

# Resource Efficient Use of Mixed Wastes

Case study: Estonian Recycling  
Competence Centre

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# Key findings

Estonian Recycling Competence Centre, Estonia	
<p><b>Context</b></p> <p>Construction and demolition waste (CDW) is one of the most significant waste streams in the EU. It consists of numerous materials, many of which can be recycled. CDW has a high potential for recycling and re-use, and has been identified as a priority waste stream by the EU.</p> <p>Despite having high recovery rates and the fact that Estonia already surpassed the 70% recovery target of the Waste Framework Directive (2008/98/EC) concerning CDW as early as 2011 (72%), Estonia still faces a problem with acquiring high quality recycling and the production of recycled CDW that can be effectively used back into construction activities. It is difficult to identify the % of reuse in the recovery rate.</p> <p>In order to address the current situation and in an effort to overcome the apparent barriers in improving (a) the quality of recycling and (b) the market of CDW recycled products (e.g. recycled aggregates), the waste management sector in Estonia through its Waste Management Association initiated the creation of a Waste Recycling Cluster (eventually becoming the Recycling Competence Centre).</p> <p>The activities of the Recycling Competence Centre are mainly focused on the development of different waste recycling projects (incl. international projects), trainings for all stakeholders in waste management/recycling and sharing internationally the experiences of Estonian companies in waste recycling. Further areas of focus include the development of standards and a certification scheme for recycled aggregates.</p>	 <p><i>Location of the initiative in EU-28</i></p>
<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Increase the amounts of waste recycled in Estonia.</li> <li>• Develop products from CDW, compliant to quality standards and certified.</li> <li>• Increase: <ul style="list-style-type: none"> <li>○ production capacity and volumes, joint marketing;</li> <li>○ sales of the products-services and export.</li> <li>○ international competitiveness.</li> </ul> </li> </ul>	<p><b>Key figures/results</b></p> <ul style="list-style-type: none"> <li>• Three large scale training programmes involving over 900 participants, representing a plurality of actors (private and public).</li> <li>• Construction of a test road for proof of concept by using recycled aggregates as a base material.</li> <li>• Development of its own trademark for certifying the quality of recycled products.</li> <li>• Numerous seminars and knowledge sharing workshops involving national and international stakeholders.</li> <li>• Increase in CDW recycling.</li> </ul>

<p><b>Description</b></p> <ul style="list-style-type: none"> <li>• Timeline: Jan 2011 – Aug 2015 <ul style="list-style-type: none"> <li>○ Jan 2011 – Dec 2013: Waste Recycling Cluster</li> <li>○ Jan 2014 – Aug 2015: Recycling Competence Centre</li> </ul> </li> <li>• Developed by the Estonian Waste Management Association and involved 21 partners (16 private waste management, 2 construction and construction product companies and 3 academic institutions).</li> <li>• Allocated resources: <ul style="list-style-type: none"> <li>○ Financial: 662 000 EUR</li> <li>○ Human resources: approx. 45 people across all 21 project partners.</li> </ul> </li> </ul>	<div style="text-align: center;">  <p>KOMPETENTSIKESKUS</p> <p><i>Estonian Recycling Competence Centre logo</i></p> </div> <p><b>Key factors of success and potential for replicability</b></p> <ul style="list-style-type: none"> <li>• High level of cooperation between all involved partners.</li> <li>• Research and demonstration activities.</li> <li>• Sufficient financing (private and EU funds).</li> <li>• High involvement and interest of private CDW management and recycling companies.</li> <li>• Good project management and administrative capacity skills.</li> <li>• Extensive networking and dissemination of project activities and results.</li> <li>• Involvement of national and international actors in the sector.</li> </ul>
<p><b>Conclusion</b></p> <p>The initiative has been largely successful with providing much needed knowledge and hands-on experience on CDW recycling issues and on the use of recycled products across the CDW management sector in Estonia.</p> <p>There is a good replicability potential that could enable other small-medium sized Member States or regions to learn from this case study, and ultimately apply similar concepts in their own territorial context.</p>	<p><b>Contacts</b></p> <ul style="list-style-type: none"> <li>• <b>Margit Rütelmann</b>, Managing Director, Estonian Recycling Competence Centre</li> </ul> <p><b>Useful links</b></p> <ul style="list-style-type: none"> <li>• <a href="http://www.recycling.ee/en/">http://www.recycling.ee/en/</a></li> <li>• <a href="http://www.ejkl.ee/en/">http://www.ejkl.ee/en/</a></li> </ul>

