

Assessing the WARES pilot communities in Northern Finland

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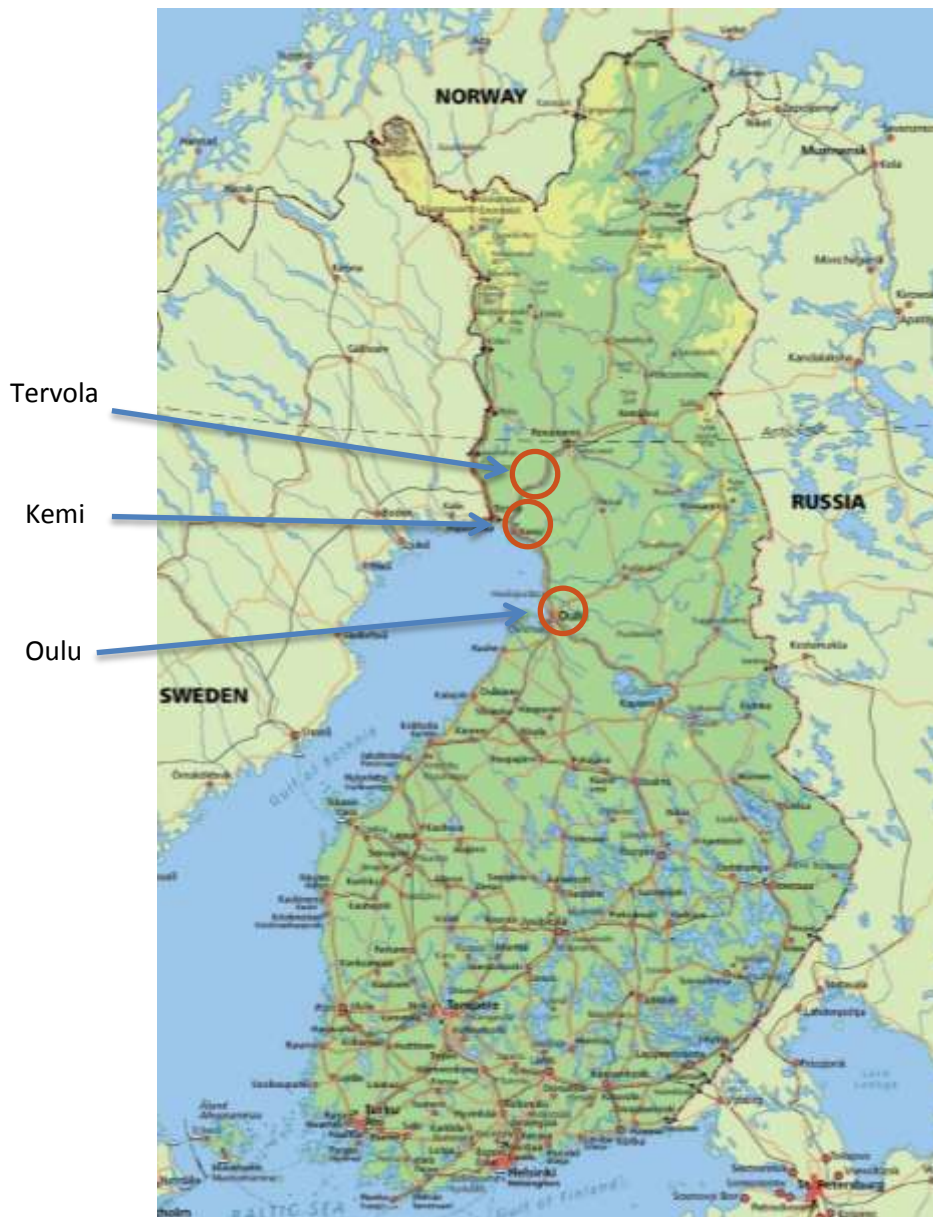


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Appendix 1 Map of Kemi

Appendix 2 Questionnaire in English

1. Introduction

In this report the pilot communities in Northern Finland - Kemi, Oulu and Tervola - are studied. The social context and needs of each community are explored using information from articles, statistics and social media. Also questionnaires are used in order to provide a view of the inhabitants on their community and also to understand their view on the planned project as well as on the importance of renewable energy in the area.

First, the history of each pilot community is described shortly in order to provide information on how the area came to be and how its strengths have formed during the years. Then, the situation of today is described; general information about the area is included as well as statistics about the inhabitants and the labour market. Social media and studies are used in order to provide a view of how the inhabitants see the area and what they think are the issues that should be addressed. Also the answers to the questionnaires are presented and examined. Finally, the needs of the community are summarised and the impacts of the project are studied in order to understand the ideal outcomes of the project in terms of improvement in the community.

2. Kemi

2.1 History

Kemi was founded in 1869 at the bottom of the Bothnian Bay. At the same time staple rights were accorded to the city. The woodworking industry was established in 1863, already before Kemi received the city rights. After 1869 the city grew quickly to be one of the most significant centres of woodworking industry in Finland. Due to industry also the transport connections improved; railway was opened in Kemi in 1902 and the airport was completed in 1939. Until 1930 the industrial plants and workers' residential areas were situated outside the city in the rural municipality, but in the beginning of 1931 the suburbs with the factories were incorporated to the city and Kemi became an industrial and proletarian town. (Vilén 2013)

2.2 Today

Kemi has the area of 747 km² of which land is 95 km² (Kemin kaupunki 2013a). This area houses two paper companies and a chrome mine and the city has also the biggest technology concentration in Lapland. Due to its location and the heavy industry, Kemi is the most prominent industry and harbour city in Lapland. (Kemin kaupunki 2013b)

Among tourists Kemi is known as the home of the Snow Castle and the ice breaker Sampo. (Kemin kaupunki 2013b) Kemi is also known as a culture city; the city has a theatre, city orchestra and regional art museum (Kemin kaupunki 2013a). The city hosts yearly the Arctic Comic Festivals and also other cultural events. Lappia Vocational College, Kemi-Tornio University of Applied Sciences, local workers' colleges and open colleges and the Kemi unit of the University of Lapland and the University of Oulu offer educational services in the city (Kemin kaupunki 2013b).

2.2.1 Inhabitants

In the end of 2012 the number of inhabitants in Kemi was 22 257. The number has decreased over the last decades as can be seen from Figure 1. Incorporation increased the number of inhabitants rapidly in 1931. The peak of 29 830 inhabitants was reached in 1967 after which the number has been constantly declining. (Kemin kaupungin kehittämis- ja talousosasto 2013b) Projection of the population growth suggests that the number of inhabitants in Kemi will continue to decrease in such a way that in year 2040 the number of inhabitants is estimated to be 19 264 (Tilastokeskus 2004).

