THE MATERIAL MANAGEMENT IN THE BALTIC SEA REGION – OVERVIEW AND POTENTIALS –

SIMM-CCITIES PROJECT

START-UP STUDY

REPORT

2011038 SIMM-CCITIES

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Master project in Environmental Sciences

Stockholm 2011

ABSTRACT

This report presents the context, the parameters and the results of a study that has been performed as a start-up phase for the Sustainable and Innovative Material Management for Construction in Cities (SIMM-CCities) project. The purpose of the latter project is to establish a Baltic knowledge network that will contribute to the development of a more efficient and sustainable material management system within the different cities and metropolitan regions. In fact, previous studies and projects have pointed out the material management as a major issue that causes several negative impacts on the environment and the society. To improve the current system, the start-up study was meant to provide an overview of the global and local situations concerning material management, in order to give guidelines to the pursuit of the SIMM-CCities project. The study took the form of a questionnaire study; although, the carrying out process, both related to networking and environmental education, also provided important informal results.

Owing to the complexity of the material management system, the current lack of knowledge regarding its structure, as well as the limited time given for the study, only a few filled in questionnaires were collected. However, the study already allowed ensuring the interest of such a project as a possible solution regarding the issue, as the need for more knowledge and an overview was confirmed. It also showed that the encountered problems are certainly shared across the Baltic Sea region, and that the issue could appeal to the interest of the stakeholders who would gather in order to address the encountered problems. In order to develop the desired network, it is suggested to first focus on growing the awareness of the stakeholders by disseminating information on the issue and the project. Meanwhile, a sustained communication must be established to maintain the network. Besides, the collaboration with local key stakeholders is to prioritize, as it should help in reaching more actors and convincing them to take part in the knowledge network.

Key words: Material management, Supply chain, Sustainability, Baltic Sea region, Network, Multi-scale, Cooperation, Questionnaire study

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CO_2	Carbon dioxide
GHG	Greenhouse gas
HMFS	Sustainable material supply *(Hållbar materialförsörjning)*
KTH	Royal Institute of Technology (*Kungliga Tekniska Högskolan*)
ORPS	Office of Regional Planning of the Stockholm County Council *(Regionplanekontoret, Stockholms läns landsting)*
RUFS 2010	Regional Development Plan for the Stockholm Region 2010 *(Regional utvecklingsplan för Stockholmsregionen 2010)*
Sida	Swedish International Development Cooperation Agency
SIMM-CCities	Sustainable and Innovative Material Management for Construction in Cities

1. INTRODUCTION

1.1 Context of study: SIMM-CCities projects

The present study is performed as a start-up phase of the Sustainable and Innovative Material Management for Construction in Cities (SIMM-CCities) project that is owned by the Office of Regional Planning of the Stockholm County Council (ORPS) and co-financed by the Baltic Sea unit of the Swedish International Development Cooperation Agency (Sida). The purpose of the SIMM-CCities project is to establish a Baltic knowledge network that will contribute to the development of more efficient and sustainable material (especially aggregates) supply and uses in the different regions and metropolitan areas. This question has been pointed out as a major issue in the international context of rapidly growing cities, so that it is imperative to improve the material management system in order to reach optimal conditions for the development within the Baltic Sea region. There is presently a lack of holistic view and updated data, and the complexity of the material management system, with different responsibilities and stakeholders in separate parts of the planning, supply, and demand chains, makes it difficult to find ways to reduce the negative effects by improving efficiency. Consequently, to make this possible, the SIMM-CCities project proposes an international cooperation that includes participants from nine countries around the Baltic Sea: Estonia, Latvia, Lithuania, Russia, Poland, Germany, Norway, Finland, and Sweden. This network is also meant to be the base for a potential EU-financed Baltic Sea region project for an extended future cooperation.

Figure 1: The Baltic Sea region

1.2 Aim and objectives

The aim of the SIMM-CCities knowledge network project is to provide each metropolitan region with information and useful tools that will allow them to optimise their local material management. Owing to the complexity of the situation that is presently not wholly understood by any group or instance, the SIMM-CCities project aim to develop stronger links between the different stakeholders of the material management supply chain of the Baltic Sea region, in order to increase the communication and the cooperation between them. Through a series of action involving stakeholders at all levels, this networking and cooperation project is meant to create a more efficient management system that will make it possible to grow in prosperity. In fact, it is thought that a better understanding of both local and global material flow systems, as well as the availability of updated data, would enable the different metropolitan regions to plan for more efficient ways and practices. Thus, by highlighting the potentials of improvement, the good solutions, and the international complementarities concerning needs and resources, it will be possible to reach more sustainable uses, in all economical, environmental and social perspectives.

To achieve this goal, the network intends to initiate the discussion between the local stakeholders from each metropolitan region, who should gather in local core groups to share their knowledge and data information. Then, these experts groups will be able to provide updated information to be analysed and discussed by the four international workgroups that should be created. The subjects of these international workgroups are suggested to be the following: 1) *Material use, flow and future needs*, focussing on the mapping of uses and the major material flows to reach a better understanding of improvement potentials; 2) *Transportation and logistics*, producing useful knowledge for the development of easy-to-use tools and systems to support planning measures and logistics to achieve the full potential for material transportation; 3) *Land use and planning*, dealing mainly with territorial planning at different scales, all in a comprehensive approach to optimize the location of materials sources (pits, quarries and demolition sites) and areas for recycling, as well as to develop solutions to transportation intermodality; and 4) *Recycling and natural resource management*, working to make the technologies for reuse, recycling and minimization of used material, more widely available (SIMM-Cities,

2011).

In coherence with the objectives set for this project, the present start-up phase study is meant to give a holistic overview of the current situation concerning material management in the Baltic Sea region. Considering the lack of knowledge and the presumed nonexistence of effective network at the present time, the question was first to enlighten the local specificities, and to indicate which organizations could provide data, and which ones should participate in the project. Thereby, it sought for:

- the establishment of guidelines for the SIMM-CCities project and the knowledge network;
- the creation of local core groups that will work in collaboration toward the improvement of the material management system;
- the gathering of updated data concerning the uses and needs of aggregates upon the different cities and metropolitan regions;
- the initiation of a dialogue between the different stakeholders with the view of inviting them to a Conference in Stockholm by the end of 2011.

1.3 Approach

The study that has been performed and which is presented in this report consists in a questionnaire survey that was distributed to different stakeholders toward the Baltic Sea region. It was initially planned to interview two stakeholders for each metropolitan region, i.e. one representative of a public organization and one representative of a private organisation. The chosen cities and metropolitan regions were: Tallinn (Estonia), Riga (Latvia), Vilnius (Lithuania), Hamburg (Germany), Oslo (Norway), Helsinki (Finland), and Stockholm (Sweden); for Russia and Poland, the cities were not certain yet, though Kaliningrad and Dansk had been pointed out.

Although, as explained in *section 3*, the difficulty to reaching concerned stakeholders who could give answers to the questionnaire made that impossible, in the given time, to complete the study in the intended way. Some results have nevertheless been collected, and the carrying out process added some useful informal knowledge that must be considered.

On the one hand, the achievement of the study can instead be appreciated through its role in speeding information concerning material management problematic and the SIMM-CCities project, and thus in growing the interest of the stakeholders. On the other hand, the study led to some understanding that can guide the following steps of the project. Therefore, this report presents the different conclusions, with regard to the local interest and the potential of collaboration, and to the direction that the SIMM-CCities project could take.

2. BACKGROUND

As previously mentioned, the SIMM-CCities project is to be situated in a context of continuous growth of the metropolitan regions, in the Baltic Sea region such as in the whole world, where the development of cities implies a growing demand for new housing , commerce, office and urban infrastructure (Sida, 2010; SIMM-CCities, 2011). This induces strong pressures on the material supply system (aggregates and other materials used as ballast and for filling and construction purpose) involving increasing environmental impacts as well as conflicts between different strategic goals of society (ibid.). Consequently, there is a need to find solutions to a situation that is harmful to the sustainable development within the Baltic Sea region. The present section aims to provide a better understanding of the structure of the supply system, and to trace the problems that must be addressed.

