WP 4 **Final Report**

4Biomass – Results of the Trans-national Stakeholder Dialogue

Evaluation of a Trans-national Stakeholder Survey on Political Framework and National Renewable Energy Action Plans

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1 Executive Summary

Between November 2009 and September 2010, biomass-stakeholders from eight Central European countries (Austria, Czech Republic, Germany, Hungary, Italy, Poland, Slovak Republic, Slovenia) were invited to express their respective opinion and assessment concerning the framework conditions of bioenergy, the national biomass action plans, measures and instruments for the support of bioenergy, the prospects and the most favourable markets of bioenergy deployment and the role of bioenergy in relation to the other renewable energy sources. The 1,221 experts who filled in the questionnaire, or at least parts of it, responded to a list of questions in national languages which were aligned among the eight national teams. This report refers to the answers to this set of identical questions. A second group of questions referring to specific national legislations and features has been evaluated separately, the particular national reports can be found on the 4biomass-website.

1.1 Evaluation of the National Biomass Action Plans (nBAPs)

The stakeholders´ rating of nBAP-targets and of the success rates of the countries in reaching these targets show that stakeholders endorse the nBAP´s targets, but remain sceptical about reaching them. Experts from Hungary and Poland are most critical on their nBAPs, experts from Czech Republic, Germany and Slovak Republic appreciate it. Regarding the likelihood of reaching the overall targets of their BAPs, significantly more experts think that their countries will not reach them, than think that they will reach them (40 % vs. 25 %). Experts from Austria and Hungary are particularly critical, German experts are most confident that the overall targets will be reached.

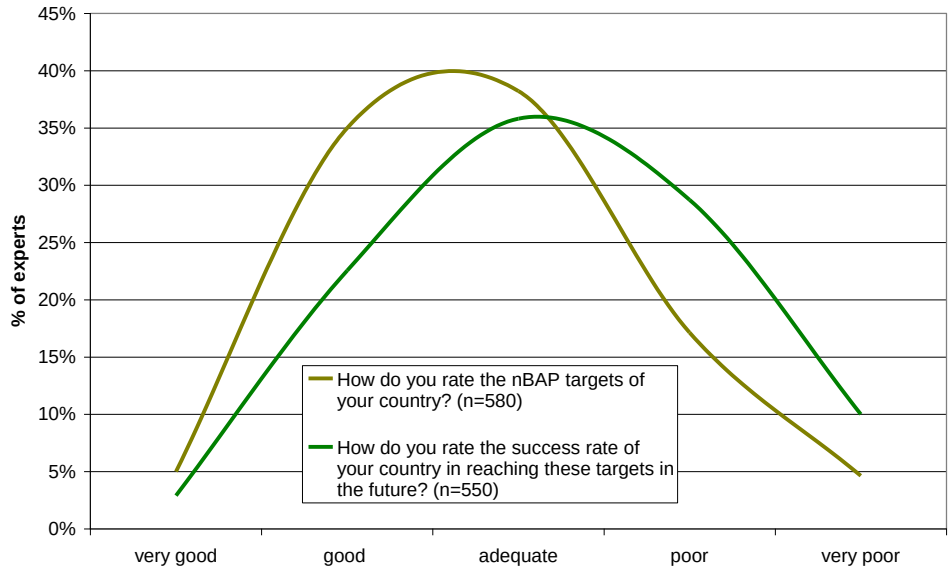
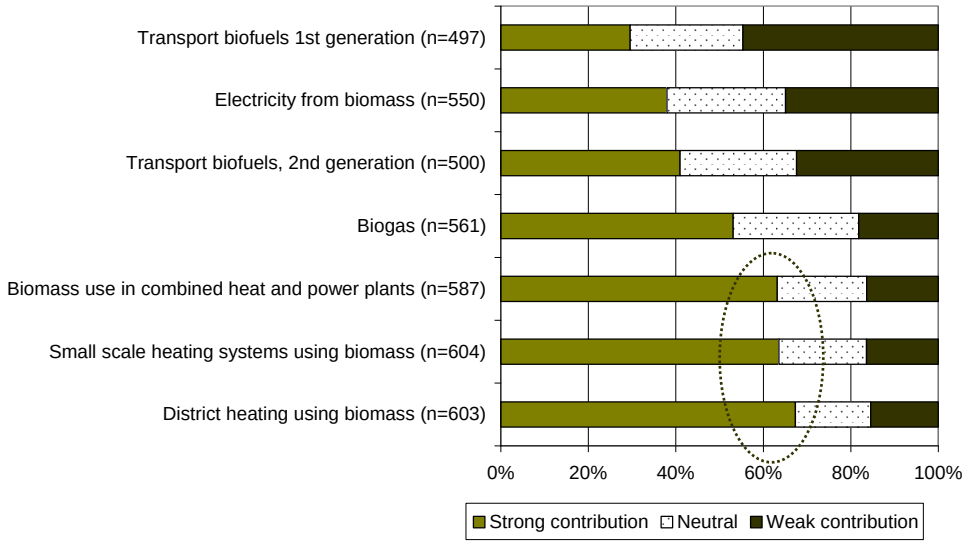


Figure *1*: Stakeholders´ rating of nBAPs targets and -success-rate

Experts working for governments or in the services sector are more frequently in favour of their action plans than the respondents engaged in associations or in companies. The support for the targets of the respective national BAPs by experts who work at the national or international levels is lower than by those working at a regional or local level. The same can be found regarding the estimation for reaching the targets of the respective action plans: the more internationally the experts are working, the more sceptical they are. Government- and policy experts acclaim the overall goals of their BAPs in general, yet do at the same time not see much chance in reaching those goals. Experts working for companies and associations are sceptical that the overall goals can be reached too, energy end-users, in contrast, are more optimistic.

1.2 Which goals to aim at?

Biomass for heat will most significantly contribute to reach the goals of nBAPs. This clear message keeps its significance throughout all participating countries and with respect to all sectors of stakeholders analyzed, it remains furthermore applicable if biomass is compared to the other renewable energy sources like wind and hydro (see 1.4).



Question: Which kind of biomass usage do you think is most important to achieve these aims? (1 = most important; 5 = least important) | Strong contribution = Categories 1 & 2, Neutral = Category 3, Weak contribution = Categories 4 & 5

Figure *2*: Importance of biomass to achieve the nBAPs-goals

1.3 Strategies for reaching the goals of the action plans

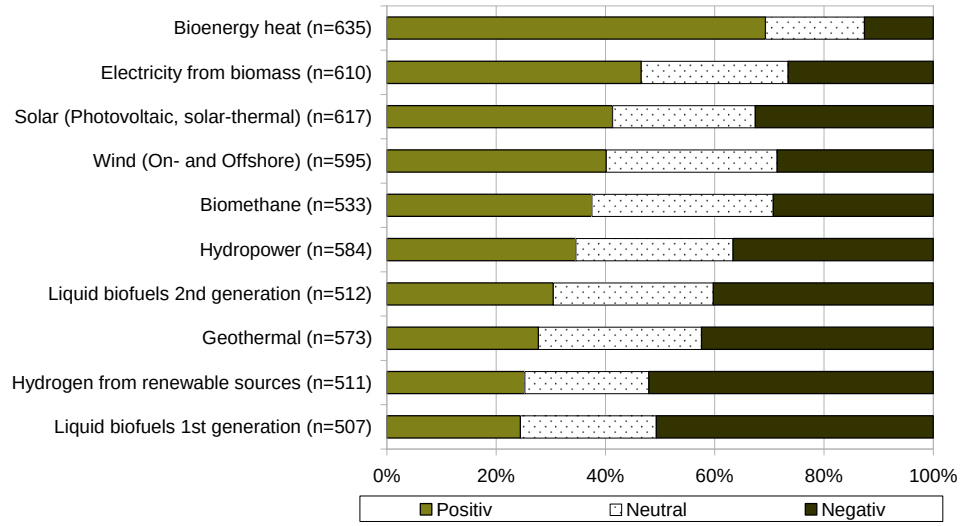
The experts´ assessment of the best strategies for reaching the goals of national BAPs differed according to the sectors electricity, heat and fuel.

- For electricity production, the most important measure is financial support, especially in the form of feed-in tariffs. Experts from Austria, Poland, Hungary and Slovak Republic particularly demanded higher feed-in tariffs.
- To reach the goals of the national BAPs in the area of heat, the experts argued that it is most important to reduce the costs for the "hardware" like stoves and boilers, to increase the availability of biomass and to give financial incentives for investments.
- The best way to support biofuels is to reduce the costs of their costs by tax exemptions, -reductions or refunds. It was also emphasised that the support of research and development is important in this area.

In some countries, notably Italy, Poland and Hungary, experts apprehend the low availability of national biomass resources in general.

1.4 Importance of renewable energy sources in the future

Heat from biomass will, even if compared to the other renewable energy sources, provide the most additional gain in primary energy supply for their respective countries in 2020, the stakeholders state. At the same time, however, 60 % of the respondents, final energy-users in particular, argue that heat from bioenergy will need more support for market introduction. The additional contribution to energy consumption by electricity from biomass was ranked second, followed by solar- and wind energy. Hydrogen from renewable sources and liquid biofuels of the first generation will, according to the consulted experts, provide the least additional gain in primary energy supply.



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Neutral = 3, Negative = 4 & 5

Figure 3: Additional gain in primary energy supply in 2020?

2 Introduction

The goal of the project "4Biomass" is to foster the sustainable use of renewable energy from biomass and to increase the share of renewables in the total primary energy supply in Central Europe.

The European Commission (EC) has established a template for National Renewable Energy Action Plans (nREAPs) under Directive 2009/28/EC. This directive required all Member States of the European Union to submit nREAPs to the EC by 30th of June 2010. National Biomass Action Plans (nBAP) form an important part of them.

As part of collecting information about the role of national Biomass Action Plans (nBAP), about strategies to reach the respective national goals and about the best support mechanisms for renewable energy sources, an online questionnaire was developed and a stakeholder-dialogue was started. The stakeholder dialogue was an opportunity for stakeholders to give feedback on the national action plans and a chance to directly recommend to policy makers on how to improve the design of bioenergy policy.

The following report contains the results of the stakeholder dialogue concerning political bioenergy frameworks.

2.1 Methodological approach

In order to conduct a qualitative assessment of stakeholders´ expectations and opinions on their national BAPs and REAPs, the preferable markets, and recommended technologies for the use of biomass, an online questionnaire was set up at the 4Biomass website. The questionnaire was developed by the Agency for Renewable Resources (Fachagentur Nachwachsende Rohstoffe e.V. FNR) and completed by the project partners in a stepwise approach. The completed questionnaire was translated into the national languages of the participating countries and was put online in November 2009. It was modestly adapted to the respective national requirements, but most of the questions were aligned throughout all countries.

Relevant stakeholders (companies concerned with bioenergy, associations, research institutes, individual experts, interest groups, etc.) have been contacted between

November 2009 and July 2010 in order to fill in the questionnaire. The online survey was closed in September 2010.

This report includes a detailed analysis of the outcome of the survey including recommendations for the design of bioenergy policy in Central Europe. The report only refers to the part of the questionnaire that was aligned throughout all participating countries. The answers referring to national questions exclusively (about 5 % of all questions), have been published in the national reports on the 4Biomass website[1].

3 Composition of respondents

In total, 1,221 persons participated in the survey. However, a large part of the respondents did not complete the entire questionnaire and skipped a range of questions. Therefore, the number of respondents differs from question to question.

3.1 Country of origin of experts

The largest group of respondents is from Germany with 213 experts (or 17 %), followed by Czech Republic (166 or 14 %), Austria (138 or 11 %), Slovak Republic (130 or 11 %) and Poland (124 or 10 %). Italy is represented by 117 persons (10 %), Slovenia by 115 experts (9 %) and Hungary by 90 (or 7 %). A group of 119 experts (or 10 %) did not tell their country of origin. Figure 4 shows the number of respondents according to their country of origin. The 9 experts (0.8 %) who responded "others" are neglected in the figure.

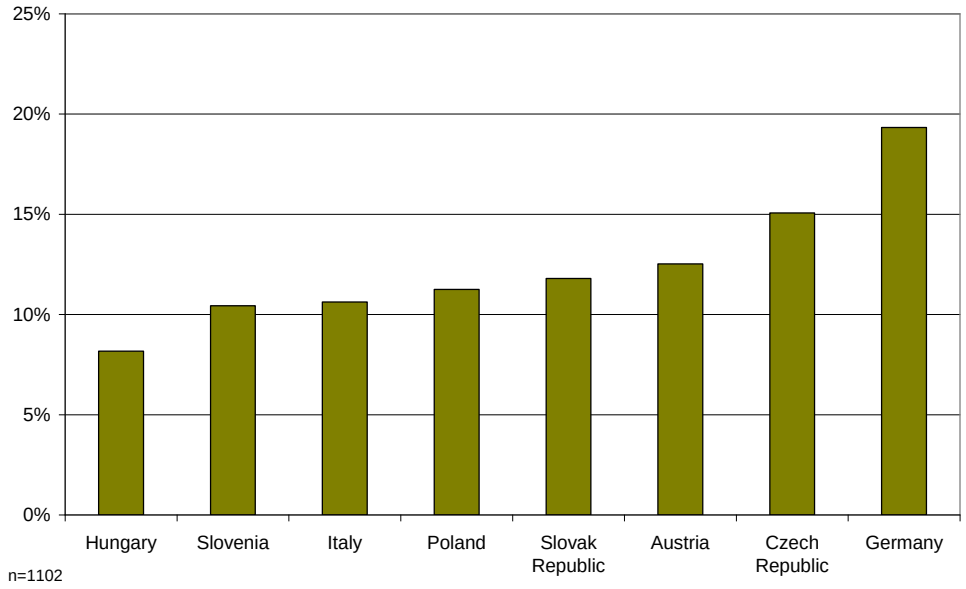


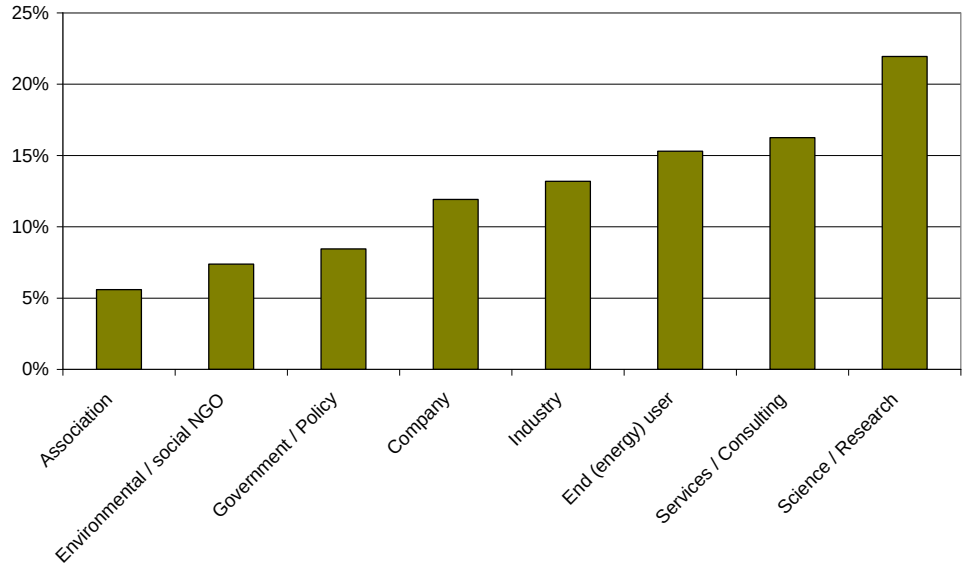
Figure *4*: Country of origin of experts in the survey

3.2 Professional background of experts

Regarding the professional background of the respondents, a slight bias towards science and research can be observed, which can be partly explained by the composition of the consortium of this project. The largest group of experts is from the science or research

[1] see http://www.4biomass.eu/en/publications

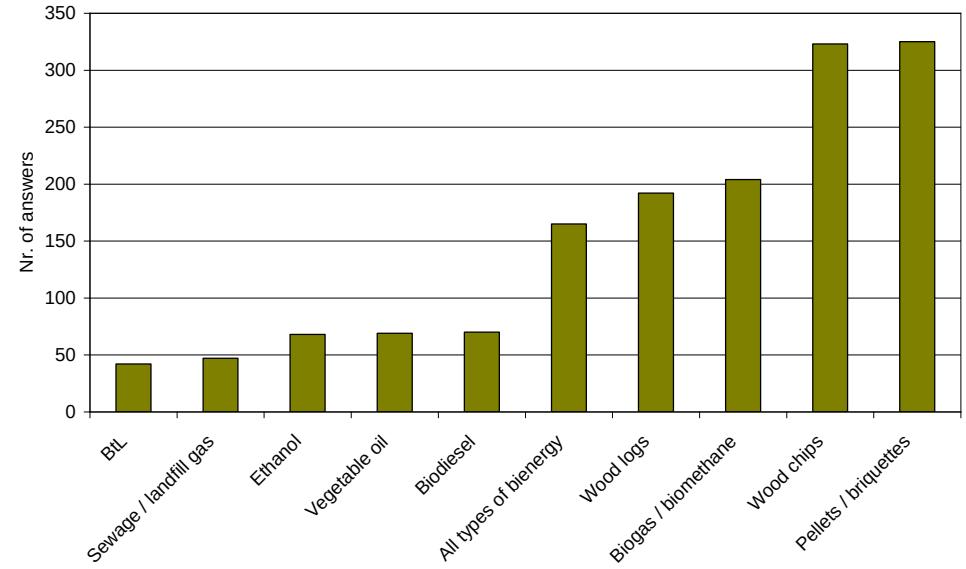
sector (208 experts or 22 %). The services and consulting sector is represented by 154 persons (or 16 %), followed by end (energy) users (145 persons), industry (125 persons) and company (113 persons) representatives (see Figure 5).



n=948 | Question: What is your primary area of (bioenergy) expertise?

Figure *5*: Primary area of (bioenergy) expertise

The predominant types of bioenergy represented by the participating experts are pellets/briquettes and wood chips, followed by biogas/bio-methane and wood-logs. 165 experts are engaged with more than one type of bioenergy (see Figure 6).

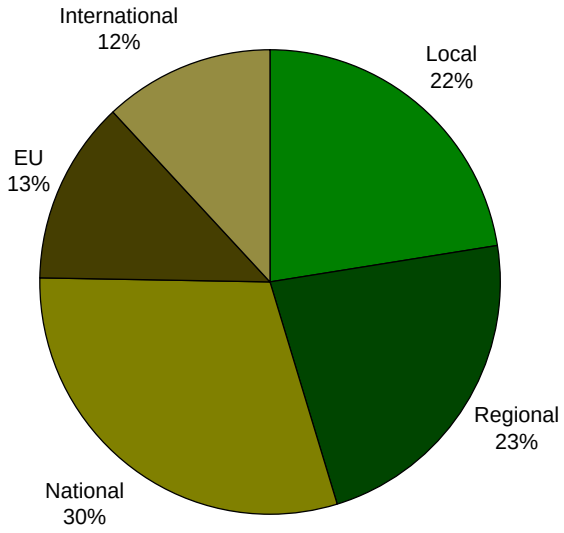


n=1221 (multiple answers possible) | Question: What is the typical type of bioenergy relating to your work?

