

Cleantech Business Opportunities in the Future

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ABSTRACT

Environmentally friendly solutions in different business sectors have been looked for during last decades. Energy sector and process industry have been forerunners in developing eco-efficient production processes from the 1960's. For example pulp and paper industry has faced environment, health and safety issues very early already in 1970's in the consumer market. Already late 1980's, and even more during 1990's and in the new millennium climate change discussion took a big role in everyday media and all the businesses and sectors had to meet the challenges concerning corporate social responsibility (Meristö 2013). Today the new economy (Erber & Hageman 2005) has been replaced by circular (Pearce & Turner 1989) economy and all the industries are looking for new opportunities from sustainable solutions (Kettunen 1998) both in processes and products and services.

In this paper we will focus on cleantech business opportunities (Meristö & Laitinen 2014) which the future will provide for the companies as well as on the skills and capabilities required to exploit those opportunities. The research questions are as follows:

1. What are the main drivers for the future concerning energy-efficient and sustainable solutions?
2. What are the skills and competences needed to meet the future challenges in this field?
3. What are the barriers and / or enablers when developing cleantech business for the future?

The data collected to this research paper will consist of web-survey replies collected from industry leaders, governmental decision makers, NGO representatives and individual experts from this field. The main drivers will vary from international environmental agreements to consumer market behavior, depending on how strictly the legislation, but also the purchasing power of consumers will guide the development. Skills concerning digitalization and automation, but also marketing and communication are important among skills concerning new materials and renewable energy development work. Taboos in this field are discussed, too.

INTRODUCTION

Environmentally friendly solutions in different business sectors have been looked for during last decades. Energy sector and process industry have been forerunners in developing eco-efficient production processes from the 1960's. For example pulp and paper industry has faced environment, health and safety issues very early already in 1970's in the consumer market. Already late 1980's, and even more during 1990's and in the new millennium climate change discussion took a big role in everyday media and all the businesses and sectors had to meet the challenges concerning corporate social responsibility (Meristö 2013). Today the new economy (Erber & Hageman 2005) has been replaced by circular economy (Pearce & Turner 1989) and all the industries are looking for new opportunities from sustainable solutions (Kettunen 1998) both in processes and products and services.

Value chain throughout the whole life-cycle includes many different opportunities for the growth of cleantech business. In the beginning, the input of raw materials and energy is the key enabler (or barrier) to cleantech business. The more renewables from energy side are used the cleaner the business is in long run. Also, the more renewables or recycled materials are used the more opportunities for the cleantech defined business will be there. The logistics and transportation along the value chain is a remarkable factor when defining the sustainability rate of the businesses or communities. The sustainable community by definition has at least a chance for logistics with no emissions, i.e. safe routes for walking and bicycling or electricity car network. Also the construction materials and multi-perspective energy solutions based on renewables and bio energy will form the basis for green and clean business opportunities in construction sector and community planning, too. (Tuohimaa et. al. 2011; Kettunen et. al. 2015)

RESEARCH DESIGN

The framework for this study consists of futures research methodology (Masini 1993) including mega- and mini-trend analysis (Vanston & Vanston 2011) and scenario approach (Meristö et.al. 2012) concerning especially the future of residential areas and their opportunities for cleantech business. Another part of the framework includes the skills and competences (Meristö et. al. 2015) required to exploit these opportunities not only at company level but at national level, too.

In this paper we will focus on cleantech business opportunities which the future will provide for the companies as well as on the skills and capabilities required to exploit those opportunities. The research questions are as follows:

1. What are the main drivers for the future concerning energy-efficient and sustainable solutions?
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3. What are the barriers and / or enablers when developing cleantech business for the future?

The data collected for this work relies mostly on the replies from the web-survey run in May-August 2016 by us in the project ELLI financed by European Regional Development Fund

ERDF. The survey has been sent to the actors in the field of sustainable business and energy-efficient solutions in South Finland in different regions, namely Lahti, Riihimäki, Hämeenlinna and Lohja region with their surroundings. The survey is still open and the replies in this paper will be completed before publishing the final version.

RESULTS

The survey has been sent to the actors from the cleantech cluster in many roles: companies from different industries, government organizations at local, regional and national level, research institutes and educational organizations as well as NGOs and experts and active citizens from this field. Altogether 37 replies were received until to the end of August 2016, and the survey will be open one more month.