# 1. Introduction

The Estonian Recycling Competence Centre (henceforth the Recycling Competence Centre) came as a result of an evolutionary process of knowledge and networking development projects planned and administered by the Estonian Waste Management Association (EWMA). The EWMA acts as an umbrella organisation, representing the majority of enterprises engaging in waste management in Estonia, and especially the companies that focus on waste material recycling and recovery into useful products. The mission of EWMA is to stand for the common interests of the members and to develop waste management in Estonia directed by the general principles of sustainable development.

Waste management and recycling activities are increasingly becoming more and more sophisticated and technology intensive. In order for Estonia to become a competitive player in the future market development within the field of waste management and recycling, it is important that the local professional competence of waste recycling enterprises should be sufficiently developed and grow through research and innovation.

Furthermore, the products of recycling and recovery operations should meet certain quality standards and be certified in order to be competitive against natural materials and create added value within the waste recycling sector.

For dealing with the challenges identified above, the Estonian Recycling Competence Centre was founded in September 2013 as a non-profit organisation with the aim to increase waste recycling in Estonia and to support waste recycling companies in producing high quality and certified materials from waste.

The activities of the Recycling Competence Centre are focused on development of different waste recycling projects (incl. international projects), trainings for all stakeholders in waste management/recycling and also sharing internationally the experiences of Estonian companies in waste recycling. Three waste product group categories have been identified as priority areas in the working programme of the Recycling Competence Centre. These are:

1. Production of compost
2. Production of recycled aggregates
3. Production of recovered fuels

However, the focus of this report, as an example case study from Estonia, will mainly be on the activities of the Recycling Competence Centre concerning the efficient use of Construction and Demolition Waste (CDW) and the production of recycled aggregates. CDW consists a priority waste stream in the activities of the Recycling Competence Centre and especially CDW recycling, the development of standards and the use of recycled aggregates in new construction.

The Recycling Competence Centre is also planning to establish a foundation that would develop technical standards and proceed into waste products certification. A certification scheme will be developed for crushed concrete (primarily) and in the longer term it is envisaged that other CDW materials will be included as well. The certification of CDW materials will ensure high and common applied standards for crushed concrete to be used as aggregates for construction purposes. The certification will increase the visibility and confidence in use of this material instead of natural aggregates and it is expected to boost the image of recycled CDW while raising awareness about the quality of the recycled materials among the relevant actors in the construction and retail sector (of materials).

The Recycling Competence Centre's founders include the following companies: AS Kunda Nordic Cement, Ragn-Sells AS, the Estonian Environmental Services AS, AS Tallinna Waste Recycling Center and Landfill Väätsa AS.

## 1.1. Context of the initiative

Estonia is one of the EU-28 Member States which have very high recovery rates of CDW. According to the latest published data in the Estonian waste register (JATS) and following the calculation method described in Commission Decision 2011/753/EU, Estonia reached a recovery rate of 91% in 2013. This is a very high recovery rate, meaning that most of the quantities of CDW generated in Estonia are recovered in one way or another and thus diverted from landfilling. According to the Ministry of the Environment, so far most part of mineral CDW is used for backfilling operations (reclamation of old quarries, use on construction works, etc.). This means that a large part of the 91% recovery rate consists of backfilling.

There has been a strong national policy framework in place over the last few years in Estonia, governing the principles of sustainable and resource efficient CDW management, including among others, the Waste Act (RT I 2004, 9, 52), Environmental charges Act (RT I 2005, 67, 512) and several local governments' waste management rules. On top of that, strong economic incentives contributed significantly in diverting large quantities of CDW from landfilling. Such incentives include the pollution charge applied to CDW disposal and the subsidies provided through the Estonian Environmental Investment Centre to demolition projects that include detailed planning for the sustainable management of CDW and for the appropriate treatment of asbestos-containing CDW (e.g. eternite roofs).