Change in the number of inhabitants in Kemi

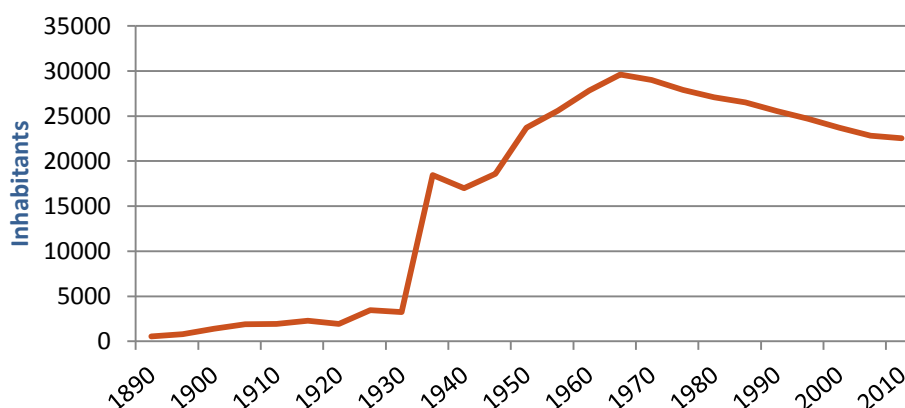


Figure 1. Change in the number of inhabitants in Kemi 1890-2010 (Kemin kaupungin kehittämis- ja talousosasto 2013b).

The declining number of inhabitants in recent years is due to negative natural population growth as can be seen from Figure 2. In the beginning of 2013 the natural population growth (births/deaths) was -37 and the net migration (people moving to/from the city) was +26. This resulted in population change of -11. (Kemin kaupungin kehittämis- ja talousosasto 2013a)

Change in natural population growth and net migration in Kemi

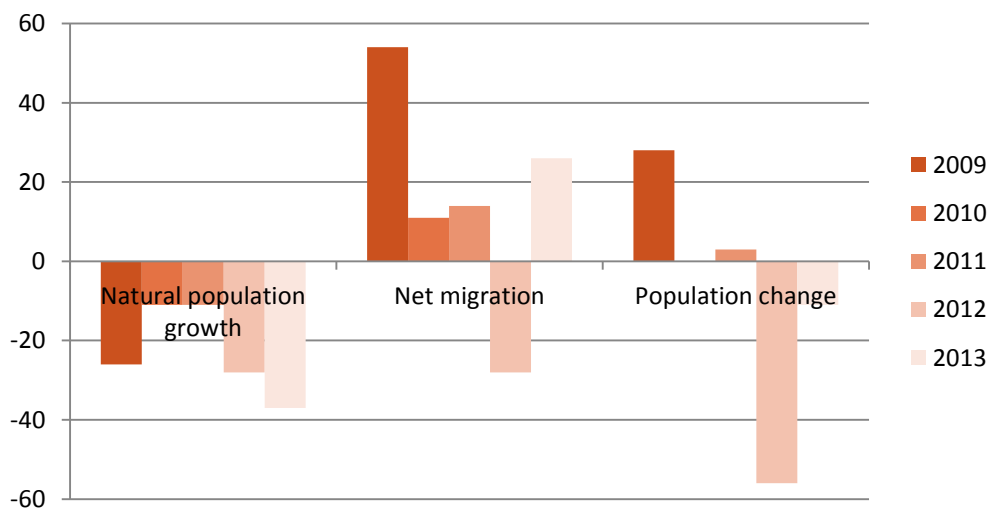


Figure 2. Change in natural population growth and net migration in Kemi 2009-2013 (Kemin kaupungin kehittämis- ja talousosasto 2013a).

The age distribution in Kemi in the end of 2012 is presented in Figure 3. It is compared with the respective percentage of Finland. It can be seen that the share of inhabitants over 65 years of age is larger in Kemi than what is the Finnish average and that the number of inhabitants under 65 is lower than the Finnish average. Still, Kemi represents quite the average Finnish city.

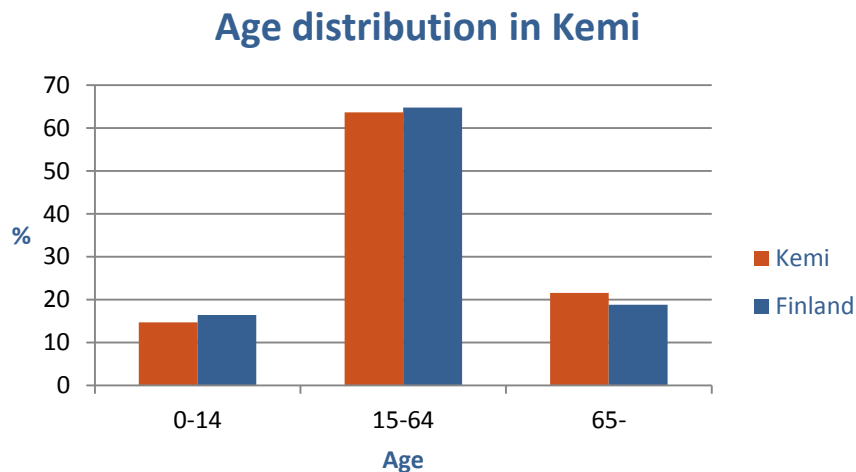


Figure 3. Age distribution in Kemi in the end of 2012 (Tilastokeskus 2013a).

2.2.2 Employment

Figure 4 presents how the jobs in Kemi are divided between different sectors. Services and industry are the biggest employers in Kemi (Kemin kaupungin kehittämis- ja talousosasto 2013b). The unemployment rate in Kemi was 16.7 % in the beginning of 2013 (Kemin kaupungin kehittämis- ja talousosasto 2013a).

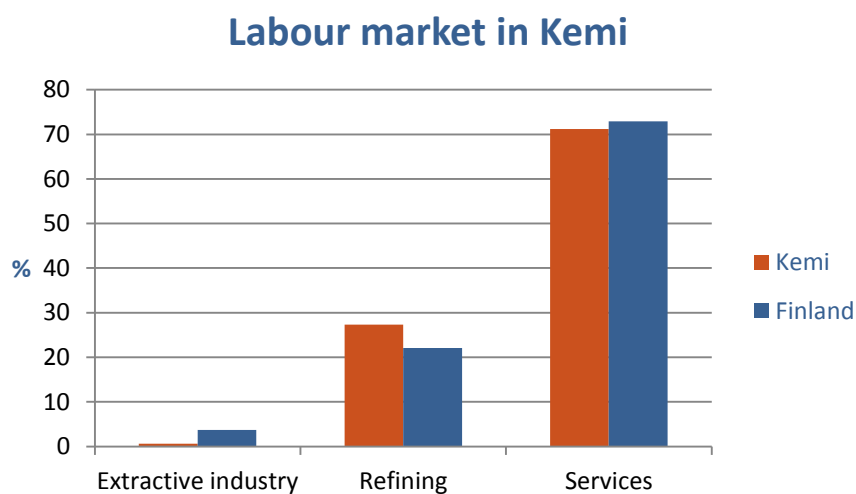


Figure 4. Labour market in Kemi in the end of 2010 (Tilastokeskus 2013a).

