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Consumers & Small Scale Electricity Production

Customer Survey Results

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Consumers' viewpoint on the small scale electricity production

What would be required in order to make the consumers willing to invest in their own small scale electricity production?

- The focus purely on the household customers
- No emphasis on the technical issues, business models, roles of different market players, regulation etc.
- Methods: Literature review, expert interviews, consumer interviews & questionnaires
- The work is being done within Task 7.2 by the University of Vaasa

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Key research questions

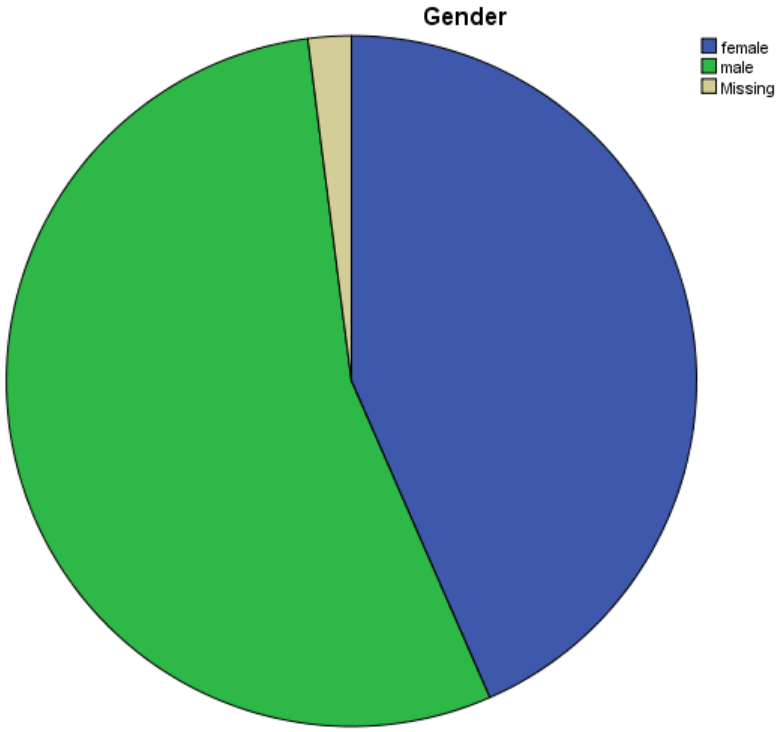
Identifying…

- What is the level of the consumers' awareness and interest towards small scale production? What kinds of consumers might be interested (customer segments)?
- What would the consumers expect to gain (motivating factors)?
- What would stop the consumers' interest (barriers)?
- What are the prerequisites of the consumers (investment options, repayment period, price level etc.)?

Customer survey

- This presentation focuses on the results of a **customer survey**. The respondents were contacted through Finnish House Owners' Association (Suomen Omakotiliitto); the invitation to the survey was sent to their members as a part of their newsletter.
- In total **198 customers** filled in the e-form in March 2014.
- The main idea of the customer survey was to understand the level of the house owners' awareness as well as their attitudes and interest towards small scale electricity production.
- *The outcomes of previous expert interviews as well as solar panel owner interviews helped to understand the concept and to ask the right questions in the consumer study.*
- *All the results in this presentation are based purely on the customer survey. The results of the other pieces of research are available separately.*

Background information



Gender

56 % of the interviewees were male and 44 % female.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	86	43,4	44,3	44,3
	male	108	54,5	55,7	100,0
	Total	194	98,0	100,0	
Missing	System	4	2,0		
Total		198	100,0		

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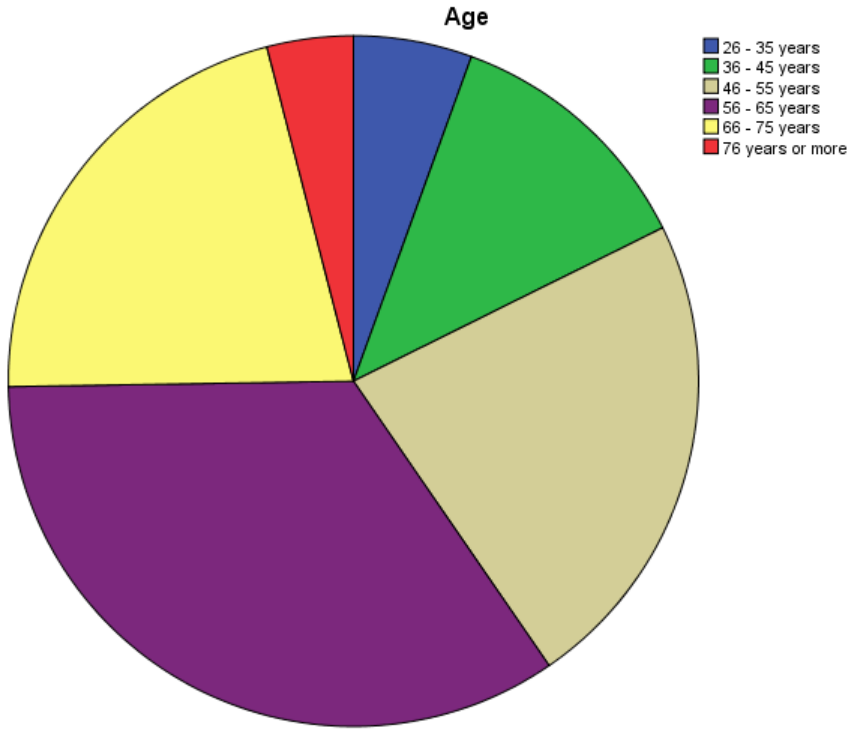
Age

The respondents were distributed quite evenly to different age categories. The largest group was 56-65 years olds.



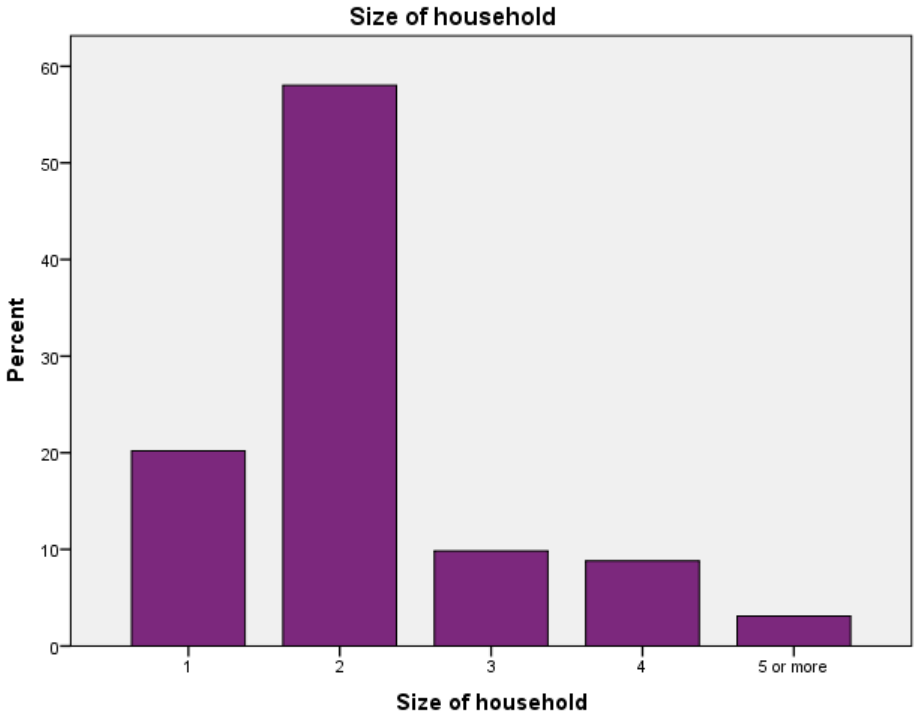
Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26 - 35 years	11	5,6	5,6	5,6
	36 - 45 years	24	12,1	12,1	17,7
	46 - 55 years	45	22,7	22,7	40,4
	56 - 65 years	68	34,3	34,3	74,7
	66 - 75 years	42	21,2	21,2	96,0
	76 years or more	8	4,0	4,0	100,0
	Total	198	100,0	100,0	

There were no respondents who were 25 years or younger.