Furthermore, Estonia is one of the very few Member States in EU-28 that have included a more ambitious target in their National Waste Management Plan than that of the Waste Framework Directive (2008/98/EC). The new Waste Management Plan of Estonia (for the period 2014-2020) is setting a target of 75% recovery of CDW by 2020. Taking into consideration the data presented above, it is most likely that this target will be fulfilled by 2020.

However, the majority of CDW recovered in Estonia is used for backfilling purposes, which consists a low form of recovery operation according to the waste treatment hierarchy. Having fulfilled the target of the WFD, the waste management sector in Estonia is aspiring to focus more in the quality of recovery/recycling, as well as in the production of secondary materials from waste, and not so much on the quantity aspect of recovery.

At the moment there are several barriers which hinder the development of higher quality recycling and the uptake of recycled aggregates as raw materials for new construction projects. Most importantly, the mentality in the construction sector which treats recycled materials as inferior to natural raw materials. There is a considerable lack of trust in recycled materials, which are perceived as of lower quality by builders and developers, and proof is needed that recycled materials have equal technical standards to virgin materials. As a result to this mistrust, there is very little or no demand for recycled CDW. Therefore, the market for recycled aggregates is not developed and there is little uptake of this material within the construction sector.

In order to address the current issues of CDW management in Estonia and in an effort to overcome the apparent barriers in improving (a) the quality of recycling and (b) the market of CDW recycled products (as described above), the waste management sector in Estonia through its waste management association initiated the creation of a Waste Recycling Cluster (eventually becoming the Recycling Competence Centre). As the waste management sector in Estonia is widely deregulated, private waste management companies play a major role in the management of CDW. Therefore, the creation of the Recycling Competence Centre came as a result of the need within the sector to improve and create the appropriate conditions that will increase recycling of CDW and the production of quality recycled products with high added value. The Recycling Competence Centre is an entirely private sector initiative which attracted funding through the EU regional development fund, but did not have any Estonian public financial support.

## 1.2.Objectives

The activities of the Estonian Recycling Competence Centre are focused on the development of different waste recycling projects (incl. international projects), trainings for all stakeholders in waste management/ recycling and also sharing internationally the experiences of Estonian companies in waste recycling.

Main objectives of the Recycling Competence Centre include the following:

- Increase the amounts of waste recycled in Estonia.
- Develop products from CDW, compliant to quality standards and certified Increase:
  - production capacity and volumes, joint marketing;
  - sales of the products-services and export.
  - international competitiveness.

Main Activities include:

- Development of different waste recycling projects.
- Training programs.
- Product certification.
- Consultation.

## 1.3.Results

According to the focus of the activities of the Recycling Competence Centre, the outcomes of the initiative are presented both qualitative and quantitative (where possible) in the respective sections below.

### 1.3.1. Training programmes

The Recycling Competence Centre has been very successful in organising and implementing training programmes concerning principles and practice of efficient waste management. The training programmes consist of different modules targeting each step of the waste management chain (on-site separation, collection, transfer, sorting, recycling, etc.) and different waste streams. The total length of the training programmes is 8 months, with a separate training module (two days) taking place each month. There is a dedicated training module for the efficient use of CDW, while several of the other modules can be linked to efficient CDW management, such as management of hazardous waste, EPR systems, etc. The CDW module focuses not only on mineral CDW that can be used in road construction but also recycling opportunities of other demolition waste materials (such as glass, plastics etc). The complete list of the training modules is presented in Table 1. Three training programmes have been already implemented and the last one ended in December 2015.

**Table 1: Outline of the modules included in the Recycling Competence Centre's training programme**

No. of module	Title / subject	Description of content
1	Waste Management	Concepts and principles, regulations, monitoring, transboundary shipment of waste, reporting.
2	Municipal Waste Management	Waste collection, waste stations, waste treatment (including sorting), recovery.
3	Production and Use of Compost	Trends in compost production, technologies, anaerobic treatment, the necessary permits and licenses.
4	Landfills and Waste Stations	Types of landfills, leachate, landfill gas, landfill daily maintenance, closure, after-care.
5	Construction and Demolition Waste	Construction and demolition waste (including scrap) in the collection and recovery.
6	Hazardous Waste	Permits, licenses, reports, packaging and labelling
7	Extended Producer Responsibility (EPR)	Packaging recovery, problematic/special product groups.
8	Waste-derived Fuels	Mechanical-Biological Treatment (MBT), Waste incineration and combustion.

