and building capacity for PPI uptake in the waste sector.

The work-plan of this 30-month project has a concise structure supporting the workflow to achieve its main aim; which is improving resource efficiency, sustainable waste management and sustainable consumption throughout Europe by increasing the use of PPI through a structured coordination action of networking, capacity-building and dissemination.

The cornerstone of the project is to boost resource efficiency through PPI, on the basis of the waste hierarchy. The establishment of both a Purchasing Community and an Interest Group on innovative waste management solutions in the first phase of the project created critical mass and has facilitated the exchange of knowledge among public procurers in the waste sector.

Two other important aspects covered in the project are the *innovation system perspective* to assess ex ante whether the right conditions are in place to expect innovations in PPI procedures, and *risk management strategies* to take when engaging in PPI procedures (see respective PPI4Waste reports).

This guide aims to collect the lessons learned during this period, both concerning the needs and barriers of public procurers operating in the waste sector and the possible solutions and opportunities that can be found. A key output is policy recommendations for applying public procurement of innovation in the waste sector.

Website: www.ppi4waste.eu

1. INTRODUCTION TO PPI AND BARRIERS TO ITS IMPLEMENTATION

1.1 PUBLIC PROCUREMENT OF INNOVATION (PPI)

Public procurement refers to the process by which public authorities, such as government departments or local authorities, purchase work, goods or services from companies which they have selected for this purpose. It is about the spending of taxpayers' money to deliver goods, services and works and to achieve best value for money. Public purchasing power makes up a significant share of the EU market and has thus the potential to be a significant driver for innovation.

Innovation in principle means the implementation of a new or significantly improved good, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, with the purpose of helping to solve societal challenges. Innovation is thus about finding new and better ways of doing things.¹

Public procurement of innovation (PPI) occurs when public authorities act as a launch customer for innovative goods or services that may be new to the public authority or sector, or to the market as a whole.

1.2 POLICIES AND OPPORTUNITIES

In spite of the importance placed on innovation by international bodies such as the Organisation for Economic Cooperation and Development (OECD)², Europe currently spends much less on R&D than the US, Japan and many other countries. It has been estimated that increasing investment in R&D to 3% of EU GDP by 2020 would create 3.7 million jobs and increase annual GDP by €795 billion by 2025.³

From a European perspective, the current main innovation policy is the Innovation Union, a Europe 2020 flagship initiative, with over thirty actions to stimulate partnerships and strategic use of public procurement budgets, provide access to finance, develop research infrastructure and measure progress. The main objective is to help boost research and innovation performance by speeding up the process from ideas to markets.

Public procurement has also been recognised politically by the European Council as a tool for increased innovation through PPI uptake and an increase in the development of innovative companies.

¹ ICLEI (2015) Guidance for public authorities on Public Procurement of Innovation

² See OECD (2010) The OECD Innovation Strategy: Getting a Head Start on Tomorrow; OECD and Eurostat (2005) Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data (3rd edition)

³ Zagamé, P. (2010) The cost of a non-innovative Europe at page 16, quoted in SEC (2010) 1161 Innovation Union.

The Procurement of Innovation Platform⁴ lists three key benefits for procuring innovation:

Increasing economic growth

The power of demand (e.g. first buyer or lead customer) can move the market to stimulate the economy and increase competitiveness of firms in future markets, creating new businesses and increasing the level of employment.

Better products and services

Direct benefits to the public as the users of public services can be the result of bringing new ideas onto the market. These can be then provided more efficiently and effectively and also more cheaply.

Solving the challenges facing society

Scientific and technological breakthroughs can be the result of PPI and PCP processes. The outcome of these can help tackle key societal challenges such as health and well-being; food security, sustainable agriculture, clean and efficient energy; sustainable and integrated transport; or climate change and resource efficiency.

1.3 BARRIERS TO PPI

Notwithstanding that PPI has the potential to introduce powerful solutions to fulfil present needs it still is very much underused. Public procurers often do not have the knowledge about how to carry out PPI in practice and do not use the available tools that could facilitate the process. In some cases procurers are not aware of available new technologies in the market while in others cases, they are simply overwhelmed by the flow of new developments around products and services and the lack of trust about the effectiveness of the results. On the other hand, procurers - even those willing to engage in PPI – often do not see incentives for buying new solutions. They are afraid of new solutions leading to higher costs or are faced with wrong incentives that do not encourage them to take the risk of buying innovative products from innovative suppliers.

Effective waste management requires a critical mass in terms of demand, in order for new investments to be cost-efficient. This is not the case of smaller municipalities, which have traditionally been responsible for their own waste management and have difficulties reaching this critical mass. Conducting joint public procurement among different municipalities, which are located close to each other, is in many cases the best approach to reaching the necessary critical mass to make investments worthy. Though several examples of inter-municipal organisations focusing on waste management exist in countries such as Belgium, France, the Netherlands and Portugal, many European municipalities still rely on small budgets and long term contracts that make the introduction of innovations in the waste sector difficult.

Procurement of innovation does not necessarily lead to increased sustainability. However, there are strong links between innovation and more sustainable performance – for example where new technology extends the lifetime of a product, or where better access to information means services to people can be performed more effectively and inclusively.⁵ Procuring innovation that leads to increased sustainability through the inclusion environmental and social procurement requirements provides an important contribution to ongoing sustainability commitments such as the Sustainable Development Goals that specifically mention sustainable public procurement as well.⁶

⁴ See infra FN2

⁵ ICLEI, The Procura+ Manual – A Guide to Implementing Sustainable Procurement (3rd edition) 2016

⁶ See online at: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Another barrier exists in the total price of innovative procurements, which are considered to be higher than normal procurements procedures seeking lowest price solutions. Despite the encouragement of the 2014 EU Procurement Directives⁷ to opt for the most economically advantageous tenders (MEAT), too many public procurers still focus on the cheapest purchasing prices due to financial constraints, lack of motivation and support, or simply due to "business as usual" attitudes.