Size of household

Two persons was by far the most common household size. 21 % of the households had children.

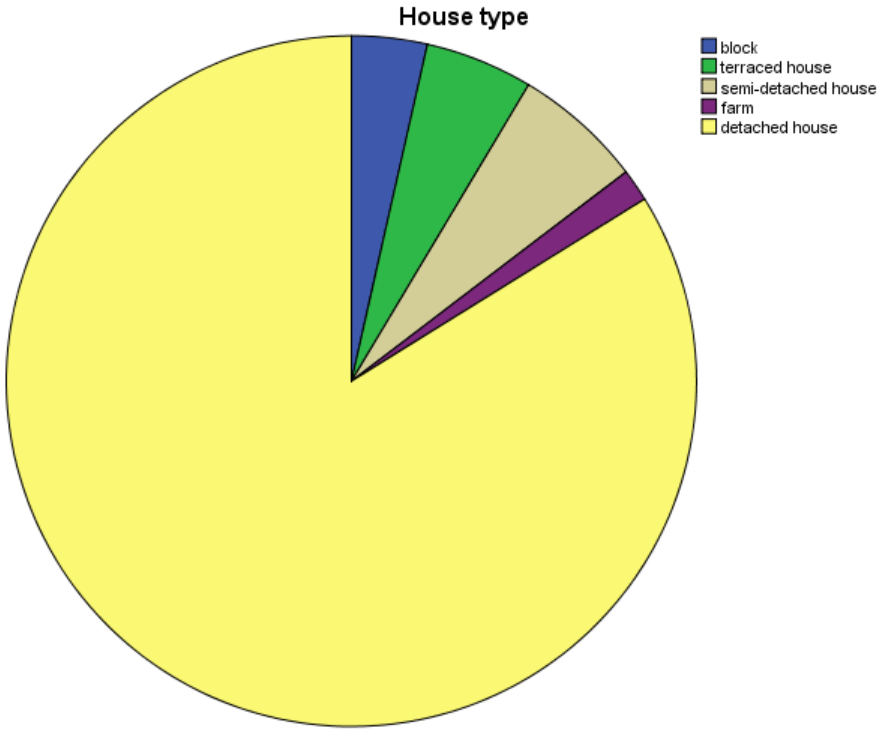


Size of household

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	39	19,7	20,2	20,2
	2	112	56,6	58,0	78,2
	3	19	9,6	9,8	88,1
	4	17	8,6	8,8	96,9
	5 or more	6	3,0	3,1	100,0
	Total	193	97,5	100,0	
Missing	System	5	2,5		
Total		198	100,0		

House type

84 % of the respondents live in detached house, which was expected due to the fact that they are members of Finnish House Owners' Association.

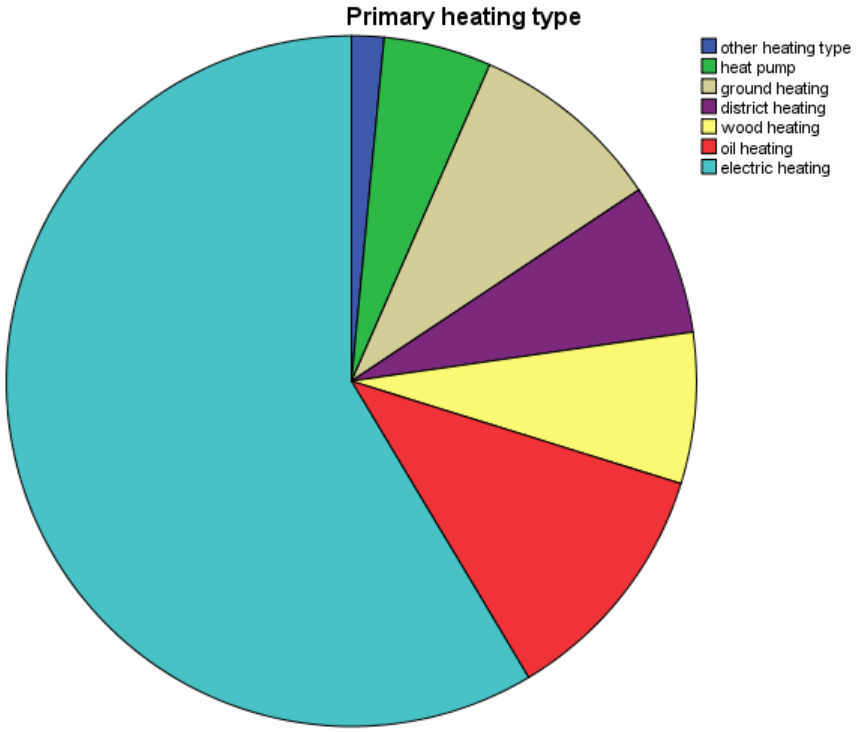


House type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	block	7	3,5	3,5	3,5
	terraced house	10	5,1	5,1	8,6
	semi-detached house	12	6,1	6,1	14,6
	farm	3	1,5	1,5	16,2
	detached house	166	83,8	83,8	100,0
	Total	198	100,0	100,0	

Primary heating type

The most common heating type among the customers was electric heating, which was used by more than half of the respondents.



Primary heating type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	other heating type	3	1,5	1,5	1,5
	heat pump	10	5,1	5,1	6,6
	ground heating	18	9,1	9,1	15,7
	district heating	14	7,1	7,1	22,7
	wood heating	14	7,1	7,1	29,8
	oil heating	23	11,6	11,6	41,4
	electric heating	116	58,6	58,6	100,0
	Total	198	100,0	100,0	

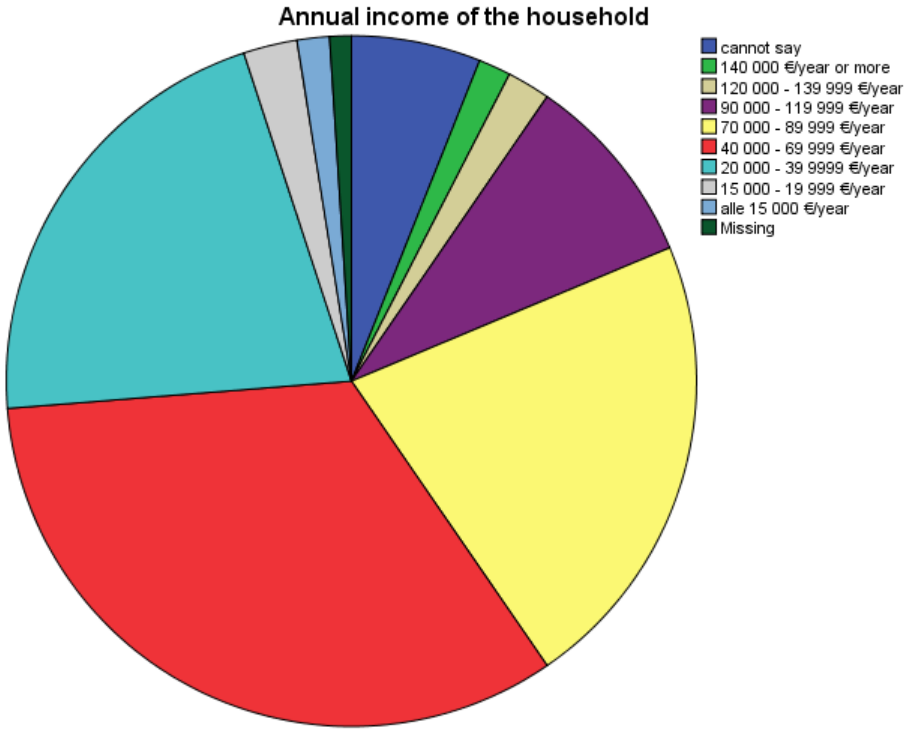
Secondary heating type

In total 77 % of the respondents had one or more secondary heating types as well. Most common was wood heating, which was mentioned by 73 % of those with several heating types.