The participation rate in the training programmes is high, with an average of 40 participants in each module. The participants come from different actors within the CDW management chain and are representatives of waste management companies, recycling companies, construction companies, local authorities, ministries and other state authorities, environmental inspectors, as well as representatives of the competent licencing bodies in Estonia for certification of products and management systems. Overall, about 650 persons have participated in the first 2 training programmes of the Recycling Competence Centre and over 300 persons are expected to have participated by the end of the current – third – training programme.

There has been very high interest from different actors in the CDW management chain as well as in the public authorities to participate in the training programmes. There is a participation fee of 125 EUR per participant per module. Despite the participation fee, most of the training modules in the programme were fully booked, a fact that shows the high interest and commitment of the participants in developing their knowledge and operational capacity on state-of-the-art CDW management.

During the trainings, the participants have the possibility to visit a number of waste treatment facilities and learn first-hand about practical waste management issues.

### 1.3.2. Knowledge sharing and international networking

The Recycling Competence Centre has been successful in establishing partnerships with other cluster networks and recycling associations in the EU (e.g. the Austrian Association for the Recycling of Building Materials - BRV) as well as an extensive network of partners in the Nordic countries, especially Norway, Finland and Sweden. The wide partner network has facilitated knowledge sharing and dissemination, among the international and national partners and the Recycling Competence Centre, and has led to increased uptake of the latest developments and technologies in the sector.

The academic partners in the Recycling Competence Centre, namely the 3 Universities taking part in the initiative, are mainly responsible for the dissemination of research results and demonstration of innovative practices in CDW management and especially the utilisation of recycled aggregates in different construction projects (e.g. the construction of a test road with recycled materials).

**Figure 1: Conference on recycled aggregates, 9-10 October 2014 in Tallinn - Mr Christian Engelsen from SINTEF (Norway) is presenting about 'Viable recovery options for construction and demolition waste'.**



### 1.3.3. Supporting the implementation of a research and demonstration project

The Tallinn University of Technology developed the concept of the construction of a test road using recycled aggregates from CDW. Initial tests were carried out in the laboratory of the University in order to assess the properties of the material. The material used in the test road was recycled aggregate - crushed concrete 0/31.5 mm. Following the material tests, a road section was sought in order to construct a real scale test road. The timeline of the project was as follows:

- 2010 - starting an overview study of crushed concrete at Tallinn University of Technology
- 2011 February - starting negotiations with the Estonian Road Administration in order to find an appropriate location for situating the test road
- 2011 May - final confirmation from the Road Administration authority on a specific road segment in a low traffic area a few kilometres east of Tallinn, the capital city.
- 2011 July - tender for finding a contractor for constructing the test road
- 2011 Sept-Oct - Road construction with crushed concrete unbound base course
- 2011 Nov – Completion of the road, continuous monitoring of the test section until the end of 2014

After the long-time monitoring period (over 3 years), the results concluded that recycled aggregates' basic properties are good enough for use as construction material in Low Volume Roads. Measurements have showed good Bearing Capacity and sufficient pavement performance of the test road. Furthermore, well known negative side-effects of recycled aggregate properties, such as high water susceptibility and low frost susceptibility, were disproved in the test road segment, which showed good field performance (Talvik, 2014).



**Figure 2: Development of the test road Maardu-Raasiku (No.11103) - Test section km 3.4-3.9**  
(photos by Ott Talvik, Tallinn University of Technology, and Margit Rüütelmann, Recycling Competence Centre)



This was the first example of road constructed using recycled aggregates in Estonia. The test road has been received with great national and international interest, as the site has already been visited by guests from Malta and Spain.

Additionally, the large evidence base created by the monitoring and data gathering of the test road has been presented to several relevant actors (public authorities, local authorities and road construction companies) in order to encourage the recycling of materials.

On the basis of Clusters test road in April 2012 Estonian Road Administration developed guidelines for “Using recycled materials in road pavement”. The guideline allows to use crushed concrete in footpaths, bikeways, for pavements designed for cars parking lots. For the Cluster this was the first biggest outcome in the field of CDW.