As shown by the national 'meet the market' workshops organised in several countries in the framework of the PPI4Waste project, the identified barriers regarding PPI implementation in the waste sector still exist: from the "business as usual" preference over change and R&D investment to the lack of knowledge on how to practically implement PPI and the solutions that the market can offer. However, a clear outcome of all the 'meet the market' events was also that PPI in successful waste management is not just about the procurement of innovative products but also about innovation at all levels, including organisational structure within waste management departments and other related administrative departments (environment, urban planning, economic development).

Addressing these barriers among others through facilitating interaction between the existing market of innovative waste solutions and public procurers, and improving knowledge of available tools and approaches to waste management from other municipalities and waste management companies that have succeeded in implementing innovation, can contribute reducing the risk of innovating and facilitate the uptake of PPI in this field.

⁷ DIRECTIVE 2014/24/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on public procurement and repealing Directive 2004/18/EC

2. SPECIFIC CHALLENGES TO PPI IN THE WASTE SECTOR AND HOW TO ADDRESS THEM

2.1 ASSESSING COMMON NEEDS AND MARKET ENGAGEMENT

In an initial phase, the PPI4Waste project assessed the needs of public procurers and experts operating in the European waste sector. The objective was to draw a snapshot of the current status of innovation in the waste sector, to explore further PPI potential and identify needs through structured interviews and charts.

Following the interviews on innovative waste solutions, almost 100 identified needs were analysed and prioritized, including an assessment of their procurability potential. The needs were clustered according to the steps in the waste chain, primarily by referring to the waste hierarchy (prevention -> preparing for re-use -> recycling -> energy and other recovery -> disposal) and circular economy processes as well as according to overarching topics such as awareness, policy, support systems etc.

The target group consisted of procuring organisations (purchasers) such as waste departments in municipalities, waste management companies owned by cities or fully privatized companies, while also including organisations who are not procuring themselves (non-buyers).

Eventually, the PPI4Waste consortium selected the following five common needs to be met by procurement activities:

1. Bio-waste management;
2. Plastic separation;
3. Bulky waste management;
4. Separate collection for specific waste streams at collection points;
5. Decision support system for waste management.

The successive national 'meet the market' workshops in the PPI4Waste project were designed to address these needs. The following sup-chapters focus on the five identified common needs.

2.1.1 BIO-WASTE MANAGEMENT

According to the Waste Framework Directive, bio-waste includes biodegradable garden and park waste (50-60% of water and high composition of lignocelluloses materials), food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants (up to 80% of water a low quantity of lignocelluloses materials). This does not include other biodegradable waste such as paper, cardboard, wood or sewage sludge.

Bio-waste management (collection, treatment, separation), which, according to the European Commission is more often collected and treated as part of the mixed municipal solid waste (European Commission, 2008), was identified as one of the most important areas for public buyers in charge of municipal waste management.

The need relates to the separate collection of bio waste, and to means and approaches to treating and using bio-waste more efficiently: a scheme, which does not yet exist in all EU countries and does

not work always well in the countries where it does exist. In Spain, for instance, national debates are still going on about the most appropriate bio-waste collection systems and how to finance them.

Nevertheless, it is an area where public buyers are expected to invest considerable funding in the short and medium term, focused mainly on setting up separate collection systems. Hence, the clear need for more bio-waste treatment capacity in current facilities and for better performance of current solutions applied, such as anaerobic digester, translates into considerable PPI potential; a need that clearly calls for new processes and business models and is thus an ideal place to improve PPI uptake.

Project partners acknowledged the substantial potential to reduce waste if bio-waste was to be collected separately in all European countries. However, this would implicate a change of logistics and interregional planning in regions where new infrastructure for organic waste treatment would need to be created.

A barrier to innovative technical solutions lies often on the bio-waste producer side. Particularly when it comes to larger cities, separate collection is hindered by insufficient space for collection (bins) within residential buildings and public space.

Societal barriers are worth mentioning here as well: communication is sometimes difficult due to the high number of different nationalities and cultures. In addition, in Spain, for instance, the anonymous nature of public street containers does not encourage citizens to actively participate in the selective collection of waste.

The fact that a bio-waste system has been in place for many years does not mean that it is unproblematic, thus calling for a continuous investment in awareness raising and enforcement initiatives, as well as looking for new strategies, could be more effective. Dutch households, for instance, are obliged to separate organic kitchen waste since 1993, those bins are predominantly filled with garden waste while much of the organic kitchen waste is still discarded as residual waste.

Public authorities can apply PPI in this sector as the technology is mature enough and circular economy models deliver proven value. However, EU regulation includes specific rules that might limit recycling of the full organic fraction, in order to prevent risks for animal and human health (in particular in relation to Transmissible Spongiform Encephalopathies (TSEs), dioxin contamination, and exotic diseases such as Classical Swine Fever and Foot and Mouth Disease). Indeed, only certain categories of animal by-products can be composted or anaerobically digested and this must be done in a plant which meets the plant hygiene standards and treatment requirements set out in the legislation. Provided that a certain quality of bio-waste can be guaranteed, separating bio waste can support the growing urban food production in cities across Europe through the production of good quality compost in a circular procurement frame.

The national 'meet the market' workshops included lengthy discussions on bio-waste management looking at opportunities for PPI uptake in the field. Market players showcased relevant existing innovative solutions ranging from waste tracking sensors to compact converters for turning food waste into high quality compost, including software that helps to manage hazardous and non-hazardous waste, ensuring compliance with relevant legislation. An interesting outcome was that any investment in the implementation of separate bio-waste collection and in new biowaste facilities and technologies should take local conditions into account as a one-size-fits-all approach will not be suitable everywhere. Local conditions can have a strong influence in the selection of the most appropriate solutions to apply. For instance, some regions show a high demand for compost due to strong agricultural practices, while others prioritise energy production, which implies higher production costs.

The importance of market studies and consultations was also mentioned during the workshops, to ensure tenders have a realistic level of ambition in terms of existing technology in line with municipal targets. However, any successful PPI in this field needs a strong vision and will from political decision makers, such as the mayor of a city. Where public procurement does not move beyond the business as usual practice of choosing the cheapest waste collection services as main purchasing criteria, there is little room for innovative solutions that include also an effective bio-waste management system.