Figure *6*: What is the typical type of bioenergy relating to your work?

3.3 Level of professional activity of experts

Regarding the level on which the experts primarily operate, the participants are divided roughly equally among the local, the regional, the national and the international /European levels. In absolute figures, most of the participating experts work on a national level (319), followed by those on regional (244) or local (240) level. Fewest are engaged on an international level (126 persons) (see Figure 7).



n=1067 | Question: On what scale do you primarily

Figure *7: On what scale do you primarily operate?*

4 Appraisal of national Biomass Action Plans (nBAP)

The various national BAPs present proposals for the use of biomass for heat, electricity and as a fuel. Stakeholders were asked to evaluate the overall goals of the respective national BAPs and the likely rate of success for reaching the goals of the plans until 2020.

Figure 8 shows that the experts rated the targets of the BAPs more positively than the probability of reaching those targets. The chapters below illustrate the outcome in greater detail.

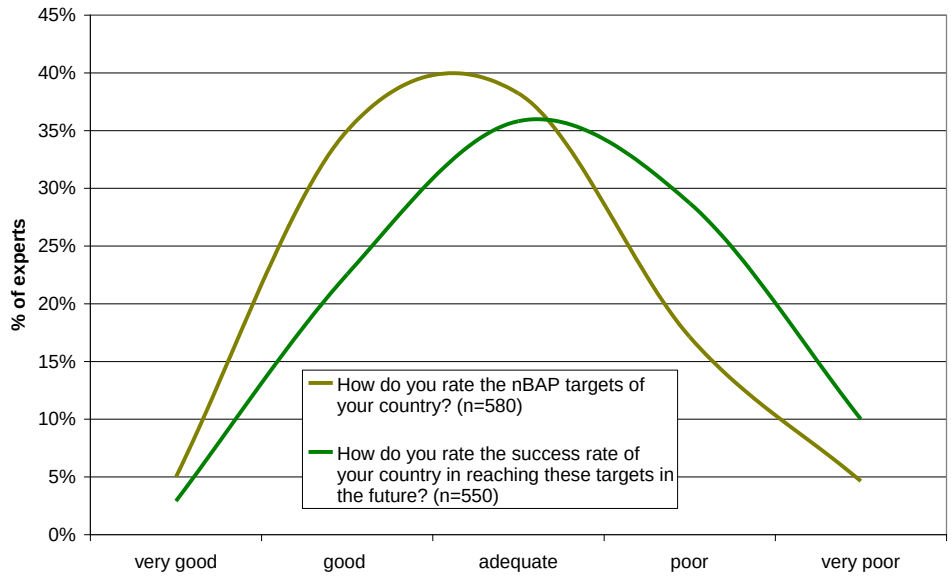
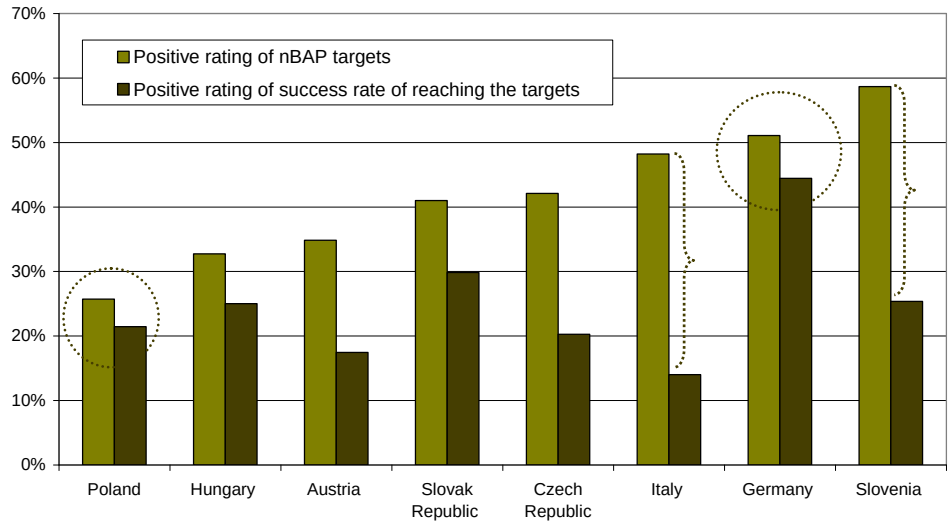


Figure *8*: Rating of goals vs. reaching these goals

Figure 9 indicates that especially in Italy and Slovenia there are large differences between highly valued targets of BAPs and lowly rated probabilities of success. The interpretation is, that the targets in these countries could be too ambitious. In particular

in Germany there is a high correlation between the approval of the targets and the probability of success. In Poland, in turn, both the targets and the probability of success were regarded by the experts being poor.



Positive = "very good" and "good" | Questions: How do you rate the nBAP targets of your country? (n=580); How do you rate the success rate of your country in reaching these targets in the future? (n=550)

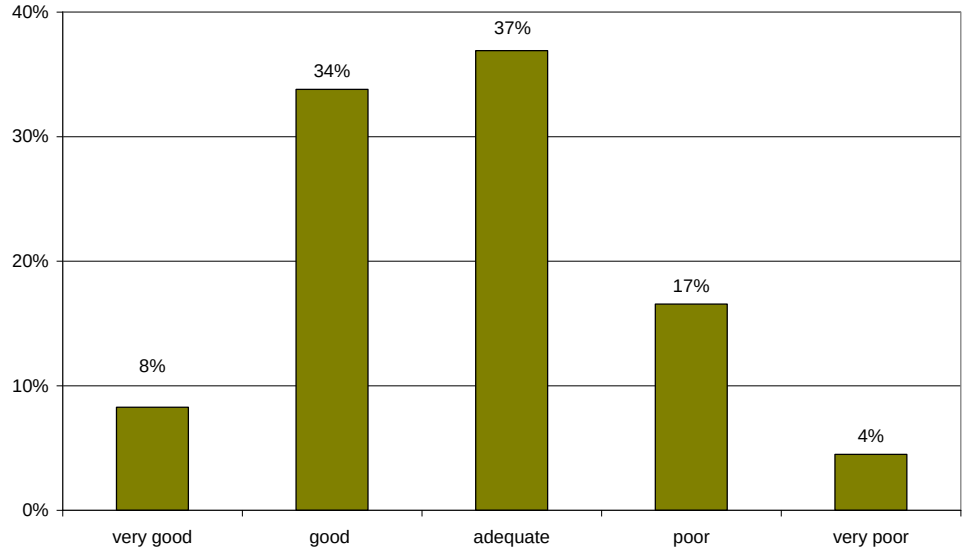
Figure 9: Positive ratings of targets of BAPs vs. rating of success rate of reaching the targets

4.1 Evaluation of the overall goals of the national BAPs

The stakeholders were asked to rate the overall goals of their nBAPs.

4.1.1 Overall results

Overall, more respondents are sceptical than supportive of their respective national BAPs. Experts from Hungary and Poland are most critical, experts from Czech Republic, Germany and the Slovak Republic are most well-meaning about their national action plans.



n=580 | Question: How do you rate the nBAP targets of your country?

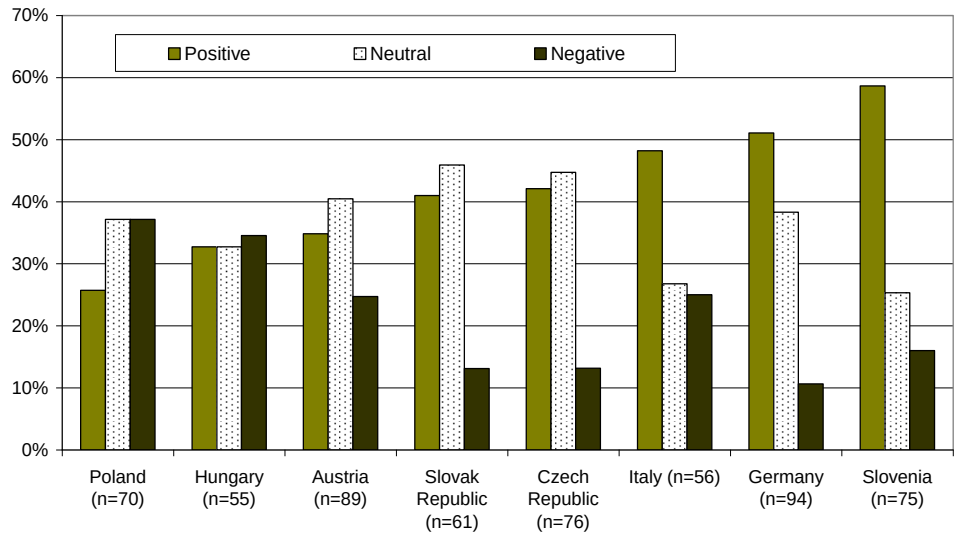
Figure *10*: How do you rate the nBAP targets of your country? (n=560, all countries)

More than one third (37 %) of stakeholders rate the national BAPs adequate, 42 % of them good or very good and only a fifth rate them poor or very poor (22 %). The response rate for this particular question was higher than average. Around 50 % of respondents answered this question – other items have been answered by less than 25 % of the participants.

4.1.2 Country analysis

As shown in *Figure* 11 the national BAPs received the most positive ratings from experts from Italy, Germany and Slovenia, these results are significantly higher than in the rest of the investigated countries (around 50-60 % rate their nBAP positive, i.e. good or very good).

Experts from Poland, Hungary and Austria are more critical (Figure 11), most critical are those from Poland: 37 % of them regard the overall goals of their nBAPs as very poor or poor and only 26 % evaluate their nBAP very good or good.



n=580 (4 experts are from other countries) | Question: How do you rate the nBAP targets of your country? | Positive = very good & good, Neutral = adequate, Negative = poor & very poor

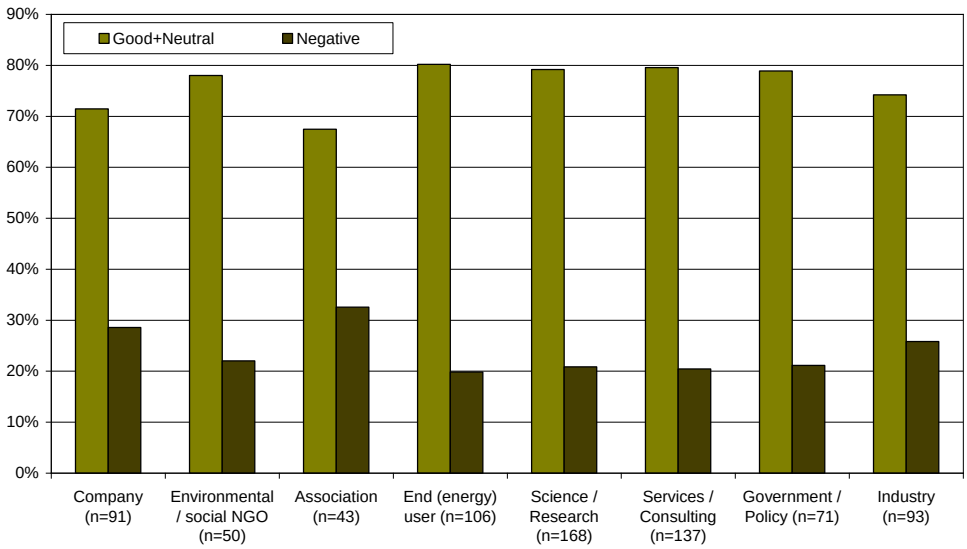
Figure *11*: How do you rate the nBAP targets of your country (country-specific analysis)?

4.1.3 Sectoral analysis

Figure 12 shows that experts from associations and companies are more sceptical than those others regarding the nBAP targets of their respective countries.

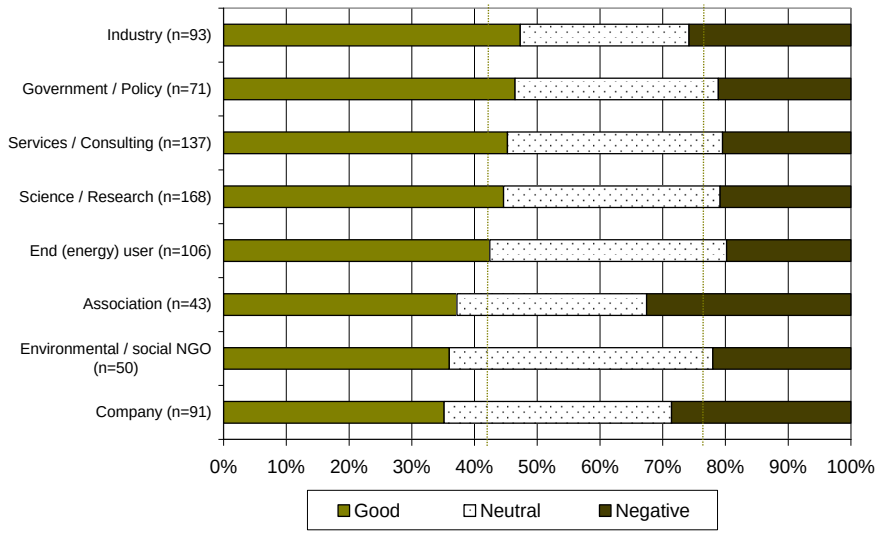
In Figure 13, the approval rate is displayed per sector and according to positive, neutral and negative responses. The category "positive" summarizes the answers given in the categories "very good" and "good", the category "neutral" summarizes the answers given in category "neutral", and "negative" means all answers given in the categories "poor" and "very poor".

There is a slightly different picture when the focus is on the "positive rate". The positive attitude (ratings "very good" and "good") towards the national BAPs is higher among experts who work for industry-, government/policy-, in the services/consulting- and in the science/research sectors. 47 % of the respondents who are employed either in the industrial sector or in government/policy, rate their national BAPs very good or good, as do 45 % of the respondents employed in the service/consulting sector. The national BAPs got the lowest positive ratings from respondents engaged in companies, NGOs and associations.



Question: How do you rate the nBAP targets of your country? | Good+Neutal = very good, good & adequate, Negative = poor & very poor

Figure *12*: How do you rate the nBAP targets of your country (divided between sectors)?



Question: How do you rate the nBAP targets of your country? | Please note that the question about the professional activity of experts allowed multiple answers. The total number of responses in the sectoral analysis (n=759) therefore differs from the total number of responses in the country-specific analysis (n=580) | Positive = very good & good, Neutral = adequate, Negative = poor & very poor.

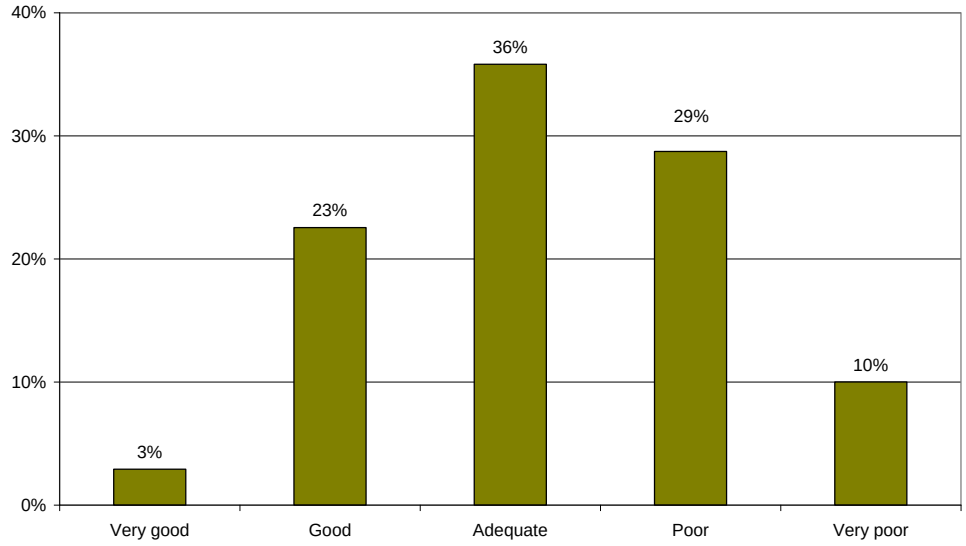
Figure *13*: How do you rate the nBAP targets of your country (good, neutral, negative)?

However, even those who work in the government sector, and who have generally a positive attitude towards the national BAP-targets, are not always content with the national action plans. The satisfaction depends on the area they are engaged in. It is mainly those engaged in research that support the national BAPs, followed by those engaged with agricultural issues. Least supporters are to be found among government employees working in the environmental sector.

In the service sector – also a sector whose employees mainly support the national BAPs – the professional background of employment (as shown in chapter 3.2) does not influence the rating of the nBAP.

4.2 Reaching the goals of the nBAP

4.2.1 Overall results



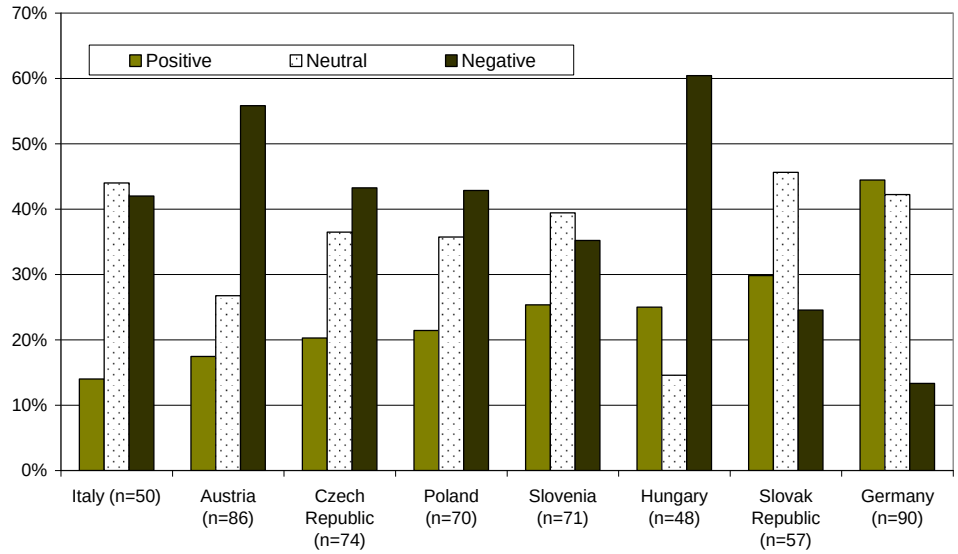
n=550 | Question: How do you rate the success rate of your country in reaching these targets in the future?

