

PROMOTING CLEANTECH IN PUBLIC PROCUREMENT AND INVESTMENTS IN FINLAND

Katriina Alhola¹, Ari Nissinen² and Jyri Seppälä³

Finnish Environment Institute
P.O.Box 140
FIN-00251 Helsinki
Finland

¹Katriina Alhola, D.Sc.(Tech.) is a senior researcher in the Finnish Environment Institute (Centre for Sustainable Consumption and Production). Her area of interest is in sustainable production and consumption, especially in cleantech and green public procurement (GPP) and innovations. ²Ari Nissinen, Ph.D., is a senior researcher working at the Finnish Environment Institute's Centre for Sustainable Consumption and Production. His teaching and research interests are in green public procurement, eco-design, environmental impacts of products and services, sustainable consumption, and life-cycle assessment. ³Jyri Seppälä, Prof., is a director in the Centre for Sustainable Consumption and Production in Finnish Environment Institute. His expertise is in life cycle assessment, risk analysis and environmental impact assessment.

ABSTRACT. The Finnish government has set an objective of 350 million Euros, or 1 % of the total value of Finland's public procurement, to be directed to cleantech solutions, i.e. products, services and processes that cause less harmful effects to environment than their alternatives, and also add economic value. Buildings, energy production, traffic solutions and waste services have been named as potential sectors for cleantech but yet there are no explicit criteria, content, implementation process or follow-up system for public cleantech procurement and investments.

This paper aims at illustrating how the innovative public cleantech procurement could be examined and promoted. The focus is on several realized cleantech solutions in Finland and on the cleantech potential of future investments of so called "carbon neutral municipalities", but also state framework contracts are studied. This paper describes a methodology on how cleantech investments could be assessed and promoted, and suggests for a web based decision support system that could be used by the contracting authorities in order to implement innovative cleantech procurement. It could also be used by bidders in order to strengthen the market and demand for cleantech solutions in Finland and more generally.

Keywords: Public procurement, investments, cleantech, green public procurement, decision support system

INTRODUCTION

Cleantech refers to industries, technologies and solutions that reduce the harmful environmental effects of production and consumption more than their alternatives while competing favorably on price. More precisely, to be considered 'cleantech', products and services must optimize the use of natural resources offering a cleaner alternative to traditional products and services, being an innovative or novel technology or application and add economic value (Stack et al., 2007).

Growth in cleantech sector has increased during the past ten years and it is now an established investment category in public markets. Altogether 18 categories are recognized under the cleantech sector including categories related to energy solutions, transportation, water and wastewater, air and environment, materials, manufacturing agriculture, recycling and waste (Cleantech Group, 2014). On these markets, the growth has been significant during the past years both internationally and nationally. In 2012 there were 15 % growth in the cleantech business sector in Finland, and it was expected to rise up to 29 % in 2013 (EK, 2013). Globally innovative cleantech industry could be worth many trillion euros by 2015 (CMS, 2009). Thus cleantech is seen as one of the most important sectors accelerating innovations and success of local companies, and public procurement can be seen as one of the important means to boost this market growth.

Cleantech investments is a key component also in the European political agenda aiming at more innovative and sustainable future according to the EU's ambitious objectives of increasing the use of renewable energy and resource efficiency. In the Europe 2020 strategy public procurement is seen as one of the market-based instruments that could fulfill the objectives of supporting the shift towards a resource efficient and low-carbon economy and improving the framework conditions for business to innovate (European Commission, 2010a, see also: European Commission, 2011; European Commission, 2010b; European Commission, 2010c). Thus, public procurement rules should insist on efficiency conditions to increase energy savings and spread innovative solutions, notably in buildings and transport (European Commission, 2010c) which are recognized as important cleantech sectors. Also the revision of public procurement directives, announced 15th January 2014, allows the public purchasers for taking environmental aspects better into account in different phases of the purchasing process and promotes the selection of cleantech solutions in the procurement process. For example, a new form of competitive procedure, introduced as 'innovation partnership' will allow for a public purchaser to open a competitive procedure to find a supplier to new innovative product or service, giving opportunity to the tenderer to come up with an innovative solution together with the purchaser. Thus, when it comes to the delivery stage, the procuring authority will not need to go through a second competitive procedure to find the supplier of the solution (Proposal for a Directive of the European Parliament and of the Council on public procurement, 2011/0438 (17a)). In addition, the renewal of public procurement directives encourages public authorities to use the life cycle costing (LCC) method in order to better point out also the monetary benefits of innovative cleantech solutions during the life cycle (Proposal for a Directive of the European Parliament and of the Council on public procurement, 2011/0438 (38)).