In August 2014 amendments to the Estonian regulation “Roadway Design Standards” were made based on the guidelines (allowing the use in footpaths, bikeways and in parking lots).

Also changes in regulation “Quality Standards for roads and roadwork” were made (07.2014). The change allowed to use crushed concrete in road construction for roads with traffic volume less than 200 cars a day.

In Estonia recycled aggregates have to meet the same quality standards as natural aggregates. Quality standards for natural aggregates are existing which enables the certification of recycled aggregates.

Quality standards for compost and digestate were developed during the programme. In 2016 the quality standards for sewage sludge compost will be developed.

### **1.3.4. Trademark of high quality recycled products**

The Recycling Competence Centre has also developed its own trademark for certifying the quality of recycled products, which is used extensively by its members that produce recycled materials.



### **1.3.5. Increasing CDW recycling**

The wide activity of the Recycling Competence Centre has boosted the recycling figures in Estonia, by the promotion and improvement of recycling practices and the demonstration of reutilisation practices for recycled products. The majority of CDW recovery in Estonia has been mainly backfilling, but through the activity of the Recycling Competence Centre there are increasing quantities of CDW that are recycled and can be used as recycled aggregates. Solid figures for the actual quantities diverted from backfilling to recycling do not exist yet, but evidence from the waste management sector and recycling companies in Estonia suggests that there has been a positive trend in recycling of CDW (especially the mineral fraction, which was mostly backfilled in the past) and in the production of recycled aggregates.

# 2. Implementation of the initiative

In this section a practical approach on the implementation of the initiative is presented, showing the required resources and the exact planning implementation steps of the initiative as it evolved through time.

## 2.1. Planning of the initiative and actors involved

The Recycling Competence Centre started as a project of the EWMA and was developed in its current form since 2013. The early stage of the Recycling Competence Centre was named Waste Recycling Cluster and it prepared the way and first implemented most of the activities performed by the Recycling Competence Centre today.

The initiative was planned by the EWMA and was funded by its constituent members. The initiative is entirely a private endeavour, initiated by the private companies which are members of the EWMA and more specifically those companies which are taking part in the Recycling Competence Centre as its partner organisations. Although the initiative was developed by the private sector, the contribution and participation of academic partners (3 Universities) was sought right away from the inception of the initiative in order to bring the required knowledge and expertise in CDW management and to provide the needed research for delivering the objectives of the Recycling Competence Centre.

Currently there are 21 Cluster members, of which 16 are private waste management companies, 3 research and educational institutions (Estonian University of Life Sciences, Tallinn University of Technology, Central Estonian Education and Competence Centre), as well as the Estonian Water Works Association and the Estonian Waste Management Association.

The total budget of the project throughout its separate stages (01.01.2011 – 31.08.2015) was 662 000 EUR. 30% of the total budget was provided by the private waste management companies (private financing) and the rest 70% was raised through EU funding mechanisms mediated by Enterprise Estonia. EU funding came in the form of the EU regional development fund. Enterprise Estonia promotes business and regional policy in Estonia and is one of the largest institutions within the national support system for entrepreneurship, providing financial assistance, counselling, cooperation opportunities and training for entrepreneurs, research institutions, the public and non-profit sectors. Following Estonia's accession to the EU, Enterprise Estonia became one of the agencies implementing EU structural funds in Estonia.

The actual expenses however are estimated to be split almost evenly, around 50-50% between private financing and EU funding, because there was significant additional financing from the private companies, including additional workforce from the companies, travelling expenses paid by the companies which was not included in the planning of the project budget and additional research expenses which were deemed necessary for the successful experimentation in the partner academic institutes.

The human resources mobilised for the development and implementation of the Recycling Competence Centre initiative is about 45 people. At least 2 persons from each participating partner (either private company or research/academic institution) as well as a small team comprising the management and administration segments of the initiative.

The project funding ended in 31 August 2015, however the Recycling Competence Centre continues its activities as a self-standing organisation, aiming to continue its work programme as it has been developed so far and furthermore aims to go even a step further by applying to the Estonian authorities for official accreditation rights, in order to be able to provide quality certifications (according to national and EU technical standards) to recycled products (recycled aggregates). The Recycling Competence Centre, on top of its current activities of trainings, networking and knowledge sharing, it provides also project management and consultancy services to entities (either public or private, domestic or abroad) who wish to improve their recycling knowledge capacity and management of CDW.