A related barrier in Croatia, for instance, is the *single objective procurement* where each step in the chain (collection bins, equipment, processing, administrative control, public involvement) is often separately tendered and dedicated to the specific problem, without linking it to broader objectives. Joint procurement in this case serves national policies that opt for regional waste management centres (i.e. landfill) for the whole region, making it difficult for single cities to apply their own PPI model. This is exacerbated by the lack of experience, knowledge and conservative attitudes of citizens who have to be convinced to carry out different practices to the ones that they are used to.

2.1.2 PLASTIC SEPARATION

The challenge of plastic separation is how to separate plastic from the other waste streams as well as sorting the different types of plastics, with the target to use plastic collected from waste streams as a recyclable material.

Experts agree that when it comes to collection and treatment of plastic, new processes and business models are needed. Separating plastics from bio-waste has the potential to lead to a considerable reduction in the amount of generated waste but implicate a change of logistics and treatment facilities. The challenging objective, however, is to improve the quality of the material going out of the sorting centres, by reducing the rate of impurities/contaminants in the plastic waste fraction that would go to the sorting centre. Though a pay-as-you-throw system would be very effective for this fraction, the political will for such a measure is lacking in most countries as the measure appears unpopular due to the fear of higher costs. In most cases, politicians don't want to force citizens to pay separately for waste management by establishing a pay-as-you-throw system and it seems that citizens do not realize that they already pay for waste collection in their taxes. In some areas, such as Portugal, the water consumption tax is used to cover (part of) the cost of waste management with no link between the type of product consumed and the service provided by the municipality. In other areas - such as in most parts of France -, the waste tax is the same whatever quantity of waste is generated, potentially hindering a responsabilisation process of citizens.

While, for instance, Croatia is faced with governance issues, with a lack of understanding of which organisational systems can give which results, Spain has rather technical barriers to innovation, with existing long term public waste contracts, which last up to 25 years. The latter considerably inhibits any innovation and market development. With private companies providing the service for a low budget, it is all about financial gain with little manoeuvre for innovative solutions. Another related issue in Spain is legislation with one national law and 17 separate regional laws where compliance is not always easy to finance nor to control.

PPI related to plastic separation requires both the political will to change the system at national level, such as in France, where the national government imposed the system on the sector, and the mind shift of waste management bodies towards new business models looking beyond the collection of waste towards behavioural change of customers and valorising waste for new markets through innovative public-private partnership models.

Applying PPI in this sector requires specific skills and knowledge. Furthermore in the case of plastic bottles, a high quality plastic recycling market is not yet established, despite the fact that 60% of collected packaging plastic waste is recycled in Belgium and financial resources are available (see also the final chapter on 'policy recommendations on applying PPI in waste sector')

At the 'meet the market' event in Spain, packaging waste and bio-waste management were identified as key topics for municipal waste managers and regulators, with public procurement seen as an important tool to shift to more innovative solutions. Another national market engagement workshop in Belgium focused exclusively on plastics, leading to similar conclusions. All the stakeholders agreed on the need to improve the available solutions and approach to packaging waste management in order to achieve current and future European and national goals on waste. Key application fields for PPI uptake were identified and included: a strategic packaging waste approach from collection, transport and sorting to ICT support technologies and improved treatment.

Plastics waste ranks particularly high on the regional agendas in Belgium, where collection of packaging waste is currently piloted in several municipalities under the coordination of the Producer Responsibility Organisation (PRO) in charge of packaging. Potential solutions identified included collection systems based on transparent bags and pre-sorting facilities for hard plastics collection. Local authorities are thus regarded as drivers for innovation in the sector through PPI, and they appear to be willing to experiment with new strategies. The extended packaging waste collection approach is supported by the private sector, which encourages more collection of plastic packaging (and therefore supports investments in innovation) provided there is a long-term commitment by the national authorities to extend the system to the whole territory. Regarding the collection of hard plastics, this takes place at communal amenity sites in Belgium. Given that hard plastics are not well sorted by citizens (probably due to the diversity of these plastics), municipalities are burdened with the task of carefully separating them. A recommendation was therefore to include in tenders contract-specific clauses on progressive improvement of performances.

2.1.3 BULKY WASTE MANAGEMENT

From a circular economy perspective, bulky waste offers considerable potential for PPI approaches, particularly in the field of reuse, remanufacturing and recycling, and local authorities would be well positioned to steer the innovation process in this field.

Countries such as Ireland and Sweden show a trend towards increasing recycling facilities. Recycling companies have the prospect of increasing revenue by re-selling recycled material, which makes it even more interesting to engage with the manufacturing industry. Naturally, to have a profitable circular economy in place, products need to have a higher quality that could potentially lead to the production of competitive products. It is important to retain as much of the resource quality as possible during the recycle process. If a product has a high quality in the first line, as mentioned earlier regarding the need of reducing impurities and contaminants in plastic waste going to sorting centres, the recycled product will likely be of higher quality as well which makes it more attractive at the market.

A difficulty is presented by the technical challenges of including the potentially social nature of circular bulky waste management into public procurement procedures. A challenge, however, that offers at the same time an important opportunity to address local social policies. Procuring bulky waste management in a circular way can indeed address unemployment, particularly in the social economy sector, involving for instance reuse organisations that employ low-qualified or marginalised people. These social economy organisations often benefit from support from the public authorities

via subsidies, such as in the case in Belgium and France. Interestingly, these social economy actors play a big role in local inclusion policies by providing work and training to the staff they hire. The increasing number of initiatives such as repair cafés, furniture restoration workshops, swap fairs as well as e.g. competitions, innovation weeks, training and science festivals, show considerable entrepreneurial activities in the field. The use of new technologies by the suppliers requires these social economy organisations to continuously adapt to the increasingly complex products and technologies in this wide field of what is commonly defined as bulky waste.

For instance the city of Gothenburg created a website for second-hand products but realised that one of the biggest problems lay in the logistics. A study of the IVL Swedish Environmental Research Institute is currently assessing scientifically how the second-hand trade can prevent waste. These developments lead to the creation of new jobs and new markets, and at the same time, call for new business models. From a PPI perspective, however, public authorities will have to ensure minimum thresholds in volume are reached.