The Finnish Government has set similar aims for cleantech, and has announced the Government Decision-in-principle on the promotion of sustainable environmental and energy solutions (cleantech solutions) in public procurement, accepted on 13th June, 2013 (Finnish Government, 2013). More precise objective has been set that 350 million Euros, or 1 % of the total value of Finland's public procurement should be directed to cleantech solutions. The governmental paper states that the public sector shall promote cleantech criteria and solutions in all its procurement but the key industries are construction, energy sector, transport and waste management. The governmental decision has binding force in respect to state procurement units but is a recommendation for other procurement entities. With this paper, the government also seeks for benchmarks for business that could be increasingly adopted as cleantech solutions both the Finnish and EU markets. At the moment, energy efficiency is the most important cleantech sector in Finland and around 60 % of cleantech companies have expertise on energy efficiency solutions, including the production, transfer and delivery of renewable energy, and also waste management and development of waste utilization solutions provide important market opportunities for Finnish cleantech sector (Korpiemi, 2013).

Despite the importance of cleantech in several national and international policies, the implementation of cleantech procurement, the more precise definition, content, procurement criteria and processes and follow-up system for public cleantech procurement and investments is lacking in practice. In this paper, we suggest a method on how innovative cleantech procurement could be analysed and developed to better reach the ambitious objectives set in the national and EU level.

MATERIAL AND METHODS

In order to plan the methodology and framework for analysing cleantech and its further potential in public investments, we did a preliminary screening of 1) existing cleantech cases, 2) potential future cleantech public investments and 3) the challenges and expectations of procuring authorities towards innovative cleantech procurement and research. We asked the Finnish 'carbon neutral municipalities' and several larger cities about their interests to join the larger cleantech procurement project "Processes and Decision Support system for Innovative Public Cleantech Procurement", where this methodology to assess the cleantech procurement and processes would be developed. Altogether 14 so called 'carbon neutral municipalities' and five larger cities expressed their interest to join as well as the state procurement unit and several actors that actively promote cleantech, including ministries. In the end of the year 2013, the funding application of the research project was approved by TEKES (Finnish Funding Agency for Technology and Innovation) which is the most important publicly funded expert organisation for financing research, development and innovation in Finland (<http://www.tekes.fi/en/tekes/>). The development of the method and its expected outcome, the decision support system –database, started in the beginning of 2014.

The material in the method for studying cleantech procurement include:

1. The innovative cleantech investments and procurement cases that have already been realized in Finland (and internationally)

2. The ongoing and potential innovative cleantech investments of Finnish carbon neutral municipalities
3. Expectations and interest of procuring municipalities towards developing innovative cleantech procurement through research

Firstly, we collected cases of innovative cleantech investments that have been financed by institutions promoting innovations. Many of the cases have been funded by TEKES Innovative public procurement financing instrument. Other examples and pilots can be found for example among investments of the public hospital districts and EAKR-funded cases in which the cleantech component has been one of the determining aspects. Examples of selected cases are shown in Table 1.

Table 1. Examples of Finnish cleantech investment cases.