Currently, the management of the Recycling Competence Centre is in the process of application for new financing opportunities, as a continuation project to the previous two (namely the Waste Recycling Cluster and the Recycling Competence Centre which just ended its project period at 31 August 2015), looking for EU funding but also for private funding through the companies of EWMA.

## 2.2. Implementation of the initiative

The Estonian Recycling Competence Centre was developed with the goal of improving the quality and quantity of waste recycling in Estonia, promoting the production, marketing and use of recycled materials compliant with high quality standards, and ultimately improve the competitiveness of the Estonian waste recycling sector internationally. The activities of the initiative are focused on development of different waste recycling projects (incl. international projects), trainings for all stakeholders in waste management/ recycling and also sharing internationally the experiences of Estonian companies in waste recycling.

The initiative developed gradually from a few waste management projects in the early years, to a full stand-alone non-for-profit organisation with the capacity to manage large scale projects and provide a wide range of services and trainings. The stages of development of the Recycling Competence Centre have been:

1. December 2009 – November 2010, preliminary projects of the EWMA, including compost production and production of recycled aggregates from CDW.
2. 1 January 2011 – 31 December 2013, establishment of the Estonian Waste Recycling Cluster
3. 1 January 2014 – 31 August 2015, evolution to the Estonian Recycling Competence Centre

The specific objectives of the initiative as well as the whole range of activities and results

of the Recycling Competence Centre have been analysed in detail in previous sections of this report (sections 1.2 and 1.3 respectively).

The first training programme started as a pilot in 2012 and was established as the flagship activity of the Recycling Competence Centre ever since, having successfully completed three rounds.

The latest and most aspiring activity of the Recycling Competence Centre is the application for official accreditation by the Estonian authorities for establishing a certification scheme for recycled materials (e.g. recycled aggregates).

**On June 30<sup>th</sup>, 2015** the Estonian Certification Centre of Recycled Materials was established as the result of waste management/recycling companies and research and educational institutions co-operation project Estonian Waste Recycling Cluster.

Initially the idea was to copy the certification systems from Central Europe – Austria, Germany but according to the Estonian legislation producers organization/association is not allowed to be the certifying body.

So absolutely new system was developed and Foundation Certification Centre of Recycled Materials was established.

The main task of the Estonian Certification Centre of Recycled Materials is certification of waste products.

The first certification scheme was developed for compost and on **Feb.17<sup>th</sup>, 2016** the Estonian Accreditation Centre issued accreditation certificate confirming that the Certification Centre of Recycled Materials conforms the requirements as certification body.

In 2016 and 2017 it is envisaged that other recycled materials as such as digestate, crushed concrete etc will be included as well.

## 2.3. Factors of success

The project has resulted in very positive results which are acknowledged at a national level. The factors of success of the project consist of a combination of administrative, knowledge, budgetary and cooperation aspects, coupled with good project management skills. Specifically, there was good project management and administrative capacity to develop, organise and implement the project and the activities involved. Good financing opportunities enabled the implementation of the project, where EU funding and private funding together made it possible. There was high private involvement in the funding of the project as it was in the interest of companies to improve recycling and their CDW management operations, which have already identified economic potential in these operations.

However, the most significant factor of success was the close cooperation between CDW management companies (as well as other companies relevant to the sector, e.g. construction) and the research institutes. By working efficiently and with a common understanding for the anticipated results, they managed to produce the necessary evidence base for improving CDW management holistically and innovatively, using CDW recycled products in ways that have never been used before in Estonia (e.g. construction of roads). In the case study of a test road construction, the specialised laboratories of the universities contributed with applied research in road construction with recycled aggregates, while the private construction and recycling companies

provided recycled materials and their operational capacity and infrastructure, assisting in delivering the implementation of the research project and at the same time learning in the process.

The Recycling Competence Centre initiative and the complete spectrum of its activities was thoroughly supported by public authorities as well, which showed the high interest in the outcomes of the initiative and urged for further work, research and demonstration. However, public authorities did not provide any additional financial support. Nevertheless, the public authorities indicated that the results of the initiative might help Estonia to improve its performance in recycling and contribute in developing a healthy secondary materials market for CDW.