Figure *14*: Success rate of reaching the nBAP targets in the future

The interviewed experts evaluated the likelihood of reaching the goals of the respective national biomass action plans more sceptical than the targets themselves. In sum, an average of only one quarter (25 %) of the experts thought that it is likely that their country will reach the goals of the national BAP. Almost 40 % did not think their country will reach this goal ("poor", "very poor").

4.2.2 Country analysis

There were significant differences in the ratings of the success of the respective national



n=550 (4 experts are from other countries) | Question: How do you rate the success rate of your country in reaching these targets in the future? | Positive = very good & good, Neutral = adequate, Negative = poor & very poor

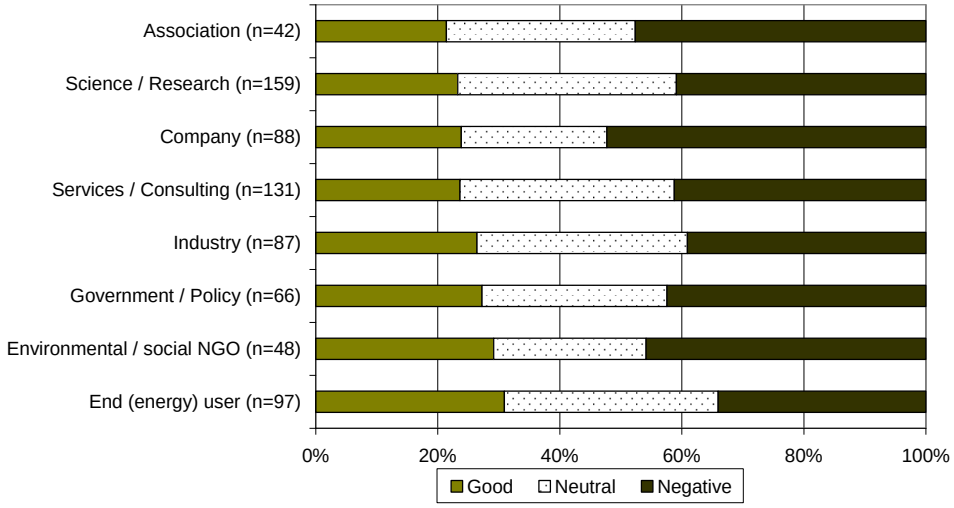
Figure *15*: Success rate of reaching the targets of the national biomass action plan in different countries (country-specific analysis)

BAPs according to the country of origin of the experts (Figure 15). The category "positive" summarizes the answers given in the categories "very good" and "good", the category "neutral" summarizes the answers given in category "neutral", and "negative" means all answers given in the categories "poor" and "very poor".

The confidence that the targets of the national biomass action plans will actually be achieved was by far the strongest in Germany (Figure 15). The Hungarian and Austrian experts were the least confident.

4.2.3 Sectoral analysis

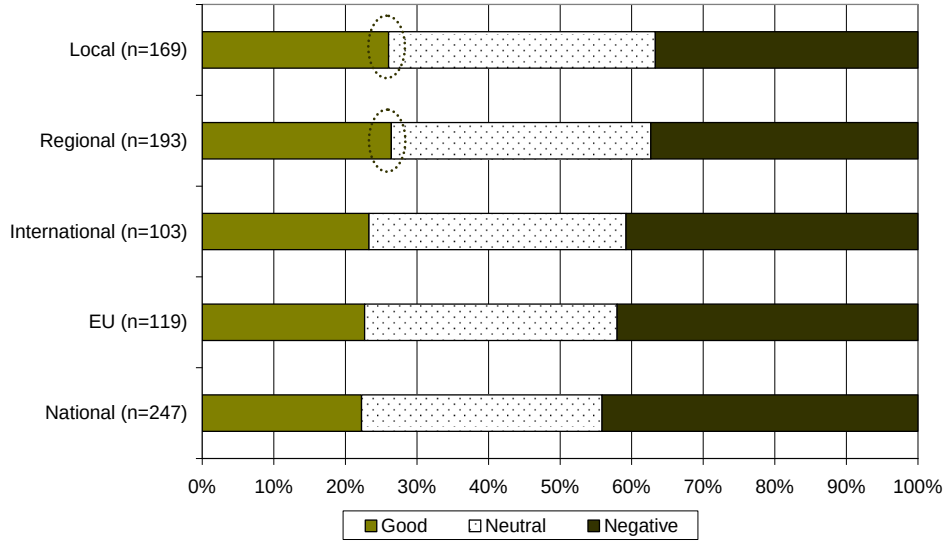
Experts working for companies had the least confidence that the goals of their national BAPs will be achieved (52 % negative response), followed by experts working for associations (48 % negative response). The most confident group regarding the probability to reach the goals are end (energy) users (31 % confidence) and NGOs (29 % confidence).



The question about the professional activity of experts allowed multiple answers. The total number of responses in the sectoral analysis (n=718) therefore differs from the total number of responses in the country-specific analysis (n=550) of this question. | Question: How do you rate the success rate of your country in reaching these targets in the future? | Positive = very good & good, Neutral = adequate, Negative = poor & very poor

Figure *16*: Success rate of reaching the targets of the national biomass action plan in different sectors (sectoral analysis)

The more international the level of operation of an expert (national, EU, international) the higher the doubt that the goals of the national BAPs will be reached. More than 40 % of national, EU and international experts doubt that the aims can be reached and less than 23 % believe that the aims can be reached. Experts engaged on a local or regional level are more confident to meet the goals (both 26 %). However, the differences in the responses of the different groups were not very significant.



n=831 (the question allowed multiple answers) | Question: How do you rate the success rate of your country in reaching these targets in the future? | Positive = very good & good, Neutral = adequate, Negative = poor & very poor

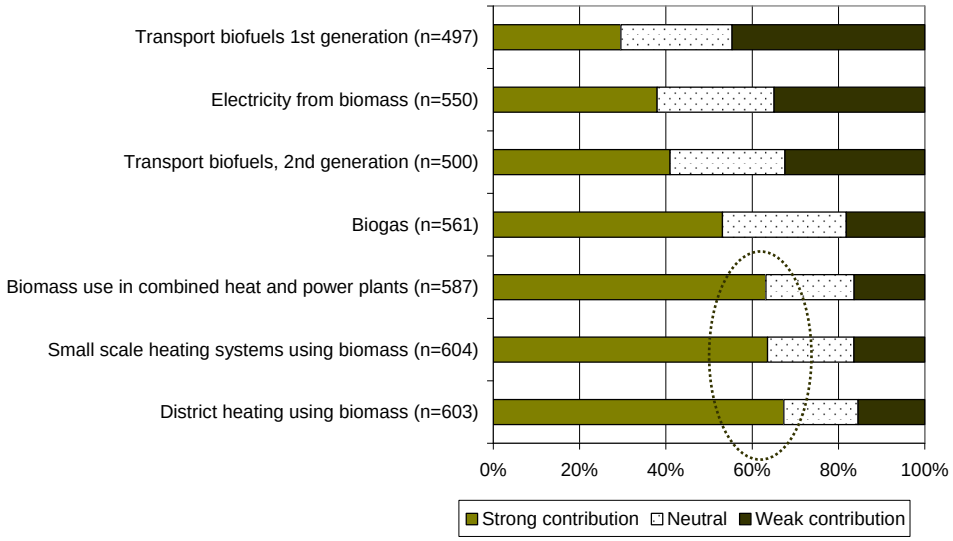
Figure *17*: Success rate of reaching the targets of the national biomass action plan (level of operation)

4.3 Which kind of biomass-usage will contribute to the goals of the national BAP

Which kind of biomass usage will be most important to achieve the aims of the national BAP? As a general pattern, biomass-technologies for heat generation are evaluated as being more important than those for electricity and transport. This result is consistent with the results of other responses in this survey (see, e.g. chapter 5.1).

Stakeholders argue that renewables for heat are the most important for reaching the BAP targets.

More than two thirds of the respondents argue that biomass usage in district heating will provide the most significant contribution (Figure 18) in order to achieve the goals of their national BAP.



Question: Which kind of biomass usage do you think is most important to achieve these aims? (1 = most important; 5 = least important) | Strong contribution = Categories 1 & 2, Neutral = Category 3, Weak contribution = Categories 4 & 5

Figure *18*: Which kind of biomass technology do you think could preferably contribute to achieve BAP-goals?

Other important forms of biomass for reaching the aims of the national BAP are small scale heating systems using biomass, and biomass usage in combined heat and power plants.

Experts estimated that the contributions from transport biofuels (first generation even less than second generation) and electricity from biomass would contribute little to nBAPs (Figure 18)

The most significant reply, that biomass technologies for heat are the most important for reaching the BAP targets, remains valid with respect to different groups of experts. Table 1 provides an overview of experts´ opinions from different professional backgrounds concerning the question: which biomass-technologies will provide a strong contribution in achieving the targets of the national BAPs. The close-up supports the finding that district heating, small scale heating systems, and CHPs using biomass are regarded as the most important contributions. Table 9 in the Annex provides a detailed sectoral analysis.

Table *1*: Evaluation of which kind of biomass usage is important for reaching the targets of the nBAPs (sectoral analysis)

Strong contribution to achieve targets of nBAP [in %]	Industry	Comp.	Associat.	End user	Govt / Policy	Science / Research	Services / Consult.	NGO
Small scale heating systems using biomass	59%	52%	**88%**	**73%**	**70%**	**71%**	65%	**70%**
District heating using biomass	**62%**	**63%**	**65%**	**70%**	**73%**	**66%**	**67%**	**65%**
Biomass use in combined heat and power plants	**61%**	**68%**	55%	53%	64%	64%	**68%**	56%
Electricity from biomass	37%	52%	23%	41%	34%	40%	35%	33%
Biogas	60%	57%	48%	51%	60%	55%	58%	55%
Transport biofuels 1st generation	40%	29%	36%	34%	30%	28%	29%	28%
Transport biofuels, 2nd generation	38%	32%	54%	37%	50%	41%	38%	43%

Comment: In the question "Which kind of biomass usage do you think is most important to achieve these aims?" each kind of biomass could be indicated between 1 (most important) and 5 (least important). The percentages show the share of experts in different sectors that rate one specific kind of biomass as 1 (most important) or 2 (important).

4.4 The strategy for reaching the respective national biomass action plan goals

What are the most successful strategies for reaching the overall goals of the national BAPs? The action plans highlight different strategies to support the use of biomass in the sectors heat, electricity and fuel production. The participants of the survey were asked to rate the different measures to support or promote market implementation of bioenergy technologies and indicate the 5 most important measures (1 = most important) to support/promote market implementation of bioenergy technologies. The responses to these questions are presented below. The following categories were asked in the questionnaire (*Table* 2)

Table *2*: Please indicate the 5 most important measures to support/promote market implementation of bioenergy technologies for each category

Technologies	Improve product (hardware) quality
	Improve product (hardware) availability
	Reduce costs for products
	Others (please specify)
Biomass (fuel)	Increase biomass availability
	Implement quality standards for biomass
	Improve traceability of fuel imports
	Set biomass sustainability criteria & verification of compliance
	Others (please specify)
Financial incentives, legal frameworks	Tax exemptions/reductions/refunds
	Eco-taxation
	Financial support for investments
	Subsidies for production of biomass
	Capital grants
	Low interest loans
	Feed-in tarrifs
	Quota systems for Biofuels
	Premiumtariffs
	Tradeable certificates
	Legal obligations (e.g. share of 10 % renewables)
	Voluntary schemes
	Accelerate administrative licensing processes
	Improve legal processes
	Financial support for research/development
	Others (please specify)
Information, awareness raising	Information adressing the end consumers
	Information adressing policy makers
	Information adressing utilities, district heating operators
	Information adressing technology producers
	Trainings and certification of respective people
	Others (please specify)

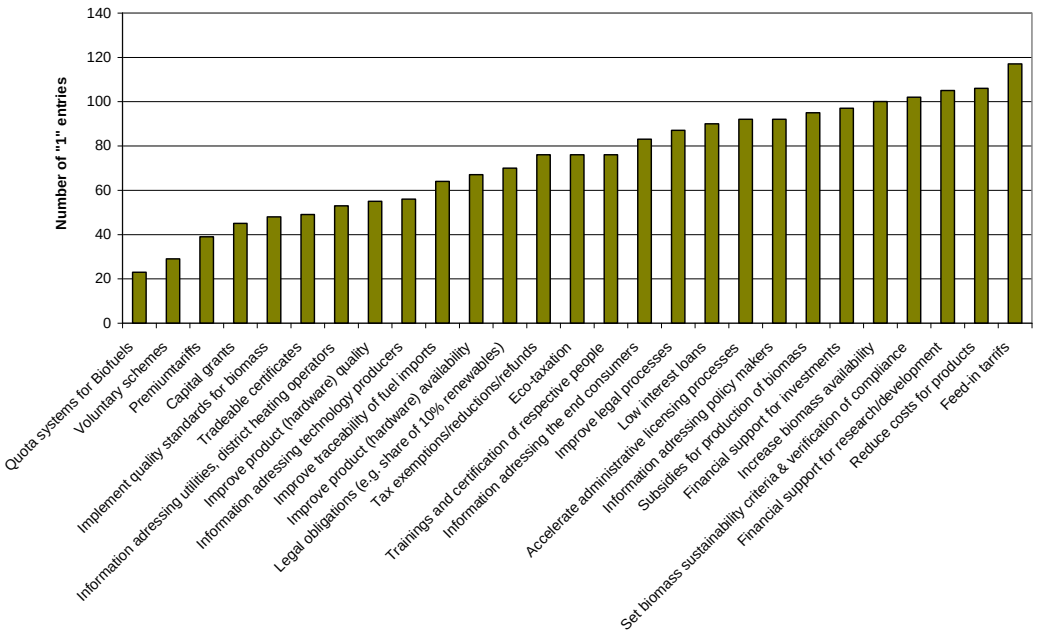
4.4.1 Biomass for electricity

To support the market integration of technologies for electricity production, the consulted experts consider feed-in tariffs, reduction of costs for products, and financial support for research and development most important. Least important to support market

integration are quota systems for biofuels, voluntary schemes and premium tariffs. Figure 19 provides a graphical overview of the number of "most important" entries (= '1') in each category. Financial support for investment received 97 "most important" entries and is, therefore, also relevant to the consulted experts.

Most important (entry 1) to support/promote market implementation of bioenergy technologies for electricity	Number of entries
Feed-in tarrifs	117
Reduce costs for products	106
Financial support for research/development	105
Set biomass sustainability criteria & verification of compliance	102
Increase biomass availability	100

Least important (entry 1) to support/promote market implementation of bioenergy technologies for electricity	Number of entries
Quota systems for Biofuels	23
Voluntary schemes	29
Premiumtariffs	39
Capital grants	45
Implement quality standards for biomass	48



Question: Please indicate the 5 most important measures (1 = most important) to support/promote market implementation of bioenergy technologies

Figure 19: Measures to support/promote market implementation of bioenergy technology for electricity

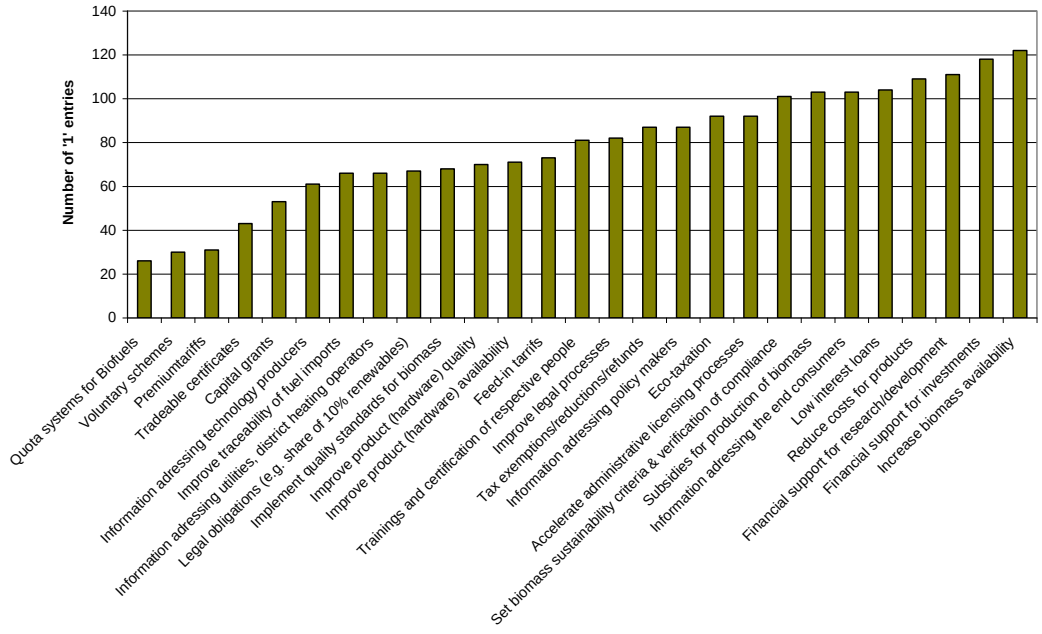
4.4.2 Biomass for heat

To reach the goals of the national BAPs in the area of heat, the experts argued that it is most important to increase biomass availability, provide financial support for investments and for research and development and reduce the costs for products (technologies).

Similar to the answers above, quota systems for biofuels (which is not necessarily relevant for heat and electricity generation), voluntary schemes and premium tariffs were not regarded as effective to support market implementation of technologies for heat.

Figure 20 provides a graphical overview of the number of "most important" entries (= '1') in each category for heat.