Case	Procurer / Financing instrument or organization	Innovative cleantech component	Reference
Design competition and solutions for sustainability of office and laboratory building “Synergy Building”	Finnish Environment Institute and Senate Properties / TEKES	Energy-efficient and ecologically sustainable building forming an excellent working environment as well as cost-effective construction.	Nissinen et al., 2010; Rintala & Nissinen, 2011
Energy production plant, planning and procurement; implementation of a small CHP power plant based on ORC technology	Energy company (owned by a Toholampi municipality) / TEKES	Use of wood-based pellets instead of fossil fuels.	http://www.tekes.fi/en/tekes/results-and-impact/cases1/2013/toholamin-energia-new-power-plant-type-arrives-in-finland/
New energy-efficient day care centres as life cycle implementation	City of Porvoo / TEKES	Established as life cycle project. Energy efficiency was in a significant role throughout the whole life cycle project. The total level of annual energy consumption was set in the call for bids. The choice of heating systems was left up to the bidder, with one exception: direct electric heating was not permissible.	http://www.tekes.fi/en/tekes/results-and-impact/cases1/2013/city-of-porvoo-porvoos-new-energy-efficient-day-care-centres-as-life-cycle-implementation/
Energy efficient and needs oriented supported housing	Siiliinjärvi municipality / TEKES	To improve efficiency while combining social and energy efficiency of buildings and housing. Co-operation of the public, private and third sector was essential.	http://www.tekes.fi/tekes/tulokset-ja-vaikutukset/caset/2013/siiliinjärvälle-ensimmäinen-passiivitasoinen-palvelutalo/
Design competition for a program to reduce homelessness	Cities of Espoo, Helsinki and Tampere / TEKES	The features of the service guided the design of each building. Focus was also on energy efficiency of buildings and in housing.	http://www.tekes.fi/tekes/tulokset-ja-vaikutukset/caset/2013/tampereen-kaupunki-tampereelle-uudenlainen-tukiasumisyksikko-suunnittelukilpailulla1/
Solar energy in Östersundom	Östersundom area in Helsinki region / IJI-	Residential area in Östersundom planned as using solar energy.	http://www.iji-hanke.fi/caset/lahden-seudun-kehitys-ladec-oy/

	program (EAKR)		
Zero energy children's day care	City of Lahti / III-program (EAKR)	Environmentally efficient building, new financing options for energy efficiency and possibilities for renewable and local energy.	http://www.iji-hanke.fi/caset/green-net-finland-ry/
Energy efficient (major) renovation, updating a large hospital complex built in 1965 to respond today's high functional requirements	HUS - The Hospital District of Helsinki and Uusimaa / TEKES	Major reduction of energy consumption. Information modelling is used during the project in order to fit the large amount of technical systems in energy efficient way.	http://www.skolry.fi/hus-meilahden-tornisairaala-pilottina-energiatehokkaassa-peruskorjaamisessa
New Childrens' Hospital in Helsinki	Public and private funding	The aim is to build the world's best pediatric hospital that offers first-rate care, comfort, safety, versatility and energy efficiency.	http://www.granlund.fi/en/news/granlund-involved-in-the-new-children-s-hospital-team/#main

Secondly, we asked for potential cleantech procurement and investments in the Finnish 'carbon neutral municipalities' (http://www.hinku-foorumi.fi/en_GB/). The potential is pre-examined through screening the investment lists of the municipalities, mainly allocated for the year 2014. Altogether 12 (of 14) municipalities delivered their investment lists (Table 2).

Table 2. Summary of the potential cleantech investments of the carbon neutral municipalities (based on their investment lists for the year 2014).