From the recipients one third came different industries (35 %) and almost another third from research and education (32 %). One tenth came from decision making side (11 %), 8 % were experts and 8 % active citizens. Some of the recipients represented themselves in several different roles. At the moment we do not have yet any replies from EU level nor from NGOs in the field of environment, inhabitants' or lobbying interests. Two third from the replies were male, one third female. Most answers came from Western Uusimaa county (39 %) and from Lahti region (39 %) and the rest were from Hämeenlinna (6 %) and Riihimäki (3 %) region or other places in Finland (14 %).

The survey included six different research areas of questions: 1) Level of cleantech competences in Finland, 2) Special expertise / skills in cleantech in that region, 3) Key actors in energy-efficient residential regions, 4) Taboos, 5) Future Energy Solutions in Residential areas, 6) Key Trends concerning Future Energy Solutions. Also background information from the replier and open feedback were asked.

The results will be divided in this paper into three parts, by answering the research questions as follows. First, the main drivers for the future concerning energy-efficient and sustainable solutions will vary from today to the future according to the next diagram, where the average values of the survey results are presented (Figure 1).

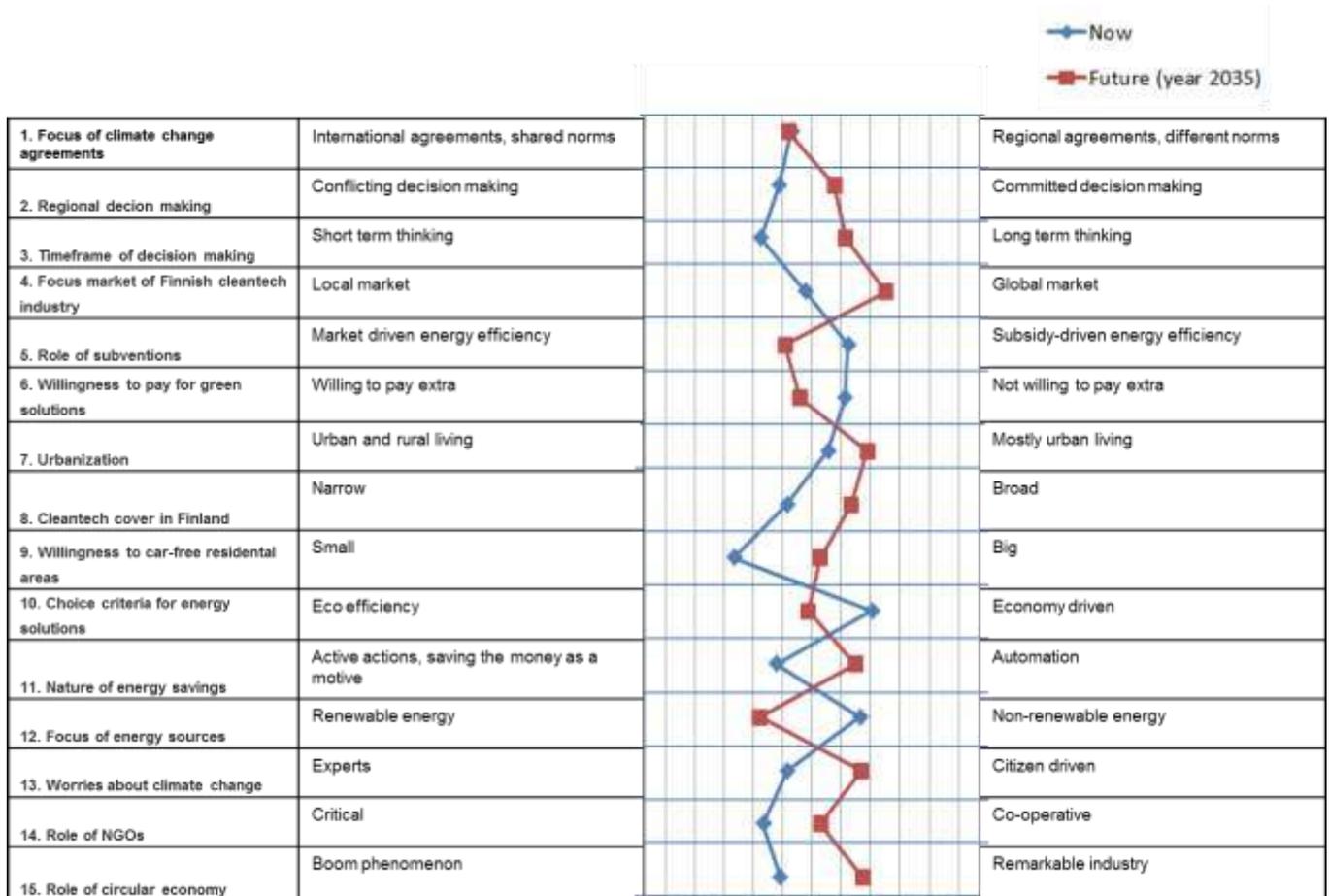


Figure 1: Main drivers for the future and the directions of the change needed.