Most important (entry 1) to support/promote market implementation of bioenergy technologies for heat	Number of entries
Increase biomass availability	122
Financial support for investments	118
Financial support for research/development	111
Reduce costs for products	109
Low interest loans	104
Least important to support/promote market implementation of bioenergy technologies for heat	**Number of entries**
Quota systems for Biofuels	26
Voluntary schemes	30
Premiumtariffs	31
Tradeable certificates	43
Capital grants	53



Question: Please indicate the 5 most important measures (1 = most important) to support/promote market implementation of bioenergy technologies

Figure 20: Measures to support/promote market implementation of bioenergy technology for heat

4.4.3 Biofuels

To support the market implementation of biofuel technologies it is most important to reduce the costs for the products (technologies) and provide financial support for research and development. However, experts also argue that it is important to set sustainability criteria and verify the compliance of these criteria. Tax exemptions,

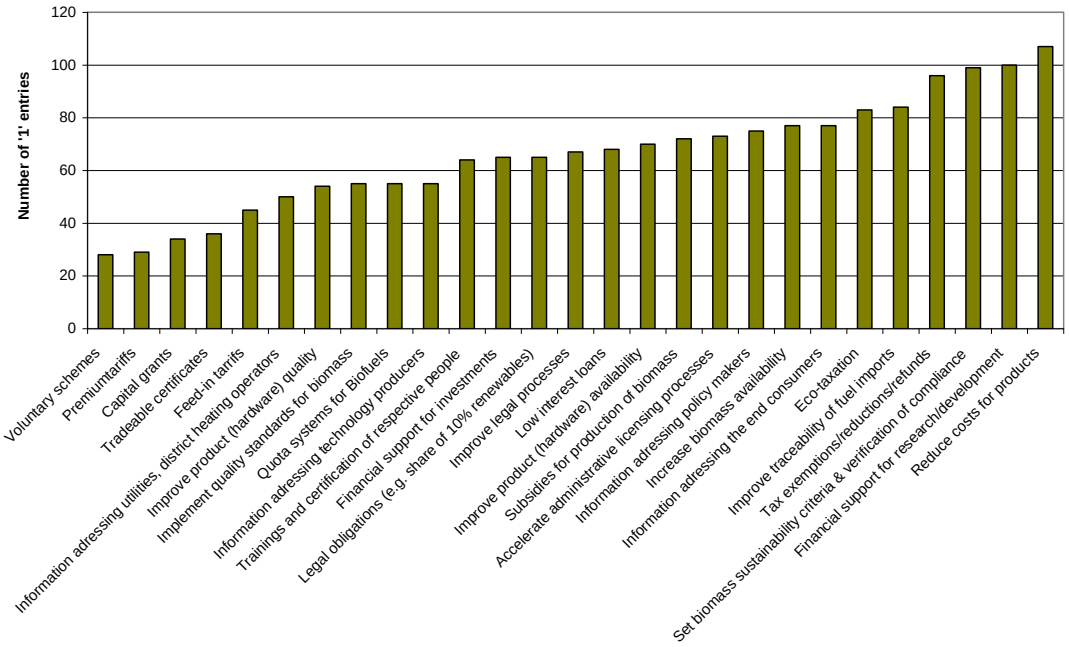
reductions, or refunds and a shift of the system of taxation towards eco-taxations are other measures that would support market implementation of biofuel technologies.

Again, voluntary schemes and premium tariffs do not seem to be adequate measures to support the market implementation of biofuel technologies, neither are capital grants or tradeable certificats.

Most important (entry 1) to support/promote market implementation of bioenergy technologies for biofuels	Number of entries
Reduce costs for products	107
Financial support for research/development	100
Set biomass sustainability criteria & verification of compliance	99
Tax exemptions/reductions/refunds	96
Eco-taxation	83

Least important to support/promote market implementation of bioenergy technologies for biofuels	Number of entries
Voluntary schemes	28
Premium tariffs	29
Capital grants	34
Tradable certificates	36
Feed-in tariffs	45

Figure 21 provides a graphical overview of the number of "most important" entries (= '1') in each category for biofuel technologies.



Question: Please indicate the 5 most important measures (1 = most important) to support/promote market implementation of bioenergy technologies

Figure 21: Measures to support/promote market implementation of bioenergy technology for biofuels

5 Biomass and other Renewables

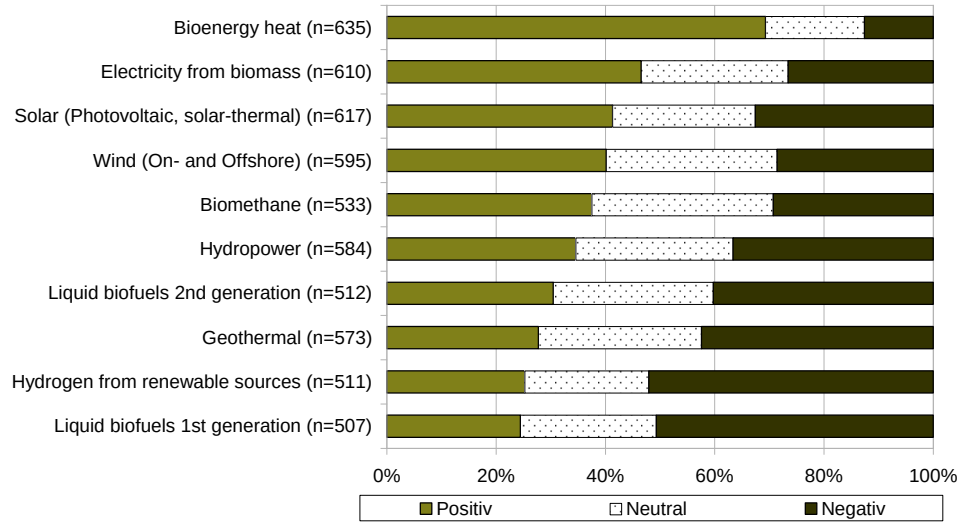
The set of responses discussed in the following tried to answer the question: "Which kind of renewable energies will have the highest contribution in primary energy consumption in 2020, and which need public support?" The objective of this question was to discover trends in renewable energy consumption.

5.1 Which renewables could provide most additional gain in primary energy supply of your country in 2020?

The overall data provide a clear picture about experts´ assessments regarding the potential of renewables until 2020: Most stakeholders believed that heat from biomass will provide most additional gain in primary energy supply for their country in 2020. 69 % of the respondents (that is 440 answers in absolute terms) saw most or some additional gain from bioenergy heat which had the lowest neutral and negative responses. Electricity (CHP) from biomass was ranked second (47 % or 284 approvals), followed by solar (41 % or 255 approvals) and wind energy (40 % or 239 approvals). Hydrogen from renewable sources and liquid biofuels of the first generation received the strongest disapproval rates (52 % and 51 %, respectively, see little or least additional gains from this energy sources for primary energy consumption in 2020), followed by geothermal energy and liquid biofuels of the second generation (42 % and 40 % disapproval, respectively).

Heat from biomass will provide the most additional gain in primary energy supply in 2020

The detailed figures are listed in the Annex (chapter 8.3)



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Neutral = 3, Negative = 4 & 5

Figure 22: Which renewables could provide most additional gain in primary energy supply of your country in 2020?

The following sections provide an overview of the results for the different energy technologies. The analysis is differentiated according to occupational groups and countries. In order to improve the clarity of the graphs, only positive responses (answers 1 and 2 in the questionnaire) were included in the country analysis. All data are listed in the appendix.

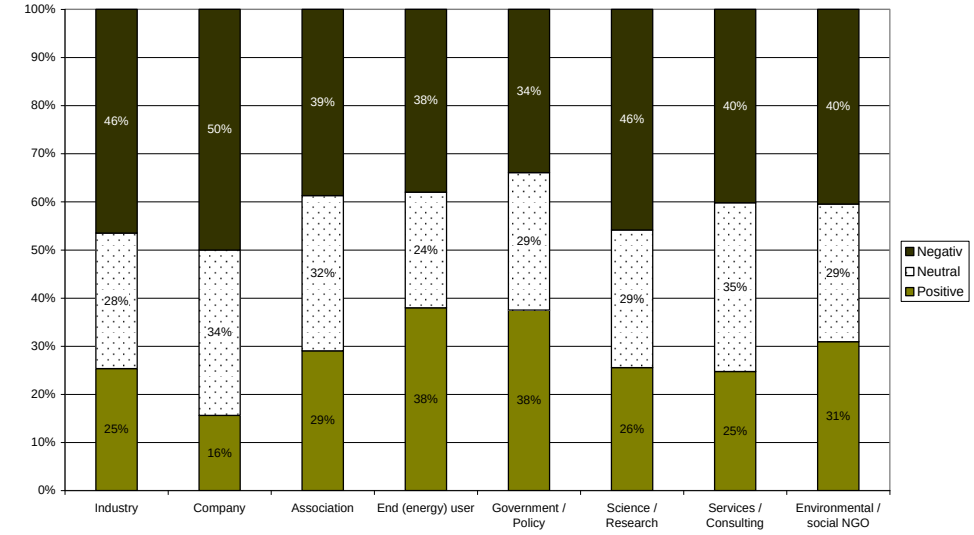
5.1.1 Energy Technologies

5.1.1.1 Geothermal

According to the biomass-stakeholders, geothermal energy will only play a limited role for primary energy supply in 2020. Only 28 % of all respondents (n=573) saw some or most additional gain from this energy source. Overall, only liquid biofuels of the first generation and hydrogen from renewable sources received lower rates.

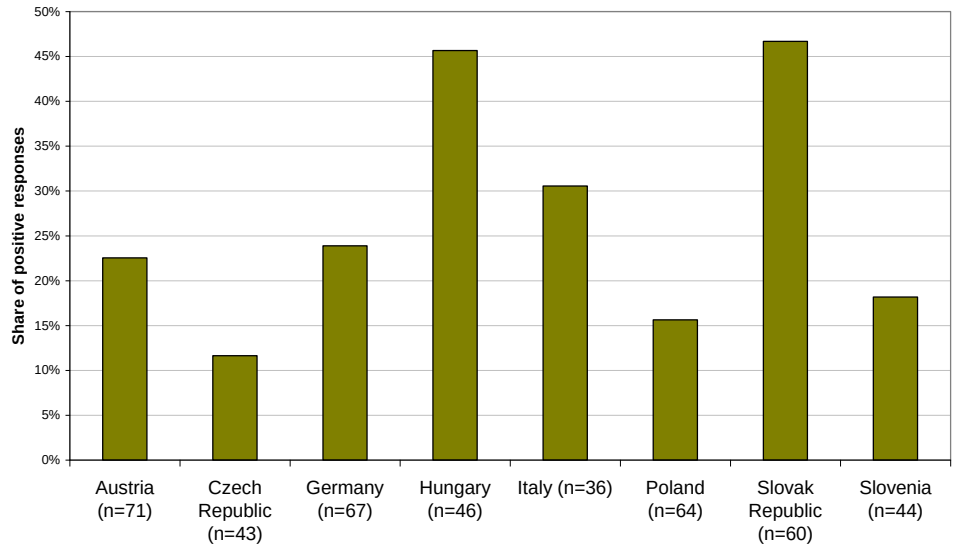
End-users and experts from governments, and policy-makers rated geothermal energy relatively most favorable (38 % see additional gains, respectively) whereas companies were the most critical group (only 16 % see additional gains and 50 % see only little or no additional gains from geothermal energy in their country in 2020).

Stakeholders in the Slovak Republic and Hungary see the greatest additional gain from renewables in primary energy supply in 2020. At the same time, experts from these countries strongly argue that geothermal energy needs support for market introduction in order to contribute according to the nREAP.



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *23*: Geothermal - additional gain in primary energy supply in 2020?



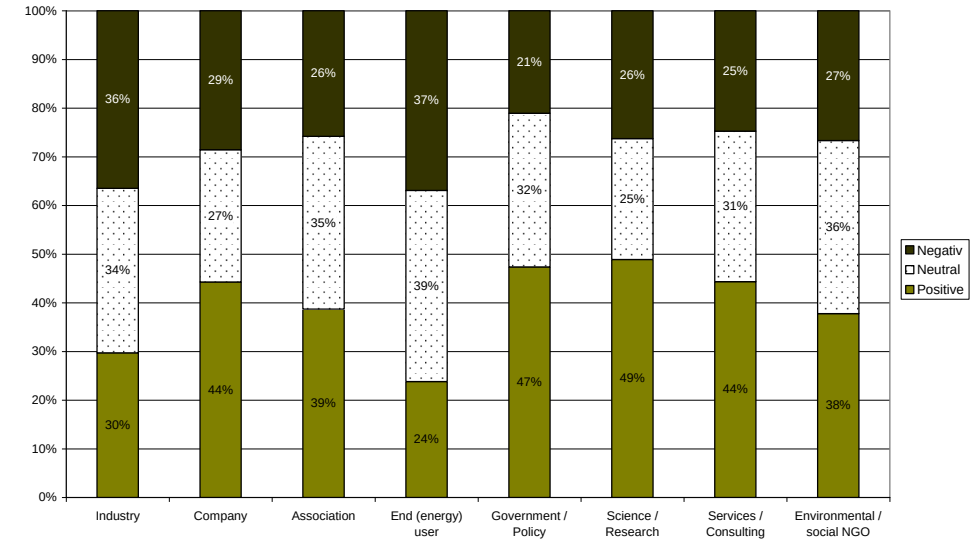
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 24: Geothermal – Positive responses to "additional gains", country analysis

Stakeholders in the Slovak Republic and Hungary see the greatest additional gain in primary energy supply in 2020 (Figure 24). At the same time, as will be shown later, experts from these countries strongly argue that geothermal energy needs support for market introduction in order to contribute according to the nREAP.

5.1.1.2 Wind Power (on- and offshore)

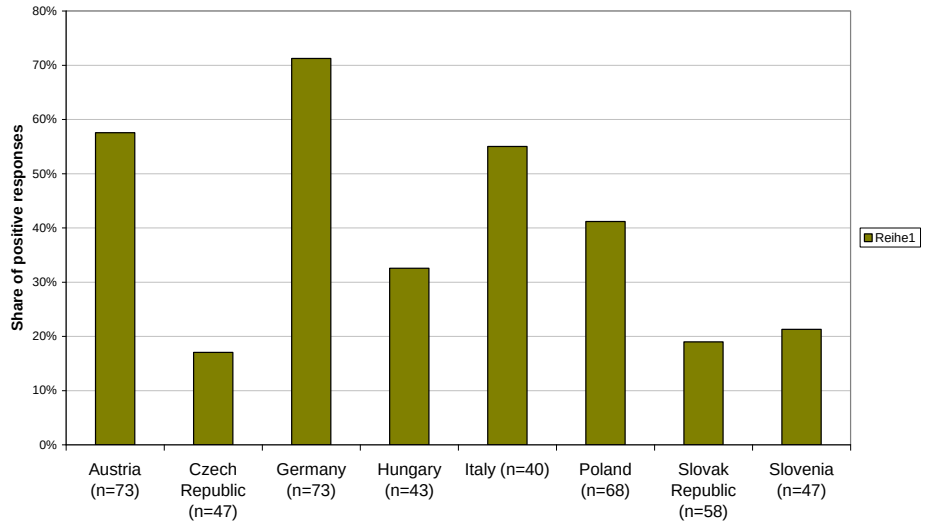
Overall, 40 % (n=595) see significant additional gains (most or some gains) from on- and offshore wind for primary energy production in 2020. Wind power was ranked forth in the list of renewables that provide additional gains to primary energy supply in 2020 (only behind bioenergy heat, electricity from biomass and solar). Scientists and public officials view wind power most positively (49 % and 47 % approval), in this group wind power received the second highest ranking only topped by heat from biomass. The strongest negative assessment was issued by industry and end-users (37 % and 36 % disapproval, respectively). The strongest indifferent answers were given by end-users and NGOs.



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *25*: Wind Energy (On- and Offshore) - additional gain in primary energy supply in 2020?

Stakeholders in Germany and Austria see the greatest additional gain in primary energy supply in 2020 (Figure 26).

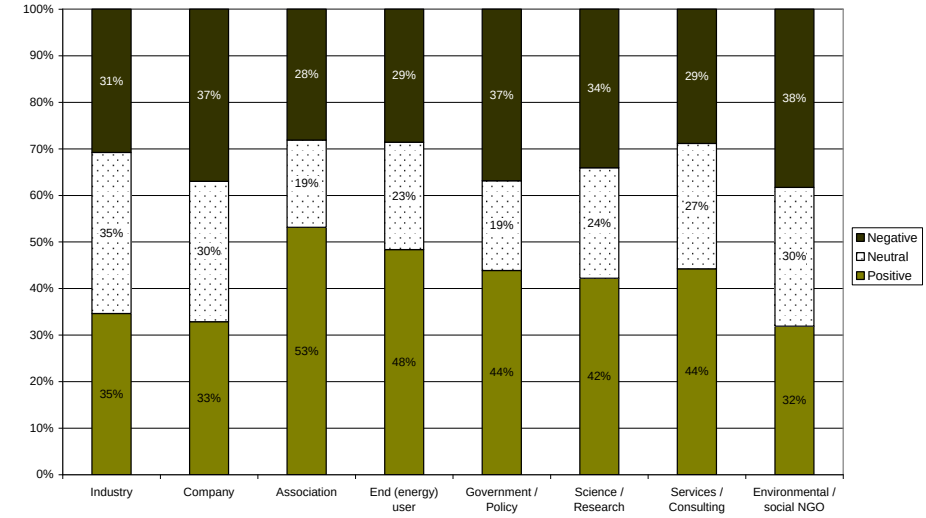


Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 26: Wind Energy (On- and Offshore) – Positive responses to "additional gains", country analysis

5.1.1.3 Solar (Photovoltaic, solar-thermal)

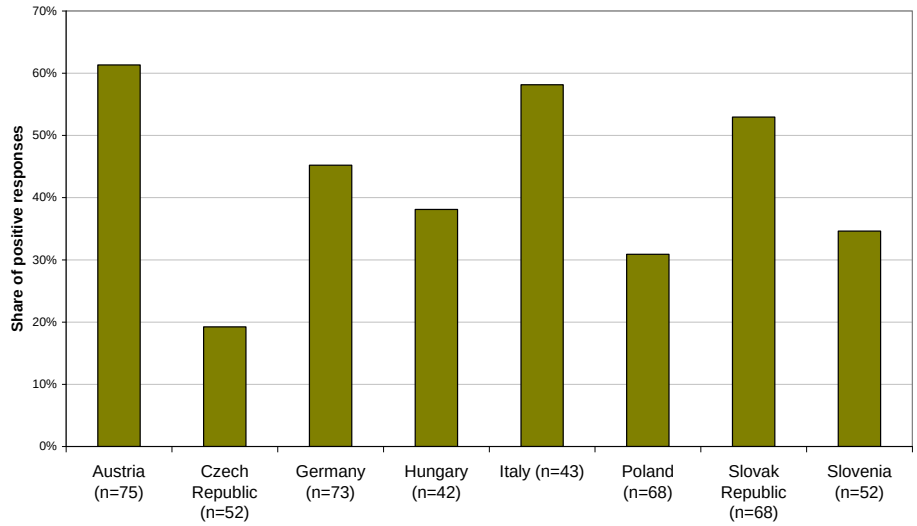
41 % of all respondents (n=617) saw most or some additional gain from solar energy for the primary energy supply of their country in 2020. The consulted stakeholders viewed solar energy as the third most important form of renewable energy. Associations and end-users were most favorable towards solar energy (53 % and 48 % approval, respectively) while environmental and social NGOs as well as companies issued only limited approval. Government officials and policy-makers were the group with the lowest indifference: 44 % saw some or most additional gains and 37 saw only little or least additional gains from solar energy.



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *27*: Solar (Photovoltaic, solar-thermal) - additional gain in primary energy supply in 2020?

Austria and Italy have the highest number of experts who expect additional contributions from solar energy for the primary energy supply in 2020 in their countries (Figure 28).