In the case of the Netherlands, many stakeholders are willing to be a part in the development of innovative solutions. The problem – which is in no way exclusive to the Netherlands – is to find funding for developing innovative services or products and to create a market for them. Hence, economic sustainability for these activities is often lacking and makes it difficult to be competitive and attractive for public procurers willing to engage in ‘circular procurement’. Support in terms of business investment funds is needed. Environmental and/or spatial legislation does not always allow for sufficient room of experimentation.

SMEs are generally supportive of innovation in waste management and do cooperate on circular economy approaches, though some appear to be more conservative and not willing to take the risks that come with the development of innovative solutions and technologies. Nevertheless, given the usual difficulty of SMEs to engage directly with contracting authorities, this may provide a niche for them when competing with larger companies who have easier access to larger tenders. This is particularly the case in Ireland, where smaller-sized local companies provide the waste collection services, with limited competition from larger international companies. Waste is largely managed by private companies that own the waste facilities and generally manage the sorting centres, while local authorities manage the collection sites (i.e. civic amenity sites and ‘bring banks’). Their interest in innovation is primarily driven by increased efficiency, cost reduction and meeting their statutory targets. They are less risk-averse towards innovative solutions that have worked in other parts of the world and, most of all, have succeeded in minimising waste collection/management costs.

2.1.4 SEPARATE COLLECTION FOR SPECIFIC WASTE STREAMS AT COLLECTION POINTS

The need for separate collection points for specific waste streams addresses the question of how to sort waste at collection points as efficiently as possible for the different purposes they serve in the waste management chain. The project looked at concrete examples that could be procured from an environmental perspective and similar innovative solutions for collection points that could be incorporated in PPI approaches. (See also Chapter 3 on ‘Approaches to PPI in waste - lessons from successful cases’)

The material chain approach based on a holistic view on materials and products throughout their life cycle offers substantial PPI opportunities, particularly the improvement of household waste separation in cities and densely populated areas, and the improvement of the organic kitchen waste separation offer, which in many places requires a significant upgrade.

However, the PPI potential in this field also depends on how advanced EU member states are with separate waste collection systems. Some countries do not have a national market for recycled materials as the separate collection is not sufficiently implemented yet. Another barrier is the lack of political will needed in the first place to encourage willing stakeholders to invest and develop such a market. Many countries witness resistance from politicians to change existing separate waste collection systems out of fear that any change would bring about an unpopular increase in costs.

In Sweden, for instance, policies are not lacking but leadership around the optimisation of the separate waste collection services is. There are different forms of procurement and innovation processes and they are all linear. Politicians and decision makers are still afraid of incorporating both circular economy thinking into innovative procurement practice and a stronger inclusion of the end user, as separate collection for specific waste streams is strongly linked with behavioural change, and potentially with higher costs (e.g. pay-as-you-throw system).

In Spain, discussions are exploring how to achieve the European objectives in waste management without increasing the current costs. On one side are the positions aimed at strengthening the systems of existing selective collection and on the other side there are existing proposals to radically change the current system and take advantage of technological innovations in the treatment plants to simplify the collection systems and thereby achieve a greater citizen participation in waste management.

Sweden has an advanced household waste collection system on the market, though further improvement is needed, as well as the inclusion of other waste management streams in the separate collection. PPI could be a key to attract more innovative and creative companies, particularly for new design and digitalization of existing solutions. For instance costly biogas production is favoured over composting solutions and good source separation is regarded as fundamental to obtain good quality recycled material.

PPI, particularly in the waste management sector, needs specific knowledge that is often lacking. Flanders in Belgium hosts several research institutes such as the Flemish Network of Knowledge Institutes for Raw Materials and the Flemish Institute of Technology which provide expert input on recycled materials and materials policies, and liaise with other networks outside the country. This then supports other actors such as the Public Waste Agency of Flanders (OVAM) in adopting policies and regulations which have the potential of driving innovative, circular approaches in the waste management sector.

Apart from the cooperation and research needed to use PPI for separate collection for specific waste streams, further lateral thinking is required to adapt to rapidly changing market and product developments. The Netherlands, for instance, developed a so called green deals policy and about 200 green deals have been already made ranging from concrete recycling to *waste2energy* to cooperation's on plastic chain. The 'North Sea of Circle of Economy' is the first international green deal. These are good examples of how public authorities can promote the development within the field of waste management with different actors working together.

Innovative solutions are already available on the market as showcased during the national 'meet the market' workshops throughout the PPI4Waste project –attractive solutions for PPI uptake in this field such as:

- Sensors to track waste levels within bins and enable smarter collections.
- An online decision-making tool to help with waste management planning.
- A platform to enable reuse and exchange in order to divert bulky goods such as furniture from landfill.

- Compact composting facilities, to convert food waste into high quality compost.
- Software to help manage hazardous and non-hazardous waste, ensuring compliance with relevant legislation.
- Software which helps integrating data analysis into waste management in sensible ways. For example, tracking waste disposal patterns to ensure that bins are put in the most sensible places.
- A service offering collection and recycling/upcycling of certain products to keep them from entering the waste chain.

2.1.5 DECISION SUPPORT SYSTEM FOR WASTE MANAGEMENT

When looking at waste in a circular context the need to make informed decisions of where to sort in the waste chain becomes even more apparent. Using relevant support systems is key in making management decisions and ensure continuous improvements in the current waste management approach, and where and how to sort most efficiently in the waste chain at local level.

Most EU countries show considerable room for improvement when it comes to decision support systems for waste management. Technology is available but new business models need to be developed and applied. Though this presents obvious opportunities for PPI, good practice is still at a preliminary stage and far from being widely spread.

The quest for innovative procurement in the field of waste management must lead to the question whether the innovation system is effectively ready to deliver changes. A structured focus on innovation processes needs a bundling of relevant actors and stakeholders, of technologies, institutions and networks working together. Within PPI4Waste the innovation system analysis had also been a part in analyzing the common needs.

A good decision support system requires a triple helix approach, where SMEs, academies and the public sector are working together. In Sweden the innovation system for decision support system was analysed. Notwithstanding a long tradition and well developed understanding of waste management there is still a need to identify new technologies for decision support systems. In spite of a large market potential for decision support systems, few entrepreneurs are active and no developed market is currently established. However, the possibility to use PPI for decision support systems has been tested for different needs and there is the willingness to go further. When a well-functioning decision system for waste management is developed at the market thanks to PPI, there seems to be a huge potential and leverage for this product.