Also heat pump (37 %) and electric heating (17 %) were quite typical secondary heating types. Oil heating and ground heating were only mentioned by few respondents.
Two respondents mentioned solar heating.

Household income

The respondents were distributed among all income levels. More than half of the households have income between 40 000 € and 90 000 €/year.



Annual income of the household

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	cannot say	12	6,1	6,1	6,1
	140 000 €/year or more	3	1,5	1,5	7,7
	120 000 - 139 999 €/year	4	2,0	2,0	9,7
	90 000 - 119 999 €/year	18	9,1	9,2	18,9
	70 000 - 89 999 €/year	43	21,7	21,9	40,8
	40 000 - 69 999 €/year	66	33,3	33,7	74,5
	20 000 - 39 9999 €/year	42	21,2	21,4	95,9
	15 000 - 19 999 €/year	5	2,5	2,6	98,5
	alle 15 000 €/year	3	1,5	1,5	100,0
	Total	196	99,0	100,0	
Missing	System	2	1,0		
Total		198	100,0		

Electricity consumption, awareness & interest

Electricity consumption

The household customers often fail to know their annual electricity consumption. Therefore, they were given some consumption category options in order to make it easier for them to estimate their consumption level. The categories are approximate but sufficient:

- 40 000 kWh/year or more (very big electricity user, such as farm)
- 30 000 kWh/year (e.g. large electrically heated detached house)
- 18 000 kWh/year (e.g. electrically heated detached house)
- 10 000 kWh/year (e.g. detached house with a sauna stove but without electric heating)
- 5 000 kWh/year (e.g. fairly large flat or terraced house with a sauna stove but without electric heating)
- 2 000 kWh/year (e.g. rather small flat or terraced house without sauna stove or electric heating).

The respondents were asked to choose the *most suitable* option to describe the level of their electricity consumption.

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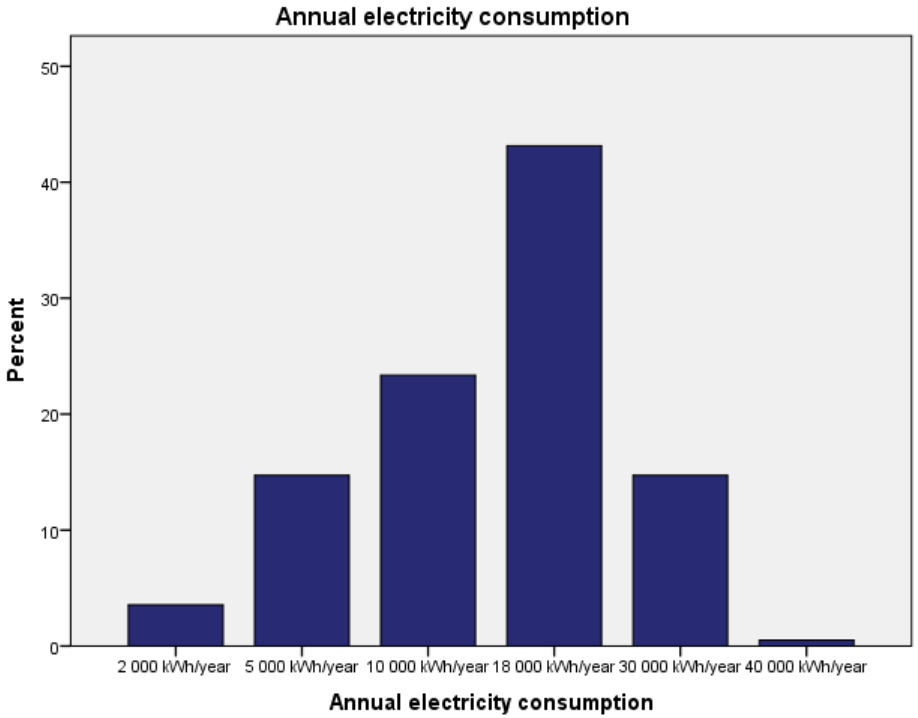
Electricity consumption

18 000 kWh/year was the most common electricity consumption level among the respondents.



Annual electricity consumption

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 000 kWh/year	7	3,5	3,6	3,6
	5 000 kWh/year	29	14,6	14,7	18,3
	10 000 kWh/year	46	23,2	23,4	41,6
	18 000 kWh/year	85	42,9	43,1	84,8
	30 000 kWh/year	29	14,6	14,7	99,5
	40 000 kWh/year	1	,5	,5	100,0
	Total	197	99,5	100,0	
Missing	System	1	,5		
Total		198	100,0		

Significance of the electricity costs

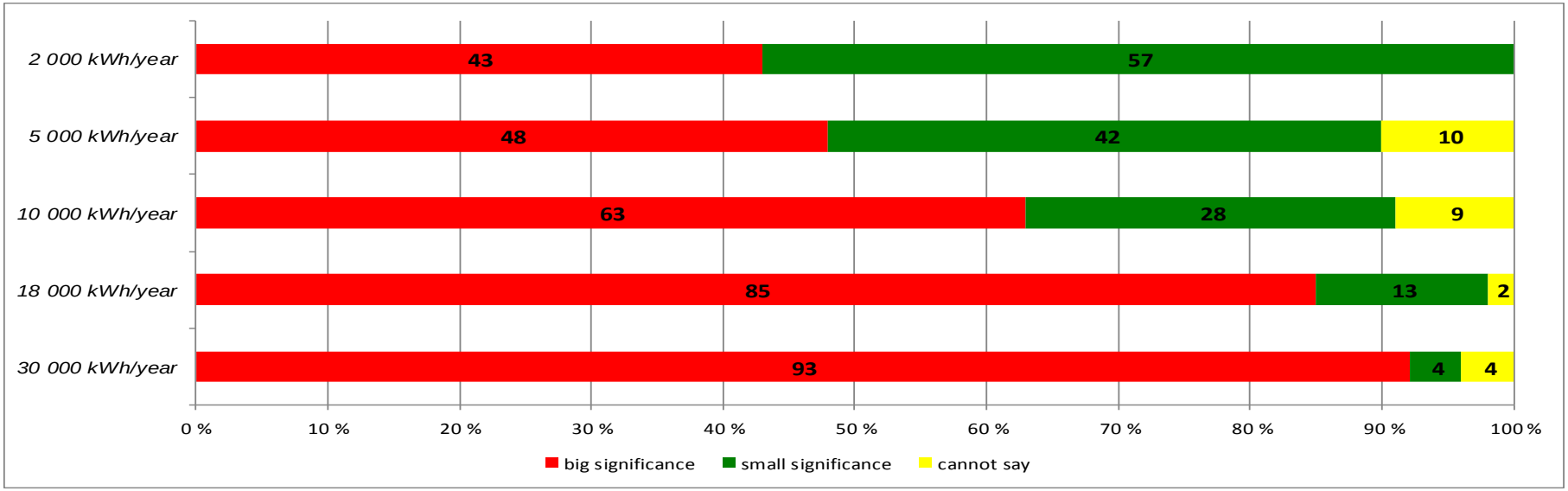
The respondents were asked how significant they consider their electricity bill to be for their household (in relation to the income and other costs of their household).

The answers have been categorized according to the households' electricity consumption level as it is essential information to partially define the perception of the significance of the costs.

The results are presented on the next slide.

Significance of the electricity costs

In total, 74 % of the respondents considered their electricity bill to have a big financial significance for their household.
As expected, the electricity costs were perceived most significant by households with high consumption levels.
However, also 43 % of the households with only 2 000 kWh annual consumption considered their electricity costs to be significant.