2.1 Structure of the material chain supply

Material management refers to a complex system involving different levels of decision and of action, as well as a host of stakeholders which are coming in play at different times of the supply chain. The understanding of this chain, composed of several links which are complex in themselves, is a major issue in solving the problems that are met in the material management system. In fact, it is only through a better knowledge of its constituents and its implied process that it will be possible to locate the potential of improvement and, thus, to find possible solutions. Therefore, this section constitutes a synthesis of the way the material supply chain is built, and of the actors who intervene in it (all section: workshop directed by Bo Svedberg, 2011; Muliutenko, 2009; Vaivars, 2010; Svensson, 2005).

The first link in the material supply chain comes even in upstream of the resource extraction, i.e. at the step of the inventory of the raw material that is available, and of the planning of its use. This includes various actors mostly from the administrative sector, such as from the statistical and territorial planning offices and as the environmental authorities which have to do with the resource management and the protection of the territory. That is when is determined where the material can be extracted and when the licenses are

accordingly granted, but the material management could also be planned at this time in a comprehensive and forward-looking perspective.

The second link is the one of the extraction, involving mining companies, large or smaller, as well as geologist technicians, engineers and analysts, who will lead the extraction and ensure the quality of the product. Then, the third link corresponds to the transformation of the material, also by companies of various sizes, either the same or others than for the extraction. Is then performed the processing, sorting and cleaning of the resource to make it suitable for the construction uses. These two links involve many methods and technologies that lead to multiple environmental impacts, which open the door to numerous improvements in terms of sustainable development, but also of effectiveness.

Then, when the material reaches the construction site, comes the use in itself, which constitute the fourth link. The material is then used to produce roads and highways, urban infrastructures like water systems and sewer lines, buildings or entire neighbourhoods. All components of these structures are usually assembled in a fragmented process during which intervene, one after the other, a host of consultants and companies specialized in their own practice. Theses interventions are generally barely integrate with each other, and separately planned by manufacturers that do not interact together. However, the project managers are there to keep an overview of the construction project, to ensure its coherence, but this vision is often inadequate in terms of efficiency and sustainability of the system.

The fifth link immediately takes place: the management of the built product, for its maintenance and renovation, as well as for its eventual demolition. Each of these interventions requires the use of material or at least discharge some, which refers to the next link.

Indeed, the sixth and last link refers to the management of the waste that are inevitably produced as a result of each activity of the supply chain, from extraction to demolition. Theses wastes are normally transported to a landfill or recycling site, or are redirected to be reused. Thus, at this stage act specialized stakeholders, some of which allow the sorting of the wastes for the revalorisation of the material, therefore closing the chain back on the third link, and making of it a closed cycle rather than a simple line with an end. However, a

lot of the reusable material is now rejected or reused as lower quality product, which leaves a huge potential of improvement.

Finally, it is important to note that each link in the chain is bound by a transporting activity that often covers quite long distances. The bulk of this transport is made by truck, and that in a manner that is largely not optimal, due to a lack of logistic and of integration of the operations. The transportation being a major factor for emission of greenhouse gas (GHG) and other pollutants, and trucks also causing an untimely wear of the roads, an optimisation is important in order to fight against climate change. Besides, a storage activity also occurs between the links, asking for land to be used for this purpose. The planning of the land use has, thus, an impact on the distance to be traveled by the material between the different sites of activity.

So, the supply chain must be seen as a vast system, with multiple inputs and outputs, but still in a life-cycle vision presently not fully understood by most of the stakeholders who take part to the system. Come into play important economic components that guide the organization of the activities throughout the chain, but there are also sociocultural components to influence its structure (which varies according to the countries and regions), just as should the environmental parameters which should be more considered than they are in the present situation (Vrijhoef and Koskela, 1999).

2.2 Material management in the Baltic Sea reagion: issues and challenges

Aggregates, as a construction material, account for the largest proportion of the material flow. Indeed, their important role in the construction of infrastructures and buildings actually makes of them the first product transported by boat, although aggregates are mainly transported by trucking (Miliutenko, 2009; Viavars, 2010; Sida, 2010). According to Hultkvist (2001, in Muliutenko, 2009), from 40 to 50 % of the trucking of the Stockholm's region corresponds to aggregates transportation. On the other hand, according to Fry (2007), the transport of aggregates would be responsible for 20 to 40 % of carbon dioxide (CO_2) emissions of the entire supply chain, globally representing 0.8 million tons per year. This, in addition to other emitted pollutants and dusts, induces several negative effects on the local, regional and global levels (SIMM-CCities, 2011; Sida, 2010, Miliutenko, 2009). Meanwhile,

the consequent use of infrastructures cause premature wear of roads whose maintenance and reconstruction creates new demands for material, while the growing traffic increases the rate of GHG emissions and the number of road accidents and casualties, and contributes to local disturbances like noise (ibid; Regionplanekontoret, 2010).

The stages of extraction and production of materials such as aggregates also generates GHGs and other pollutants, resulting in additional impacts on the global and regional air and water quality. In addition, this activity generates local disturbances by noise and dust, changes of the landscape and a consequent loss of biodiversity (Sida, 2011; Miliutenko, 2009; Regionplanekontoret, 2010). Various technologies have been developed to reduce these effects, but their cost often impede their diffusion, while the environmental and quality standards are not the same in all jurisdictions or in all business sectors.

In construction sites, the materials are to some extent locally reused but, because of the tight schedules, the poor planning capacities and a culture that slightly values these practices, the local logistics is often far from optimal (Miliutenko, 2009; Vaivars, 2010; Sida, 2010). This lack of optimization in Sweden is reflected also by a downward trend for the efficiency in the transport sector (Sida, 2010). As a result, the materials that could be used on the site or nearby are often transported to landfills or remote sites, and the trucks are not fully loaded. Indeed, the extended urbanization reduces the potential for nearby production, handling and recycling, while the transport is done on longer and longer distances. Due to the continued dissemination of the just-in-time (or on demand) approach, there is also a tendency to decrease the filling of the trucks (Sida, 2010). Thus, the transport efficiency is declining and the number of kilometres of transport per ton of material is increasing.

According to the trend, the various listed pressures should also increase over the coming decades. In fact the, increasing urbanization in Europe and the word, as well as the renovation and development of cities, is increasing the need for residences, commercial spaces, offices and urban infrastructures. In fact, an increase of 500 000 inhabitants by 2030 is anticipated for the Stockholm region (Regionplanekontoret, 2009). It is then important to consider this issue right now to limit the impacts caused by the rising need for aggregates and other construction materials, which are induced on the environment but also on the

socioeconomic structure of society.

However, this issue is also defined as a complex system in which the various links in the supply chain are divided into separate responsabilities often little or not integrated with each others, and without collaboration among stakeholders. This makes it difficult to develop ways to reduce negative impacts and improve transport efficiency. There is a lack of global vision, while the current statistics on material flow, being deemed invalid, are questioned (Regionplanekontoret, 2010; Sida, 2010; Miliutenko, 2009). Indeed, according to previous researches, an effective system depends on actions at all levels, i.e. on the construction site (on-site reuse and highly energy efficient transports), local and semi-regional level (recycling sites and warehouses nearby) and regional level (strategic location of quarries, intermodal solutions, etc.). It is therefore essential to establish a cooperation and knowledge sharing network that will allow a sustainable planning for material management, this ideally through the creation of a permanent instance that will guarantee the overview by grouping responsibilities now forgotten or informally took.

It is thus in this context that the SIMM-CCities project was formulated. It seems that this solution must be implemented in order to achieve sustainability for the material management system, owing to the fact that the development of a multi-level network (organizational/urban/ regional/national/international) throughout the Baltic Sea region can only be beneficial to the formulation and spreading of solutions towards the achievement of the European sustainable development goals.