Cleantech sector	Potential cleantech component	Types of investments	Number of cases	Cost €
Building and construction: maintenance and repair, new buildings	Heat production, new solutions, e.g. ESCO type solutions, technical solutions for less water, heat and electricity use, energy efficient lift, more efficient planning and use of space, energy efficient lightning, resource efficient material use	Renovation or installation of ventilation	2	2 190 000
		Improving thermal insulation	1	150 000
		Switching heat system (in rental houses)	1	1 000 000
		Planning and constructing new buildings (sport arenas)	8	8 000 000
		Extention of school building	1	620 000
		Renovation of school buildings	5	8 700 000
		Constructing day care building	4	9 550 000
		Renovation of day care building	1	1 600 000
		Building a hospital / health care center	2	3 450 000
		Renovation of hospital / health care center	2	1 200 000

		Renovation of municipal hall	1	1 400 000
		Other Energy efficiency investments	1	200 000
		Space solutions in buildings	1	100 000
		Other renovation, e.g., lifts	2	930 000
		Lightning of rooms	1	20 000
Outdoor lightning	LED lightning	Street lights	9	4 740 000
Energy and heat production		Electricity grids	1	6 290 000
		District heating, building or extension	3	2 260 000
		Wood chips heat production	1	300 000
		Actions to fulfill the energy efficiency requirements	1	1 800 000
Vehicle	Vehicle classes, euro norms, hybrids, eco-driving, car sharing	Procurement of vehicles and equipment	2	450 000
Infra (traffic)		Junctions, highways, roads, bridges, etc.; building and renovation	11	73 100 000
Infra (water sector)		Sewage and water pipes, renovation and building	6	6 200 000
Other procurement of goods and services		Food service	1	160 000
		Equipment	7	1 570 000
		Furniture	2	86 000
		Parks, swimming facilities	5	490 000
		Other services	1	90 000
Total amount €				136 646 000

Thirdly, the procuring authorities of the municipalities and larger cities as well as Hansel Ltd that makes the state framework contracts, and other actors in the field of cleantech procurement were asked about their views about promoting the cleantech procurement through research at the same time when their preliminary willingness to participate the larger research project was requested (in August, 2013). Altogether, 22 actors and procuring authorities answered the question. The respondents' expectations and views for research needs included:

- Common operational model for public purchasers that would lead to more efficient tender competition
- Need to make the monetary benefits of cleantech investments visible
- Finding new technical cleantech solutions
- New innovative financing options for cleantech investments

- Developing a tool for follow-up (ambitious cleantech targets)
- Support for planning and implementing cleantech investments
- Possibilities for joint procurement
- Measuring the environmental impacts of realised cases and comparing them to the pre-set targets
- Tools for decision making
- New ideas and tools for innovative procurement and sharing of experiences

We used this material as basis for planning the methodology on how to analyse and promote public cleantech procurement and to provide the web based tool, i.e. decision support system for procurers and bidders to better respond the challenges arisen in the field of cleantech procurement.

RESULTS

Based on the pre-screening the realized, ongoing and coming investments of the municipalities as well as the responses from the procuring authorities about their interests and challenges in the field of cleantech, there is a call for larger research and synthesis about the success factors, measurements, tools, new innovative modes and options for implementing cleantech. It is also obvious that there are many actors and interest groups as well as information providers that could share their expertise on cleantech procurement. Thus, we create a method or research framework where this network of actors could better share the experiences and views about cleantech procurement and implement cleantech to their future investments, which would also strengthen the market and demand for cleantech solutions in Finland.

The focus is on examining the processes e.g., preparation of procurement, exchange of knowledge and financing arrangements, that could advance more environmentally friendly investments. A decision support system, also called as “cleantech procurement folder” is being built to develop these processes that aim at innovative and low carbon procurement solutions. This will provide purchasers with the possibility for joint procurement, exchange of knowledge and sharing experiences, and allow bidders to get information about future cleantech demand and public procurement criteria. This decision support system will also bring up and make the environmental and financial benefits of cleantech investments more visible. The functionality and applicability of this support system is developed further by experiences gained from testing it to real-life procurement cases in Finnish municipalities.