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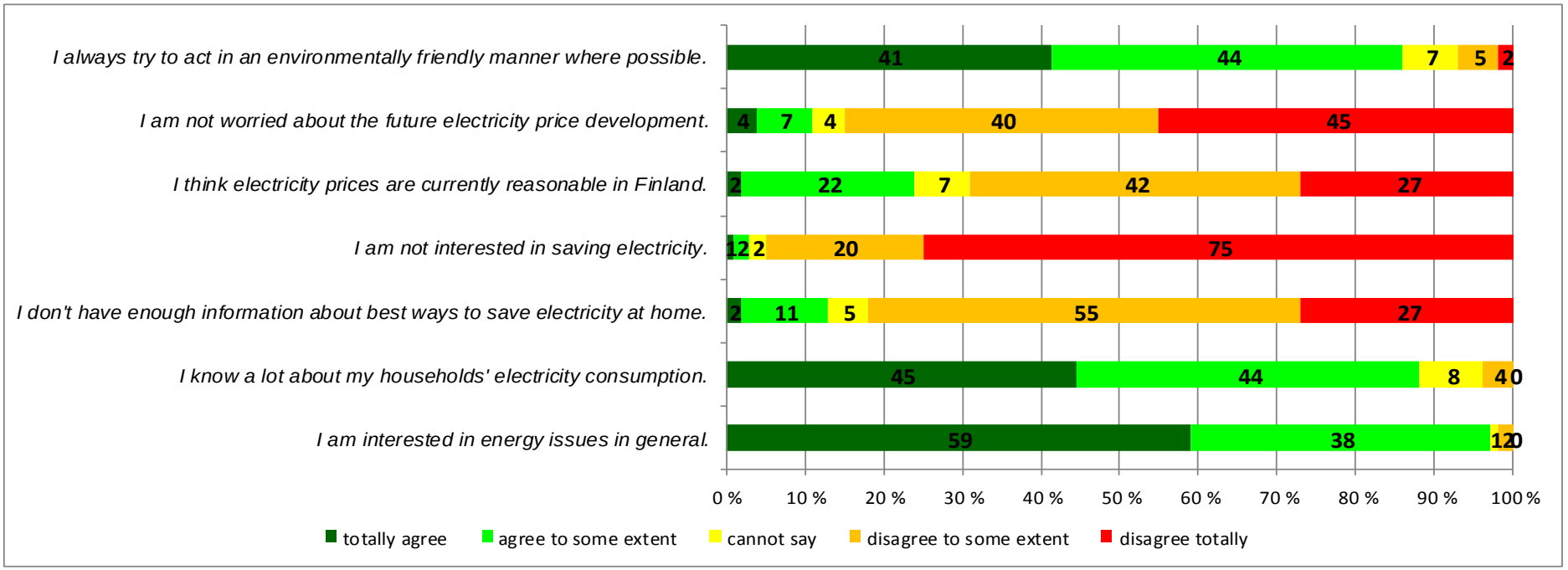
Interest & awareness toward energy

The respondents were asked to comment on whether they agree or disagree with some specific statements.
It seems that the respondents in general are very interested in the energy issues and worried about the price development of electricity.



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Perceptions of wind power

The respondents were asked to explain their perception of wind power – things that come to their mind, image etc.

It seems that almost all people have an opinion about wind power. The number of comments was very big and most people mentioned several things that they associate wind power with.

Overall, the image of wind power seems to be positive. The most common comments were that wind power is ”good” and environmental option for energy production. However, most respondents continued with a ”but”. Usually they mentioned that wind mills ruin the landscape, cause noise problems for the people living around and are also dangerous for the birds. There was also quite a lot of criticism toward wind power being expensive and very much weather sensitive.

Overall, even if the respondents seem to have generally a positive perception of wind power, it is very often mixed with some worries and criticism.

Perceptions of solar power

The respondents were also asked about their perception of solar power. The number of comments was substantial also for solar power.

It seems that the attitude towards solar power is very positive (good, environmental, should be utilized more) and most of the respondents would basically want to support the idea of increasing the use of solar power in Finland. The main difference between solar power and wind power seems to be that solar power is not seen to be ruining the landscape or causing any problems for the environment (such as noise or harm to birds).

However, despite of the good image of solar power, there are some down sides which make solar power not so worthy option from the respondents' point of view. Majority of the respondents think that solar power would be good but unfortunately the major problem is the Finnish weather conditions; solar power is not seen to suit to our country because it is only a partial solution. Therefore it is too expensive and inefficient.

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Electricity production in households

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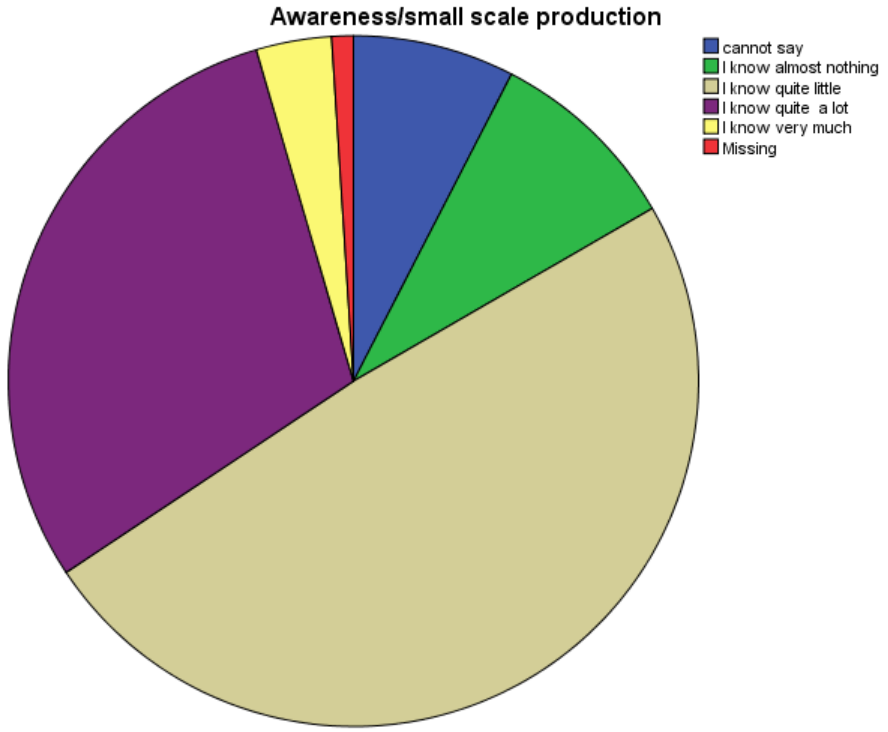
Awareness of the small scale production

As much as 34 % of the respondents feel they know at least quite a lot about households' small scale electricity production. However, majority (59 %) know quite little or almost nothing.



Awareness/small scale production

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	cannot say	15	7,6	7,7	7,7
	I know almost nothing	18	9,1	9,2	16,8
	I know quite little	97	49,0	49,5	66,3
	I know quite a lot	59	29,8	30,1	96,4
	I know very much	7	3,5	3,6	100,0
	Total	196	99,0	100,0	
Missing	System	2	1,0		
Total		198	100,0		

6 % of the respondents' households produce electricity by themselves.