The national 'meet the market' workshop in Utrecht, Netherlands focused specifically on decision support systems for waste management. More concretely, the overall question was *“how to organise procurement and stimulate innovations in a municipal cooperation agreement to support the collection and processing of waste”*. Management systems are crucial to ensure the effectiveness of separate collection and processing.

The Netherlands, where separate waste collection schemes are well established, is a leading country in the field of waste management. However, as emphasised at the 'meet the market' workshops, the country needs to focus on better quality and less on higher volumes of recycled products. Optimisation can be achieved by PPI procedures through a certain fine-tuning of existing management systems in close cooperation with the public. Optimisation through PPI only makes sense if framed within a circular economy approach where the focus shifts from collection and recycling to collection, recycling and maximising product and material reuse.

The engagement with the market actors brought also up two key discussion points regarding decision support systems in waste management. Firstly, the importance of involving citizens in the achievement of the targets set by national and/or local governments, and secondly, the importance of dividing targets (set by governments) and the means to achieve them.

An interesting example for both aspects and the uptake of PPI in this sector is the Apeldoorn/Circulus-Berkel case (see chapter 3.1) Circulus-Berkel, is a local waste collection service for 8 municipalities including the Dutch municipality of Apeldoorn. The municipalities set the main objectives and targets for separate waste collection whilst the means to achieve the targets in the most effective and environmentally friendly was defined by Circulus-Berkel.

3. APPROACHES TO PPI IN WASTE - LESSONS FROM SUCCESSFUL CASES

3.1 THE DUAL APPROACH TO WASTE MANAGEMENT IN APELDOORN/NETHERLANDS

BACKGROUND

The vast majority of Dutch municipalities are compliant with national waste targets. New policies aim to reduce the amount of residual waste via agreements between stakeholders, not via new legislation. Municipal targets exceeding the legislative scope are therefore set in close stakeholder consultation.

Apeldoorn is a municipality in the province of Gelderland in the centre of the Netherlands with a population of approximately 160,000 inhabitants. Circulus-Berkel, is a local municipal cooperation organisation providing a waste collection service for 8 municipalities, which own the service provider. The Dutch municipality of Apeldoorn is one of their members.

The overall goal was to develop a *modus operandi* and targets for waste reduction, which could be jointly used by several municipalities with similar ambitions. The good practice is innovative both in terms of management systems and ways to achieve the national waste targets alongside other municipal objectives.

APPROACH & OUTCOME

The municipalities set the main objectives and targets for separate waste collection whilst the means to achieve the targets in the most effective and environmentally friendly were defined by Circulus-Berkel. The question related to public target-setting was not so much about how the waste management needs to be done but rather about defining what needed to be done. The 'how' was dealt with by Circulus-Berkel. The objectives addressed next to general waste reduction and efficient waste collection were also employment and CO2 reduction as well.

Circulus-Berkel was also obliged to ensure the most cost-effective and environmentally friendly ways to comply with the targets and was tasked to continuously research the market for further improvements. They also ensured that the targets set by the municipalities are realistic and achievable.

Cooperation and trust-building did not just take place between Apeldoorn and Circulus-Berkel but also between the other 7 municipalities leading to a mutual learning and progressing pathway.

Due to their "ownership" of the waste and the higher volumes, Circulus-Berkel could constantly stimulate new technological developments (quality control via their collection system) and higher levels of materials and product recycling.

An important success factor is the strong national backing of such innovation schemes. Agreements, such as the Apeldoorn/Circulus-Berkel one, are often supported by the national government via support programs run by state institutions that assist local authorities with procurement and

innovation processes. The government runs also programs aimed at initiating new research and promoting applied practices.

The case presented by Circulus-Berkel and the municipality of Apeldoorn is a typical example of how such agreements are set up in the Netherlands: one party sets the ambitions and the other party determines the means to achieve this. The rationale behind it is that if the voluntary agreements are not sufficiently effective, government legislation will be developed as an alternative.

LESSONS LEARNED

- The role of citizens: involving citizens from the start is essential to ensure ambitious waste management targets are met;
- A division between setting objectives (by the municipalities) and means (by Circulus-Berkel) can initially be a challenge but can be overcome through growing trust among partners. Circulus-Berkel proactively took the lead in showing the benefits and qualities of their work. Both organisations argued that this way of acting leads to broader benefits (environmental, social employment and financial aspects).
- Innovation is not taken for granted: cooperation between different partners (in this case municipality and cooperative waste collection organisation needs strong leadership, mutual trust and persistence in achieving innovative solutions.
- The assumption was that the waste collection service provider was more effective due to economy of scale and concentrated knowledge. Economies of scale could lead to advantageous joint procurements.
- Clear agreements about tasks and responsibilities are key.
- As building trust and genuine partnerships needs time, it is recommended to consider longer-term contracts - without exaggerating in the duration - which could hinder innovation.
- From a circular economy angle, waste collection and treatment are more than just collecting and handing over for processing. Setting multiple targets certainly contributes to this broader perspective (social aspects, employment aspects, energy and CO2 etc).
- Innovative procurement requests the required scale, contract and associated organisation of the tender. This varies by feedstock flow.
- Market studies and stakeholder consultations are important to ensure tenders were in compliance with recent innovative technologies and at the same time matching municipal targets.

3.2 SOLAR POWERED, COMPACTING WASTE BINS IN IRELAND

BACKGROUND

Dun Laoghaire Rathdown (DLR) County Council is responsible for the south-east region of County Dublin in Ireland (administrative capital: Dun Laoghaire), where around 206,000 inhabitants live. The County's Development Plan 2010 – 2016 set the frame for a balanced and environmentally sustainable development⁸.

Due to the economic crisis in the years between 2009 and 2014 the budget of DLR County Council was reduced by 25% and staffing levels by 17%, forcing the County Council to take a serious look at its services, and identify how to provide the same services as previously with a reduced workforce.