In the course of the project, action research approach is used, meaning that we take an active role in structuring and implementing innovative cleantech investments in co-operation with municipalities. We go through the ongoing and planned investments of participating municipalities and search for product, service and investment groups that have the potential for cleantech. Based on this we aim at finding those product groups where the innovative approach could be best applied, searching for procurement criteria and definitions of the subject matter of the contract that would support the creation of innovative cleantech investment. In addition, we apply new processes (e.g. new financing solutions) in the implementation of cleantech procurement. These could lead to more innovative procurement solutions and create new business opportunities for Finnish companies. We also look for international examples of innovative public procurement and its impact on business performance as well as communicate the results of this study and good examples of Finnish clean tech procurement internationally.

The method will consist of two phases and eight work packages (WPs). In the first phase (WP1 – WP4), the data, i.e. the content and pilot cases are selected for the decision support system (Fig. 1).

WP1 starts with gathering the data about realized cleantech investment cases that have been funded by innovation financing instruments (e.g. TEKES) and/or are otherwise known as pilots in the cleantech area. Examples can be gathered by asking participating cities and municipalities, other procuring units, governmental procuring unit and other actors in this field about their innovative cleantech investments. Then a more detailed analysis of these cases are made in workshop in which the purchasers, tenderers and other experts participate. This analysis focuses on how the purchasers and bidders consider the success factors of the investment from the innovative and environmental point of view and what are the most important components of the procurement process. In this analysis, also the impacts of the recently published revision of EU public procurement law and its preparation to the national legislation are taken into the consideration and vice versa.

The information that has been received in the WP1 and in the WP2, i.e. a more careful analysis of selected cases, will be used to formulate criteria and assessment tools for cleantech procurement, according to which public procurement can be considered as cleantech procurement or investment (WP3). Preliminary results by the research group will be discussed in a workshop in which several experts will be invited. The specific criteria will be

analysed in terms of what cleantech means in different product and service categories, and what kind of procurement criteria and requirements would support the creation of innovative solutions in different product groups and to which categories the cleantech thinking is most suitable. In addition, the criteria will focus on the procurement processes that would promote innovative cleantech investments. Also the suitability of different tools and methods that exist in measuring the environmental performance of procurement are assessed, for example life cycle costing (LCC).

The data gathered in WP2 and WP3 will be applied in the WP4 where the coming investments of the participating municipalities, cities and other organisations will be examined. The potential ongoing and future cleantech investments are analysed together with the procuring authorities in each unit, e.g., in cities or municipalities, and the possibilities to include the cleantech component are considered. We also look for potential investment cases where new innovative approaches, e.g. joint procurement or new ESCO-type financing tools could be applied. In this work package, also the cases that could be used as pilots in the ‘cleantech procurement folder’ are pre-selected.