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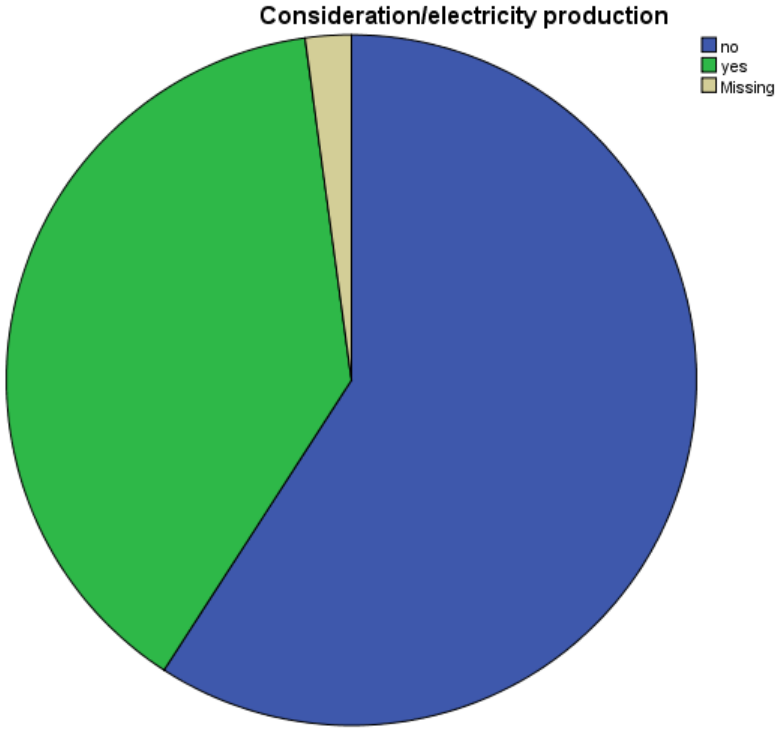
Households with no electricity production

Consideration of small scale production

40 % of the households have considered producing electricity themselves.



Consideration/electricity production

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	110	59,1	60,4	60,4
	yes	72	38,7	39,6	100,0
	Total	182	97,8	100,0	
Missing	System	4	2,2		
Total		186	100,0		

Reasonable investment and repayment period

It is very difficult for the consumers to comment on what would be reasonable investment amount and repayment period for the household customers in case they would purchase equipment for small scale electricity production, because they rarely know enough about the production equipment, it's capacity and costs.

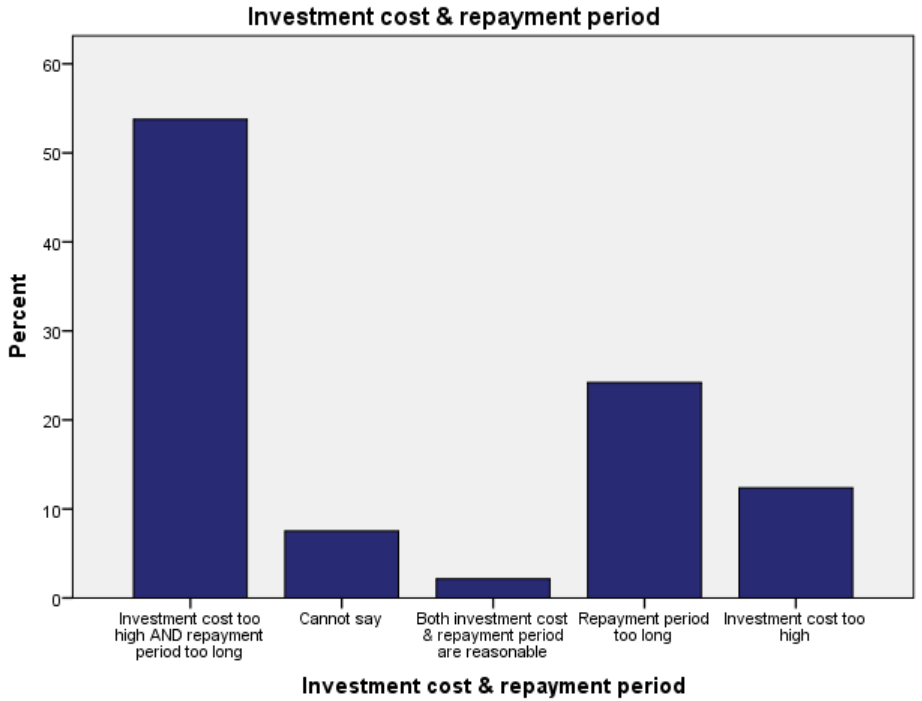
In order to give the respondents some realistic perspective of the costs, they were given an example of solar panel investment.
After that they were asked whether the investment and/or the repayment period sound reasonable for them.

"Households can produce electricity e.g. by solar panels or wind turbine. The investment costs for different equipment depend on e.g. the size and power of it, the location and position of the house etc. so it is difficult to give exact information about the costs and capacity. However, one example would be:

*A detached house with a normal south directional ridge roof, is being equipped with **12 solar panels**. The panels produce electricity approximately **2 600 kWh per year**. This system costs in turnkey delivery around 8 000 euros, which means **7 400 euros costs** after the household reduction. If the household is able to use all the electricity produced by these panels the **savings in yearly electricity bill is 400 euros**.*

*Repayment period means the time that is required for the equipment to produce electricity for the whole value of the investment costs (meaning, "to pay for itself"). **The repayment period** for the equipment in the example would be a little less than **20 years**."*

As many as 54 % of the respondents thought that the investment costs of the given example were too high **and** the repayment period was too long. Only 2 % considered both of them to be reasonable.



Investment cost & repayment period

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Investment cost too high AND repayment period too long	100	53,8	53,8	53,8
	Cannot say	14	7,5	7,5	61,3
	Both investment cost & repayment period are reasonable	4	2,2	2,2	63,4
	Repayment period too long	45	24,2	24,2	87,6
	Investment cost too high	23	12,4	12,4	100,0
	Total	186	100,0	100,0	

12 % of the respondents would accept the repayment period (but not the investment costs) and 24 % would accept the investment costs (but not the repayment period).

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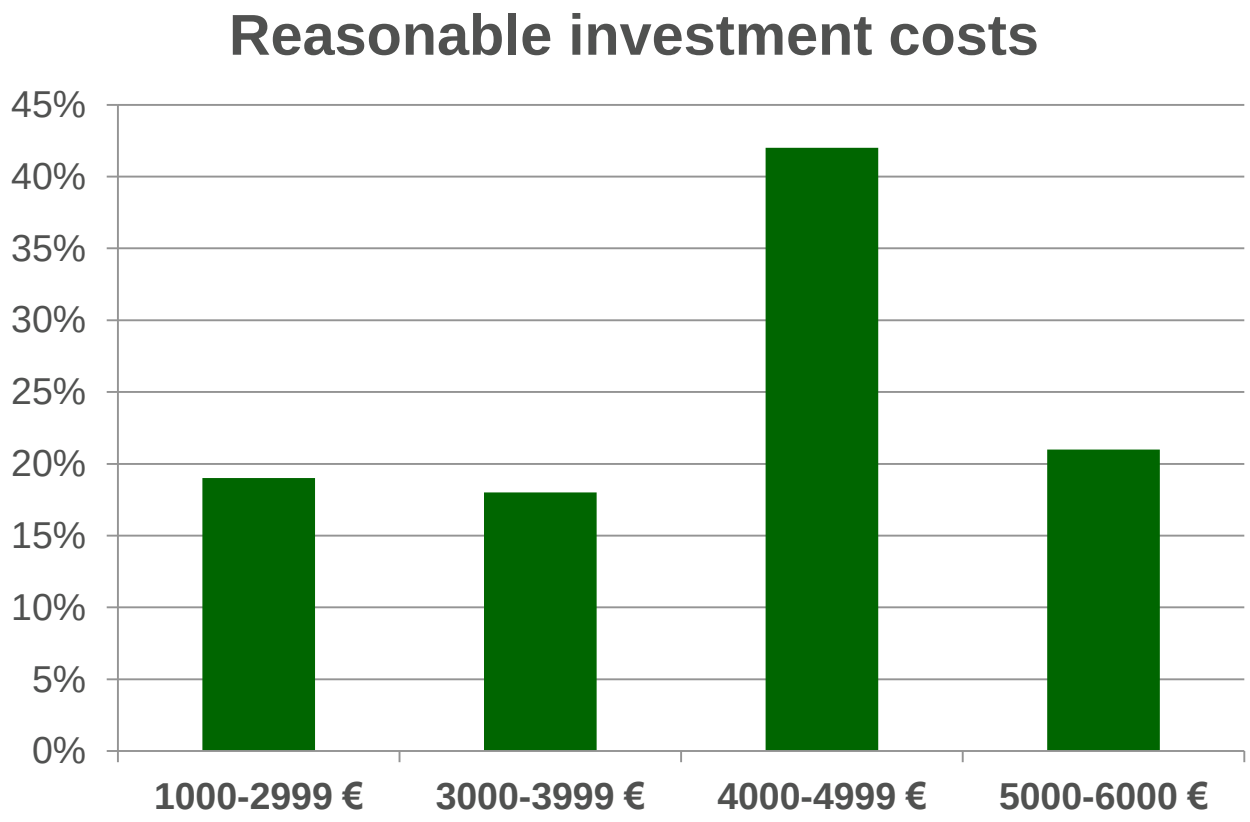
NB: The information below only includes those respondents who considered the investment costs of 8000 € being too high.