Table 1 presents the number of posts and employed inhabitants as well as the workplace sufficiency in Kemi between 2007 and 2010. Workplace self-sufficiency in Kemi is high; workplace efficiency higher than 100 % indicates that the number of posts in the area is higher than the number of employed workforce. The number of posts and employed has decreased during the examined period.

Table 1. Posts, employed and workplace self-sufficiency in Kemi 2007-2010 (Tilastokeskus 2012a, Tilastokeskus 2012b)

	2007	2008	2009	2010
Posts	10 306	10 133	9 319	9 669
Employed	8 424	8 447	7 864	8 040
Workplace self-sufficiency	122,3 %	120,0 %	118,5 %	120,3 %

2.2.3 Examples of renewable energy in the area

Innopower has constructed a wind farm of 10 wind mills in the Ajos harbour in Kemi. Two of the wind mills are built on land and the rest have been built on artificial islands. The total output of the farm is 30 MW. Innopower is planning on constructing up to 60 new wind mills in Ajos. The total output of these mills would be approximately 200 MW. In 2010 they completed the environmental impact assessment for the project. (Innopower 2011) In addition there is one wind mill constructed by Haminan Energia Oy (Haminan Energia Oy 2013).

A biodiesel plant by Vapo is also being planned into the area. It, as well, would be situated in Ajos. If fulfilled, the plant's construction would employ 800 people for three years. The finished plant would employ 400 in procurement of raw material and transportation in additions to the 100 people working at the plant itself. (Raunio 2012) The project has received funding from the EU NER300 funding programme and the Finnish government for the planning and developing of the plant. According to the CEO of Forest BTL (owned by Vapo) the planning is on schedule. (Yle uutiset 2013a)

2.3 Inhabitants' perceptions of the city

From the city description it would appear that Kemi fills all the requirements of being a successful city. Still, when it comes to the opinions of the inhabitants, it seems that the city has not been able to make the most of its possibilities. This has resulted in depopulation. Also the welfare of the inhabitants is low; according to statistics the inhabitants of Kemi are among the sickest in Finland (Leukumaavaara 2010).

The first glimpse into the opinions of the inhabitants shows that people find Kemi to lack activities and services; it is seen as a small village with only a few stores and nothing to see. Even though the

Snow Castle lures tourists, the local people are not interested in the project anymore but do still welcome the out-of-towners.

In the city's own web pages the inhabitants can ask questions which are answered by the city employees such as the heads of technical or social tasks. The questions related to the development of the city include issues such as the lack of sufficient bus transportation and the lack of areas where people can enjoy music. Beaches and playgrounds are said to need some work and people would like to see places that are not used anymore restored. Overall, they do see the potential of the city, but are frustrated that it is not used to its fullest.

According to a survey conducted in Kemi in 2012, the services which the inhabitants found to be the most hard to get are municipal health services and the services of public transportation. On the other hand pharmacies, stores, post offices, banks and cultural services were regarded to be the most easily accessible. When it comes to social services the inhabitants found children's day-care, legal services, youth work and child welfare to be the best functioning services, while income support as well as the services for senior citizens and disabled were considered to be the least functioning. Approximately every tenth respondent felt lonely quite often or very often. (Tomperi 2012)

2.4 Answers to questionnaire

The questionnaire concerning Kemi was carried out as an online survey and it was addressed to the city councillors. 10 out of 43 councillors answered the questionnaire. Almost all of the respondents answered each question.

The respondents work in various professions from teachers and police officers to journalists. Also few pensioners were included. This wide range of professions and positions assures a broad view of outlooks. Most of the respondents (60 %) have lived in Kemi for over 20 years (Figure 5). Hence they are well acquainted with the city and its inhabitants.

How long have you lived in Kemi?

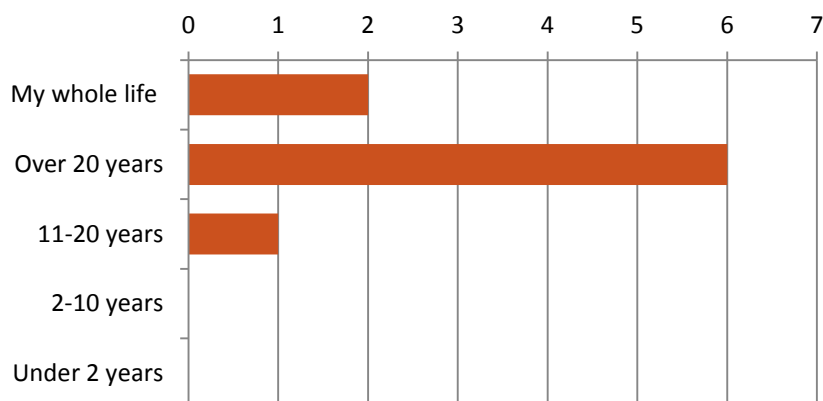


Figure 5. Question 3: How long have you lived in Kemi?

When asked how the respondents felt about the provided issues related to the city of Kemi most answered that they are pleased with the city and feel solidarity with the inhabitants. Most of them also agreed or somewhat agreed that the people living in the city are nice and that they are proud of the city. However, when asked about if they feel the city is esteemed, most answered that they somewhat agree or somewhat disagree. These results have been presented in Table 2. This indicates that the inhabitants themselves find the city and its people pleasant, but think that people from outside do not see its merits.

Table 2. Question 4: What is your opinion on the following issues concerning Kemi?

	Completely agree	Somewhat agree	Somewhat disagree	Completely disagree	Undecided
I am satisfied with the city	5	5	0	0	0
I feel solidarity with the inhabitants of the city	6	4	0	0	0
People living in the city are nice	5	4	1	0	0
I feel often proud about the city	4	4	1	1	0
The city is esteemed	0	4	4	2	0

To the open question 'What do you find to be the characteristic which makes Kemi special?' the respondents painted a picture of a red city (indicating to politics) which has a good location on the seashore, nice people, good services close by and workplace self-sufficiency. Seen as important for the inhabitants' quality of life were jobs, good services, recreation possibilities in the nature, clean air and water as well as a nice city centre. When asked about whether the quality of life has improved or worsened most answered that it has improved; they justified this answer by saying that

the city has become a more beautiful place as the surroundings have been improved by demolishing old shacks and making the seashore more beautiful. The ones to answer that the quality of life has worsened explained their view by writing that the number of jobs has decreased and that people are moving from the city.

The respondents seemed to be very satisfied or somewhat satisfied with the different issues listed in question 8 (Table 3). Few respondents were somewhat unsatisfied with the following issues; transport connections, pastime activities, beauty of the city, cleanliness of the city, calmness of the city, safety of the city and ease of movement. The respondents would like to see the roads and parks in better condition, better public transportation to the city's outskirts, a skate park for youngsters and better activities for elderly in sheltered homes. Also mentioned is that the city should stop taking more immigrants in.

Table 3. Question 8: How satisfied are you with the following issues in Kemi?