On the negative side, the public and state authorities more often than not were critical on the results and required more and more evidence in order to approve the concepts and make use of the practices which resulted from the activities of the Recycling Competence Centre.

Finally, a definite factor of success was the knowledge creation capacity developed through the various activities of the initiative and its dissemination, providing relevant and up-to-date information to relevant stakeholders in Estonia, as well as capacity building by learning from examples and cases from abroad.

The inception and implementation of the initiative would not have become possible if the Estonian waste management companies themselves hadn't realised that they need professional help in order to improve their recycling performance, qualitatively as well as quantitatively. So, it becomes apparent that another enabling factor is the realisation of the CDW management sector of its lacking capacity and strong commitment to improve using own resources and a creative attitude.

The overall performance of the Recycling Competence Centre has been largely described as a success but still the uptake of recycled products and the establishment of a well-functioning market for recycled aggregates is not yet in place. This is due to the general mentality prevalent in Estonia that waste materials are *waste* and cannot be a *product*. This mentality appears to be the most significant obstacle in the activities of the Recycling Competence Centre and seriously hinders the efforts for increasing recycling and the production of recycled products, which ultimately deprives the secondary products market creation and affects the increase of recycling in quantity and quality. Therefore, considerable proof is required by the relevant actors in the sector, that recycled materials can be equal to virgin natural materials. This means that extra effort is needed by the Recycling Competence Centre to create the conditions for approval (research and testing, dissemination of results – conclusions, certification).

# 3. Lessons learned

The organisational setting and the whole range of activities of the Recycling Competence Centre could potentially be developed in any Member State or region of the EU-28 and beyond (e.g. ENPI - European Neighbourhood countries), in which there is a need for CDW recycling increase both qualitatively and quantitatively. Ideally, the initiative could be replicated in a medium-small country or a regional department of a bigger country, which tries to move away from landfilling and backfilling practices and introduce quality standards in CDW recycling and utilisation of the recycled products.

## 3.1. Preconditions for application of the initiative - replicability

A similar initiative, as the Recycling Competence Centre, could easily be established if the following preconditions exist:

- There should be a high degree of cooperation, commitment, communication and understanding between the partners in the endeavour, having a clear goal and defined objectives that are representative to the recycling sector and promote the creation of secondary materials market. Without honest and straightforward commitment of the involved parties, it is not likely that the initiative would produce the desired results.
- The initiative contains a high level of private initiative and funding, which means that the involved parties must be willing to invest in the activities of the project (in line with their annual budget expenses). However a Public-Private Partnership (PPP) approach could be considered as an alternative option, provided that the public authorities involved are equally motivated and interested in the implementation results of the project.
- EU funding from the EU structural funds (e.g. Regional development, Cohesion funds, etc.) would contribute to the financial stability of the project, safeguarding the early implementation phases and assisting in increasing the confidence of the involved partners (either other financially involved partners or technical and operational partners necessary for the implementation of the project).
- The initiative would be most successful if the majority of actors in the CDW management chain in the country take part in the partnership, so as to accept unanimously the outcomes of the project and establish common standards and practices for the use of the recycled materials. Therefore, the initiative would be more suitable in smaller countries with an organised waste sector, larger countries only in the case of a nationwide commitment from a majority of actors to the project, or alternatively would be very suitable for regional entities (e.g. regions of Spain, Italy, etc.) which exhibit a closer cooperation within the region than at a national level. The latter could contribute to the improvement of CDW recycling and market creation within a region and potentially be expanded gradually to neighbouring regions until a high national representation is achieved.
- Finally, exceptional project management skills and good capacity in project implementation is required, because the initiative involves a large variety of actors (national and international), that need to be brought together and cooperate under a common goal and create a common vision for the anticipated results.

The Recycling Competence Centre is already under the process of planning to share its organisational setting and acquired knowledge as an example of successful CDW recycling initiative to countries with relevant background as that of Estonia (e.g. Georgia, Moldova, etc.).