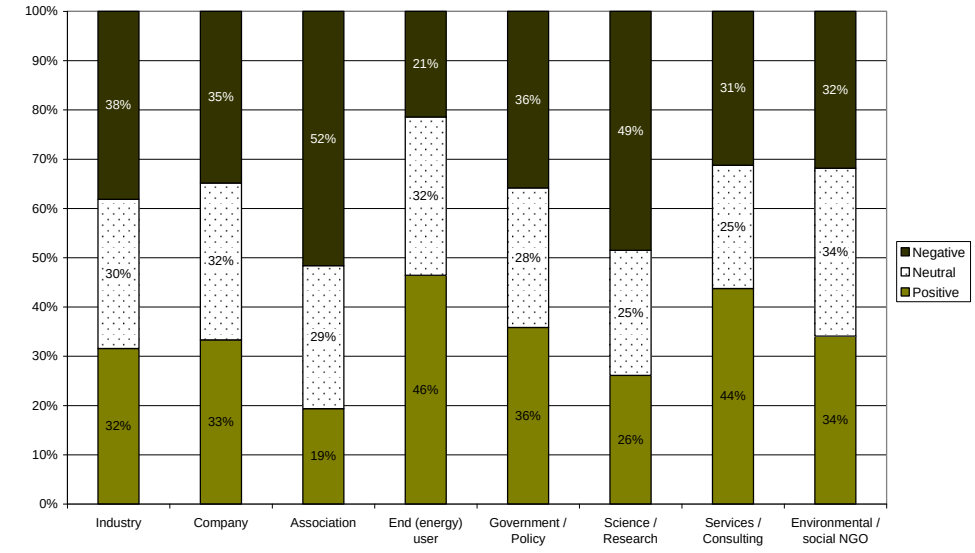
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 28: Solar (Photovoltaic, solar-thermal power plants) – Positive responses to "additional gains", country analysis

5.1.1.4 Hydropower

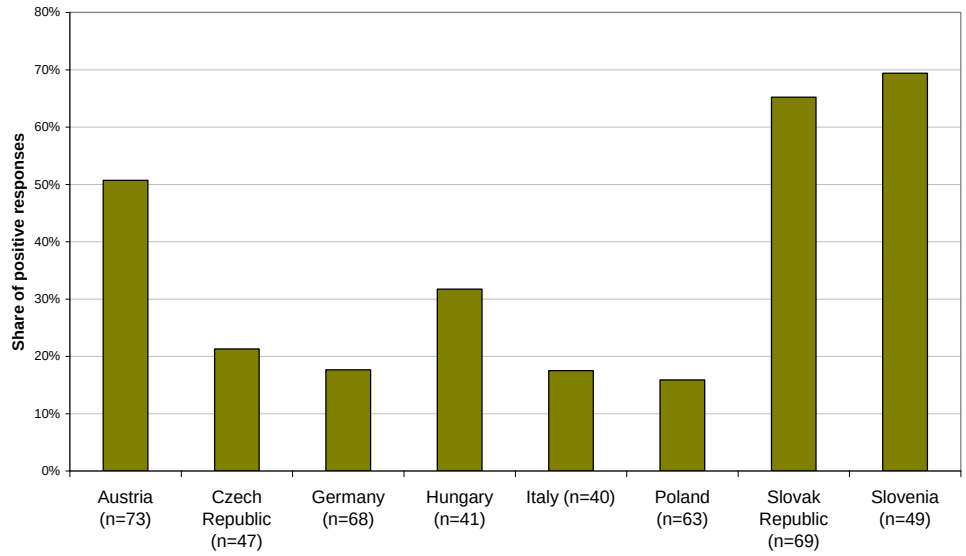
More respondents believed that there will be least or only limited gains (37 %) than believe that there will be a significant additional contribution (35 %) from hydropower for primary energy supply in 2020 (n=584). The reason for this might be that hydropower already plays a significant role in primary energy supply in various countries and additional gains are only difficult to materialize.

End-users, and services and consultant providers expected the greatest additional gains from hydropower (46 % and 44 %, respectively) while associations and researchers saw the least additional gains. From the 31 experts from associations only 6 saw any additional contribution from hydropower while the absolute majority (52 %) saw little or no additional gains. From 134 researchers only 35 (26 %) believe in additional gains. In the group of scientists and researchers hydropower received the third highest disapproval rates (only topped by hydrogen from renewables and biofuels of the first generation).



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *29*: Hydropower - additional gain in primary energy supply in 2020?



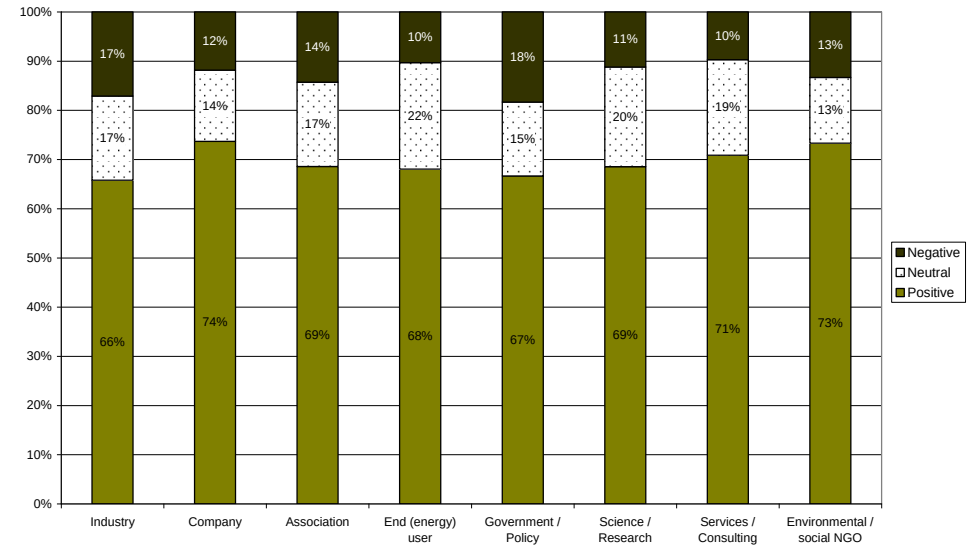
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 30: Hydropower – Positive responses to "additional gains", country analysis

In the Slovak Republic and Slovenia the number of experts that expect additional contributions from hydropower for primary energy supply in 2020 is by far the highest (Figure 30). Most of the experts in the other countries (with the exception of Austria) see only little additional contributions for hydropower.

5.1.1.5 Heat from Bioenergy

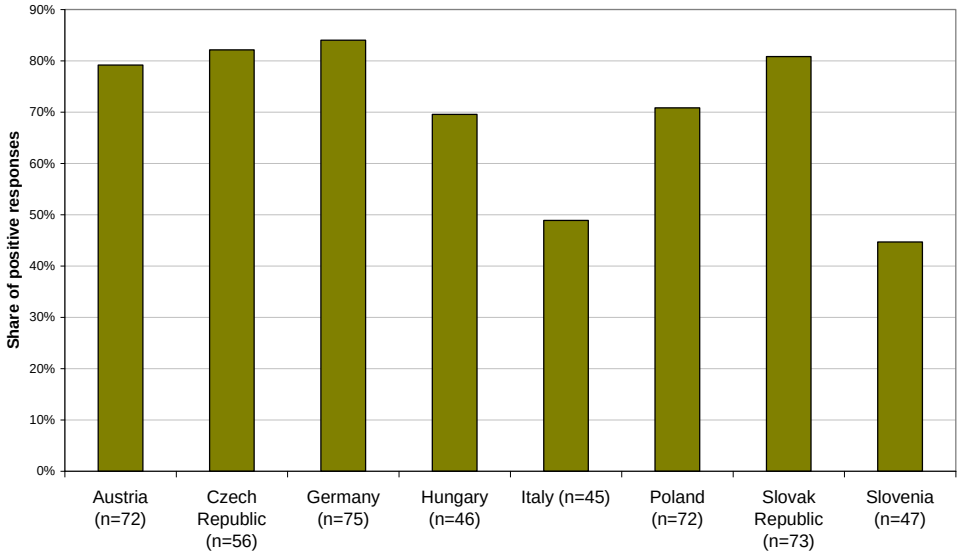
Most additional gains for primary energy supply in 2020 can be expected from bioenergy-heat (n=635). 69 % of the respondents believe that heat from biomass will have some or most additional growth rates. Only 13 % of all respondents saw no or only limited additional contributions. The approval of heat from bioenergy was uncontroversial across all different groups of stakeholders and among all states. In all groups, at least two thirds of all respondents saw a positive contribution. The disapproval rate was higher than average in the groups of experts from industry and governments. The highest approval rate can be found in the groups of company representatives and experts from environmental and social NGOs (74 % and 73 % respectively). In the group of experts from environmental and social NGOs 73 % of the respondents believed that bioenergy heat will provide much or some additional gain in primary energy supply in 2020, compared to 59 % for electricity from biomass, and 43 % of bio-methane. For all other renewable energy sources, less than 40 % of the experts (and down to 22 % in the case of hydrogen from renewable sources) believed that they will provide additional gains in 2020 for energy supply.



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *31*: Bioenergy heat - additional gain in primary energy supply in 2020?

There is widespread agreement among experts in different countries that bioenergy heat will contribute additionally to primary energy supply in 2020 (Figure 32). Only in Italy and Slovenia the figures are lower.

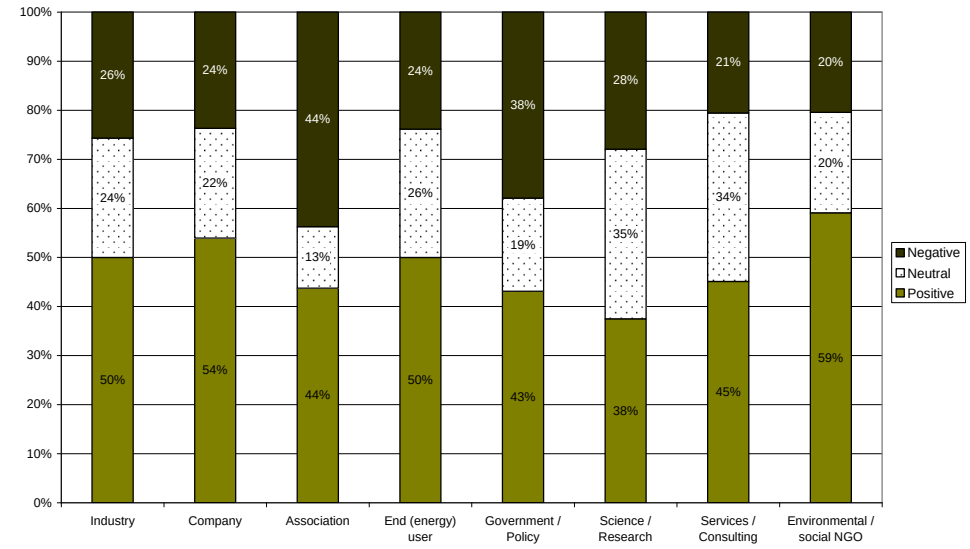


Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 32: Bioenergy heat – Positive responses to "additional gains", country analysis

5.1.1.6 Electricity from biomass

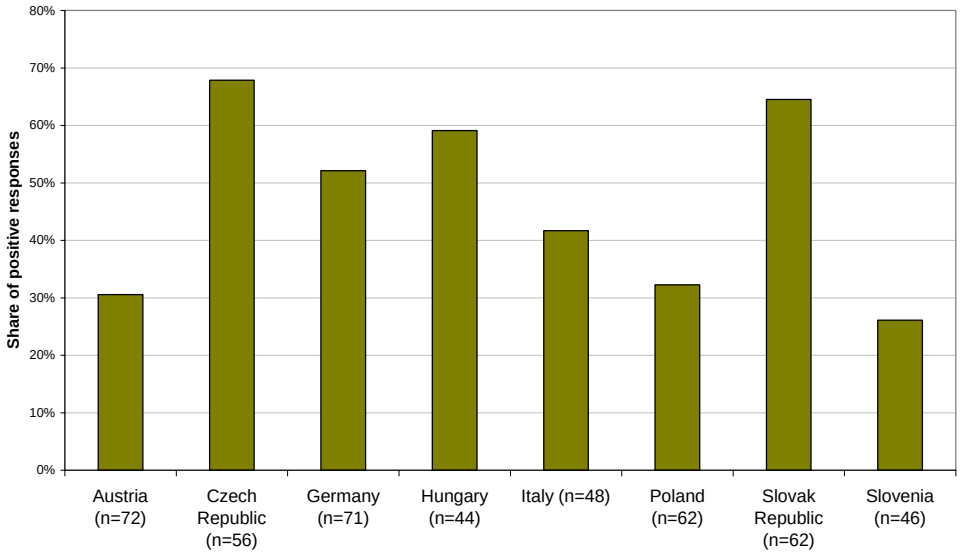
The contribution of biomass for electricity production (CHP) for energy supply in 2020 was estimated to be significantly lower than for heat (n=610). However, it will provide the second most additional gain to primary energy supply in 2020 according to the questioned experts. 47 % of all respondents believed that electricity from biomass will provide additional gains to energy supply (compared to 27 % neutral and 27 % who see no additional gains). NGOs and companies had the highest approval rates (59 % and 54 %, respectively). Two groups were significantly more sceptical than the rest: Government officials/policy-makers and associations (respective 38 % and 44 % believe that electricity from biomass will provide no additional contributions to energy supply in 2020).



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *33*: Electricity from biomass - additional gain in primary energy supply in 2020?

Whereas experts in Austria and Poland see only little additional gains for electricity from biomass for their primary energy supply, experts in the Czech Republic and Slovak Republic still see some potential (Figure 34).



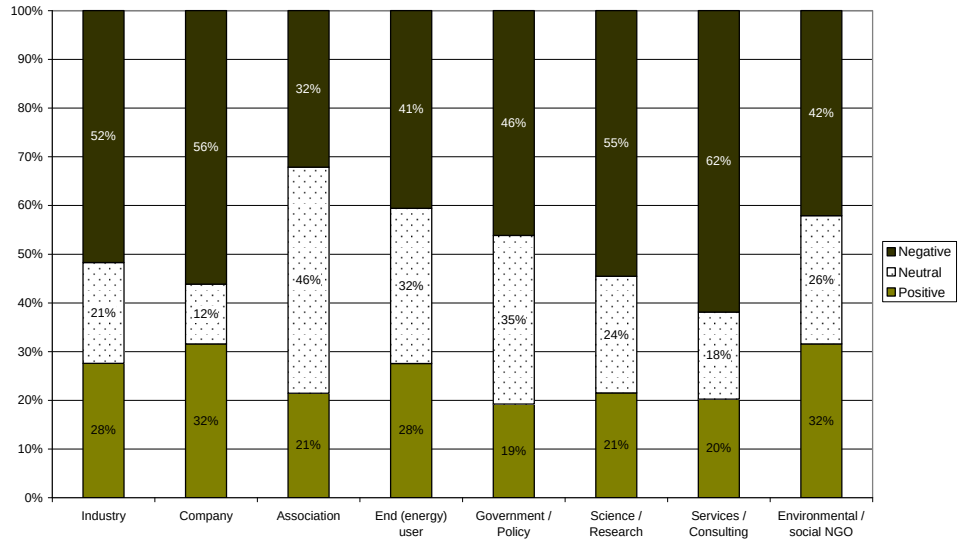
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 34: Electricity from biomass – Positive responses to "additional gains", country analysis

5.1.1.7 Liquid biofuels 1st / 2nd generation

Liquid biofuels will not be more important for primary energy supply in 2020 than they are today according to the results of the survey. While only 24 % (n=507) saw any additional contribution by liquid biofuels of the first generation, and 30 % expect an additional contribution of liquid biofuels of the second generation (n=512), 51 % rejected that claim in case of first generation biofuels and 40 % in case of second generation biofuels. The strongest disapproval for first generation biofuels was within experts from companies and services/consultants; the strongest disapproval of second generation biofuels could be found in the groups of services/consultants and researchers.

Both the approval rate and the disapproval rate of first generation biofuels was highest among company representatives. That is to say that companies are very clear about the future role of first generation biofuels but either believe in a positive role or strongly disagree. nsumption in 2020.

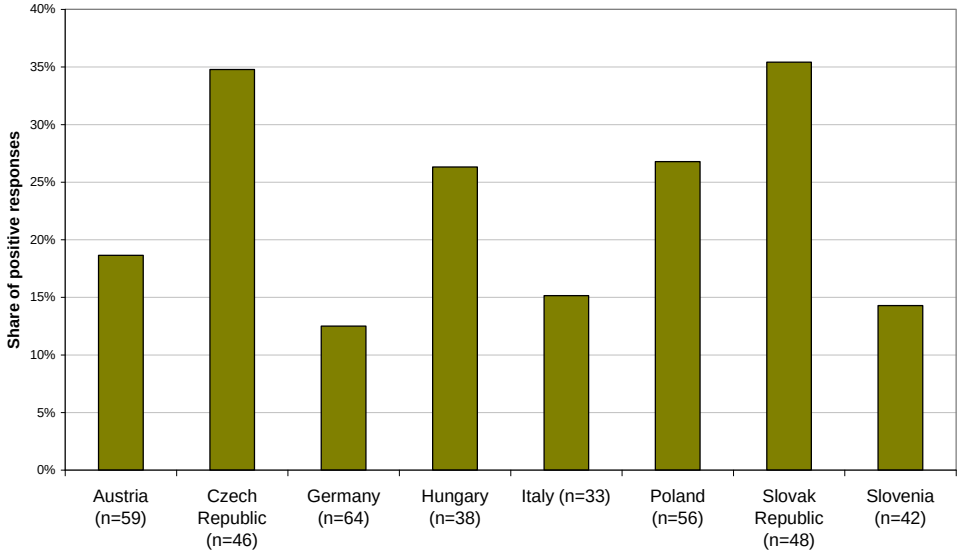


Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *35*: Liquid biofuels 1st generation - additional gain in primary energy supply in 2020?

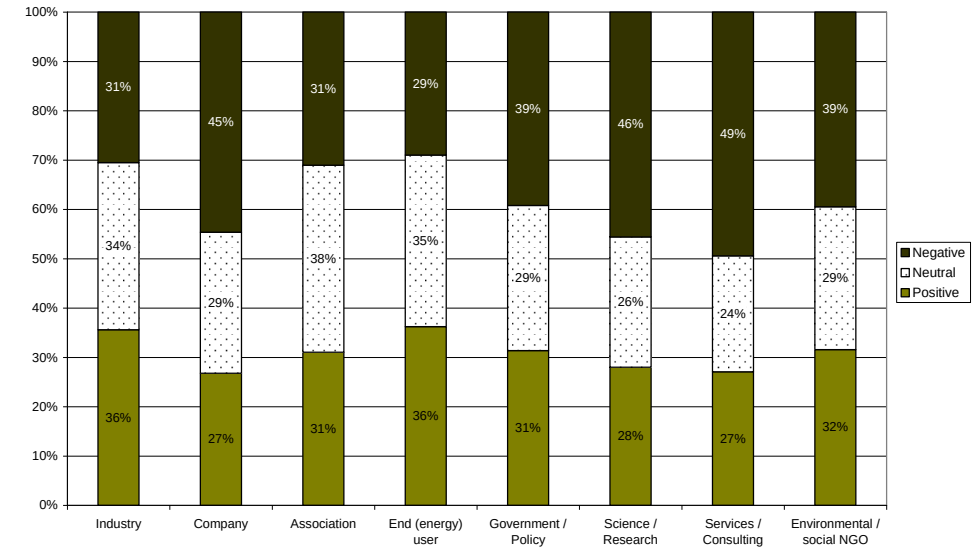
Second generation biofuels were much less controversial: only industry representatives and end-users believed in a significantly higher contribution than other groups. At the same time, the disapproval rate was lower and there are more people neutral about any additional contribution of second generation biofuels to primary energy.