2.3 Previous projects and studies

To work for the development of a sustainable material chain supply in the Stockholm metropolitan region, previous projects have been conducted to obtain a more accurate perspective of the situation in Sweden and in the Baltic Sea region.

Indeed, between 2003 and 2010, two projects were carried out, through a collaboration between the ORPS, the Royal Institute of Technology (KTH) of Stockholm, Ecoloop, the administration of the Stockholm County Council (*Länsstyrelsen i Stockholms län*) and some

other local stakeholders: the HMFS[1]1 and HMFS2 (Frostell, 2007; Regionplanekontoret, 2010; Sida, 2010). In the first project, the HMFS1, critical issues and key stakeholders in the sector have been identified, through a consultative approach; in the second, HMFS2, the identified problems and the initiated stakeholder network were further developed, while were launched a number of activities that sought for the achievement of a more sustainable material supply system in the region. Several conclusions were thus formulated, demonstrating that the current situation is complex and difficult to understand in its whole, and that there are several important issues whose management falls between the responsibilities of the different actors so that they are not considered. Therefore, important issues as been suggested to be the subject of further work (Regionplanekontoret, 2010; Sida, 2010).

The knowledge acquired from these projects contributed to a better integration of the issues concerning the material supply system into the new Regional Development Plan of the Stockholm County, the RUFS 2010. This plan therefore contains the target to "improve the production, recycling and use of construction material" (Sida, 2010, p.2), as well as to lower the use of natural gravel and sand to a level that is consistent with the national environmental objective. However, this goal is difficult to achieve with today's practice, without an overview or a central organization. Thus, much more effort should be made to improve the entire material management chain and to significantly reduce the impacts that this system induce on the climate, environment and economy. It would be for example – according to a recommendation of the Swedish Environmental Council – necessary to establish a regional material supply plan acting on the long-term (Sida, 2010).

It is in this context that, in 2010, was initiated a third project, the HMFS3, which aims 1) to work through a participatory approach with various stakeholders to expand the network and increase the awareness and motivation to address the problem of material management in the Stockholm region, 2) to work towards the development of specific scenarios to determine the real needs, present and future, and to formulate the best solutions, and 3) to produce more consistency between the different actors and different links in the supply chain to enable joint action towards sustainability (Frostell and al., 2009; Regionplanekontoret, 2010). This will

[1] HMSF stands for *Hållbar materialförsörjning*, Swedish for "Sustainable material supply"

create better conditions to reduce the transport of material, increase recycling and improve the use of the territory, so in fact allow more efficient and more sustainable planning and strategic logistic, among other things by providing advices and possible solutions to the policy makers.

Similarly, the SIMM-CCities project emanates from the conclusions of the two first HMSF projects, this time aiming to broaden the horizons to provide the needed overview and create the lacking central organization (Sida, 2010). First tracing the outlines of the local and international context, by describing the specificities of each metropolitan region in terms of problems and proposed solutions, and by detailing the in place management methods and the involved stakeholders, it is wished to allow transfers of knowledge between cities and metropolitan areas of the Baltic Sea region. Then, an extensive collaboration will allow working to improve the material management system towards a global sustainability.

Nevertheless, this goal had already been formulated for the HMSF3 which also included an international component. This took shape through the thesis of Sofiia Milutenko (2010) entitled “Aggregate provision and sustainability issues in selected European cities around the Baltic Sea”. This research project concerned the needs and trends in aggregate supply in the regions of Stockholm, Helsinki (Finland) and Hamburg (Germany), so that it constitutes a precedent to the SIMM-CCities project and the start-up study presented here.

3. METHODOLOGY

The performed start-up study has required the development of a methodology corresponding to the context and the aimed objectives. This section presents the parameters that guided the choice of the methodology and of the consequently selected approach, as well as their scientific limits.

3.1 Objectives

As mentioned in the *section 1.2* of the introduction, this study is the first phase of the SIMM-CCities project. The latter being still in its beginning, it was now important to get a full picture of the situation concerning material management in the Baltic Sea region, with regard to 1) the needs, trends and regional specificities, 2) the local structures of the management system, 3) the availability of updated data, 4) the present consciousness of the selected actors and that the entire region demonstrate concerning sustainability and the problems of the material management system, and 5) the measures in place or planned to be introduced in order to address the problems. To achieve the project, it was also necessary to highlight the potential for collaboration and learning between the different metropolitan regions while expanding the network through the process of data collection as by the information provided by the respondents, toward the creation of local core groups.

Thus, by including these questions, the start-up phase was meant to draw guidelines for the next steps of the SIMM-CCities project. Besides, we should also note that because of the novelty of the proposed knowledge network, the present study also served the pretext to first approach the stakeholders in the nine countries of the Baltic Sea region, to diffuse information on the SIMM-CCities project, but also to initiate the reflection about the problems and, possibly, to initiate the communication between the various actors; the "environmental education" value of the study should therefore not be neglected, especially given the outcome of the results (see *section 4*).

3.2 Approach

These parameters then guided the selection and development of the methodology. Indeed, it was decided to carry out a questionnaire study (the questionnaire form is presented in the *Appendix 1)*, which would present to the surveyed stakeholders a series of questions of both quantitative and qualitative values, to obtain the wanted information. However, given the highly specialised subject of the study and the probable current unavailability of specific data, it was expected that respondents could not provide all the answers. For this reason, the questions were thought to serve an educational function: the survey, while initiating the reflection and growing the awareness, would at least indicate the type of information the SIMM-CCities project would ask to be made available, if not now, in the next phases of the proposed knowledge network. For the same reason, as to contextualize the study, the questionnaire had to be preceded by an introduction presenting the project and the study objectives, as well as the general situation and the need for solutions.

In this way, it was decided to place the more specific and technical questions in an appendix section placed after to the questionnaire in itself. This approach is relatively rare, but seemed accurate to avoid repelling the respondents who would not know all technical answers (which means, as it turned out, most of them) while pursuing the educational goal by hopefully encouraging the actors to question their knowledge of the issue: “Should I know this? Who has this information? Should I care more about these problems?”

From a methodological point of view, the objective was to get a response by at least two stakeholders per country, meaning a representative of a public organization and one of a private organization, in order to provide two different perspectives on the situation. Therefore, with such a small surveyed population, it is clear that the results could not be called reliable or representative; although, this kind of product would have been impossible given the large number of stakeholders but also the current ignorance concerning the local structures and roles of the organizations, which made it impossible to operate a representative selection of respondents. Similarly, the study could in no way be sufficient to provide a complete picture of the situation in each region. Consequently, the study sought to trace some features and provide avenues of research for the next phases of the SIMM-CCities project, a goal that has been reached.

3.3 Limits

A limit remains important for the study. In fact, although several stakeholders were contacted for the study, not all completed the whole questionnaire, and some refuse to fill it in, even if many of them had some information sometimes expressed during phone or email exchanges. Thus, these informations could not be directly integrated to the results, especially since nothing was planned to analyse the refusal to participate or the reason of the refusal: often, stakeholders said they did not know enough to answer or that their organization was not working on the issue. Nevertheless, these facts provide valuable informal knowledge about the local structure and the role and awareness of the stakeholders. Moreover, these facts have proven to be the most interesting and useful information in defining guidelines for the project, and are therefore included to the results.

It should be noted however that these informal results should not be taken for granted, has the contacted person are not either representative of the whole organization or metropolitan region: the incapacity to answer could but not necessarily mean a smaller awareness of the respondent or a less effective repartition of the responsibilities concerning material management, since it is possible that these findings only come from a limited ability to reach the right person, as well as from the language barrier which complicated some communications. Similarly, the greater facility to get answers in some regions emanates in part from the previous establishment of contacts, where some right stakeholders had been previously reached and informed about the SIMM-CCities project and the issue, allowing them to become more aware and to initiate a local discussion. From a strictly scientific point of view, this constitutes a bias, which however does not cause a problem in the context of environmental education and of knowledge network building.