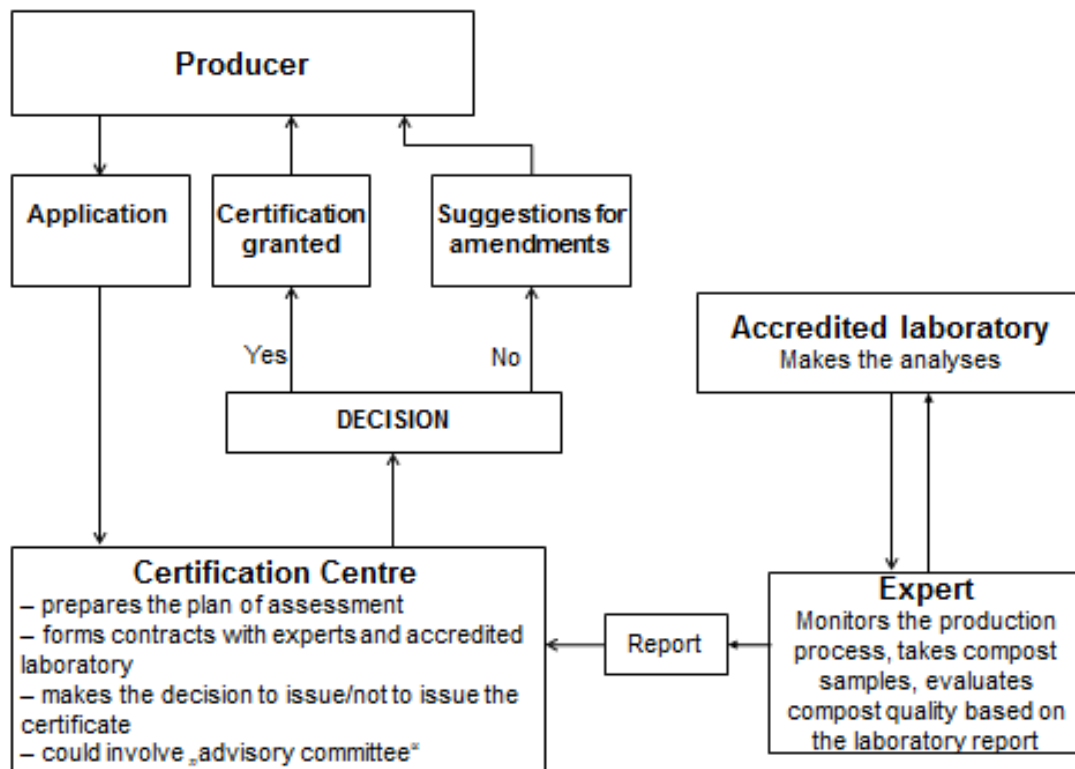
## 3.2. Innovation potential

The Recycling Competence Centre was selected as an outstanding case study example from Estonia, showing a significant contribution in improving CDW recycling, for its exceptional organisational setting and plurality of activities, especially in the context of a relatively new Member State with a dynamic and rapidly improving waste management sector.

Cluster creation and knowledge concentration in several technical aspects (e.g. waste management, among others) is certainly not something new, as similar clustering initiatives have been observed in the past in several EU Member States and worldwide. The ultimate goal of every cluster initiative is to accumulate knowledge, improve in its field, increase competitiveness at the international arena and finally become sector leader and innovator. In brief, these are the principles that apply for the Recycling Competence Centre as well. However, there are some aspects of the initiative that could be considered as novelties and would be of significant benefit in cases of replication of the initiative. These could be summarised:

- Close cooperation between market practice and applied research from universities, able to bring about ready to use solutions as a “package” to interested parties, such as public authorities responsible for waste management operations, private waste management companies, recycling companies, building material companies and construction companies.
- The Recycling Competence Centre will develop its own certification scheme for recycled aggregates which will set the necessary quality requirements for recycled CDW according to international standards. The development of one single certification scheme, within the CDW recycling sector for recycled products, will enable a uniform approach to secondary materials and harmonise the market environment for accepting such materials for use, on par with natural materials for construction purposes.

**Figure 3: Certification scheme for recyclable materials (developed by the Estonian Certification Centre of Recycled Materials)**



Certification scheme is developed for compost but can be expanded also for other recyclable materials (as digestate, crushed concrete etc).

# 4. References

## Contacts

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