From the respondents' point of view reasonable investment costs for small scale electricity production equipment would on average be 3721 €. The most common answer was 4000 €.

The variation of the answers was between 1000 and 6000 euros.



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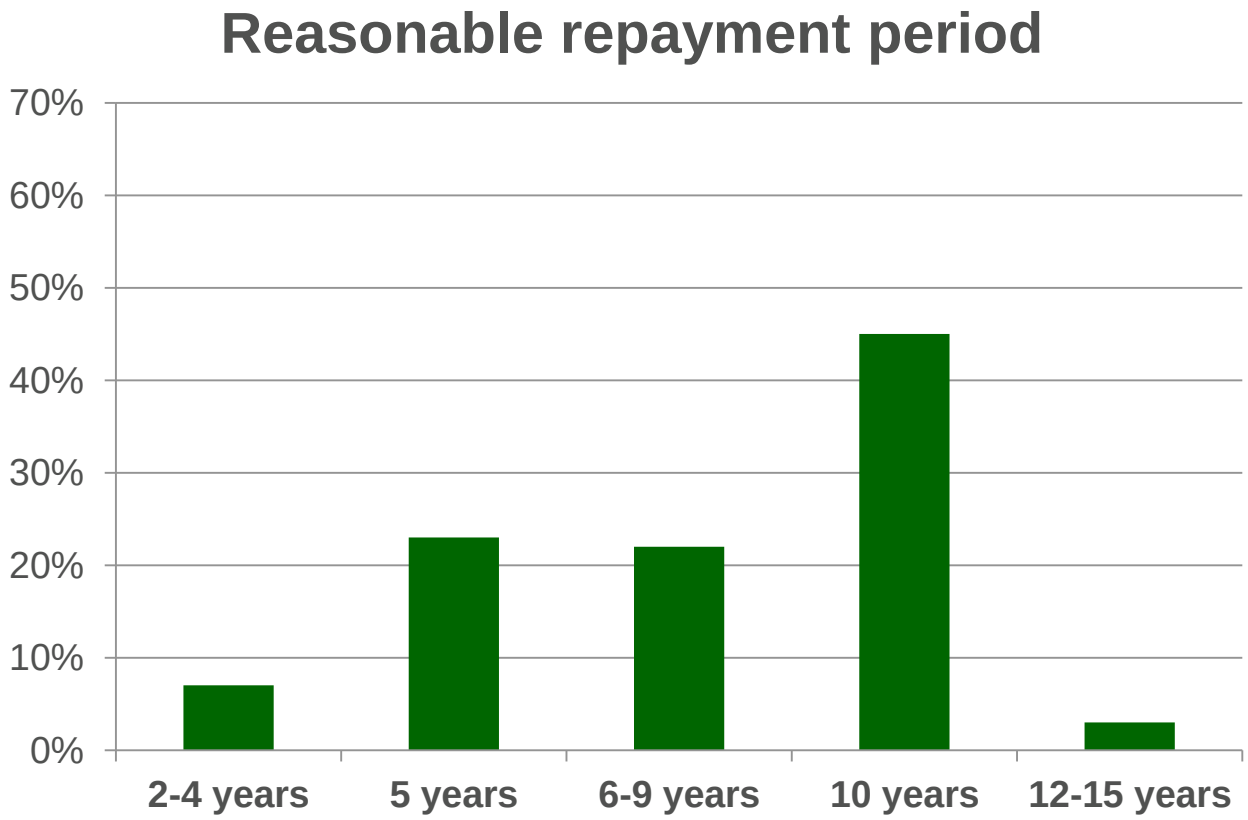
NB: The information below only includes those respondents who considered the repayment period of 20 years being too long.

From the respondents' point of view reasonable repayment period for small scale electricity production equipment would on average be 7,9 years. The most common answer was 10 years (often "max. 10 years").

The variation of the answers was between 2 and 15 years.

Only 3 % of the respondents would accept longer than 10 years repayment period.



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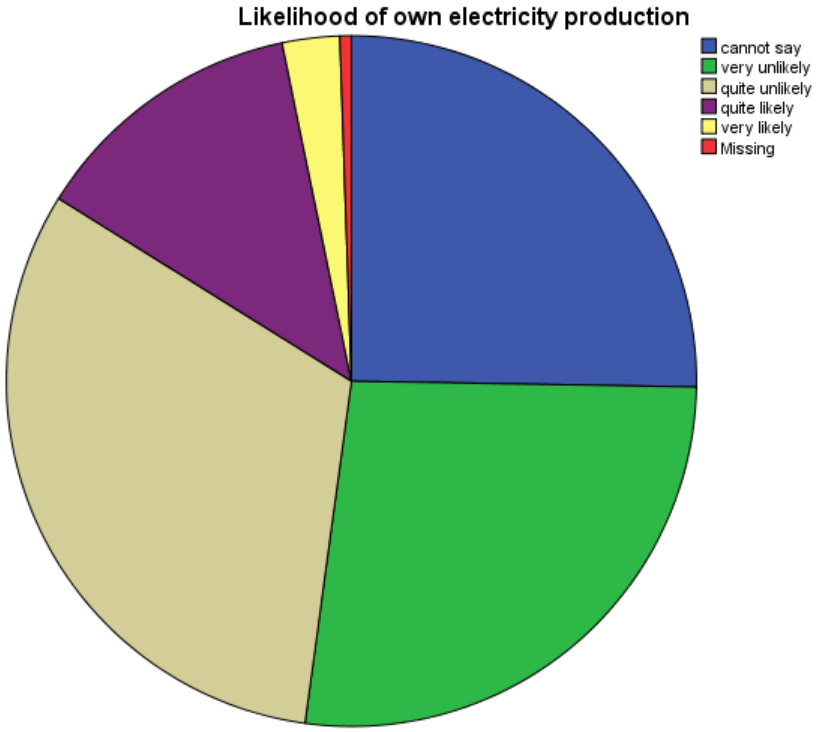
Likelihood of small scale production

16 % of the respondents think it is likely that they will start small scale electricity production within the following 10 years.



Likelihood of own electricity production

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	cannot say	47	25,3	25,4	25,4
	very unlikely	50	26,9	27,0	52,4
	quite unlikely	59	31,7	31,9	84,3
	quite likely	24	12,9	13,0	97,3
	very likely	5	2,7	2,7	100,0
	Total	185	99,5	100,0	
Missing	System	1	,5		
Total		186	100,0		

59 % think it is unlikely and 25 % could not say.