Czech Republic and Slovak Republic have the highest number of experts who expect additional contributions from liquid biofuels of the first generation for the primary energy supply in their country in 2020 (Figure 36).



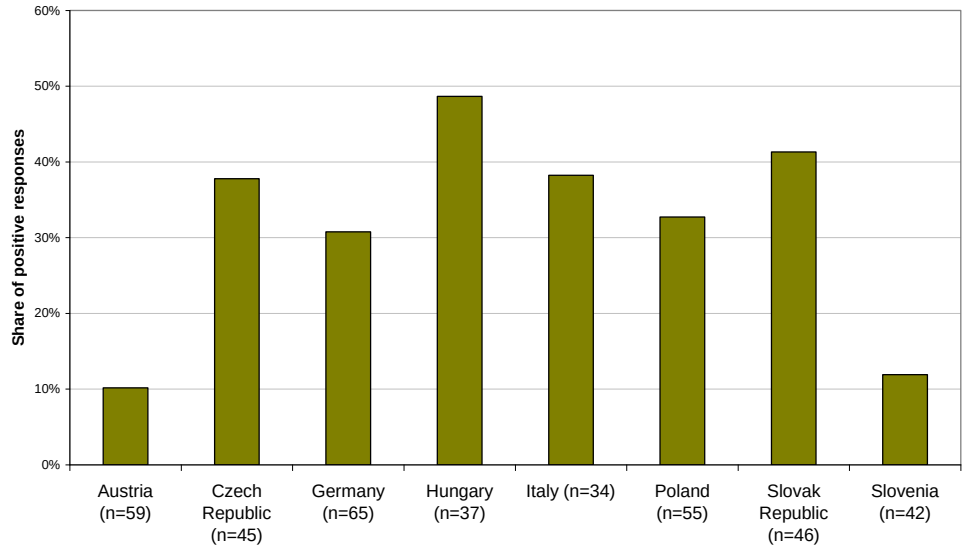
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 36: Liquid biofuels 1st generation – Positive responses to "additional gains", country analysis



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

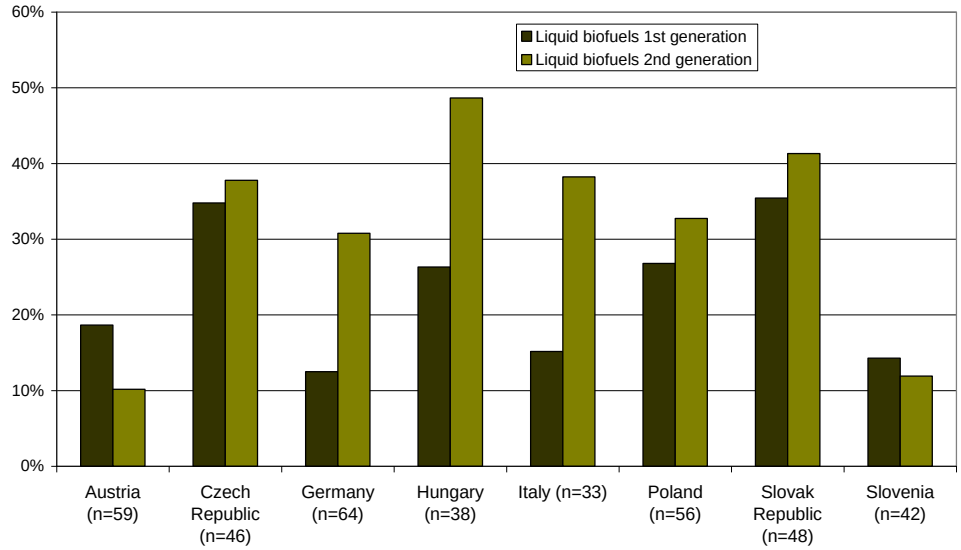
Figure *37*: Liquid biofuels 2nd generation- additional gain in primary energy supply in 2020?



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 38: Liquid biofuels 2nd generation – Positive responses to "additional gains", country analysis

Experts in most countries tend to rate biofuels of the second generation as more important for additional contributions for primary energy supply than biofuels of the first generation (Figure 39).

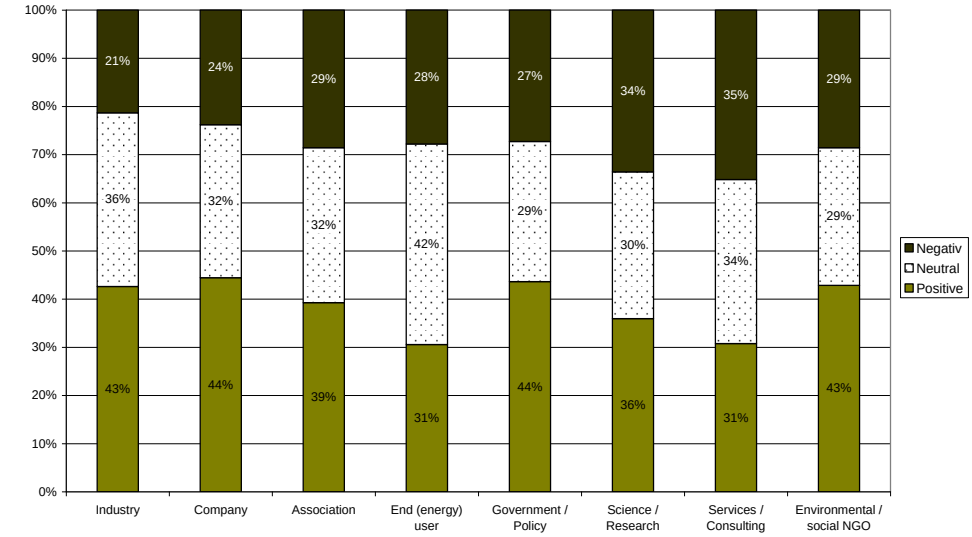


Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 39: Liquid biofuels - comparison between positive responses to "additional gains" between 1st and 2nd generation

5.1.1.8 Biomethane

The opinion of the respondents concerning the contribution of bio-methane for primary energy supply in 2020 was mixed (n=533). Overall, 38 % see a positive contribution, 29 % see no or only little contribution and 33 % are undecided. Industry, companies, governments and NGOs saw a slightly stronger role for bio-methane than the rest. The only significantly higher disapproval rate (34-35 %) was within the group of experts from research and services/consultants. However, if we look in more detail into the preferences of these two groups, bio-methane was neither strongly supported nor rejected. In general there is an indifferent attitude towards the role of bio-methane in 2020.

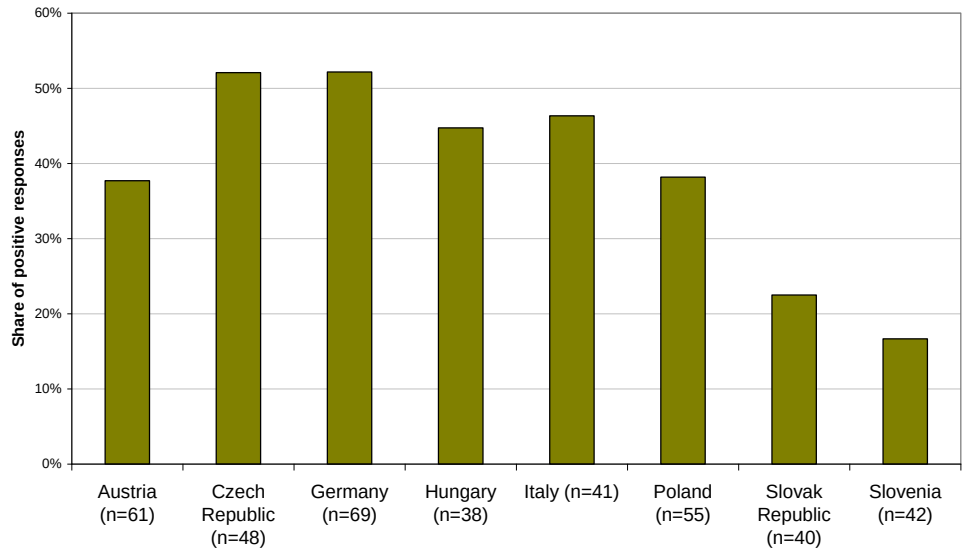


Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *40*: Bio-methane - additional gain in primary energy supply in 2020?

Figure 41 provides data on positive responses of experts in different countries. Experts from Slovenia and the Slovak Republic see no additional gains, experts from other

countries tend to see some additional gains from bio-methane in primary energy supply in 2020.

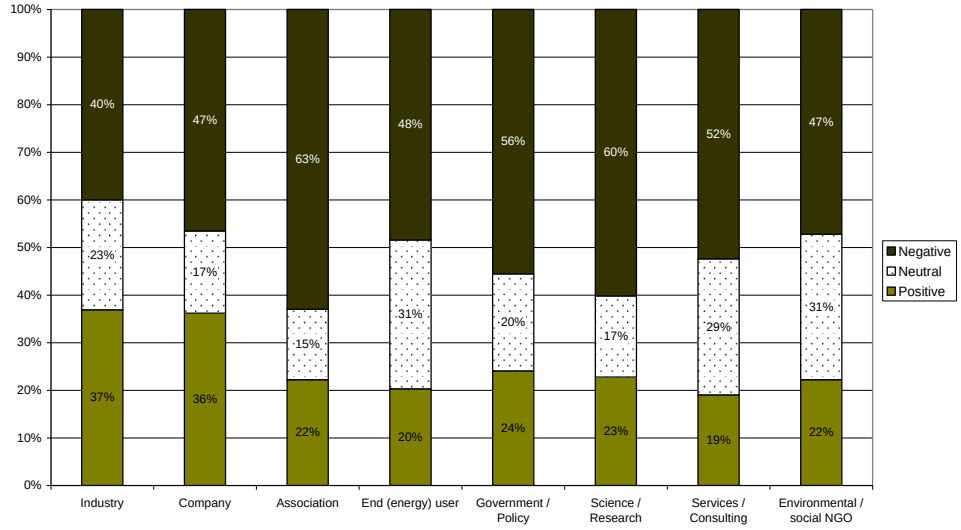


Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 41: Bio-methane – Positive responses to "additional gains", country analysis

5.1.1.9 Hydrogen from renewable sources

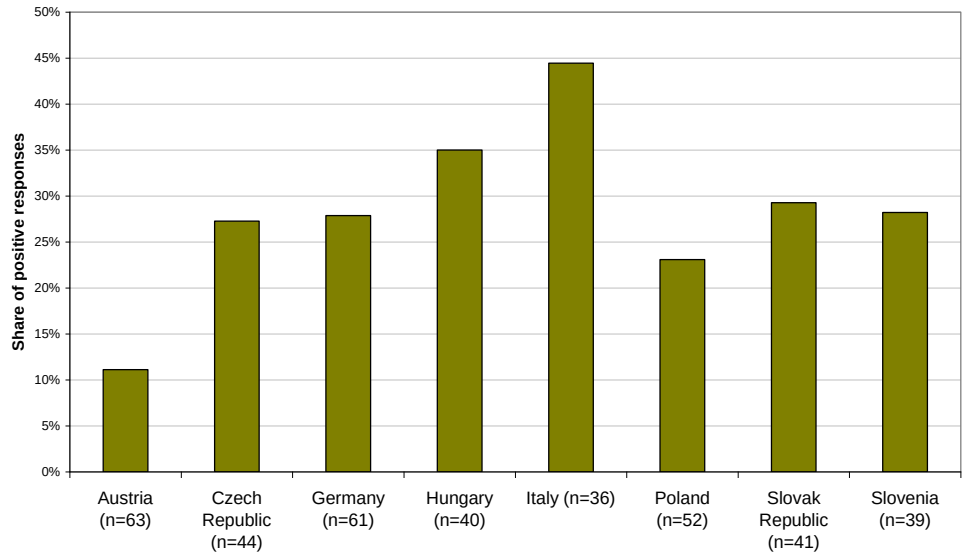
Finally, hydrogen from renewable sources will provide very limited amounts of primary energy supply in 2020, according to the respondents (n=511). Overall, the absolute majority rejected a stronger role of hydrogen (52 % see little gain or least gain of hydrogen from renewables for energy supply). Associations and researchers were the two groups with the highest disapproval rates. The only two groups that saw a slightly stronger role for hydrogen in 2020 were industry and companies.



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

Figure *42*: Hydrogen from renewable sources - additional gain in primary energy supply in 2020?

There is strong disagreement between the experts of different countries whether or not hydrogen from renewable sources may contribute additionally to primary energy supply. The greatest differences can be found between Italy and Austria (Figure 43).



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain), Only positive responses (positive = 1 & 2) are included in the graph.

Figure 43: Hydrogen from renewable sources – Positive responses to "additional gains", country analysis

5.1.2 Professional Background

In the assessment of additional gains of a particular energy technology for primary energy supply in 2020 there are only slight differences between different professional backgrounds. In general, heat from bioenergy is considered by the experts of different professions as providing the most additional gains for primary energy supply in 2020.

The graphs in the Annex provide a detailed overview of positive (response 1 and 2), neutral (response 3) and negative responses (response 4 and 5). Additionally, all supportive data is provided in the Annex.

5.2 Support for market introduction

The participating stakeholders give the clear picture that heat from biomass will provide the most additional gain in primary energy supply in 2020. In a subsequent set of questions they were asked, which renewable energy source would need the most support for market introduction to contribute to the national REAP?[2]

Most experts believe high support for market introduction will be necessary for bioenergy heat. 60 % argue that bioenergy heat will need most or some support for market introduction (Figure 44). **Stakeholders believe in an additional role for bioenergy heat in 2020 only if strong support is given for market integration**.

Other forms of renewable energy that would need support, according to the stakeholders, are hydrogen from renewable sources (59 %) and solar energy (Photovoltaic and solar-thermal with 55 %). However the majority of the respondents do not expect that hydrogen will provide any additional contributions to primary energy supply in 2020. In the case of solar energy, the need for support for market integration correlates with the strong contribution that was expected for primary energy supply by the stakeholders. Figure 44 provides an overview.

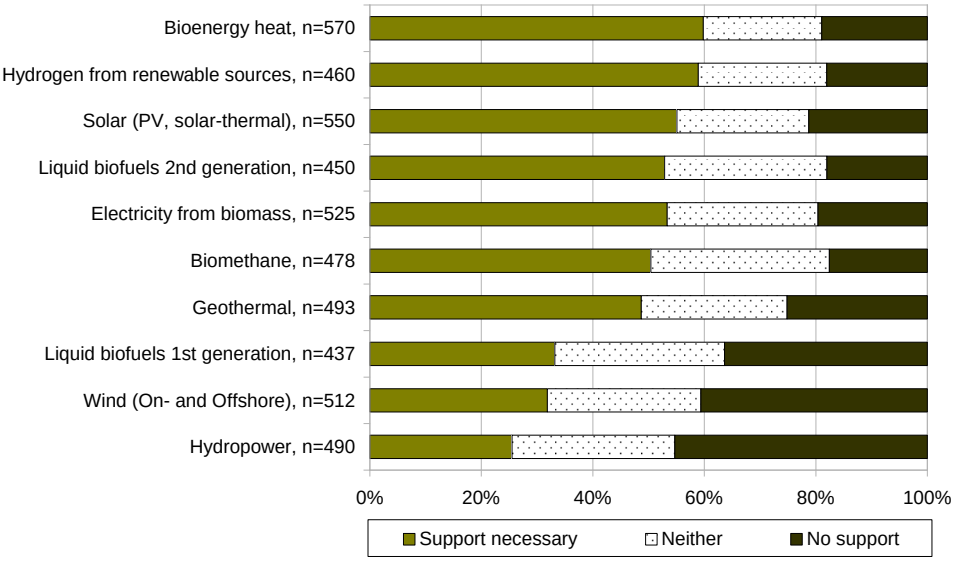
Bioenergy heat still needs strong support for market introduction.

No support needed for hydropower.

[2] Question: „Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, 1 = most gain; 5 = least gain"

Overall, the least support for market integration is believed to be necessary for hydropower (45 % see no support necessary while only 26 % articulate the need for support), wind energy (41 % see no support necessary) and, astonishingly, for liquid biofuels of the first generation (36 % see no support necessary). According to the results of the survey, hydropower will not only need no support for market integration but will also not contribute additionally to the energy supply of 2020.

Wind energy will play an important additional role in 2020 even without support for market integration. In the previous section wind power was ranked forth in the list of renewables contributing additionally to primary energy supply in 2020 by the respondents, only behind bioenergy heat, electricity from biomass and solar.



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, Neither = category 3, No support = categories 4 & 5

Figure *44*: Which renewable would need the most support for market introduction to contribute according to nREAP (national Renewable Energy Action Plan)?

Liquid biofuels in turn will, according to the experts´ responses, both not be more important for primary energy supply in 2020 and will also not need any support for market integration. However even if stakeholders involved in this survey did not believe in any important role of, and the necessity of support for, liquid biofuels of the first generation, 53 % of all respondents believe that support for market integration is necessary for liquid biofuels of the second generation.

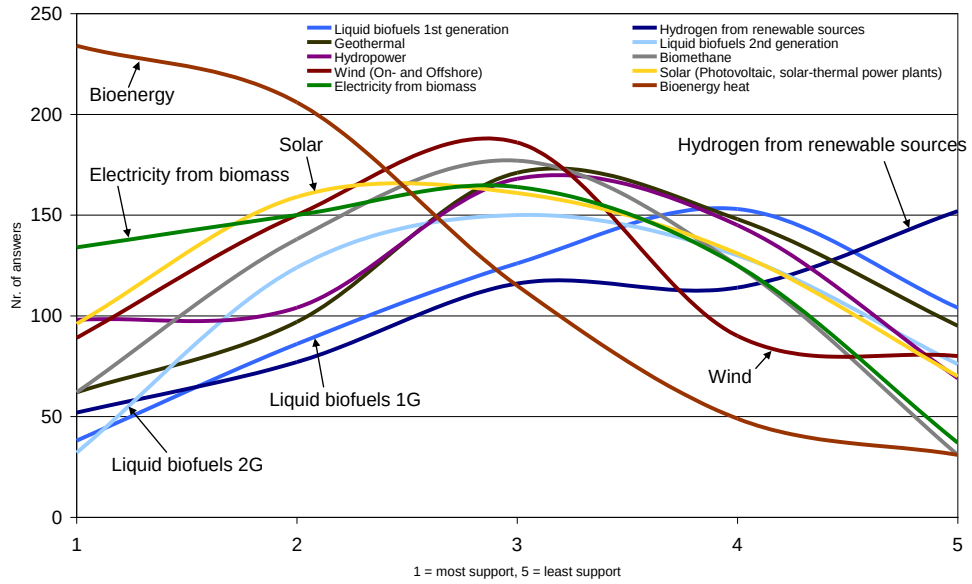


Figure *45*: Which renewable would need the most support for market introduction to contribute according to nREAP

The following figures show some examples (bioenergy heat, wind, 2nd generation biofuels) of the correlation between additional gain for energy supply and the need for support for market integration.