	Very satisfied	Somewhat satisfied	Somewhat unsatisfied	Very unsatisfied	Undecided
Transport connections	5	4	1	0	0
Grocery services	5	5	0	0	0
Municipal services	2	8	0	0	0
Outdoor recreation and exercise possibilities	5	5	0	0	0
Pastime activities	2	7	1	0	0
Parks	6	4	0	0	0
Beauty of the city	2	7	1	0	0
Cleanliness of the city	4	5	1	0	0
Calmness of the city	4	5	1	0	0
Safety of the city	3	6	1	0	0
Ease of movement	6	2	2	0	0

When asked about what the respondents find to be the three most important issues in the city's to-do list at the moment, the issue to be mentioned the most frequently is the improvement of the employment situation. The second frequently mentioned issue is securing good services or improving them and the third improving health care. Other issues mentioned are the consolidation of municipalities, improving the services for the youth and for elderly as well as developing tourism. When it comes to the decisions concerning the water utility and renewable energy the respondents found them to be either very important or somewhat important (Figures 6 and 7).

How important do you consider the decisions relating to the water utility to be to Kemi?

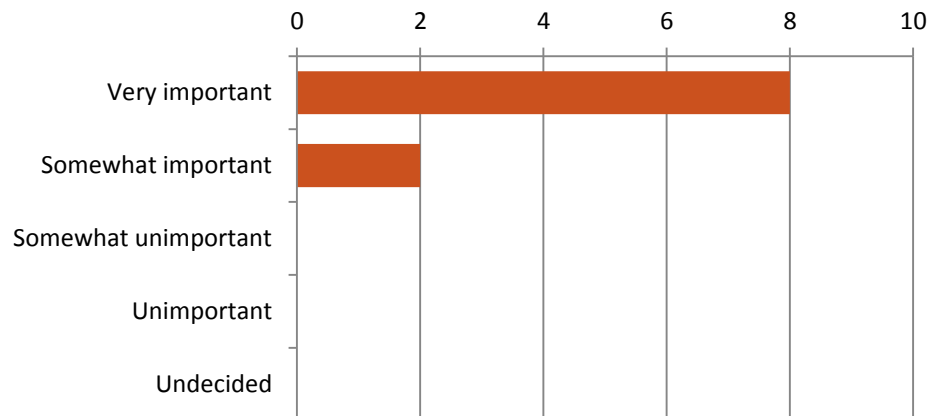


Figure 6. Question 11: How important do you consider the decisions relating to the water utility to be to Kemi?

How important do you consider the decisions relating to renewable energy to be to Kemi?

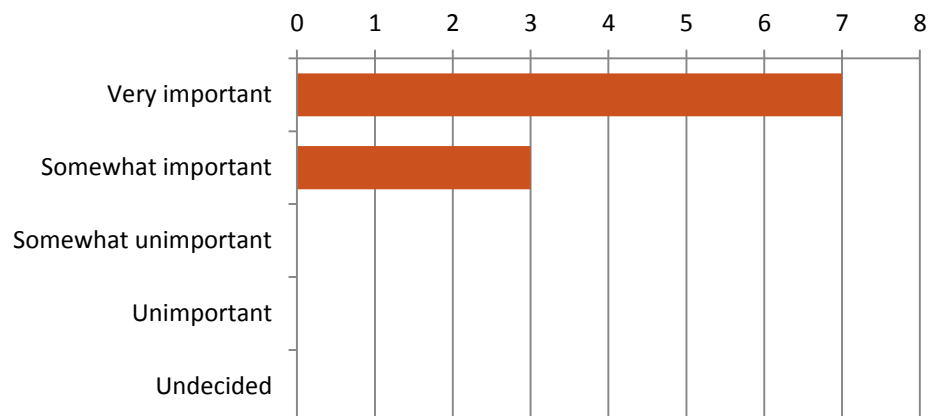


Figure 7. Question 12: How important do you consider the decisions relating to renewable energy to be to Kemi?

The respondents were also asked about their opinions on renewable energy and how it has affected the city of Kemi. The respondents completely agree or somewhat agree that the use of renewable energy should be increased in Kemi and somewhat agree that the utilisation of renewable energy has been visible in the area. Most of the respondents completely agree that self-sufficiency of energy is important for the city. These observations can also be made from Table 4. The respondents find wind energy and the use of wood and chips at the heating plant to be the renewable energy sources which have been the most visible in Kemi.

Table 4. Question 13: What is your opinion on the following statements?

	Completely agree	Somewhat agree	Somewhat disagree	Completely disagree	Undecided
The use of renewable energy should be increased in Kemi	4	6	0	0	0
The use of renewable energy has been visible in the area	2	6	2	0	0
Self-sufficiency of energy is important for the city of Kemi	6	3	1	0	0

The respondents seem to be unsure how the previous renewable energy projects have affected the city; the answers are quite scattered, mainly between positive impact and no impacts (Table 5). Most of the respondents find that the previous projects have had no impacts on the values of properties and houses, outdoor recreation possibilities, and social interaction and sense of solidarity. The projects are found to have had a positive impact on employment and the city image. When it comes to the residential amenity the respondents find it to have a positive impact or no impact at all. According to the respondents the city of Kemi does not have any ongoing plans relating to renewable energy.

Table 5. Question 15: How do you consider the previous renewable energy projects have affected the following aspects in Kemi?

	Significant positive impact	Positive impact	Negative impact	Significant negative impact	No impact	Undecided
Residential amenity	1	4	1	0	3	1
Value of properties and houses	0	3	1	0	5	1
Outdoor recreation possibilities	0	2	2	0	5	1
Social interaction and sense of solidarity	1	2	1	0	5	1
Employment situation	0	6	0	0	3	1
Image of the city	0	6	0	0	3	1

In the accompanying email, the respondents were explained that Kemin Vesi is interested in assessing the possibility of implementing decomposition into their utility. In the questionnaire the respondents were asked how they find the project would affect the listed aspects in Kemi. The respondents find that the project would have a positive impact on employment and the city image and no impacts on residential amenity or outdoor recreation possibilities. The respondents were more indecisive about the impacts the project would have on the values of properties and houses and on social interaction and sense of solidarity; the answers were torn between positive impacts or no impacts. Table 6 shows how the answers were divided.

Table 6. Question 17: Kemin Vesi is interested in assessing the possibility of implementing anaerobic digester into their utility and utilising of the produced biogas. If the project is realised how do you find it will affect the following aspects in Kemi?

	Significant positive impact	Positive impact	Negative impact	Significant negative impact	No impact	Undecided
Residential amenity	0	3	0	0	5	1
Value of properties and houses	1	4	0	0	5	0
Outdoor recreation possibilities	1	1	1	0	7	0
Social interaction and sense of solidarity	0	4	1	0	4	1
Employment situation	0	6	0	0	4	0
Image of the city	0	6	0	0	3	0

The acceptable repayment period proved to be quite a difficult question for the respondents; the answers are quite evenly scattered between all the options (Table 7). 5 year repayment period was seen as both acceptable and unacceptable, 10 years was mainly seen as acceptable, 15 years acceptable or somewhat acceptable, 20 years mainly somewhat acceptable and over 20 years somewhat acceptable or somewhat unacceptable. The answers indicate that even periods up to 20 years are seen as acceptable. If the acceptable time would be exceeded the decrease in transportation and its costs were seen as benefits which would still make the respondents support the project.