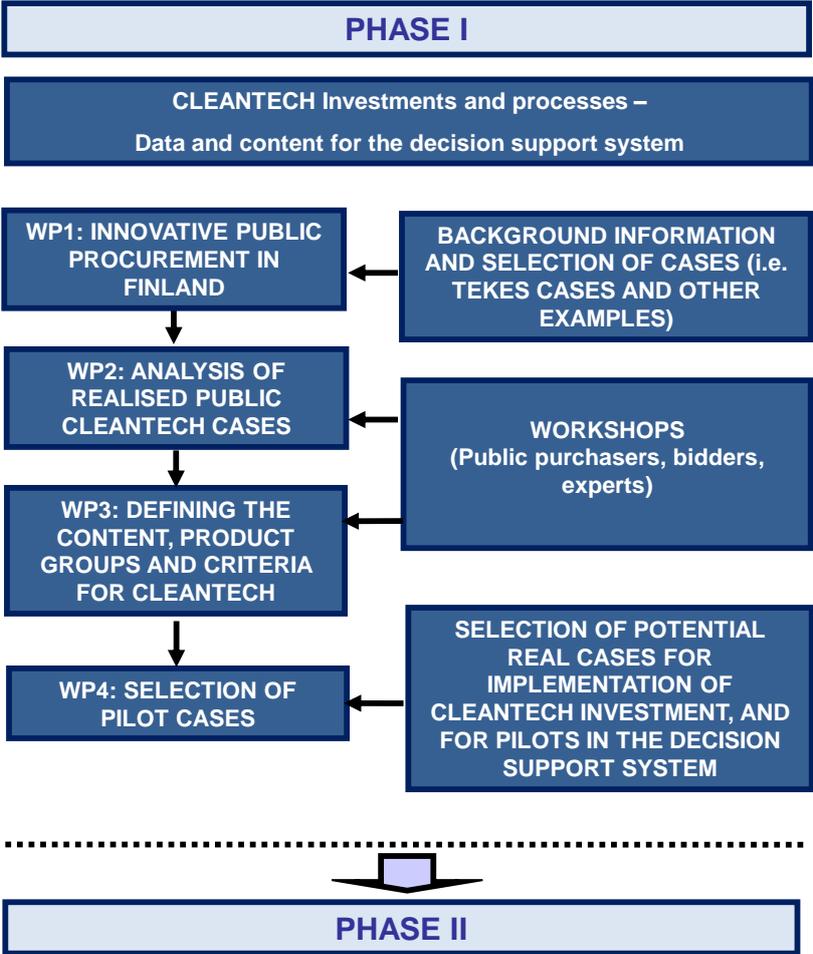
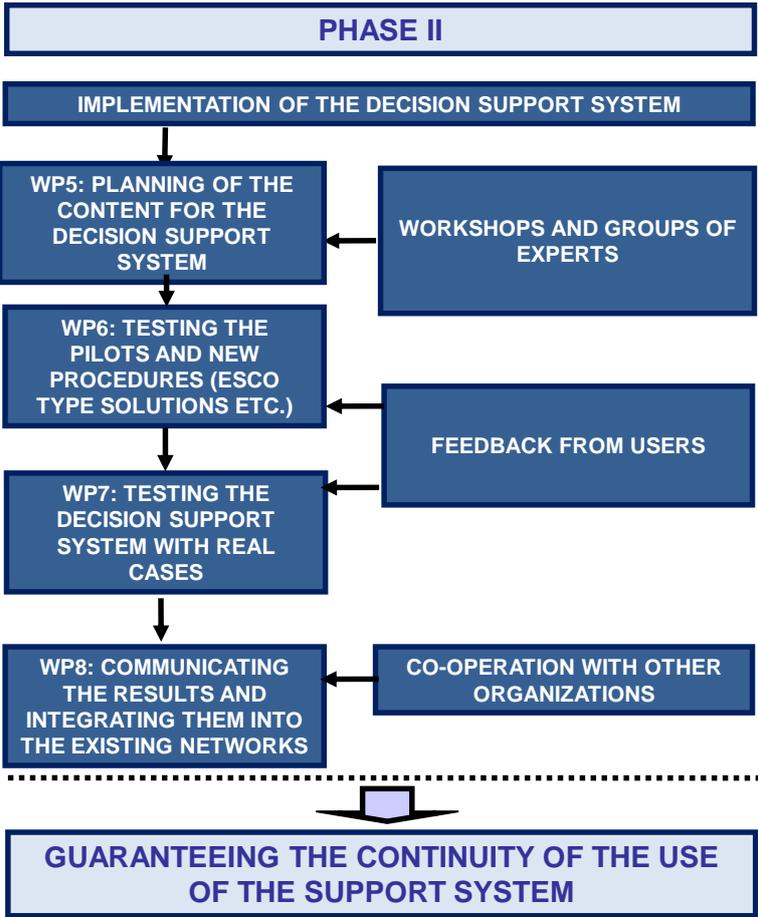


Figure 1: First phase, data gathering and analysis of cleantech procurement and its potential.

In the second phase (WP5 – WP8), the web based decision support system is planned and implemented (Fig. 2). In WP5, the content of this ‘cleantech procurement folder’ will be planned so that the objectives and results of the analysis in the first phase can be organised and communicated to users and stakeholders in a functional way. One of the most important requirements for the web interface and database is its easiness to use. In the introduction page the users could easily find links to the planned, ongoing and already realized procurement cases according to the product group and also in time order. Also international examples will be presented. An obvious task is to bring up the results from the analyses and workshops done in the first phase of the method. This database is aimed at being interactive so that the users can share their experiences and comments and create new contacts. It will be open for all users, so also companies may utilize the information on future investments on municipalities and be better prepared to respond the coming procurement requirements.