4. STUDY RESULTS

As previously mentioned, much of the results obtained during this study are informal results that do not come strictly from responses to the questionnaire. Besides, a small number of questionnaires (11) were collected, which asserts the non-representativeness of the study. However, this does not diminish the progress achieved through the completion of this study, and given the content of the results, they can be expected to show some facts concerning the material management system in the Baltic Sea region. This section thus presents, through both informal and formal results, an overview of these facts, as well as of the various aspects that seem relevant to the continuation of the knowledge network development project.

4.1 Informal results

Before getting to the information that emanates from the collected answers to the questionnaire, it first appears interesting to observe the informal knowledge that has been acquired through the study process. As explained in the previous section, these facts have proven to be the most useful information in defining guidelines for the next phases of the project, as they give an idea of the potential of collaboration and the amplitude of the work that will have to be done to establish the suggested knowledge network.

4.1.1 Contact network and potential of collaboration

To achieve the goals of the start-up study, that is to say to inform stakeholders in each of the nine selected countries and get answers to the questionnaire, several contacts were established within the metropolitan regions. As expressed in Table 1, the total number of contacted persons varies greatly from country to country, as well as the results of the process. Thus, let’s explore the conclusions that emanate from the study process, for each country.

While the expected participation in the study is complete for Tallinn, Riga, Helsinki and Stockholm, we can see by the number of contacted person that the easiness of reaching stakeholders differs. This fact can in part be explained by the previous establishment of a

Table 1: Contacts and participation to the study

	Contacts		Participation to the study		Efficiency
	in the field	**total**	**received**	**to come?**	
Estonia (Tallinn)	5	5	3	0	2.0
Finland (Helsinki)	5	10	2	1	2.0
Germany (Hambourg)	5	7	1	1	1.1
Latvia (Riga)	5	5	2	1	2.0
Lithuania (Vilnius)	?	8 (15)	0	3?	0.2
Norway (Oslo)	7	10	1	3	1.8
Poland (Varsovie)	?	1 (3)	–	–	0.2
Russia (~)	–	–	–	–	0
Sweden (Stockholm)	5	7	2	0	2.0
			10^{+1}/18		**11.3/18**

cooperation agreement with Tallinn, where some meetings were held in Estonia in April 2011. This should thus have allowed reaching respondents quite easily; although, even if the response was positive and showed goodwill to collaborate in solution finding, not all selected stakeholders said themselves in position of providing answers to the questionnaire, and some discussion has been necessary to ensure their participation. Nonetheless, the networking activity that took place in the context of the present study allowed reaching the aimed objective, while the communication between stakeholders even led to obtaining an additional questionnaire.

A similar achievement was reached for Riga, as accurate contact persons had been pointed out, though not already contacted, before the start-up study. The efficiency to get answers and produce interest in the project was anyhow quite surprising. Moreover, it has been possible to meet, at the end of June, one representative from this city, hereby confirming

her collaboration and assistance in the creation of local core groups. This let hope for a beneficial participation of this metropolitan region in the following phases of the SIMM-CCities project.

For Helsinki, the result is similar but come out from a different process. In fact, it was first hard to reach respondents, but after all, the conclusion is very promising: it appeared that, regardless of the SIMM-CCities project, a process of collaboration and knowledge sharing was previously started within the metropolitan region of Uusima that includes Helsinki. During last spring, a conference was held, financed by the various municipalities in the region, to initiate discussions with different stakeholders of the industry; a report, presently only available in Finnish, was thus issued in May 2011 to present the conclusions of this conference (RAKLI, 2011). Because of those advanced process and local interest, there is a great potential of collaboration and mutual learning with Finland in the context of the project, as local core groups are already on the way to be formed.

Then, the two wanted filled in questionnaire were also collected for Stockholm. Because of the HMFS project, a local network is attempted to exist so that it would have been easy to get those answers. However, even if most of the contacted stakeholders showed interest for the project, many still declared that their organization did not work with the material management issue, and some were not much enthusiastic in collaborating on the achievement of the project. This statement therefore demonstrates how difficult it could be to develop a solid and efficient collaboration network, which is an important fact to keep in mind for the following steps: the action must be steadily taken, and the communication must be continuously kept to maintain the interest.

Then, Oslo and Hamburg have both provided only one questionnaire; although, a collaboration with the first city seems more promising for the moment. Indeed, it appears that the information on the project and the issue was disseminated amongst stakeholders since the launching of the start-up study, generating a burgeoning interest that should have led to the meeting of some decision makers in August. Besides, some stakeholders who told themselves unable to participate in the present study yet told their desire to collaborate on the SIMM-CCities project when they would have more time for this. As for Hamburg, after

some difficulties, the received answer finally was “spontaneously” given by a respondent whom had been forwarded the questionnaire by another contact. Other possible collaborators were also suggested, so that there is more to hope from Germany; however, the local network cannot already be said to be on its way at the moment of the closure of the start-up study.

As for Vilnius, its case is more uncertain since several people were contacted without much result: for 15 potential respondents, the language barrier only left 8 of them who were minimally able to communicate. That said, the difficulties made it impossible to confirm the potential of collaboration with them. Similarly, the local management structure of Warsaw could not be captured well enough to reach potential collaborators, while only one representative of the city was reached; the two other possible contacts were only advisers from the Embassy of the Republic of Poland and the Polish-Swedish Chamber of Commerce. Finally, the lack of resources and knowledge concerning Russia quickly led, owing the limited time, to its exclusion from this study. The situation concerning those three countries thus shows some barriers to the development of the network, but it also let believe that it would certainly be easier to reach stakeholders with collaborators who speak their national language, and preferably who are aware of the local structure and could thus be able to grow the interest by working from the inside of the country.

In sum, the objective that was to collect a minimum of 18 questionnaires, i.e. two per country, was still more than half reached, as at the moment of the closure of this start-up study project, 11 questionnaires were received, including a third one from Tallinn. The conclusions that results in that manner from the carrying out process of the study shows that much persistence will be needed to convince the stakeholders to take time to participate in the SIMM-CCities project, just as it will be to induce a change in the practices of the industry and to lead to the formulation of policies that support a more sustainable material management. Although, a strengthening effect already has been felt when important local stakeholders are reached, as it highlights the potential of success of the project and could create a leadership effect that would help to structure the network from the inside of the metropolitan regions. The same thing should be shown true as the number of collaborators will be growing, as we could therefore hope for a snowball effect

when the information will be spread out through the existing networks. So, even if the objectives of the SIMM-CCities project can certainly only be achieved through a slow process, the start-up study let hope for it to be much easier from the moment the interest and the awareness will be made strong enough.

4.2 Formal results

Besides from the informal results understood from the carrying out process of the study, the filled in questionnaires that had been received, although few, permit to give some clues about the situation within the Baltic Sea region, as well as it seems already enough to confirm the necessity and the potential of a project such as SIMM-CCities. The following section thus exposes the main results of the questionnaire study, although it is important to remember that they cannot necessarily be generalized.

4.2.1 Local context and material management

First, the few compiled results indicate two things illustrated in the Figures 2, 3 and 4: that the material management currently presents some problems which make it unsustainable, but that the awareness of the stakeholders concerning the issue is limited, especially regarding the global scale of the Baltic Sea region.

Second, all the participants to the study were able to confirm by their answers the upward trend for material need, as well as for importation of material and transport distances at each stage of the life cycle, resulting of the lack of storage facilities and of production and recuperation sites within or near cities: three respondents of different cities wrote that in recent years, the recuperation sites were on average pushed away from 30 km to now 50 km from the city.