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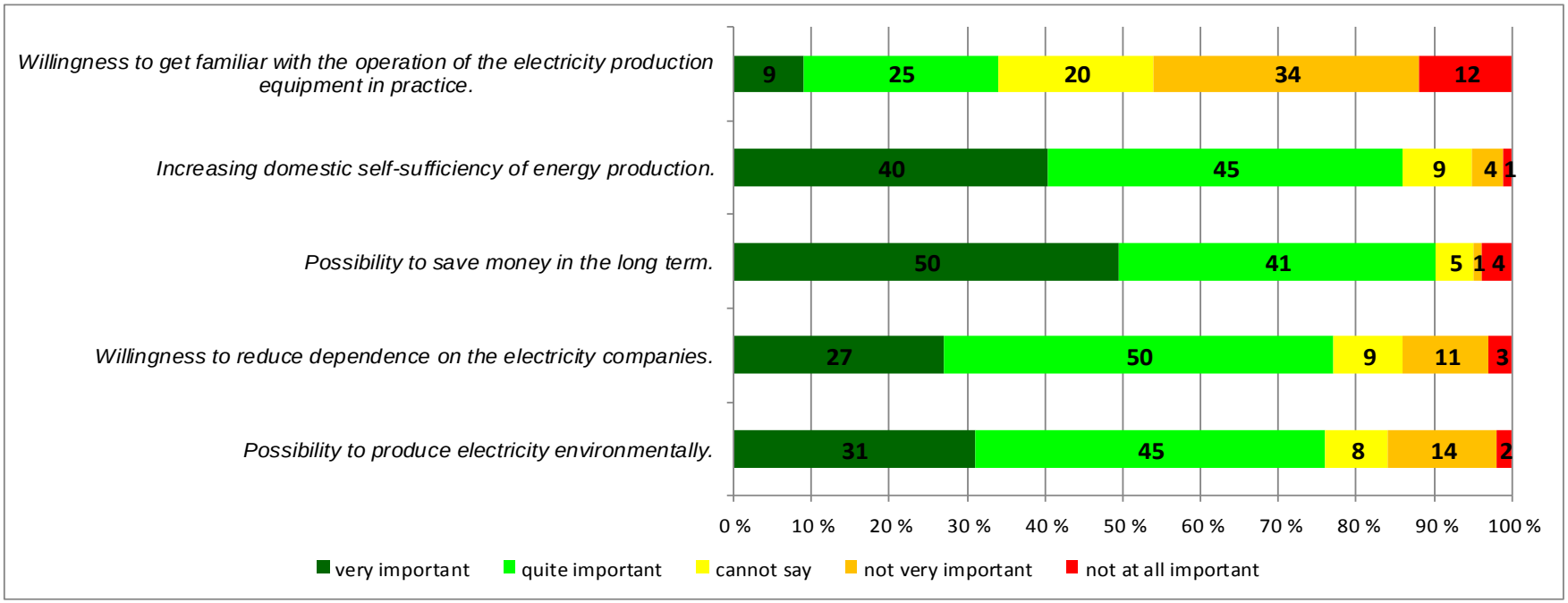
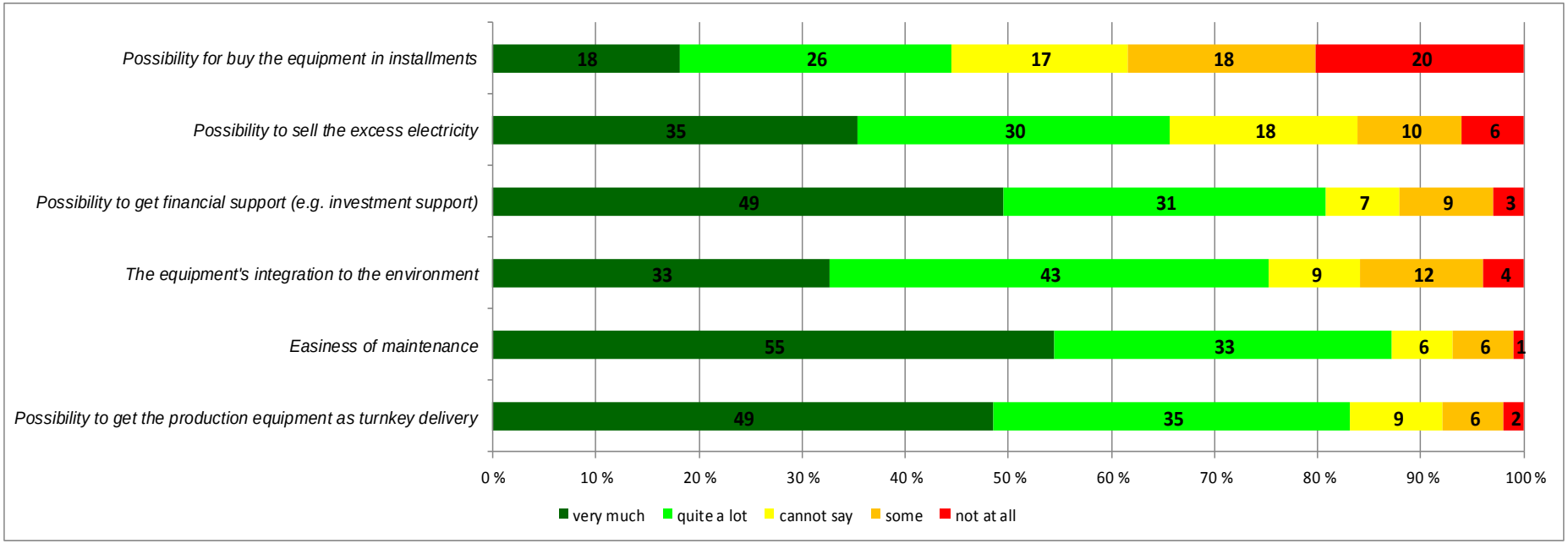
Motives for small scale production

It seems that possibility to save money in the long term and increasing domestic self-sufficiency of energy production would be the most important motives for the households to produce electricity.



Things to increase interest for small scale production

Several things would increase the households' interest towards small scale electricity production, such as easiness of maintenance and possibility to get the equipment as turnkey delivery. Possibility to buy the equipment in installments was least interesting of the suggested things.



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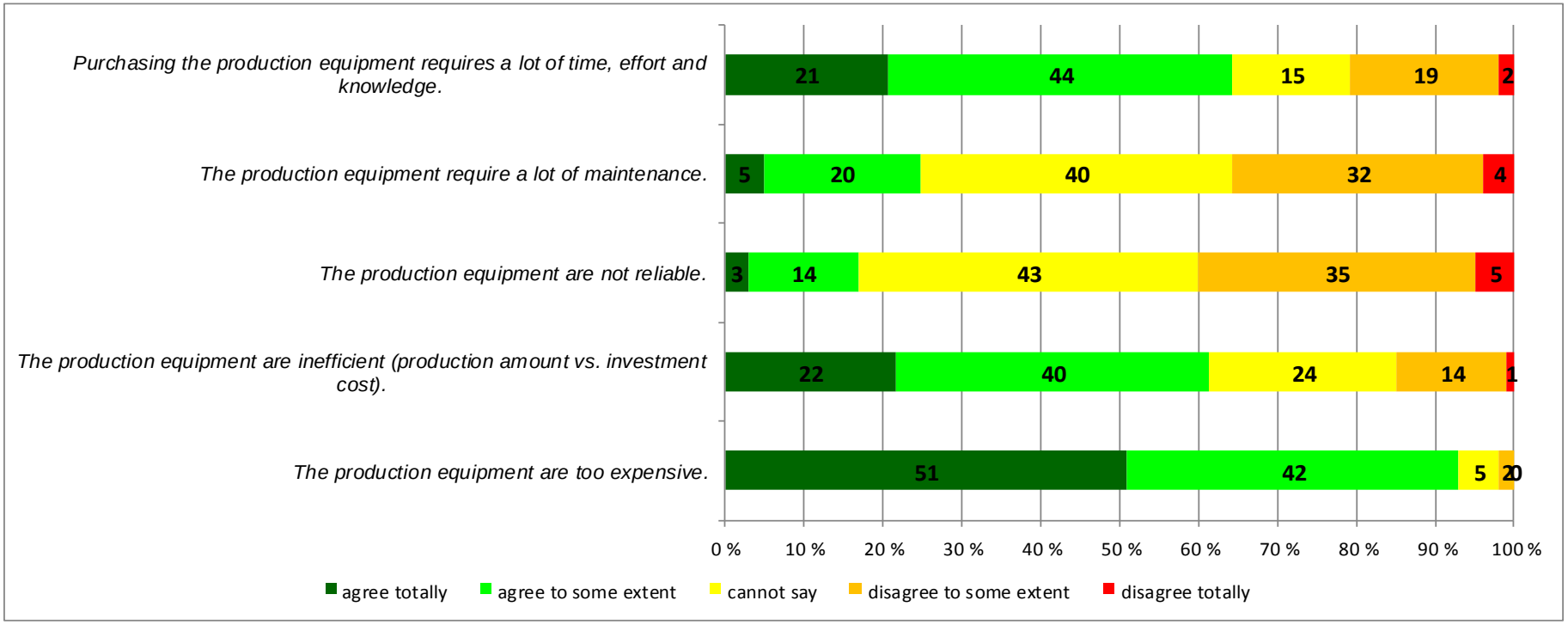
Concerns regarding small scale production