In work packages 6 and 7, the procurement cases to be included in the decision support system will be tested, i.e. how this framework would support the implementation of cleantech procurement in these cases and how it should be developed. Activating various important actors that could promote the cleantech case is an important feature of the web interface and related action. At first we test the already realized cases (analysed in WP2) and finally the ongoing or future cases will be added and tested. This will be done in the workshops of experts.

Finally, in the WP8, the decision support system will be made known in national level. In this, the interaction with other stakeholders and organizations related to public procurement and cleantech is important. The purpose is to integrate the decision support system as part of the existing networks and structures such as the Forum for carbon neutral municipalities (http://www.hinku-foorumi.fi/en_GB/).



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Figure 2: Second phase, implementation of the decision support system.

CONCLUSIONS

Based on the pre-screening of the realized, ongoing and coming investments of the Finnish municipalities, it seems that there exist great potential for cleantech investments in public procurement. Altogether the investments that could be targeted to cleantech sector of these relatively small municipalities in Finland are over 136 million euros during the year 2014. It will be interesting to see whether cleantech procurement can be realized in state framework contracts, especially as the organization has a lot of experience of various procurement methods important in the seeking of innovations. In many municipalities, however, the preparation of large investments such as construction of buildings and infra are separated from the ‘procurement office’ for goods and services. Although in monetary terms the large investments represent the major part of the total investments of the municipalities, the volume of smaller and medium sized procurement such as goods and services is high and thus will also be focused in this analysis.

So far cleantech investments are mainly done separately in different municipalities and joint procurement is not a common procedure. In addition, the experiences of cleantech investments and the process leading to a successful procurement are quite rarely shared. However, the experience sharing organized by TEKES (Finnish Funding Agency for Technology and Innovation) has evidently promoted consciousness of the benefits and potentials as well as sharing good actions models and experiences. And good examples of joint procurement exist also from the private sector, such as the procurement of solar panels by households in small Finnish towns, Lappeenranta and Mynämäki, and this approach has raised interest also among public purchasers in several municipalities (<http://www.mynamaki.fi/uploads/Asuminen/Aurinkosahko2.pdf>). Methodology illustrated in this paper, and especially the outcome, the 'cleantech procurement folder' aim at finding the opportunities for joint purchase and connecting the procurement authorities and encouraging them to co-operate. One important aspect in co-operation is the possibility to share risk through new innovative financing options and partners.

In the course of the project, action research approach is used, meaning that we take an active role in structuring and implementing innovative cleantech investments in co-operation with municipalities. In addition, the interaction with purchasers, bidders, experts and other actors in the field of cleantech is seen important in both carrying out the analysis and communicating the results. The outcome of the method, the web based decision support system, aims especially at creating and strengthening the co-operation of public and private sector in creation of new innovative solutions and smart procurement and investment decisions.

The results of this project will also serve the Finnish companies so that they would be better prepared to the demand for cleantech solutions and coming investments in advance, which could have a positive impact on their competitiveness nationally and internationally and create new business opportunities. Also pilots in this study may serve as references for cleantech companies. New innovative means could also create innovative solutions for example in the fields of traffic and renewable energy. The web interface and database can also be utilized in education and other research purposes.

ACKNOWLEDGEMENTS

We acknowledge TEKES - the Finnish Funding Agency for Technology and Innovation, Ministry of Employment and Economy, Ministry of Environment, Hansel Ltd, the Association of Finnish Local and Regional Authorities, cities of Jyväskylä, Turku, Oulu, Tampere and Lahti, and the forum of 14 carbon neutral municipalities as well as Finnish Environment Institute for funding this project.

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