Various factors have been cited, but all more than once, as main problems than must be solved to improve the material management. Thus, it was confirmed that the responsibilities in this matter are greatly diffused and that no instance exists to provide the desirable overview. It also appears that many responsibilities are in the hands of private companies, making it difficult for the public sector to fulfill its function as a regulator. Meanwhile, a need for legislation and more effective incentives arises to better control the

Figure 2: Problem in the city/metropolitan region

Figure 3: Problem in the Baltic Sea region

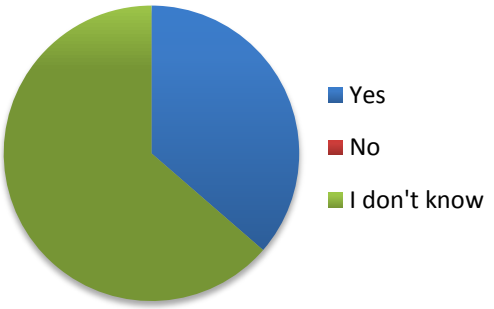
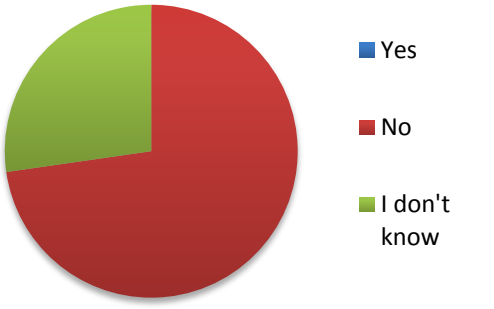


Figure 4: Current sustainability of material management

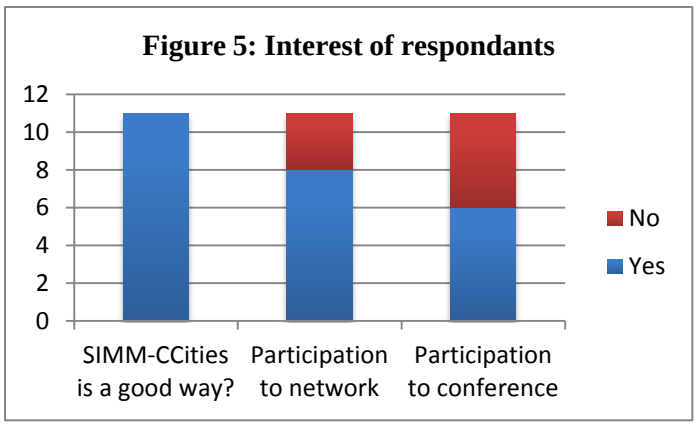


practices of the industry and the quality of the materials, as well as to reduce the administrative complexity of the environmental certification process. Nevertheless, it was indicated that the lack of information regarding current uses and sustainable practices as well as the lack of skilled and interested personnel do not allow the finding of solutions. The inadequate logistic would be a priority, while land use must be better planned, in part to provide local storage, while the transport must be optimized for example by eliminating the unloaded trips for trucks. Similarly, respondents emphasized the need to promote reuse and recycling of material to avoid losses resulting, among other things, from construction and demolition wastes.

In fact, the solution lays in the adoption of a comprehensive approach and the prioritizing of long-term goals, instead of compartmentalizing the scales and the links of the supply chain, as it is often done at the present. It is therefore suggested to focus on interventions that promote the minimization of transport distances and the reuse and recycling of material, all this towards a better accessibility of local material of a greater quality.

For this, the interest of the respondents regarding the SIMM-CCities project is great: as shown by the Figure 5, all of them described the creation of a knowledge network as a good

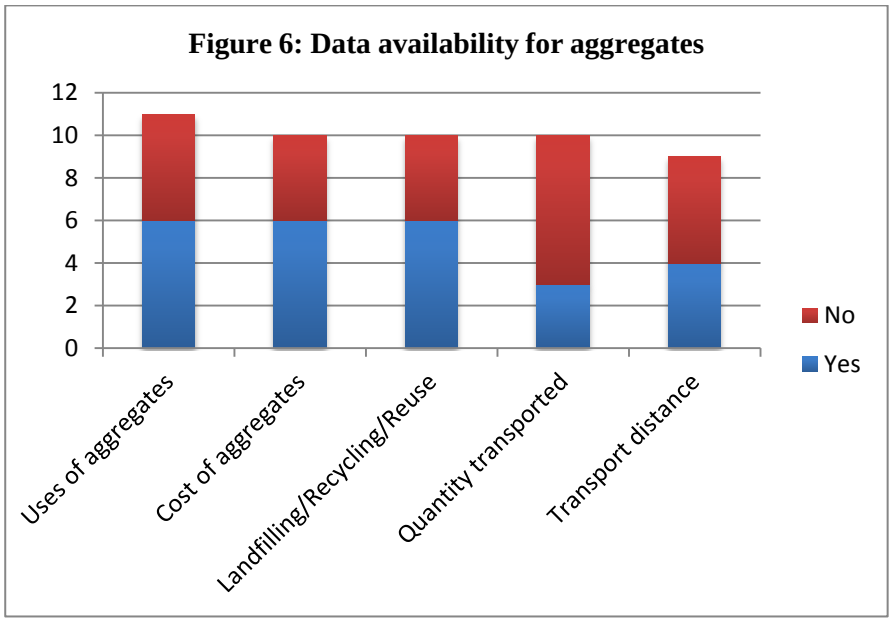
way to solve the encountered problems and to improve the material management. The majority wished to participate in this network, and half of them expressed willingness to travel to Stockholm to participate to a conference on this subject by the end of 2011.

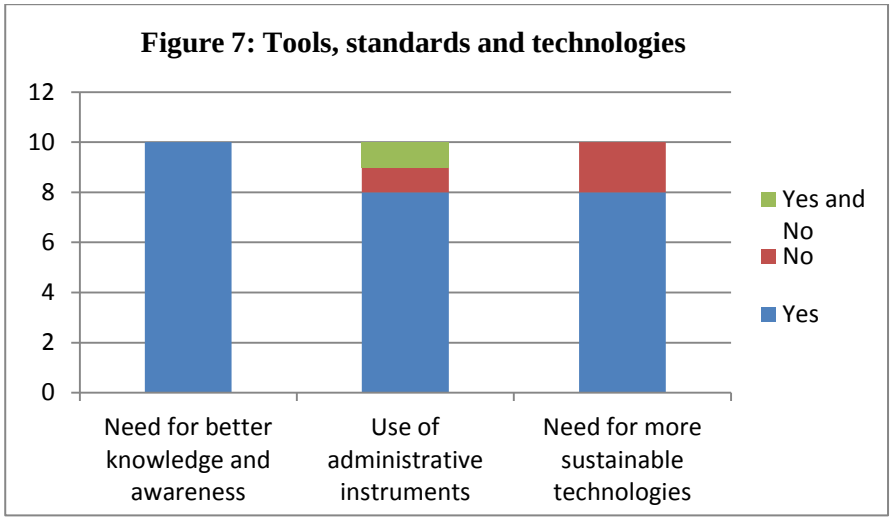


Although, even if the respondents show interest in the project, the collected questionnaires from Estonia, Germany, Latvia, Norway and Sweden all indicate that the prioritization of the sustainable material management is quite low or almost nonexistent in their metropolitan area. Only one questionnaire, from Finland, describes the sustainability and improvement of the material management system as a priority (graded 9 on a scale of 10), explaining that it is the case for Helsinki because it is a current problem, while it is probably not a priority in other regions like eastern Finland where it is not a visible problem.

4.2.2 Data and intervention tools

Finally, it turned out that, as anticipated, most respondents did not know where to find detailed and updated data, or even did not know whether such information existed at a compiled state, for each of the questions presented in Figure 6. In fact, only one respondent committed himself by providing some of the data requested in the appendix of the questionnaire. This obviously shows a lack of information in this regard, or at least the currently poor engagement of several organization and stakeholders in regard to the responsibility for solving the problems of the material management system. Moreover, the left column of Figure 7 expresses this lack of information when everyone said that more information and awareness are needed to improve the situation. Similarly, the utility of administrative instruments such as taxes and incentives is recognized by the majority, as well as is the provision of more sustainable technologies. However, one respondent judiciously pointed out that the administrative tools can only be useful if the economical





context permits it, and that the creation of a favourable market would be essential to a long-term resolution of the problems. Meanwhile, another denies the need for more technologies, stating that enough already exists and that it rather is their implementation which is the key issue; this thought can thus be confidently extended to the whole sustainable solution reality, as implementation has been shown as particularly difficult and not always possible even when the interest in the solution is shared.