The future will differ from the present mostly concerning almost all the factors asked in the survey: Time frame of the decision –making from shot term will move towards long term, the market of the Finnish cleantech industry will focus more on the global instead of the local market, role of subventions concerning energy efficiency will decrease in the future, willingness to the residential areas without cars will increase in the future, energy savings will be easily realized by automation in the future, the focus of energy sources will move from non-renewables to renewables, the climate change issues will worry in the future not only experts but even more ordinary citizens everywhere and finally the role of circular economy will be a remarkable industry instead of a present boom phenomenon and also the skills and competences related to the cleantech in Finland will be broader than today. Only the norms of the international environmental agreements seem to be almost the same in the future. Either the willingness to pay more about green solutions does not in the future change a lot from that today. Lifestyle in Finland will continue both in urban environments and in the countryside as well, although at global level the urbanization is a strong megatrend.

Second, the skills and competences needed to meet the future challenges in this field today and in the future are as follows (Figure 2).

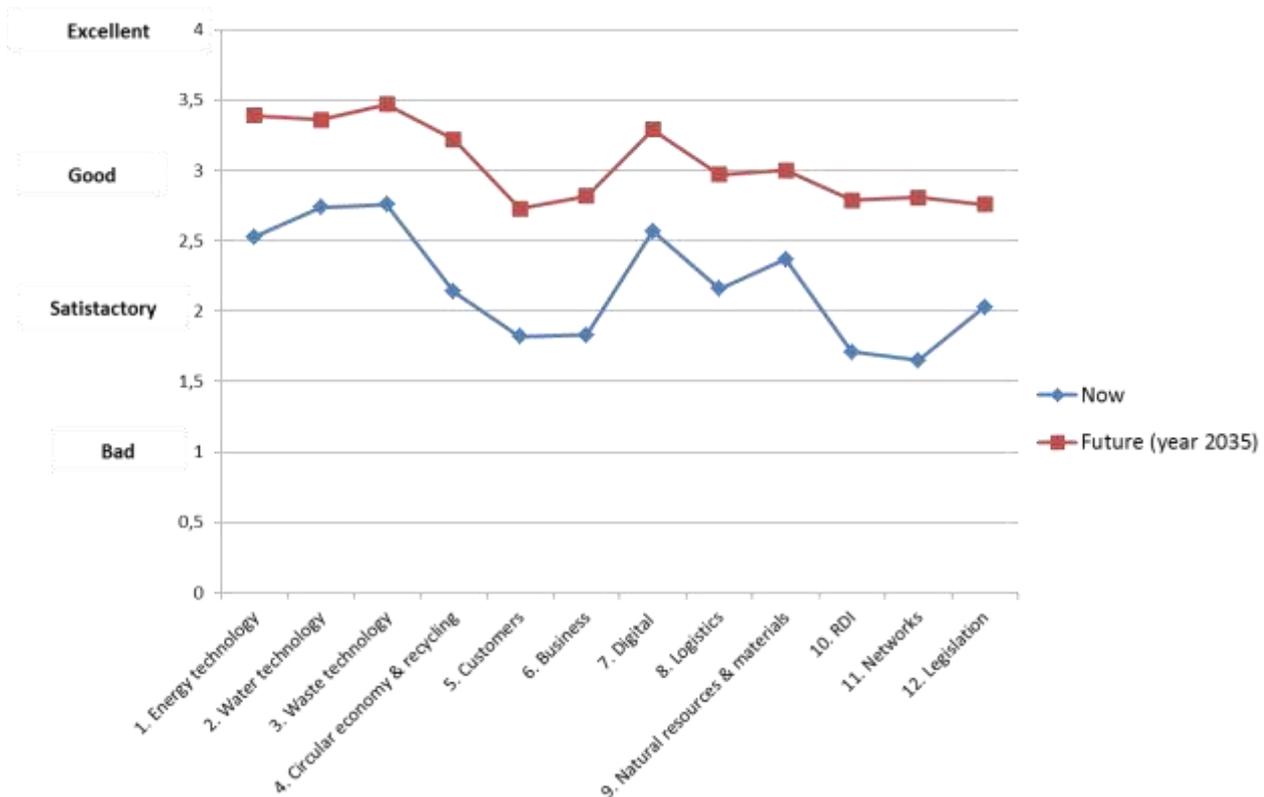


Figure 2: Skills and competences in clean tech industry needed in the future.