The waste management, in particular the emptying of the litter bins, showed inefficient use of available resources as staff often visited bins that did not need emptying. Hence, the challenge in this case was to achieve savings in current waste management and at the same time optimising collection frequencies of waste bins and improve results.

APPROACH & OUTCOME

Following some market research, the decision was taken to use solar powered compacting litter bins to ensure an optimal use of the bins with reduced fleet costs and staff numbers.

Following a successful pilot phase with 20 such bins in key locations, a procurement process was undertaken using an open EU tender process. The pilot phase showed a reduction from over 500 to 73 empties per day. Functional criteria had been favoured over over-detailed specifications. The whole bin stock was replaced by the new smart bins.

The subject matter of the contract specified the need to provide litter bins with sensors for real time information to ensure unnecessary collections and optimising resource usage. Technical specification also required the units to be capable of operating from a self-contained renewable energy source.

Eventually, the contract included an option to lease or purchase the bins from the supplier, with a minimum life of 7 years. The annual costs include repayments of capital, maintenance and software license. A list of full bins is generated every morning together with a map and the frequency of bins emptied can be measured and locations of less used bins can be changed every year to areas of greater usage.

Thanks to the real-time monitoring, the number of waste bins visited during a working day has been reduced by over 85%. The new bin system resulted in a reduction of 75% in fleet costs (less trips needed) and 60% in staff numbers. This also led to fuel and energy savings, reduction in bin repair and bag usage. Furthermore, the service was extended to new areas. Eventually, the new litter bin system helped to save around 200,000EUR per year.

⁸ See „GPP in Practice“ online at: http://ec.europa.eu/environment/gpp/index_en.htm

LESSONS LEARNED

- An initial pilot phase of such a system is recommended to ensure that the product fits with existing operations.
- On one hand, people need to be conscious about the initial high purchasing costs, on the other, they should be aware of the added value of such a system and the amortisation period needed.

3.3 ROTHERHAM NHS FOUNDATION TRUST: THE PEOPLE CENTRED & LOW CARBON FOOD HOSPITAL

BACKGROUND

The Rotherham NHS Foundation Trust's⁹ main site is the Rotherham Hospital in the Rotherham area (ca. 252,000 people) in the north of England. The hospital hosts around 500 beds and provides services to around 66,000 day case and in-patients and 295,000 outpatients per year. A total of 4,300 staff works for the Trust, of which around 3,000 work on the hospital site.

The nearing of the hospital's 15 year catering services contract provided an opportunity for rethinking and updating Rotherham Hospital's approach to catering. Previous experience in PPI and membership of initiative such as the Down to Zero Initiative and the Towards Zero Carbon Catering Procurement Compact encouraged the hospital to actively engaging the supply chain to offer innovative, low carbon catering goods and services to its patients, visitors and staff.

Hence, the challenge was to renovate the service, reduce the environmental impact and considerably increase efficiency.

APPROACH & OUTCOME

Change was induced through multi-stakeholder involvement and a pre-procurement market dialogue which helped to lay the basic requirements for the innovative catering services. A cross-departmental project team was brought together, including nursing staff, facilities, dieticians, procurement, finance and patient representation, to undertake a complete review of the catering operation. This task force assessed the successes and failures of the current catering service prior to further specify the requirements of the new service provision in terms of outcomes.

However, as the contract had been in place for so long, it took quite some time until the common vision of an environmentally sustainable, low waste and low carbon catering service was achieved. The clinical vision for the new service: an innovative integrated solution for the provision of high quality patient-appropriate meals that are enjoyable, attractive, support patient recovery and are delivered as an integral part of nursing care.

Rotherham adopted the Forward Commitment Procurement (FCP)¹⁰ approach, a pro-innovation procurement strategy using for example an outcome based specification, the Competitive Dialogue Process, and balanced evaluation criteria during the procurement phase.

⁹ See infra FN9

¹⁰ Forward Commitment Procurement (FCP) is a procurement model that can be used to deliver cost effective environmental products and services to the public sector and help to create the market conditions in which the environmental goods and services sector can thrive. (Source: Wikipedia)

Clear communication about the hospital's rethinking of its previous catering services and market sounding through the advertisement via the Prior Information Notice (PIN) in the Official Journal of the European Union (OJEU) and via Tenders Electronic Daily, as well as a market consultation workshop with key stakeholders proved to be a strategically important exercise.

LESSONS LEARNED

- Previous PPI experience, and particularly in an EU-funded project (EcoQUIP) considerably helped towards a progressive and pro-innovation procurement approach, specifically the Forward Commitment Procurement (FCP) approach.
- Multi-stakeholder engagement, including all relevant actors from supplier to nurses, was key to defining an outcome based requirement and to engage the market in a pre-procurement dialogue.
- When changing and improving 'old habits' (= catering contract), the decision makers should be prepared to engage in a longer journey. In this case the procurement process lasted 27 months.

3.4 DONCASTER REFURNISH – WIN-WIN SOCIAL ENTREPRENEURSHIP ON BULKY WASTE PROBLEM

BACKGROUND

Doncaster is a large market town in South Yorkshire, England. Together with its surrounding suburbs and settlements, the town forms part of the Metropolitan Borough of Doncaster, with a population of 304,800 inhabitants. The mission of the Refurnish Company from Doncaster UK is to prevent waste and turn materials into new usable items. The company was established in 2003 with the aim of preventing the dumping of functional and usable furniture onto landfills. Refurnish promotes recycling habits and responsible behaviour towards nature by collecting, re-designing and repairing furniture in order for it to be re-sold to the local community at affordable prices. Current scope of the business is domestic bulky household waste, trade waste (furniture and household goods), electronic waste (WEEE), unused paint and training and development of people.

APPROACH & OUTCOME

Refurnish is a small wheel in the delivery of Doncaster's Waste Strategy. However, it has partnered with SITA UK to deliver the Bulky Household Waste Collection Contract with the city of Doncaster. SITA UK serves in total 12 million residents and 40,000 business customers throughout the UK but has still found interest in partnering with a small non profit company in order to increase the re-use statistics and overall performance of the waste management system.