5. DISCUSSION ON THE RESULTS AND FOLLOWING PHASES

The start-up study that has been performed, even without leading to all the detailed answers that were expected during its definition and the formulation of its methodology, has shown to produce a better understanding of the current situation concerning material management. In fact, both informal and formal results that emanate from the study are valuable and permit to highlight some elements that should guide the next steps of the SIMM-CCities project. The reached conclusions shall thus be discussed in the present section, and some directions will be given for the following phases of the knowledge network development project. Suggestions for future related researches will also be listed.

5.1 Sustainability and network development

The research process and the actual results of the carried out study, in spite of its theoretical non-representativeness, still already allow ensuring that the SIMM-CCities project, as it was formulated and launched, is a good possible solution toward the establishment of a more sustainable material management system within the Baltic Sea region and its different metropolitan areas. In fact, it had enlightened the potential to grow an interest regarding that issue, and to gather stakeholders in order to address the encountered problems. Those problems, moreover, appear to be shared across the Baltic Sea region, so that it can be thought that a knowledge sharing network would be beneficial to spreading the good ways and to finding solutions to increase the efficiency of the supply chain while making it more sustainable in all economical, environmental and social perspectives.

Indeed, the interest that was shown through the start-up study was quite satisfactory, especially in the environmental education perspective that was part of the project. According to the unsustainable reality that has been described, and to the indicated need for better understanding and awareness, the interest can be expected to grow bigger and bigger and that more and more stakeholders will agree to participate in finding solutions to an issue that restrains the thriving growth of cities.

If the awareness of international actors is the key to such a sustainable management project, the networking approach that was set will certainly ask for a sustained action in order to

expend, but also to maintain the network. The example of the Stockholm region actually shows the difficulty of creating effective links between the stakeholders, as well as the precariousness of these links, which in that case remain apparently insufficient despite the work that was started eight years ago.

Meanwhile, the current conclusions concerning Lithuania, Poland and Russia emphasise the importance of an action that would be undertaken from the inside of the different metropolitan regions. In fact, the contribution of an internal person, who besides would speak the local language, would assure a better lecture of the local structure of the material management system and consequently would more easily be able to reach the right stakeholders. At the same time, the potential of the phenomena of social pressure and of the ripple effect should not be underestimated, as the involvement of key stakeholders could play a role in indicating and attracting other participants who would then see more interest and potential in collaborating on the SIMM-CCities project. As a matter of fact, the participation should be higher if the probability of reaching a conclusive result seems increased by the involvement of these key stakeholders. In short, this supports the idea of creating local core groups that will, in each region, stimulate the development of the network and work to obtain the relevant information.

Nevertheless, the conducted study also allowed confirming a reality of the issue that was previously established: the complexity of the material management system which consists of a multitude of stakeholders from various sectors and scales. Although, the development of a network that gather all views appears to be the best possible solution to increase communication between the different stakeholders, and in the same time to grow their knowledge and involvement regarding the sustainable development issue. However, if the creation of such network is essential to a sound and concerted action, it is important not to consider it like a solution in itself or like a panacea. This approach is, indeed, rather a tool or a favourable condition to the formulation of sustainable solutions and, most importantly, to their implementation, which is also a major issue: the conceptualisation of a desirable system is one thing, its realization is another, and that is where the real challenge is.

5.2 The next steps

Given the current development of the proposed knowledge network, the next phases should focus on increasing the interest of stakeholders in the issue of the sustainable material management and, at the same time, to the project in itself. Indeed, with regard to this experience, it seems that the data and specific information cannot be already collected, both because they are presently not available in a compiled state and because the network is presently too weak and narrow to allow providing the necessary overview. For these reasons, it is fair to think that the information will become available only when enough stakeholders would have been interested in the issue, which should at the same time convince them of the importance of working together in finding and implementing the sustainable solutions.

The SIMM-CCities project, should thus begin as an educational project where most energy would be put in spreading information and strengthening the awareness to the issue. Although, to enable this, it have appeared that the establishment of collaboration with local leaders would be best to appeal to the interest of other important stakeholders; therefore, this focus is not contradictory to the network project as the awareness and commitment of one should lead to spreading information to its contacts, and in the same time growing the actual network. Besides, it will thus be necessary to maintain a steady communication within the established network in order to avoid a future weakening of the network. The communication could consequently take the form of a newsletter that would both spread the newly collected information and facilitate contacts between members of the network.

Eventually, those members should also gather to allow sharing information, and to also grow their interest by meeting other involved stakeholders who encounter the same problem and could work for the improvement of the material management system.

5.3 Future researches

Various study researches could be conducted in order to compose a range of arguments that will more clearly demonstrate the advantage of implementing a more sustainable system. Of course, it is highly relevant to highlight the economical benefits of this action, which always represent a central consideration in the context of the market economy as well as to

make sure that the new ways are sustainable in an economical perspective. Some studies could for example be set to assess the losses related to bad transportation logistics or to the insufficient valorisation of the “wastes” that could beneficially be reused of recycled.

Moreover, the multiple environmental impacts could be assessed. This could on the one hand emphasize the important of improving the material management system for fighting against climate change and reaching the European sustainable development goals, which represent a valid argument for the population who values the environmental issues. Meanwhile, a fair assessment would permit to set more specific goals for improving the system and establishing standards for various parameters of the supply chain. A better understanding of the environmental impacts could in fact argue for a consequent regulation that would be supported by the appropriate administrative tools.

Finally, to better understand the material management system and to indicate the stakeholders that should be reached, it would be relevant to perform a network analysis that would help tracing the existing relations between actors, with regard to their role within the system. Conducting such an analysis would indeed permit seeing the schema of the current relational system that directs today’s material management, while indentifying key actors and key relationships. Then, it would become easier to plan a way to change the network structure in a way that would be favourable to the adoption of more sustainable ways, and to strategically strengthen links to foster discussion about the issue.

REFERENCES

1. FROSTELL, Björn (2007). *Hållbar materialförsörjning i Stockholms län, HMFS2 - Planering för ett pilotprojekt i ett utvecklingsområde och stärkande av ett initierat nätverk för att lyfta frågan praktiskt och politiskt*, Internal document, Stockholm, Sweden, November 10th 2007, 7 pages.

2. FROSTELL, Björn, NORSTRÖM, Anna and Bo SVEDBERG (2009). *Hållbar materialförsörjning i Stockholms län – Projektrapport*, Internal document, Stockholm, Sweden, November 18th 2009, 69 pages.

3. FRY, Chris. (2007). « Theme 1 - Reducing the Environmental Impact from Transporting Aggregates », in *Sustainable Aggregates*. 31 pages.
   Online : <http://www.sustainableaggregates.com/library/docs/mist/t1d_transport.pdf>. Consulted June 15th 2011.

4. MILIUTENKO, Sofiia (2009). *Aggregates provision and sustainability issues in selected European cities around the Baltic Sea*, Royal Institute of Technology (KTH), Degree Project SoM EX 2009-26, Stockholm, Sweden, 82 pages.

5. RAKLI (2011). *Ylijäämämassojen vastaanotto palvelutoimintana pääkaupunkiseudulla-hankintaklinikka*, Final report, Helsinki, Finland, May 31st 2011, 19 pages.

6. Regionplanekontoret (2009). *RUFS 2010 – the big picture*, Stockholm County Council, Stockholm, Sweden, 28 pages.

7. Regionplanekotoret (2010). *ANSÖKAN - Miljöanslaget Hållbar materialförsörjning i Stockholms län, HMFS 3 – Scenariostudier, stärkande av nätverket för konsensus*, Internal document, Stockholm, Sweden, 18 mai 2010, 17 pages.

8. Sida (2010). *Ansökan om projektbidrag – SIMM-CCities*, Demande de subvention de projet, Internal document, Sida Baltic Sea Unit, Sweden, 31 août 2010, 6 pages.

9. SIMM-CCities (2011). *Sustainable and Innovative Material Management for Construction in Cities*, Informative document, Sida Baltic Sea Unit, Sweden, April 5th 2011, 4 pages.