Table 7. Question 18: The objective of the decomposition plant is to produce energy for own use and thus decrease energy demand and related costs. What repayment period would you still find acceptable?

	Acceptable	Somewhat acceptable	Somewhat unacceptable	Unacceptable	Undecided
5 years	2	1	0	2	2
10 years	4	1	1	1	1
15 years	2	2	0	1	1
20 years	2	4	0	0	1
Over 20 years	0	2	2	0	1

Finally, the respondents were given an opportunity to write issues related to renewable energy which they thought were not addressed in the questionnaire. The issues mentioned include co-operation with the neighbouring municipalities and harnessing the unused rivers for hydro power. Also utilising the city's forests is seen as a good solution; wood chips and other usable products from forestry should be salvaged.

2.5 Needs of the community and ideal outcomes of the project

Kemi is a proletarian city with large factories and skilled workforce. The city is known for its red appearance but also for its cultural events and tourist attractions. Location on the seashore, at the bottom of the Bothnian Bay has provided Kemi an important position as a gateway to Lapland. In recent years the city has endured outmigration; the number of inhabitants has decreased over the last decades and the decline is estimated to continue.

The needs of the inhabitants were studied with the help of social media and a questionnaire. Both sources provided information from the inhabitants themselves and supported each other's results. The first issue arising when studying the perceptions was that even though the inhabitants themselves are satisfied with the city and feel proud to be its inhabitants, they acknowledge that the city is not seen as an esteemed one in the minds of others. The inhabitants would like to see improvements in employment, public transportation to the city's outskirts, social and health services and in the overall appearance of the city. All in all it seems that the inhabitants would like to see Kemi become more appealing, attracting new people into the area hence creating the need for new, better services and making the city lively again.

Renewable energy gets support from the inhabitants. The previous renewable energy projects have been welcomed with open arms and they are found to have had positive impacts on the city image, employment and residential amenity. Also the future projects, such as the biodiesel plant, are hoped to create even more employment into the area. On the other hand, it seems that the city is yet to benefit from the image created with the implementation of renewable energy.

When examining the answers to the questionnaire's questions related to the planned project, an anaerobic digestion plant, the respondents proved to be quite unfamiliar with the solution. This was not a surprise as the respondents were not given much information on the project and its impacts. Their ability to answer was only based on their own knowledge on the particular solution. The scattered answers make it difficult to interpret their true thoughts on the project. The project was still clearly seen as having positive impacts on employment and the city image.

When considering the needs of the inhabitants and the possible impacts of the planned project and renewable energy in general, the ideal outcomes of the project to the community in Kemi would be improving the city's image and creating employment into the area. The project could help Kemi to get even more experience in renewable energy solutions and attract new renewable energy projects into the area. This would also provide Kemi the possibility to become known as a city which invests in sustainable development and the future. These are long-term goals which require enthusiasm not only among the decision makers but also among the inhabitants who create the image and spread it. Ideally this would result in population growth and finally to the revitalisation of the city.

Maybe a more tangible outcome is that the water utility is able to ease the pressure from increasing its prices; producing energy for its own use decreases the utilities energy demand and the related costs hence lowering the need for increasing the consumer prices. As the water rates in Kemi have increased between 2007 and 2012 from 1.62 €/m³ to 2.07 €/m³ (Kemin kaupungin kehittämis- ja talousosasto 2013b) this would most probably be a benefit that the inhabitants would appreciate.

3. Oulu

3.1 History

The city of Oulu was founded in 1605. It is situated by the Gulf of Bothnia, at the mouth of Oulu River (Oulun kaupunki 2013c). Some milestones in the city's history are listed below.

- ✓ 1765 The city was accorded with the staple rights
- ✓ 1776 Became the Oulu province's capital
- ✓ 1931 A sulphite pulp factory was established by an English family business (Does not exist today)
- ✓ 1971 A sulphite pulp factory by Oulu Oy was established (Today accommodates Stora Enso Oy)
- ✓ 1948 Merikoski hydroelectric power plant started electricity production
- ✓ 1952 The first batches of ammonia, nitric acid and fertiliser were produced in the Typpi Oy (Today the area accommodates the Oulu works of the chemical industry company Kemira Oy)
- ✓ 1959 The University of Oulu began operating
- ✓ 1977 The Toppila power plant began operation; the plant produces electricity and district heating

Source: adapted from Oulun kaupunki 2013c

3.2 Today

Oulu is the largest city in Northern Finland and the fastest growing region in Finland (Oulun kaupunki 2013a). In the turn of the year (2012-2013) a consolidation of municipalities increased the number of inhabitants in the Oulu Region from 143 909 to 190 847 (Oulun kaupunki 2012). The surface area of Oulu Region is 3 866.2 km² of which land area is 3 016.3 km². The city is situated 600 km from the capital Helsinki and 600 km from the northernmost spot in Finland. (Oulun kaupunki 2013b)

Oulu is known for its technology; it is home to many hi-tech companies (Oulun kaupunki 2013a). Oulu offers educational services in the university of Oulu and Oulu University of Applied Sciences. It also offers several vocational training schools, vocational apprenticeship and adult education. (Oulun kaupunki 2013b)

3.2.1 Inhabitants

As mentioned, the city of Oulu had 190 847 inhabitants in the beginning of 2013 (Oulun kaupunki 2012). The number of inhabitants in Oulu has increased during the years quite evenly. The change between 1900 and 2010 is presented in Figure 8. Earlier incorporations have increased the number of inhabitants more rapidly in 1961, 1965 and 2009 (Oulun kaupunki 2012).

Change in the number of inhabitants in Oulu

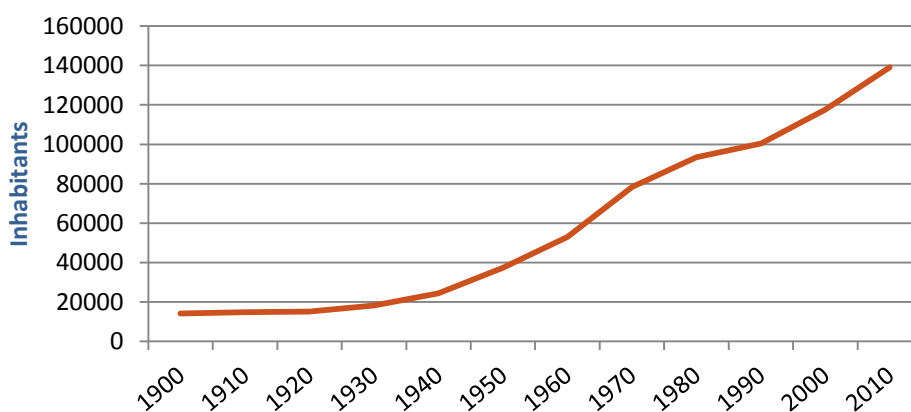


Figure 8. Change in the number of inhabitants in Oulu 1900-2010 (Oulun kaupunki 2012).