Refurnish operates in the city of Doncaster and its surroundings. Currently many of the employees are citizens which may be unfortunately labelled as 'unemployable' in some respects (with special needs) but are trained there and their skills are improved along with their experience and confidence.

Such a working environment has also been recognized by the Doncaster Business Association who rewarded the company with the award: "Employer of the Year 2010 – for exceptional accomplishments".

Besides collection of furniture and electric and electronic appliances which are donated by citizens, *Refurnish* also provides a collection service for bulky waste from citizens (in 2012 – 13,406 collections of bulky waste have been provided). As this type of waste is easily repairable and prepared for reuse, the products can be conveniently sold on at affordable prices through one of five outlets run by *Refurnish*.

Refurnish guarantees that all the collected materials will be re-used and recycled in the most environmentally preferred way, and it is important to emphasise that this organisation is not-for-profit and that all the eventual profits are invested in the development of the society at the end of the year (parks and playgrounds for children, renovation of kindergartens and retirement homes etc.) In total, 502 tonnes of domestic waste were reused in 2012 and additional 200 tonnes of trade waste have been put back to the market.

The impact *Refurnish* has on the community is huge in comparison to its size as it provides direct benefit to 10% of Doncaster's population. *Refurnish* also engages many students, directly support more than 150 deprived children and donates 24 community groups.

LESSONS LEARNED

- In the beginning, a small team of employees achieved success after success and this project became a successful social entrepreneurship in a very short time, providing working places for over 40 citizens, 86 training work placements and supporting in total 10,515 individuals and families with the products.
- Success factors include the multi-stakeholder and participatory model together with the innovative approach towards the bulky waste problem, further supported by *Refurnish's* regular contract with the City of Doncaster through the tendering process.

3.5 PARMA'S COST-EFFECTIVE WASTE MANAGEMENT TOWARDS ZERO WASTE

BACKGROUND

The City of Parma counts in total 191.418 inhabitants situated on a total area of 260.6 km², with total inhabitant density of 734,53 inhabitants/km²). In 2005 the separate collection rate was 30.1% with total of 609 kg of waste per person produced.

In recent years, Parma has seen significant changes in its perspective on waste collection. Based on the approved waste management Service Agreement with ATO 2 of the Province of Parma (utility company), written with the technical support of ESPER, Parma decided to extend the household collection of waste to the entire municipality and to implement a pay-as-you-throw (PAYT) charging scheme afterwards. The PAYT scheme was designed by ESPER in a study designed to support the city administration and the service provider in implementing the PAYT scheme.

APPROACH & OUTCOME

The revision of the previous system (street/home mixed collection) was a key step forward in achieving the ambitious quantity and quality targets set and taking up the Zero Waste challenge. The City of Parma therefore decided to make a significant change in the way it collects waste: the heavy multi-material bin (plastic, glass and tins) has been split into two different streams according to the

guidelines for the area's waste management plan. Plastic and cans are now collected door-to-door with a single container (yellow), while glass, based on the project drawn up by national packaging organization CONAI, is now collected with street containers (wheelie bins in the city centre with a hole of a suitable size).

All of this has allowed the City of Parma to increase the quantity and quality of the waste collected and increase in revenues paid by CONAI for separated waste by 300%. The increased revenues from recyclable materials, together with the reduction in disposal costs, have allowed the City to offset the higher collection and investment costs with a decrease in costs totalling around 500,000 Euro (comparing to 2013 and 2014 budgets). When household collection is implemented properly, there are higher running costs, but savings in the disposal budget help to consolidate the new system and allow us to fully implement the PAYT scheme.

In fact, Parma expects a further increase in quality with the application of PAYT. Fortunately, the waste management plan and related waste service contract had previously stipulated that all the residual waste and biowaste containers distributed in the Province of Parma were to be equipped with RFID transponders. Accordingly this new project does not call for replacement of all existing containers, but only a wider distribution of the residual waste bins equipped with a UHF transponder, allowing the company to identify each individual user.

After reaching 70% separate waste collection, Parma expects to reach at least 75-80% by adopting a rewarding system. This successful tool is already used in other cities which Parma is often compared with, such as Trento.

LESSONS LEARNED

- Careful and punctual project design was used as a basis for the Service provider tender. This way the costs and overall service performance were increased significantly.

4. RECOMMENDATIONS FOR EU POLICY MAKERS ON PPI IN THE WASTE SECTOR

- **CLEARLY OUTLINED EU POLICY RECOMMENDATIONS WITH PROGRESSIVE TARGETS**

Several waste (procurement) experts expressed the importance and wish of having clear recommendations before engaging in innovative processes and technologies with uncertain outcomes.

Clear recycling targets and definitions at European level (including those regarding monitoring of performances) are needed to give a clear signal for investment in recycling facilities. The setting of specific waste prevention targets, including reuse targets, at the European level is recommended, as waste prevention is higher than recycling in the waste hierarchy. Hence, any quantitative target should be in line with the waste hierarchy. Good practice showed the importance of setting targets which define what needs to be done, not how it needs to be done, which may hinder innovation. This last point could be further elaborated by showcasing such practices, such as the Circulus-Berkel case in the Netherlands (see chapter 3.1).

Clear policy recommendations should be split in short and long-term target framework, potentially supported by bonus/penalty system approaches linked to waste handling performance. Short-term goals can help to overcome pressing problems and ensure quick wins, whilst building up long-term trust and confidence for multi-stakeholder engagement to embed innovation into municipalities.

- **SUPPORT MARKET ENGAGEMENT OPPORTUNITIES (FORA/PLATFORMS) ON PPI IN WASTE**

The national 'meet the market' events proved to be particularly fruitful in terms of expert exchange between waste (procurement) experts and suppliers. The opportunity to engage with stakeholders from all along the supply chain was welcomed. These market engagement fora can also provide occasions to discuss specific topics, as happened at the PPI4Waste 'meet the market' events, where the use of performance based specifications in Europe versus traditionally prescriptive technical specifications was high on the discussion points ranking.