10. SVENSSON, Niclas (2005). *Scoping environmental pressure from material use for strategic environmental management – Case of the Swedish National Rail Authority*, Linköpings universitet, Licentiate thesis no. 1152, Sweden, 42 pages.

11. VAIVARS, Alexander (2010). *An evaluation of sustainable aggregates supply in Stockholm County*, Royal Institute of Technology (KTH), Master of Science Thesis, Stockholm, Sweden, 53 pages.

12. VRIJHOEF, Ruben et Lauri KOSKELA (1999). « Roles of Supply Chain Management in Construction », in *Proceedings IGLC*, Vol. 7, University of California, Berkley, USA, pp. 133-146.

RESOURCES

1. SVEDBERG, Bo. *Workshop on the material chain supply, the costs and the flow*, in collaboration with André Szeles and Peggy Karlsson, Ecoloop, Sweden, May 10th 2011.

APPENDIX 1

Questionnaire form

This study is performed as a start-up phase to the Sustainable and Innovative Material Management for Construction in Cities (SIMM-CCities) project[1] that has been set by the Baltic Sea unit of the Swedish International Development Cooperation Agendy (Sida). Its purpose is to establish a Baltic knowledge network that can contribute to the development of more efficient material (especially aggregates) supply and uses in the different regions and metropolitan areas, proposing a cooperation that includes participants from nine countries around the Baltic Sea: Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia, and Sweden. This network is also meant to be the base for a potential EU-financed Baltic region project for an extended future co-operation.

The aim of the current study is:

- to establish the guidelines for the SIMM-CCities project and the knowledge network;
- to create local core groups that will work in collaboration toward the improvement of the material management system;
- to gather updated data concerning the uses and needs of aggregates upon the different cities and metropolitan regions;
- to initiate a dialogue between the different stakeholders with the view of inviting them to a conference in Stockholm before the end of 2011.

We hope that you have the possibility to participate in this survey by answering to the enclosed questionnaire[2].

Thanks for your participation.

[1] See definitions on page 3
[2] Refer to methodology on page 5

Sida Baltic Sea Unit

Regionplanekontoret STOCKHOLMS LÄNS LANDSTING

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BACKGROUND

The context of the SIMM-CCities project is one of continuous growth of the metropolitan regions, which induces strong pressures on the material (especially aggregates) supply system. Indeed, the urban demography is rapidly increasing, leading to a growing need for new residences, commercial spaces, offices, and infrastructures; for example, the Stockholm region will have to cope with a 500 000 population growth by 2030[3]. This situation inevitably leads to rising environmental impacts and conflicts between different strategic goals of the society. Consequently, there is a need to find solutions to a situation that is harmful to the sustainable development within the Baltic Sea region.

The main metropolitan regions around the Baltic Sea

In fact, the different links of the aggregate supply chain are responsible for multiple undesirable impacts, such as emissions of greenhouse gases and other pollutants that contribute to climate change and air and water pollution, but they also lead to local disturbances like noise and dusting. Moreover, the increased urbanization is reducing the possibilities of producing, handling and recycling aggregates close to the demand so that transports are increasing in length; besides, the transport and logistics are usually far from optimal, which leads to wastes of material and of money.

The complex system with different responsibilities and stakeholders in separate parts of the planning, supply and demand chains makes it difficult to find ways to reduce negative effects by improving efficiency, as there is a lack of a holistic view and updated statistics.

Thereby, the SIMM-CCities project and the current study are to be seen in coherence with a will to enable the cities and metropolitan regions of the Baltic Sea region to reach the EU-goals concerning sustainability, and to provide them with tools that will make it possible for them to grow in prosperity, by creating a more efficient system though a series of action involving stakeholders at all levels.

[3] Regionplanekontoret (2010). *RUFS – The big picture*, Stockholm, Sweden, p.5. Online: <http://www.regionplanekontoret.sll.se/Global/Dokument/RUFS%E2%80%93the_big_picture.pdf>.

DEFINITIONS

The following table contains definitions of the concepts as they should be understood in the present context of the SIMM-CCities project and the current study.

Concepts	**Definitions**
Material	In the present study, as well as in the SIMM-CCities project, *material* is to be defined as granular or particulate material which is suitable for use in construction, on its own or with a binder such as cement, lime or bitumen. Aggregates are used in concrete, mortar, roadstone or asphalt (drainage courses), or for constructional fill and railway ballast. Aggregates are the largest components of construction minerals.
- Natural gravel	Particle of a specific size range, usually extracted from quarries as produced by natural processes of weathering and erosion, which gives it a more rounded shape than crushed rock.
- Crushed rock	A form of construction aggregate produced by breaking a suitable rock to the desired size by mechanical means using crushers, which gives it a more angular shape than natural gravel.
- Concrete	A common construction material consisting of coarse and fine aggregates mixed with cement and water.
- Filling material	Any aggregate or clay used for filling purposes.
- Asphalt	Usually used to designate *asphalt concrete*: a composite material composed of a mix of mineral aggregate with bitumen as a binder.
Material management	In the present study, as well as in the SIMM-CCities project, *material management* relates to a global view of the whole aggregate supply chain, i.e. considering each link in a "cradle to grave" approach. Therefore, it includes: extraction, processing, handling, and selling stages, as well as transportation, the uses at the construction site, and the management of wastes through landfilling, recycling or reuse. This concept is to be seen as a complex system involving multiple stakeholders and levels of decision.
Recycling	The production process by which previously used aggregates are reprocessed in order to be reused. Recycled aggregates consist of construction, demolition and excavation wastes that have been modified in order to be used in different applications either with a downgraded, upgraded or maintained quality.

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Reuse	The substitution, for primary aggregates (aggregate produced from naturally occurring mineral deposits and used for the first time), of pre-used aggregates without processing.
Sustainability	Since the Rio Summit of 1992, *sustainability* is defined as a way to meet "the needs of the present generations without jeopardizing the ability of the future generations to meet their own needs"; an aim that can only be reached through the integration of "immediate and longer-term objectives, local and global action, and regards [for] social, economic and environmental issues as inseparable and interdependent components of human progress"[4]. Several challenges related to material management issue are thus considered by the European Union, such as management of natural resources, transport, consumption and production, clean energy and demography[5].

[4] Europeen commission (2010). Environment. *Sustainable Development*. Online: <http://ec.europa.eu/environment/eussd/>.

[5] Ibid.

METHODOLOGY

In order to get a holistic view of the situation, at least two (2) stakeholders will be assessed for each of the nive (9) countries of the Baltic Sea region, i.e. one representative of a public organization and one representative of a private organisation. Thus, to properly assess the opinion of these selected stakeholders, the chosen method for this questionnaire survey includes the following steps:

1. A copy of the questionnaire will first be sent to the respondents, in order to inform them and to give them the possibility to prepare their answers;

2. The stakeholders' opinions will be assessed through individual interviews that will take approximately 30-60 minutes. These interviews will allow the respondents to further explain their answers and to make sure they were correctly understood;

3. The therefore completed questionnaire will be sent back to the respondent for review;

4. The results from the interviews will be compiled into a report for use of the project.

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QUESTIONNAIRE

A) IDENTIFICATION

1. Country: _____

2. Respondent

2.1. Full name: _____

2.2. Total working experience concerning material management: _____yrs _____mths

2.3. Working experience within the organization: _____yrs _____mths

2.4. Telephone: _____

2.5. Email: _____

3. Organization

3.1. Name: _____

3.2. Address: _____

3.3. Telephone: _____

3.4. Website: _____

3.5. Status:

a)	Public	
b)	Private	

3.6. Main field:

a)	Spatial planning	
b)	Transport	
c)	Extraction and processing	
d)	Construction	
e)	Research and Development	
f)	Other (please specify): _____	

B) OVERVIEW

4. In your opinion, is there any problem or potential of improvement concerning material management?

a) in your city/metropolitan region?

Yes	
No	
I don't know	

b) in the Baltic Sea region?