The age distribution of Oulu is presented in Figure 9. It can be seen that Oulu is a 'young' city; the number of inhabitants under 64 is higher than in the rest of Finland and the number of inhabitants over 65 is under the Finnish average. The average age of inhabitants in Oulu is 36.6 years (Oulun kaupunki 2013c). This youthful age structure is due to the migration of students to the city as well as a high birth rate. (Oulun kaupunki 2013b)

Age distribution in Oulu

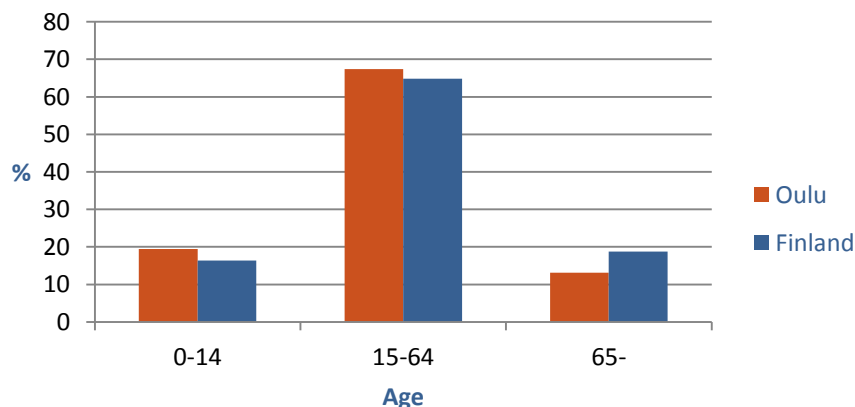


Figure 9. Age distribution in Oulu in the end of 2012 (Tilastokeskus 2013a).

3.2.2 Employment

The distribution of jobs between different sectors in Oulu is presented in Figure 10. As can be seen the main employer in the city of Oulu is the service sector.

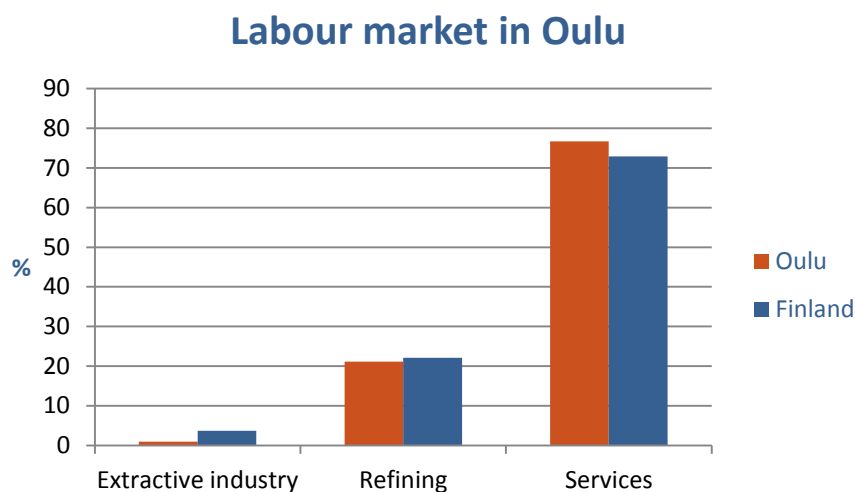


Figure 10. Labour market in Oulu in the end of 2010 (Tilastokeskus 2013a).

Table 8 presents the number of posts and employed inhabitants as well as workplace self-sufficiency in Oulu between 2007 and 2010. It shows that the number of posts and employed workforce has fluctuated during the examined period. Workplace self-sufficiency in Oulu is higher than 100 % which indicates that the number of posts in Oulu is higher than the number of employed inhabitants.

Table 8. Posts, employed and workplace self-sufficiency in Oulu 2007-2010 (Tilastokeskus 2012a, Tilastokeskus 2012b)

	2007	2008	2009	2010
Posts	73 185	75 259	72 914	73 935
Employed	60 122	61 281	59 681	61 366
Workplace self-sufficiency	121,7 %	122,8 %	122,2 %	120,5 %

Unfortunately, Oulu has been affected by the recession quite harshly; according to statistics the unemployment rate in Oulu, 16.7 %, is the highest among Finland's big cities. Especially ICT engineers have recently been forced to leave their jobs in Oulu as companies are shutting down. (Yle uutiset 2013b)

3.2.3 Examples of renewable energy in the area

Innopower has wind mills in two locations in the Oulu region; Oulu and Oulunsalo. The capacity in Oulu is 4 MW and in Oulunsalo 10.3 MW. (Innopower 2011) The newly found Oulu region produces also hydro power; there are dams situated in the river Oulu as well as in the river Ii.

A pilot site with the possibility to test and compare renewable energy sources in one-family houses will be constructed in Hiukkavaara, Oulu. In this RESCA (Renewable Energy Solutions in City Areas) - project the participating cities develop ways to increase the share of renewable energy in households. The buildings are to be finished in 2014. (Oulun kaupunki 2013d)

3.3 Inhabitants' perceptions of the city

Oulu keeps attracting young students and families into the area with its educational services, fast developing technology and big city vibe. However, the city has recently endured setbacks as the big technology companies such as Nokia have had to lay off their employees due to the recession. It remains to be seen whether the high unemployment rate will force people to move from Oulu or on the other hand drive possible new inhabitants away. This also seems to be a hot topic in social media concerning Oulu.

The perceptions of the inhabitants of their hometown Oulu are quite neutral. There is however some issues which get people debating. One of these issues is Kallioparkki, the underground parking area which is being built under the city centre at the moment. Most of the inhabitants oppose the project; people find that the city is throwing good money after bad by building the car park. One person sums up the perceptions of most of the people opposing the project; it is as a means to increase the use of private cars even though it should be decreased. The same person also states that the city centre should be otherwise developed; not on the terms of cars but on the terms of people.

Also in other discussions it seems that the inhabitants in Oulu would like to see improvements in public transportation; the prices of bus tickets are seen too expensive and the buses do not go frequently enough. People indicate to be willing to use public transportation rather than their own cars if it was made easier. Cycling possibilities in Oulu are seen as good and functioning.

As mentioned, the unemployment rate in Oulu is high. This fact arouses discussion; are people forced to move from Oulu in order to seek jobs elsewhere? On the other hand people are annoyed because they find that people working in ICT are being pampered and given too much attention.

Overall, the impression given in the social media about Oulu is quite positive. The main issue which the inhabitants would like to see addressed is public transportation and making it more affordable and frequent. The uncertainties caused by the recession seem to concern people; Oulu is known for technology but today the sector seems to be the one under most stress. Still, people are not too worried about these matters and are more driven to improve issues that are within their own reach.