The scale to estimate the level the skills and competences in the cleantech is from 1 to 4: 1 = bad, 2= satisfactory, 3= good and 4= excellent. None of the listed skills and competences reached the level good (number 3) in this survey. Energy technology skills, water technology skills, waste technology skills and digital skills and competences as well as competences concerning natural resources and materials were estimated approximately to the level 2.5 (almost good). The weakest evaluation points went to the RDI skills, network skills, customer understanding and business skills, all getting values under the satisfactory level 2. Legislation skills reached barely satisfactory level. The estimations concerning the future statement did increase the evaluation points throughout the whole list of competences. The highest ranking, level 3.5 belongs to the waste technology skills and competences and close to that were ranked also energy technology skills and water technology skills. In the future, none of the skills were evaluated under the level 2 (satisfactory), but under the level 3 (good) in the future still are the competences having the lowest score today, namely skills concerning e.g. customer understanding, business RDI , networking and legislative issues. Outside the given list one of the replies mentioned the branding skills, still being very low concerning the Finnish cleantech industry.

Third, the barriers and /or enablers when developing cleantech business for the future will be found among the taboos recognized in this survey, but also from the key actors estimated in this field. The most powerful actors are decision-makers at EU level, but also national

decision-makers, decision-makers at regional level as well as the companies from this field. This result means that still the focus is on the enablers and just after that the business will have opportunities to develop. The subvention driven policy seems to be a barrier for the market driven growth, but also on the industry side there is a lack of holistic view to the branch and holistic solutions are still rare; instead of the systematic, multidisciplinary co-operation in the international networks many of the companies and entrepreneurs in this field work alone, far from the market and customers. Also, the long-term life-cycle analysis in the eyes of the sustainability is missing. Perhaps active citizens together with research actors and other experts could rise these issues more to the table in the future, when planning and building new residential areas? Environment, health and safety (EHS) are related to each other and customers with high aware from the risks are in the future probably willing to pay to reduce these risks, too. At the moment, the active citizens in this field still can get a sign of a green fellow, without touch to the reality, was one of the barriers mentioned in the survey replies.

CONCLUSIONS

According the survey results no one estimated the significance of non-renewable energy sources very high in the future and almost all of the replies ranked it low or even less significant, when developing residential areas (Figure 3). On the other hand, solar power and geothermal energy were evaluated to the very significant or at least significant score in the energy palette in the future. Bioenergy based on the waste got a bit higher points than bio based on the wood. The figure as follows will summarize these estimates concerning different energy sources and their importance in the future after next 20 years.

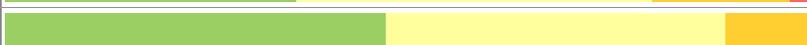
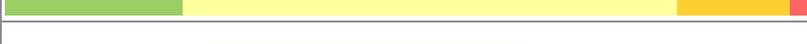
	Very significant (Value: 4)	Significant (Value: 3)	Little significant (Value: 2)	Not significant at all (Value: 1)	Cannot answer (Value: 0)
1. Solar energy (avg: 3,14)					
2. Geothermal heat (avg: 3,36)					
3. Wind energy (avg: 2,31)					
4. Bioenergy (wood) (avg: 2,61)					
5. Bioenergy (waste) (avg: 3,03)					
6. Non-renewal energy (avg: 1,89)					
7. Nuclear energy (avg: 2,53)					

Figure 3: The significance of the alternative energy solutions of residential areas in the future.

The holistic view in long-run, including natural resources and economic calculations at global level will open the eyes for the new opportunities in cleantech sector. Its impact on the globe and its state of the art will be dramatic, if developing business from the attitude save the world. Also the skills and competences have to be updated, and that will require changes in the education and government policy as well. Also, the networking activities have to be prepared to everyday life level, without handicap in attitudes in multicultural world.

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