Yes	
No	
I don't know	

5. In your opinion, what are the main problems that should be solved? Please prioritize them.

____ : _____
____ : _____
____ : _____
____ : _____
____ : _____
____ : _____

6. Are there any specific local/regional conditions that must be considered for the improvement of the material management? (e.g., geologic, administrative, economic, social or demographic conditions)

_____
_____
_____
_____

7. As far as you know, how is it planned, in your city or metropolitan region, to handle the problems that you face or will face concerning material management?

_____
_____
_____
_____
_____

8. If you had to set up a core group in order to discuss the improvement of the material management within your city or metropolitan region, who would you like to see participating in it? Please identify specific organizations and stakeholders.

a) Administration/governance: _____

_____

_____

b) Construction industry: _____

_____

_____

c) Material suppliers: _____

_____

_____

d) Research & Development: _____

_____

_____

e) Others: _____

_____

_____

9. According to what you know about it, is the SIMM-CCities project, i.e. the creation of a knowledge network concerning material management, a good way of finding solutions to resolve the problems and improve the material management? Why?

Yes	
No	

Why? _____

10. Are you interested in participating in this network?

Yes	
No	

11. Would you be interested in participating to a conference that would be organised in Stockholm before the end of year 2011?

Yes	
No	

C) SUSTAINABILITY (ECONOMICAL, SOCIAL AND ENVIRONMENTAL)

12. In your opinion, could the local material management, in your city or metropolitan region, be described as sustainable, at the present time?

Yes	
No	
I don't know	

13. According to you, on a scale to 1 to 10, is the sustainability and improvement of the material management system a priority, for your city or metropolitan region?

Not a priority ⟶ A major priority

1	2	3	4	5	6	7	8	9	10

14. What, do you think, must be done in order to reach a sustainable management of material? (if you answered "Yes" to question 12, please give some good examples of material management that other countries should learn from)

_____

_____

_____

_____

_____

_____

D) USES AND TRENDS

In order to improve the situation concerning material management in the Baltic Sea region, it is important to get a local/regional picture of the present situation concerning the following issues. For questions 15 to 19, please refer to the tables presented in the Appendix in order to indicate the right stakeholders.

15. According to what you know, is there any data available concerning the uses of aggregates in your city or metropolitan region? Please indicate who (organization and/or contact person) have or might have this information, and if possible fill in table I of the Appendix.

Yes	
No	

Name:	
Telephone:	
Email:	

16. According to what you know, is there any data available concerning the costs of aggregates in your city or metropolitan region? Please indicate who (organization and/or contact person) have or might have this information, and if possible fill in table II of the Appendix.

Yes	
No	

Name:	
Telephone:	
Email:	

17. According to what you know, is there any data available concerning the landfilling, recycling and reuse of aggregates in your city or metropolitan region? Please indicate who (organization and/or contact person) have or might have this information, and if possible fill in table III of the Appendix.

Yes	
No	

Name:	
Telephone:	
Email:	

18. According to what you know, is there any data available concerning the quantity of aggregates transported per mode (lorries, boat or train) in your city or metropolitan region? Please indicate who (organization and/or contact person) have or might have this information, and if possible fill in table IV of the Appendix.

Yes	
No	

Name:	
Telephone:	
Email:	

19. According to what you know, is there any data available concerning the average distance of transportation for aggregates, per mode (lorries, boat or train), in your city or metropolitan region? Please indicate who (organization and/or contact person) have or might have this information, and if possible fill in table V of the Appendix.

Yes	
No	

Name:	
Telephone:	
Email:	

20. According to what you know, what are the trends concerning the future uses and needs of aggregates, for your city or metropolitan region? (e.g., increases, decreases, variations of the import/export rates, recycling)

_____

_____

_____

21. According to what you know, what are the trends concerning material transportation, for your city or metropolitan region? (e.g., variations in distances, quantities and prices)

_____

_____

_____

22. In your opinion, what are the main pressures on the material supply system, for your city or metropolitan region? (e.g., demography, lack of local material, growing distances, environmental impacts)

_____

_____

_____

E) TOOLS, STANDARDS AND TECHNOLOGIES

23. According to you, is there a need for better knowledge and enhanced awareness of the different actors of the material management system in order to be able to improve it? Why?

Yes	
No	

Why? _____

24. According to you, is the use of administrative instruments (incentives, taxes, standards, quality/environmental assessments, etc.) useful in order to be able to improve the material management system? Why?

Yes	
No	

Why? _____

25. According to you, is there a need to find and introduce more sustainable technologies (machineries, methods, modes of transportation, etc.) in order to be able to improve the material management system? Why?

Yes	
No	

Why? _____

26. As far as you know, are there any legislation or incentives in place, in your city or metropolitan region, that promote more sustainable uses and ways concerning material management? Please, describe them. (e.g., quality or environmental standards, carbon tax, etc.)

_____

_____

_____

_____

27. Comments:

_____

_____

_____

_____

_____

_____

Thank you – Tack – Спасибо *– Tänan teid – Dziękuję – Paldies*

Ačiū – Takk – Vielen Dank – Kiitos

APPENDIX

DETAILED TABLES

To be filled in, according to what you know, if the information is available.
If there is no detailed data available, please fill in with approximate numbers or proportions.

I. Used volumes of aggregates per year

Data provided for (please indicate):
*i) metropolitan region ❑ **or** ii) city ❑ (representing: (#)_____inhabitants)*

	Aggregate types	Used volumes/year *(Mton)*		
		Local material	Imported material	Total
a)	Natural gravel (0-8mm)			
b)	Crushed rock (2-8mm)			
c)	Filling material			
d)	Fly ash from coal power stations			
e)	Recycled concrete			
	Total/year:			

II. Cost of aggregates

Data provided for (please indicate):
*i) metropolitan region ❑ **or** ii) city ❑ (representing: (#)_____inhabitants)*

	Aggregate types	Prices *(Euros/ton)*	
		Local material	Imported material
a)	Natural gravel (0-8mm)		
b)	Crushed rock (2-8mm)		
c)	Filling material		
d)	Fly ash from coal power stations		
e)	Recycled concrete		
	Total/year:	*€/yr*	*€/yr*

III. Landfilling, recycling and reuse of aggregates

Data provided for (please indicate):
*i) metropolitan region ❑ **or** ii) city ❑ (representing: (#)_____inhabitants)*

	Aggregate types	Aggregates *(Mton/yr or %)*		
		Landfilling	Recycling	Reuse
a)	Gravel			
b)	Masonry (bricks)			
c)	Concrete			
d)	Asphalt			
e)	other? _____			
	Total/year:			

IV. Quantity of aggregates transported per mode

Data provided for (please indicate):
*i) metropolitan region ❑ **or** ii) city ❑ (representing: (#)_____inhabitants)*

		Quantity transported per mode *(ton/yr* or *%)*		
	Aggregate types	A) Lorries	B) Boat	C) Train
a)	Natural gravel (0-8mm)			
b)	Crushed rock (2-8mm)			
c)	Filling material			
d)	Fly ash from coal power stations			
e)	Recycled concrete			
	Cost per mode *(€/ton/year)*:			

V. Average distance for transportation of aggregates (from extraction site to construction site AND from construction site to landfill/recycling/reuse site)

Data provided for (please indicate):
*i) metropolitan region ❑ **or** ii) city ❑ (representing: (#)_____inhabitants)*

	Aggregate types	Average distance of transportion per mode *(km)*		
		from extraction site to construction site		
		A) Lorries	B) Boat	C) Train
a)	Natural gravel (0-8mm)			
b)	Crushed rock (2-8mm)			
c)	Filling material			
d)	Fly ash from coal powered station			
e)	Recycled concrete			
	Aggregate types	from construction site to landfill/recycling/reuse site		
		A) Lorries	B) Boat	C) Train
a)	Natural gravel (0-8mm)			
b)	Crushed rock (2-8mm)			
c)	Filling material			
d)	Fly ash from coal powered station			
	cycled concrete			