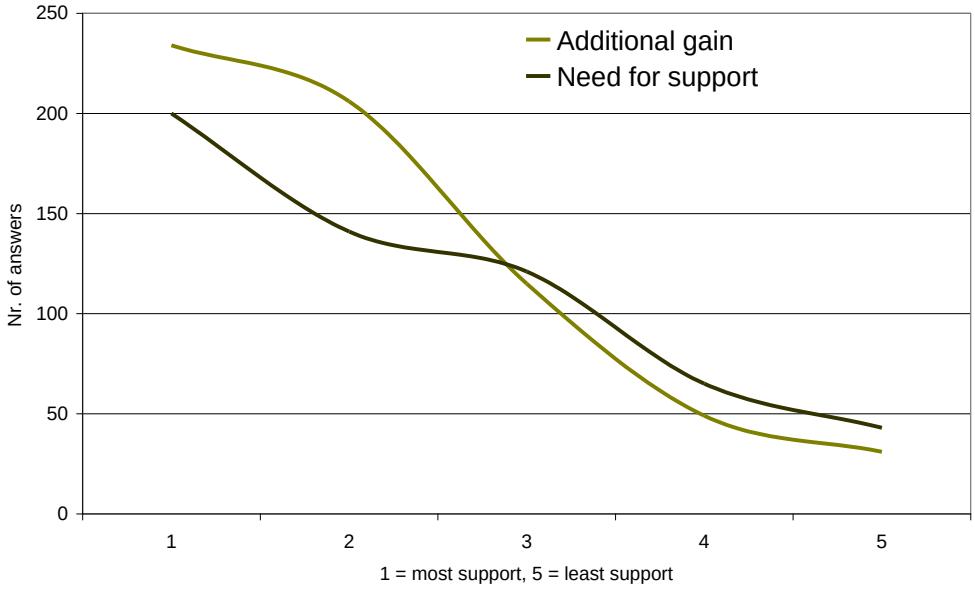


Figure *46*: Bioenergy heat: Relation between additional gain for energy supply in 2020 and need for support for market integration

The estimated additional gains for primary energy supply in 2020 and the expected need for support are not closely correlated. For bioenergy heat or wind, for example, the expected additional gain is higher than the need for support. On the other hand, stakeholders expectations for biofuels of the second generation were only low in regard to additional gains for energy supply in 2020, whereas it was estimated that this technology would need strong support for market integration.

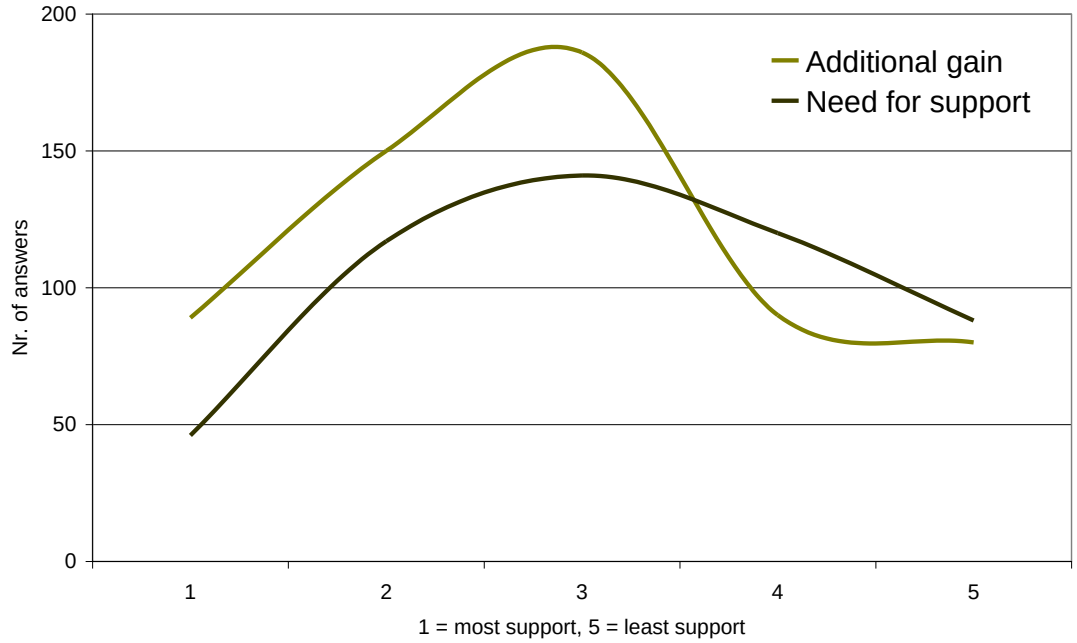


Figure 47: Wind: Relation between additional gain for energy supply in 2020 and need for support for market integration

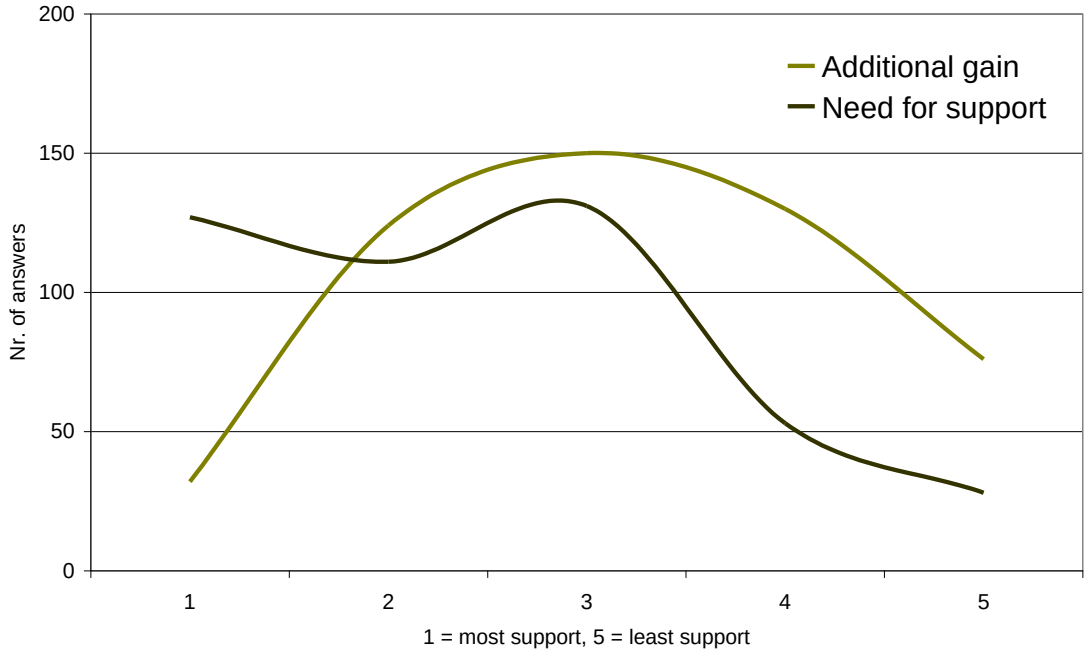


Figure 48: 2nd generation biofuels: Relation between additional gain for energy supply in 2020 and need for support for market integration

5.2.1 Energy Technologies

If we look at the specific results for different groups, it was coherent with the overall picture: support is particularly necessary for bioenergy heat and not necessary for wind and hydropower. The highest rate of agreement for support of bioenergy heat was found in the group of energy end-users; the lowest rate of agreement was found in the group of government officials (43 %) and researchers (53 %).

Industry representatives argue that besides support for bioenergy heat, support is also necessary for bio-methane and hydrogen from renewable sources. This is in line with the

additional role for these two forms of energy for energy supply in. Experts from companies more or less supported this view. Experts working in association, on the contrary, saw the need for support particularly for liquid biofuels of the second generation, and for geothermal energy. A detailed analysis of the ratings broken down by the respective professional backgrounds can be found in the annex (chapter 8.3).

There seems to be a relation between national energy policies and the opinion of experts from different countries about the need for market support mechanisms for renewables. Further research is needed to find possible correlations between the stance of the experts on market integration support for different forms of renewable energy and the national energy policies in the respective countries and the unused potential of renewables.

The following graphs differentiate the needs for support of market integration of different renewable energy sources with respect to the professional background of the participating experts.

5.2.1.1 Geothermal

Geothermal energy (*Figure* 49) in general will require some support for market integration. There are only slight differences in this assessment between the experts working in different professional environments, only experts from companies see a lower level of necessary support.

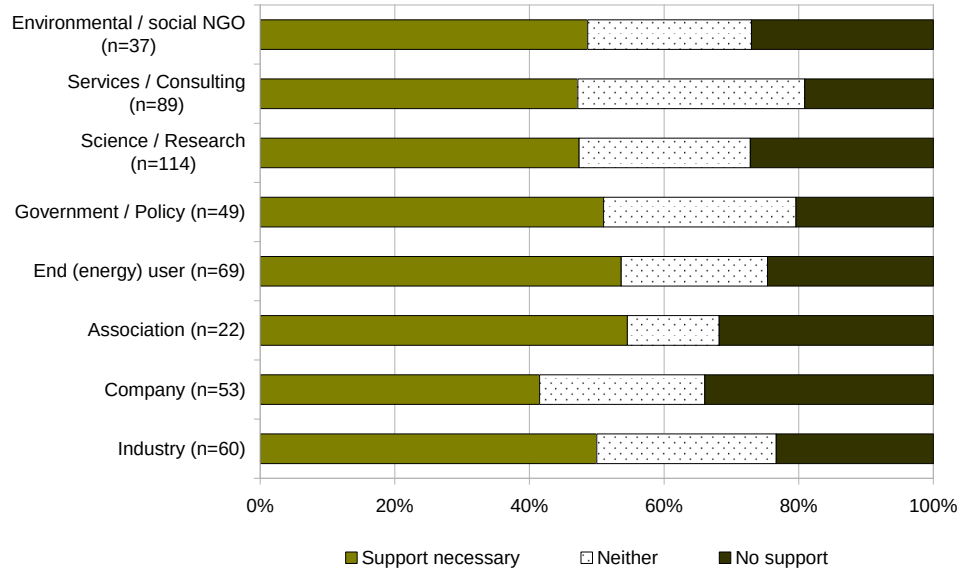
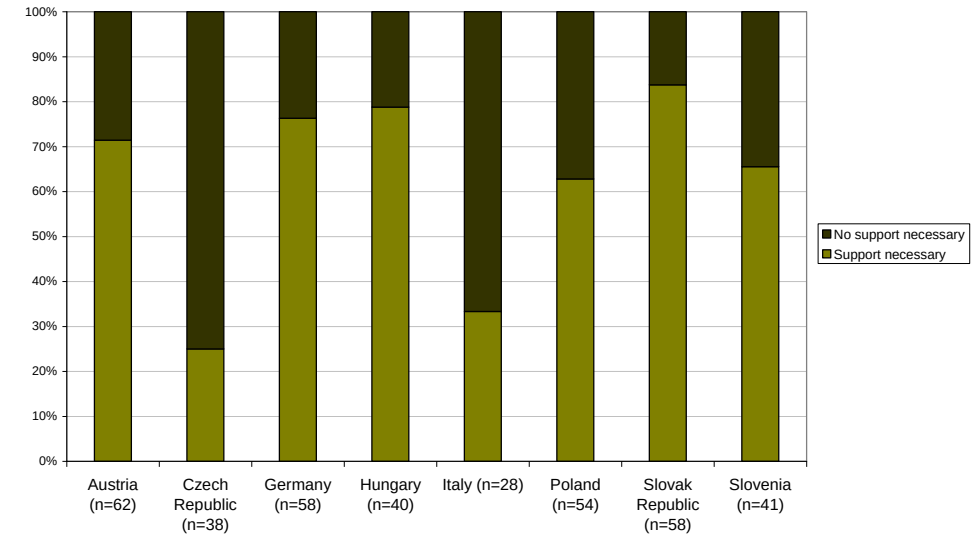


Figure *49*: Geothermal - Which renewable would need the most support for market introduction to contribute according to nREAP?

Figure 50 highlights differences in national strategies. While experts from the Slovak Republic, Hungary, Germany and Austria see a need for market integration for geothermal energy, this need is considered being much lower in the Czech Republic and in Italy.



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 50: Geothermal - support for market integration, country analysis

5.2.1.2 Wind Power

Contrary to geothermal energy, most participating experts estimate that wind will require no support for market integration (Figure 51). This conviction was most strongly represented by experts from governments and policy and there are no significant differences between the professional groups.

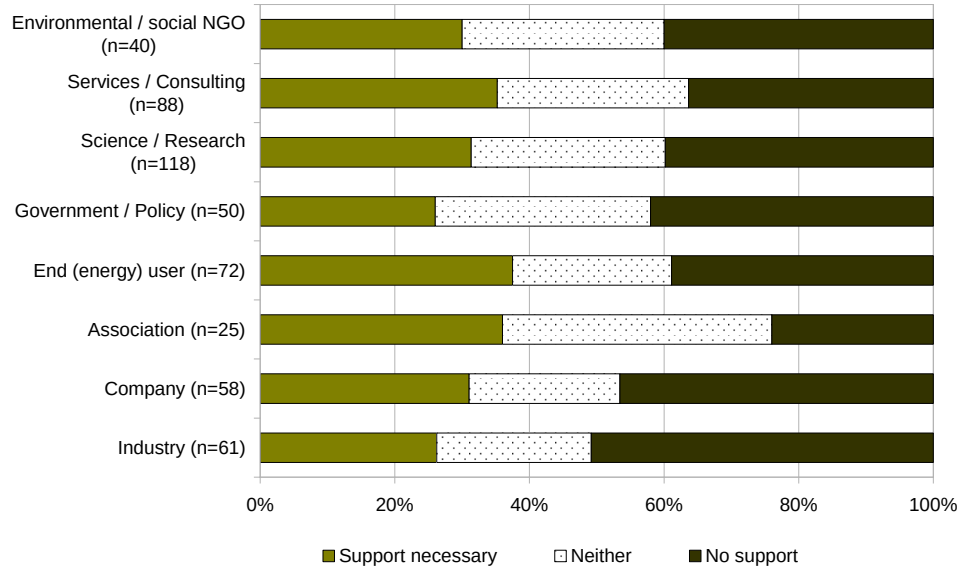
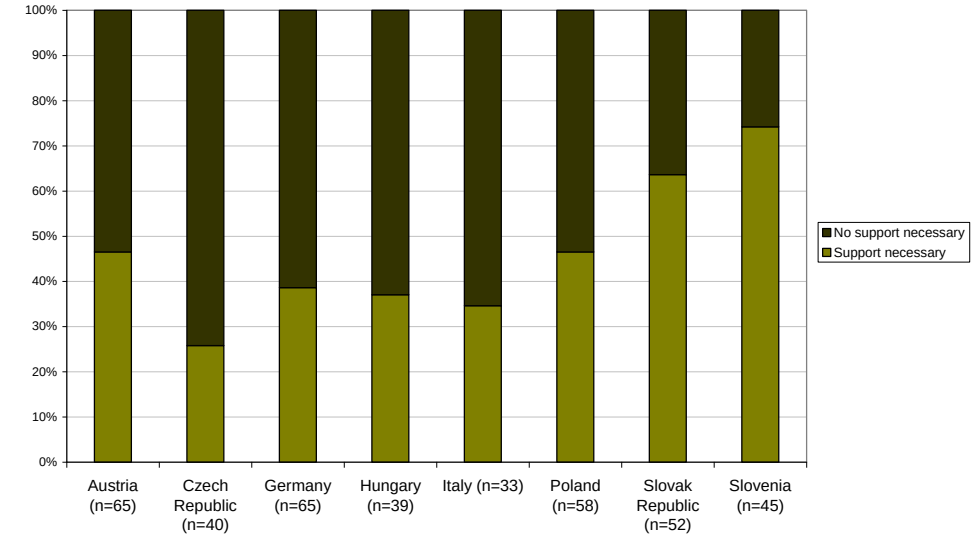


Figure *51*: Wind (On- and Offshore) - Which renewable would need the most support for market introduction to contribute according to nREAP?

However, there are significant differences between the experts of different countries in the question of if wind energy needs support for market integration. Again, experts from the Czech Republic and Italy see the least need for market integration measures.



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 52: Wind power - support for market integration, country analysis

5.2.1.3 Solar

Photovoltaic and solar-thermal energy will need some form of support for market integration (*Figure* 53). This conviction is represented by experts from different professional backgrounds. Only companies and NGOs are more critical towards support.

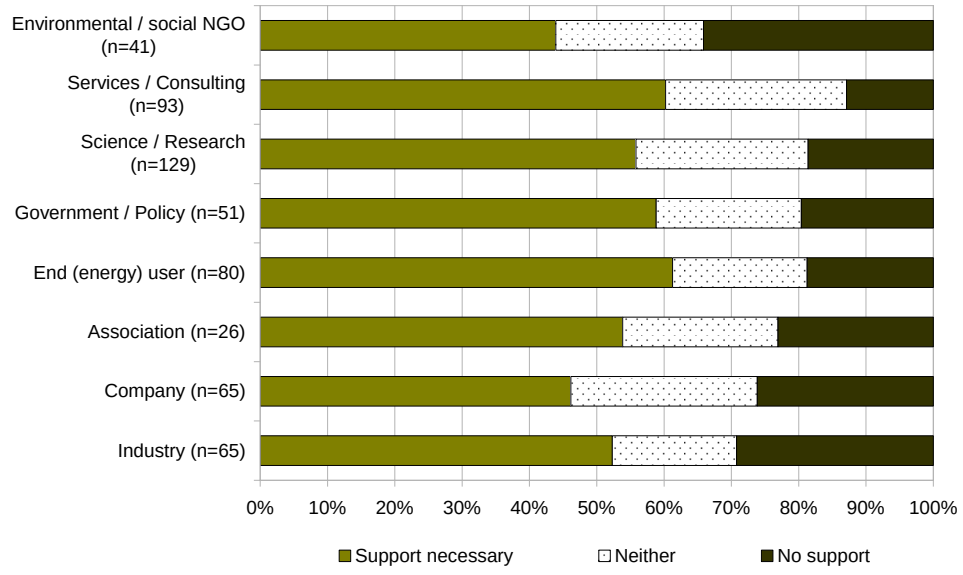
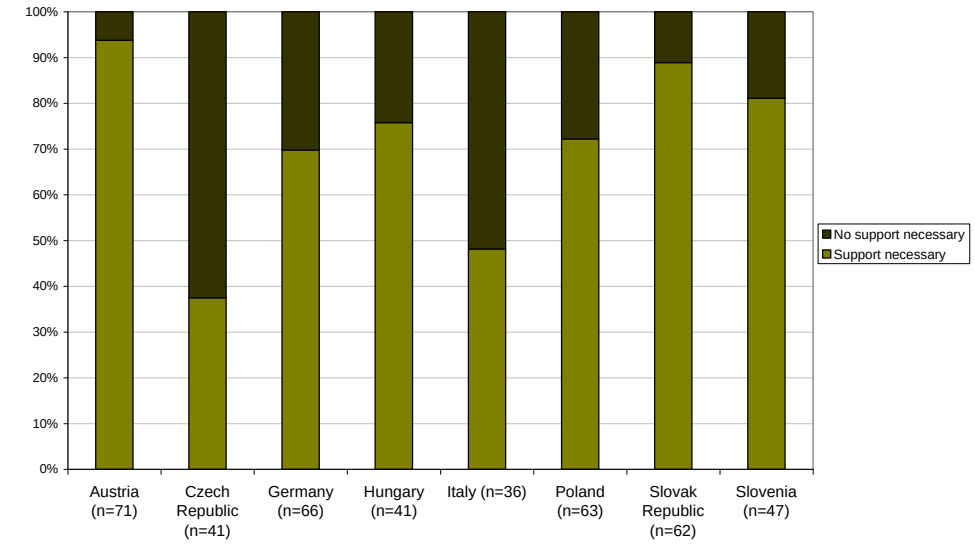


Figure *53*: Solar (Photovoltaic, solar-thermal power plants) - Which renewable would need the most support for market introduction to contribute according to nREAP?