4. Tervola

4.1 Today

Tervola was founded in 1867. It is a rural municipality situated by the Finland's longest river, Kemijoki, and in the centre of three cities Kemi, Tornio and Rovaniemi. (Tervolan kunta 2013) The land area of Tervola is 1 560 km² (Tilastokeskus 2013a). Tervola is known for its wood, stone and metal industry products as well as agriculture and forestry. The municipality offers good basic services and recreation possibilities. (Lapin Liitto 2013) Tervola offers education from preschool all through to secondary education (either vocational or academic) (Tervolan kunta 2013).

4.1.1 Inhabitants

The number of inhabitants in Tervola was 3 339 in the end of 2012 (Tilastokeskus 2013a). The number has evenly decreased during the last few decades; in 1980 the number of inhabitants was 4 631 and in 2010 it was 3 444 (Tilastokeskus 2013b). The change in the number of inhabitants between 1980 and 2010 is presented in Figure 11. The number is projected to decrease in the coming years so that in 2040 the number of inhabitants is estimated to be 2 707 (Tilastokeskus 2004).

Change in the number of inhabitants in Tervola

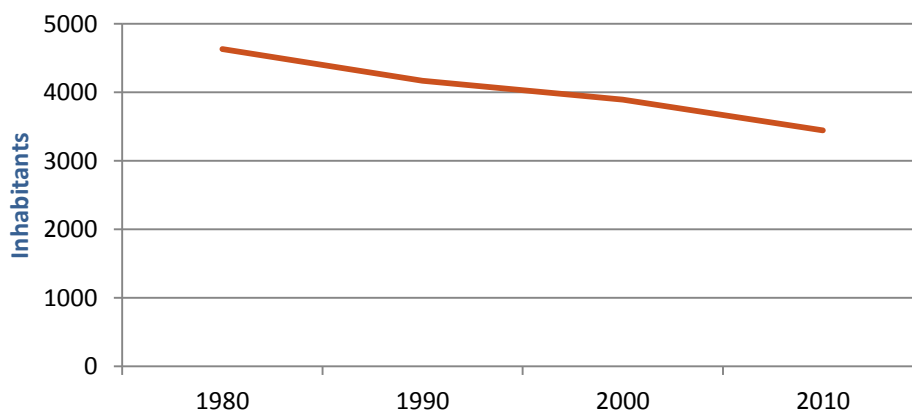


Figure 11. Change in the number of inhabitants in Tervola 1980-2010 (Tilastokeskus 2013b).

As can be seen in Figure 12 the decrease in the number of inhabitants in recent years is due to negative natural population growth. The population change in the beginning of 2013 was -26 people (Kemin kaupungin kehittämis- ja talousosasto 2013a).

Change in natural population growth and net migration in Tervola

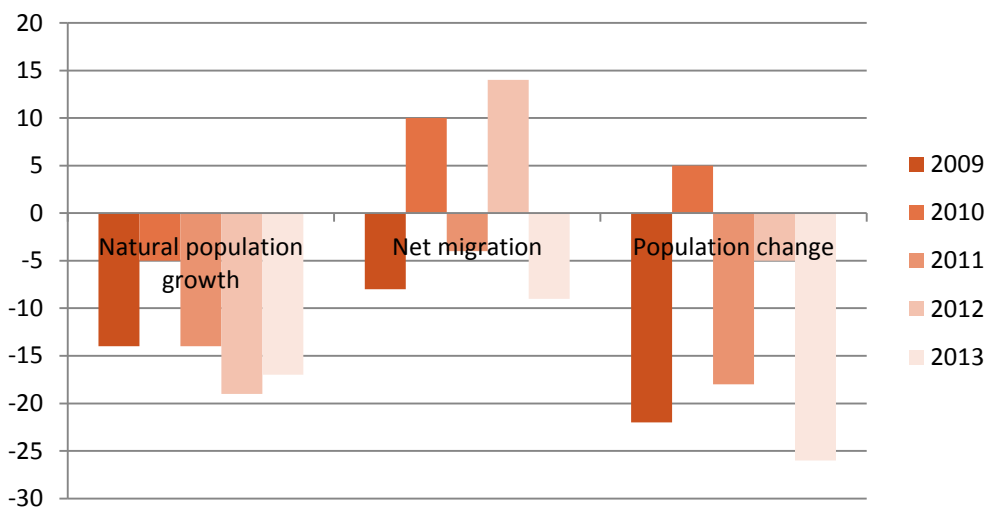


Figure 12. Change in natural population growth and net migration in Tervola 2009-2013 (Kemin kaupungin kehittämis- ja talousosasto 2013a).

The age distribution presented in Figure 13 shows that the number of people over 65 years of age is higher in Tervola than what the Finnish average is and the number of inhabitants under 65 is lower than the Finnish average. Migration to larger cities which offer higher education can partly explain the age distribution in Tervola; young people leave the area to go study in universities and then seek jobs outside Tervola hence lowering the number of people under 65.

Age distribution in Tervola

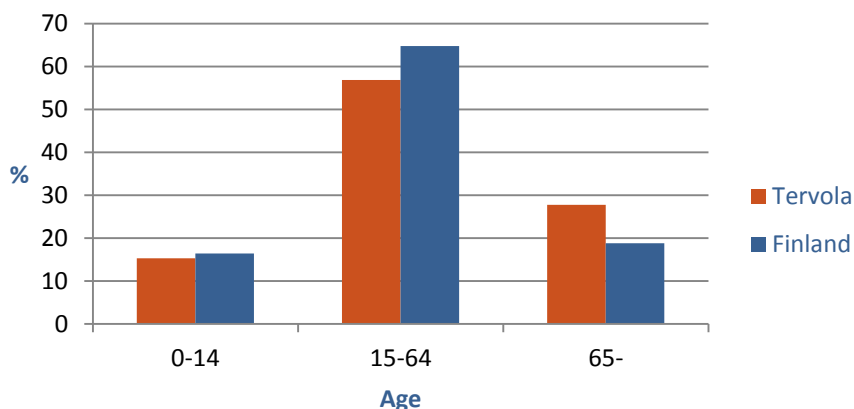


Figure 13. Age distribution in Tervola in the end of 2012 (Tilastokeskus 2013a).

4.1.2 Employment

The share of jobs in agriculture and forestry has stayed significant in Tervola; the percentage of people working in primary production in Tervola in 2010 was 17.3 % while the share in whole Finland was 3.7 %. Even though the service sector is the main employer in the area, the percentage of people working in this sector in Tervola is smaller than the Finnish average. The number of jobs in refining has been steadily increasing. (Tervolan kunta 2013) These observations can also be made from Figure 14.