- **GUIDANCE & CAPACITY BUILDING ON INNOVATION REGARDING SOCIO-TECHNICAL OPTIONS**

The market is rapidly developing around innovative waste management solutions and different systems are being tested in different countries. Market engagement events certainly help to learn about new technological developments. However, not all procurers can easily attend such events. Hence, they often lack the knowledge to make informed decisions on such technical innovations, and even more, they would not have the resources to compare different existing systems and technologies. Furthermore, innovation is not only about technology but also about the social innovation in the field of waste management as outlined earlier. Whether it is plastics, bio-waste, bulk waste etc., there is a lack of knowledge on which waste management system can give what results, and how to approach this process of identifying and incorporating innovative technologies and methodologies.

To ensure effective PPI in waste management, guidance should clearly address the importance of having a risk management strategy and an innovation system analysis in place and show how to do this. An effective innovation system analysis can be essential in this regard to find out whether the right conditions are given to expect innovations when engaging in PPI procedures.

Awareness raising and capacity building around PPI are therefore vital to ensure that the appropriate groundwork is laid for innovation procurement to be carried out successfully. Hence, capacity building should be strengthened in two directions: 1) innovative solutions regarding waste and resource management (and more broadly circular economy) and 2) PPI practices as compared to regular public procurement practices.

- **STRENGTHEN & INNOVATE MULTI-STAKEHOLDER ENGAGEMENT - PUBLIC, PRIVATE, CITIZENS**
Successful waste management will not work in the long run without the effective involvement of the citizens. Some countries strategically use communication to influence the citizens' attitudes, behaviour and habits when it comes to waste separation. Even though some campaigns can be developed and implemented at national level, it is rather at the local or regional level that awareness raising campaigns are the closest to citizens and the most effective because they are related to practical information like collection points and frequencies, available tools and contacts, etc. A good example to mention here is the communication campaign conducted in Ljubljana in 2013, which greatly led to increased separate collection in the city in the following years¹¹.

Cooperation and communication between procurers, suppliers and decision makers is key in ensuring that the process of PPI and the benefits it can bring are well understood.

Another lesson from the 'meet the market' events, was that PPI needs to consider not only the procurement of innovative products but also innovation at the organisational level, within the waste management process. The cooperative, results-focused approach used by Circulus-Berkeel in the Netherlands, for example, showcases how active multi-stakeholder involvement can look like (see chapter 3.1). It is equally important to involve EPR organisations, such as in the case of Belgium (Fostplus), provided cooperation does not hinder innovation opportunities.

- **EMPOWER LOCAL AUTHORITIES TO LEAD ON INNOVATION IN WASTE MANAGEMENT**
With respect to PPI the biggest opportunities would lie within the improvement of waste separation in cities and the improvement of separation of food waste. Municipalities are strategically key in delivering services on these activities and any existing targets. In most Member States, municipal waste management is considered as a service of general interest. Municipalities should be accountable and responsible for municipal waste, so that all the citizens are served and that all legislation is being implemented. Local or regional authorities are responsible for the prevention, collection and treatment of municipal waste (in many cases with the help of private contractors).¹²

However, to take on this role effectively and efficiently, municipalities across Europe need to be sufficiently empowered via vertically integrated governance and dialogue frameworks (national-> regional-> local) to financial support in order to seriously consider applying innovation and achieving waste (management) targets that are progressively increasing over time, potentially with bonus/penalty clauses linked to performance.¹³

- **HANDS-ON GUIDANCE ON INCLUDING SOCIAL (ECONOMY) IN PPI FOR WASTE**

¹¹ See for instance online at: <http://ec.europa.eu/environment/europeangreencapital/news/20160122.html> [May 2017]

¹² See online at : ource: http://ec.europa.eu/environment/waste/studies/pdf/waste_market_study.pdf

¹³ Such as in the case of the Netherlands

Recycling, reuse, upcycling, remanufacturing are rapidly evolving with multiple opportunities in the field of social entrepreneurship, circular economy, green growth and objectives ranking from local economy support, job creation to low carbon development. Though “social aspects” can be included in public purchasing processes more guidance with practical examples would be useful to show sustainable public procurers how to support social economy and ensure its participation in such procedures.

- **ECONOMIC INCENTIVES FOR STRONGER MOVES AND TARGETS**

Whilst the call for new business models in waste handling becomes louder, European cities are already engaging in various initiatives with ambitious targets such as the Zero Waste one, a political commitment born from citizens and community initiative. In Italy, over 200 towns and villages pledged to become Zero Waste. The question is how to incentivise such initiatives and targets in addition to strong local leadership and multi-stakeholder collaboration.

Pay-as-you-throw systems for all residual wastes to promote prevention and separate collection is often mentioned as a 'sensible though sensitive' solution as politicians fear increased costs for citizens. For both, ambitious targets, systems and economic incentives may provide the needed support for the breakthrough.

Some countries offer funding opportunities for SMEs but specific waste-related public funding aimed at innovation in waste management is rare and/or difficult to access for private companies.

Countries such as the Netherlands build on greening the tax-system as alternative income to financing also innovation. Today, about 15% of the government's taxes are green taxes. Here again strong leadership is needed to engage in new models and alternative financing mechanisms for innovative systems.

- **CLOSING THE GAP BETWEEN PPI AND SUSTAINABILITY VIA THE CIRCULAR ECONOMY**

Public procurement of innovation is not necessarily more sustainable and sustainable public procurement does not necessarily lead to innovation. The stakeholders of the national 'meet the market' workshops clearly expressed a strong interest in pursuing a holistic approach where innovation possibly embeds all aspects of sustainability. Procurement and innovation processes are predominantly linear. Circular economy has the enormous potential of closing that gap by leaving the linear path towards a sustainable development. Hence, the circular economy model could be much more strategically used and promoted to showcase the potential of closing the gap between PPI and sustainability, particularly as waste is ideally placed between innovative technology and social economy.

- **STRONG POLITICAL LEADERSHIP FOR NEW BUSINESS MODELS**

New innovative solutions and business models, particularly if embracing circular framing, bear risks and require strong leadership and multi-stakeholder involvement. In some countries, perceived risks associated to innovation in the waste sector are so high that almost no pro-active innovation is taking place. With all the theory about the potential of PPI and circular economy the time has come for implementation. Good practices are needed to inspire and show what is possible prior to any wider market uptake. Strong leaders with longer term vision are therefore needed to make it happen.