It seems that the main concern of the households is that they believe small scale electricity production equipment are too expensive to be purchased. Other major concerns are that purchasing the equipment would require a lot of time and effort and that the equipment is inefficient compared to the money invested.



Other concerns regarding small scale production

The respondents were asked if there are some other concerns they might have regarding solar panels. Quite many comments were received. Three most common ones were:

- How long is the lifespan of the solar panels?
- How well will the panels survive from cold weather, snow and storms?
- How much will the sun shine → will the panels produce enough electricity?

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Households
with electricity production

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Type of production equipment

Those respondents who stated that they have some kind of small scale electricity production, were asked what type of equipment have they purchased and when they have bought it.

One respondent had purchased an aggregate in 2010, but all the others had solar panels. The panels had been typically purchased in the past couple of years, but two cases were from 1993 and 1996.

Three respondents mentioned that the panels are at their summer cottage or on the roof of their caravan. However, from the answers to the following questions a conclusion can be drawn that actually most of these respondents have purchased the solar panels specifically to their summer cottages.

Main reason for the purchasing decision

Seven out of ten respondents had purchased the solar panels because it was impossible or very expensive to get their summer cottage connected to the electricity network otherwise. One respondent said that the reason was replacing the water boiler.

One respondent stated ”the benefit of the future generations” to be main reason for purchasing solar panels, whereas one said ”curiosity and possibility to reduce the electricity bill in summer”.

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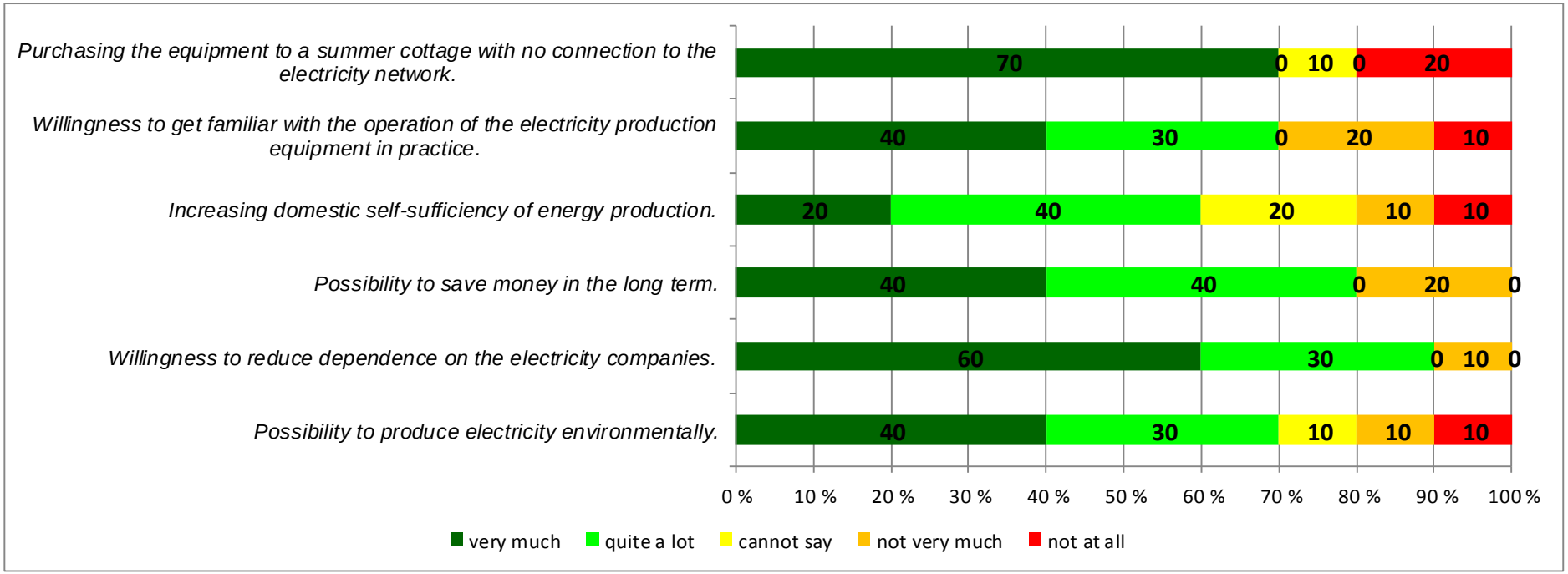
Motives for small scale production

For those who have purchased solar panels, main reasons were getting electricity to their summer cottage, possibility to save money on the long term and willingness to reduce the dependence on the electricity companies.



Repayment period

Most of the respondents had found out the repayment period for their purchase. Due to the fact that most of them had bought the panels to their summer cottage, usually the only available option was even more expensive: Connecting to the network. Therefore investing in panels seemed to have been a very easy decision for these respondents.

Problems or dissatisfaction?

The respondents had very little to complain about. One respondent mentioned that the company taking care of the installation, was not skillful. Another respondent said that he would like to buy more panels but it is challenging because there is no guarantee that different manufacturers' equipment are compatible.

Satisfaction with the purchasing decision & reasons

All the respondents stated that they are **very** satisfied with their purchasing decision.

Many respondents justify their satisfaction by the fact that otherwise they would not have electricity at their summer cottage. Some of them also mentioned other things: panels are maintenance free, electricity is free of charge and there are no sudden electricity cuts.

However, one respondent mentioned that the weakest link is the battery where the electricity is being stored. The battery needs to be replaced by a new one every now and then.

Summary

Summary

- It is very common that the electricity costs are being considered significant for the household's budget, especially by those with high electricity consumption.
- The respondents in general are very interested in the energy issues and worried about the price development of electricity
- Wind power and solar power are considered to be good and environmental electricity production methods, but also with significant down sides: especially noise and harms to landscape (wind power), expensive price, inefficiency and dependency on the weather conditions.
- Majority of the households know quite little or almost nothing about households' own electricity production. One third knows quite a lot.

Households with no electricity production…

- 40 % have considered producing electricity
- On average the households would be prepared to pay 3721 € for the solar panels, most common answer being 4000 €.
- On average the households would expect max. 7,9 years repayment period for the solar panels, most common answer being 10 years.
- 16 % of the households think it is likely, and 59 % unlikely, that they would start small scale electricity production within 10 years.
- Main motives are willingness to save money in the long term and to increase domestic self-sufficiency of the electricity production.
- Easiness of maintenance and possibility to get the equipment as turnkey delivery are things to increase the interest of the households.
- Main concerns are too expensive price, inefficiency of the equipment and the required time, effort and knowledge in the purchasing stage.

Households already with their own electricity production…

- Most have purchased solar panels for their summer cottage
  - Main reason was the even more expensive alternative (connecting to the national network) → money saved.
  - The investment was usually profitable because it was compared to the costs of connecting to the network.
- The households have been very satisfied with their decision to purchase solar panels and have very little to complain about.

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Thank you!