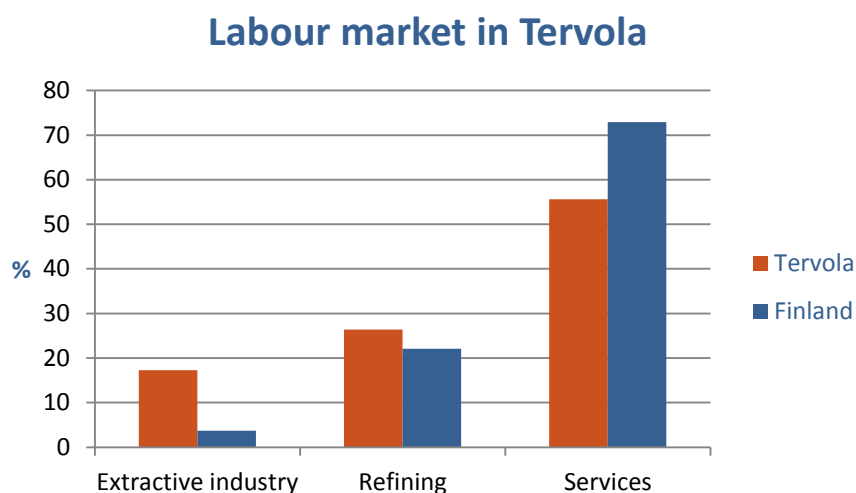


Figure 14. Labour market in Tervola in the end of 2010 (Tilastokeskus 2013a).

In Table 9 the number of posts and employed workforce as well as workplace self-sufficiency in Tervola is presented. Workplace self-sufficiency in Tervola was in 2007-2009 under 100 % which indicates that there were more employed inhabitants than available posts. Therefore the inhabitants have had to seek job outside the municipality. In 2010, however, the number rose to be just over 100 %.

Table 9. Posts, employed and workplace self-sufficiency in Tervola 2007-2010 (Tilastokeskus 2012a, Tilastokeskus 2012b)

	2007	2008	2009	2010
Posts	1 080	1 160	1 044	1 157
Employed	1 175	1 165	1 130	1 155
Workplace self-sufficiency	91,9 %	99,6 %	92,4 %	100,2 %

The decrease in the number of farms has forced Tervola to be the first local unit to decrease the number of stand-ins. Until the date, there has been a shortage of stand-ins. (Maaseudun Tulevaisuus 2013) Unemployment rate in Tervola was 13.4 % in the beginning of 2013 (Kemin kaupungin kehittämis- ja talousosasto 2013a).

4.1.3 Examples of renewable energy in the area

According to the municipal manager of Tervola, Mika Simoska, Tervola has been profiled as the bioenergy municipality of Lapland; Tervola produces biogas as well as energy from water, wood and peat. The latest addition to the list of renewable energy sources is wind energy as the first 'real' inland wind farm was constructed in Tervola, 50 km from the seaside. (St1 2013) The wind farm consists of ten 3 MW wind mills (TuuliWatti 2013).

4.2 Inhabitants' perceptions of the municipality

Tervola is presented as a small, rural municipality with beautiful views and friendly people. Still, the municipality has not been able to attract new people to the area. Young people move from Tervola to cities with the possibility for higher education and usually do not return to their hometown. For these reasons the number of inhabitants is decreasing and there are less people of working age in the municipality.

In social media Tervola is described with adjectives such as 'nice', 'small', 'calm', 'positive' and 'friendly'. Many of these words have been used by people who have lived in Tervola and are portraying the municipality to people who ask what kind of area Tervola is. Even though people use these positive terms to describe the municipality they also mention that they are not going to return to the area themselves. It is said that Tervola has all the needed services and that it is far enough from everything but still conveniently close.

The general opinion of Tervola in the surrounding areas is that Tervola does not have anything else but farms and forest. However, there seems to be no apparent reason presented in social media why people are of this opinion.

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Appendices

Appendix 1: Map of Kemi (source: <http://www.kemi.fi/menu/keminkartta.htm>)



Appendix 2: Questionnaire for the city councillors of Kemi

Use of renewable energy in water utilities - WARES project

1. Sex

Female

Male

2. Profession, title or position

3. How long have you lived in Kemi?

My whole life

Over 20 years

11-20 years

2-10 years

Under 2 years

4. What is your opinion on the following issues concerning Kemi? (Answer options: *Completely agree, Somewhat agree, Somewhat disagree, Completely disagree, Undecided*)

I am satisfied with the city.

I feel solidarity with the inhabitants of the city.

People living in the city are nice.

I feel often proud about the city.

The city is esteemed.

5. What do you consider to be the characteristic which makes the city of Kemi special?

6. What do you consider to be important to the quality of life of the inhabitants in Kemi?

7. Do you feel the quality of life has improved or worsened over the last 10, 20 or 30 years? Why?

8. **How satisfied are you with the following issues in Kemi? (Answer options: *Very satisfied, Somewhat satisfied, Somewhat unsatisfied, Very unsatisfied, Undecided*)**

Transport connections
 Grocery services
 Municipal services
 Outdoor recreation and exercise possibilities
 Pastime activities
 Parks
 Beauty of the city
 Cleanliness of the city
 Calmness of the city
 Safety of the city
 Ease of movement

9. **If you answered to be unsatisfied with one or more of the previous points how could that / those issues be improved in Kemi?**
10. **What do you consider to be the three most important issues on the city's to-do list at the moment?**
11. **How important do you consider the decisions relating to the water utility to be to Kemi? (Answer options: *Very important, Somewhat important, Somewhat unimportant, Unimportant, Undecided*)**
12. **How important do you consider the decisions relating to renewable energy to be to Kemi? (Answer options: *Very important, Somewhat important, Somewhat unimportant, Unimportant, Undecided*)**
13. **What is your opinion on the following statements? (Answer opinions: *Completely agree, Somewhat agree, Somewhat disagree, Completely disagree, Undecided*)**
- The use of renewable energy should be increased in Kemi.
 The use of renewable energy has been visible in the area.
 Self-sufficiency of energy is important for the city of Kemi.
14. **What form of renewable energy has been the most visible in Kemi?**

- 15. How do you consider the previous renewable energy projects have affected the following aspects in Kemi? (Answer options: Significant positive impact, Positive impact, Negative impact, Significant negative impact, No impact, Undecided)**

Residential amenity
 Value of properties and houses
 Outdoor recreation possibilities
 Social interaction and sense of solidarity
 Employment situation
 Image of the city

- 16. Does Kemi have any ongoing plans relating to renewable energy?**

- 17. Kemin Vesi is interested in assessing the possibility of implementing anaerobic digester into their utility and utilising of the produced biogas. If the project is realised how do you find it will affect the following aspects in Kemi? (Answer options: Significant positive impact, Positive impact, Negative impact, Significant negative impact, No impact, Undecided)**

Residential amenity
 Value of properties and houses
 Outdoor recreation possibilities
 Social interaction and sense of solidarity
 Employment situation
 Image of the city

- 18. The objective of the decomposition plant is to produce energy for own use and thus decrease energy demand and related costs. What repayment period would you still find acceptable? (Answer options: Acceptable, Somewhat acceptable, Somewhat unacceptable, Unacceptable, Undecided)**

5 years
 10 years
 15 years
 20 years
 Over 20 years

- 19. If the repayment period exceeds the period you choose acceptable, what other benefits would make you support the project?**

- 20. If you would like to bring other aspects concerning renewable energy which have not been addressed in this questionnaire, please write them below.**