The differences between the countries are significant. Austria has a long tradition of thermal solar energy use. Nevertheless, more than 90 % of the experts from Austria argue that solar (PV and solar thermal) needs support for market integration. Experts

from the Czech Republic and Italy again share the opinion that solar energy does not need support for market integration (Figure 54).



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 54: Solar - support for market integration, country analysis

5.2.1.4 Hydropower

Hydropower (Figure 55) received the lowest backing for support for market introduction of all renewable sources. Only end users have a slightly different opinion.

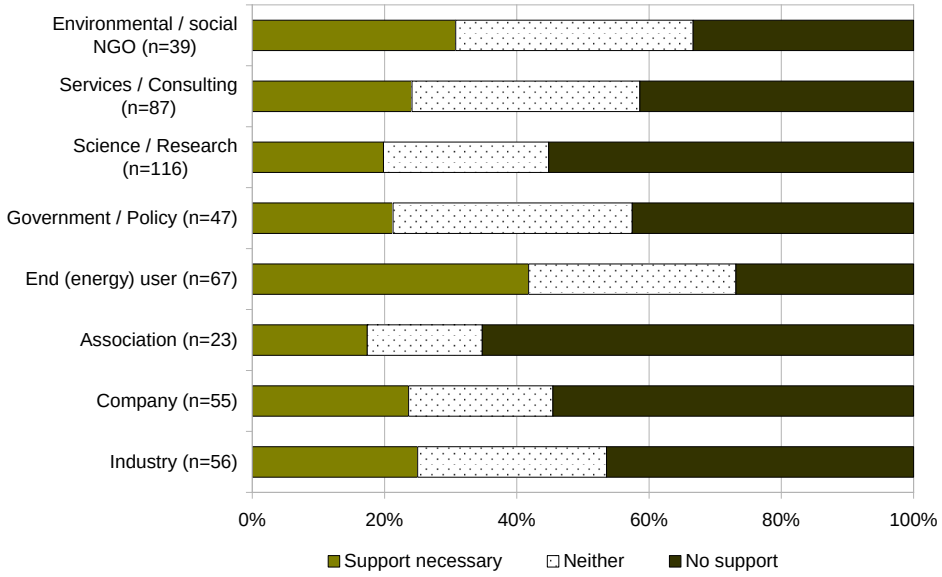
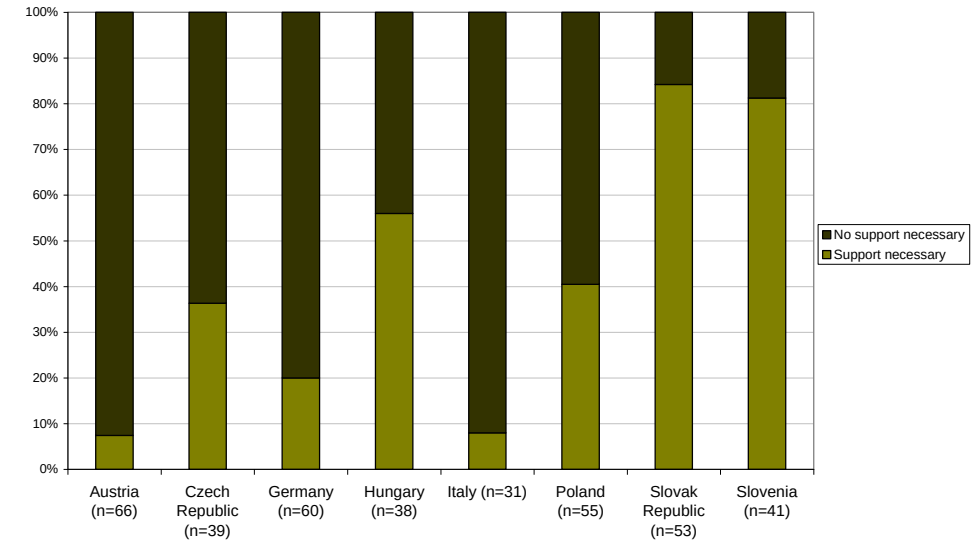


Figure *55*: Hydropower - Which renewable would need the most support for market introduction to contribute according to nREAP?

If we look at the national preferences we can see large differences between the experts of different countries. Experts from Austria and Italy see very little need for market integration measures. Experts from Slovenia or the Slovak Republic, on the contrary, argue with a large majority for support for market integration of hydropower. Those country-specific differences may reflect the unused potential of hydropower.



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 56: Hydropower - support for market integration, country analysis

5.2.1.5 Heat for Bioenergy

For bioenergy heat it is striking that there was an enormous difference between the stakeholder groups (Figure 57). While the total figures suggest a strong demand for support for market introduction, experts from government and policy see little need, contrary to end-users. There might be a simple interest-based explanation that experts that are first and foremost end-users want to see financial support for a form of renewable energy that can be used in almost every household.

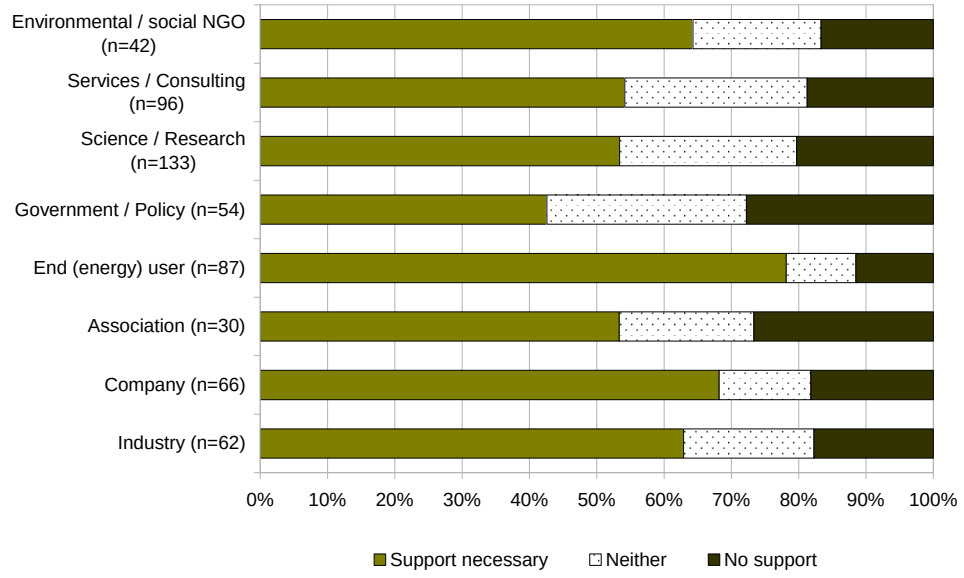
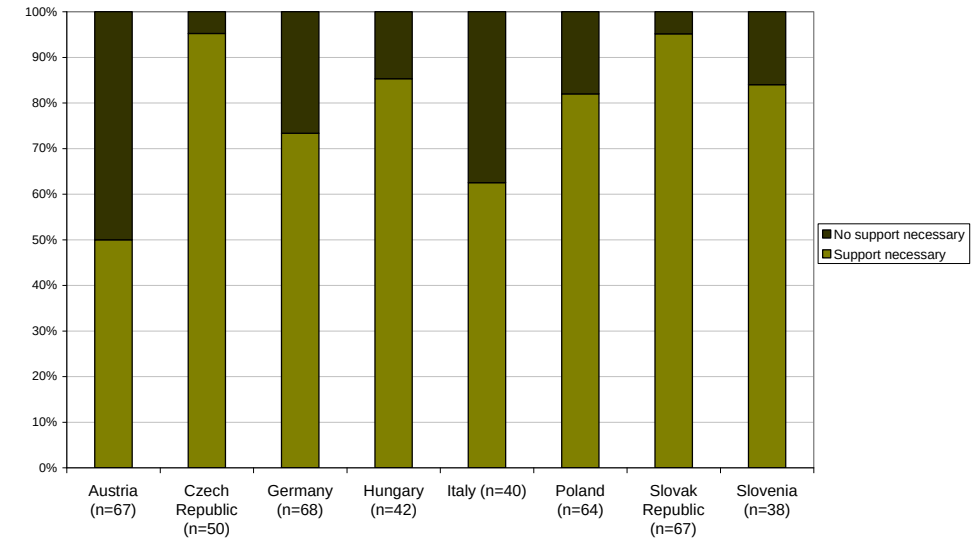


Figure *57*: Bioenergy heat - Which renewable would need the most support for market introduction to contribute according to nREAP?

The experts from the Czech Republic that see no need for market support mechanisms for geothermal energy, wind power, solar and hydropower, have a strong interest for support for market integration of bioenergy heat. The same accounts for experts from the Slovak Republic.



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 58: Bioenergy heat - support for market integration, country analysis

5.2.1.6 Electricity from biomass

The need for support for electricity from biomass is also controversial, the experts from associations being very sceptical (Figure 59). However, the number of experts from associations is very low (n=24). Energy end-users see the need for market integration support.

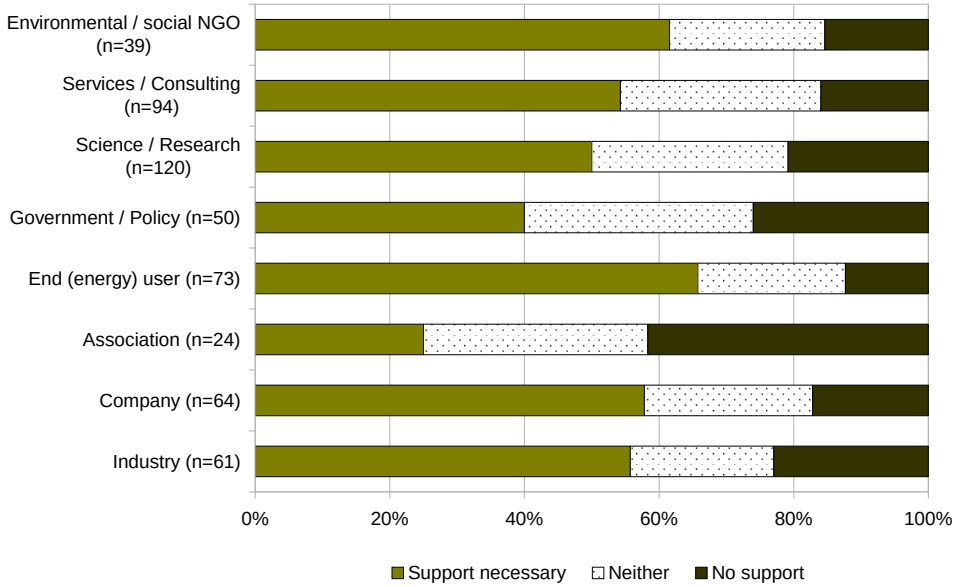
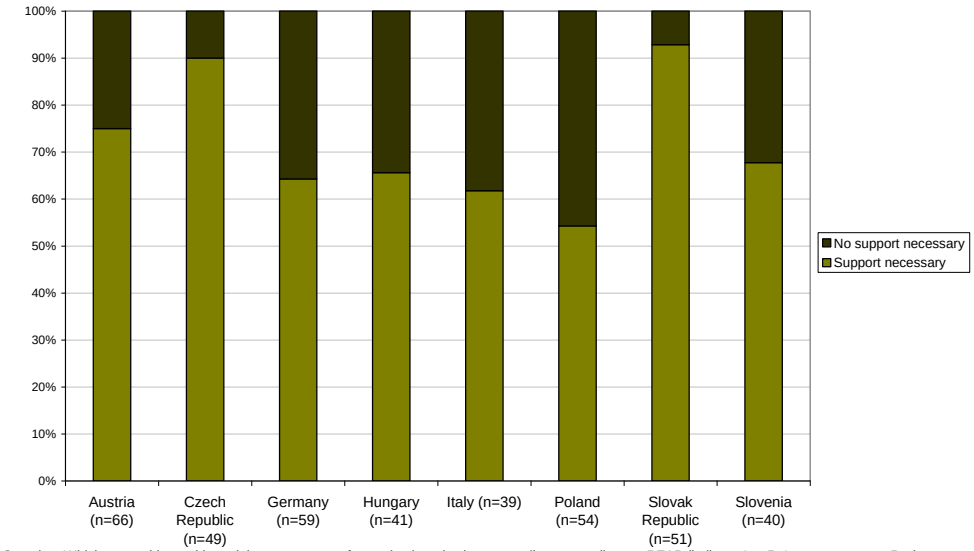


Figure *59*: Electricity from biomass - Which renewable would need the most support for market introduction to contribute according to nREAP?

The national differences in the opinion about the need for market support measures for electricity from biomass are highest between Poland and Slovak Republic (Figure 60).



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 60: Electricity from biomass - support for market integration, country analysis

5.2.1.7 Liquid biofuels 1st / 2nd generation

There was a general agreement among the participants of this survey that liquid biofuels of the first generation will not need support in order to contribute to the national BAP-targets (Figure 61). Both market actors in industry and associations and researchers seemed to think that biofuels of the second generation need support in contrast to the other groups.(Figure 63).

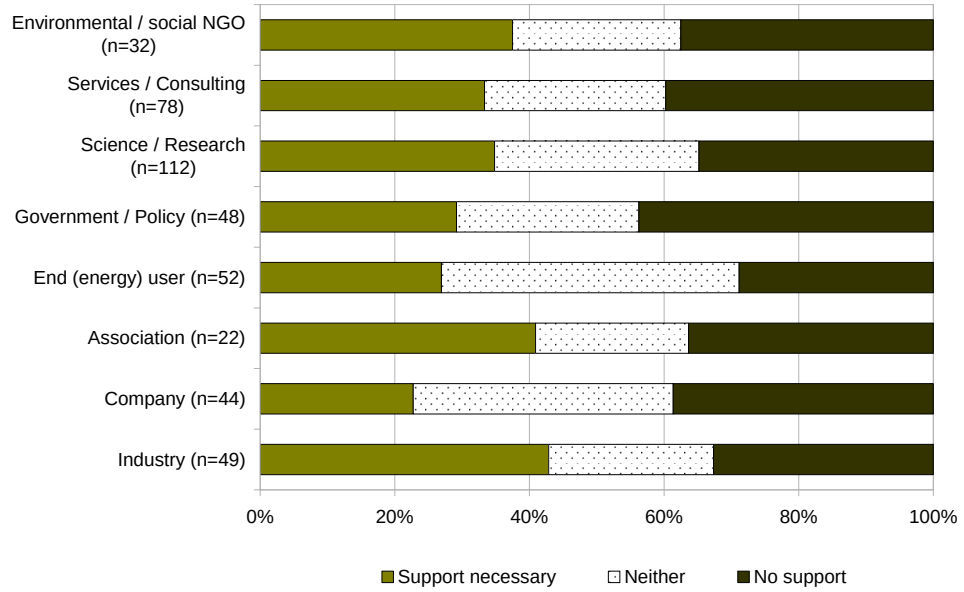
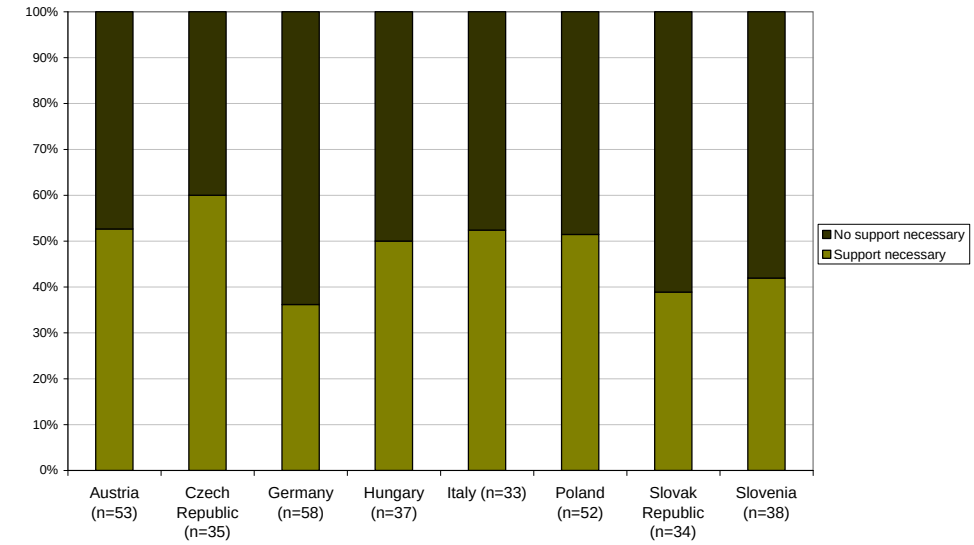


Figure *61*: Liquid biofuels 1st generation - Which renewable would need the most support for market introduction to contribute according to nREAP?

There are no significant differences in the opinion of experts from different countries. All experts agree that there is some need for market integration measures of bio-fuels (Figure 62). It would be interesting for further qualitative research to explain why there

is almost consensus according to this energy technology, if compared to most of the others.



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 62: Liquid biofuels 1st generation - *support for market integration, country analysis*

A majority of the experts argue that there is more need for market integration measures for bio-fuels of the 2nd than for the 1st generation (Figure 63). This can be explained by the different market positions of biofuels. There are some national differences: experts from Slovenia and the Slovak Republic see less need for market integration measures than their colleagues from all other countries (Figure 64).

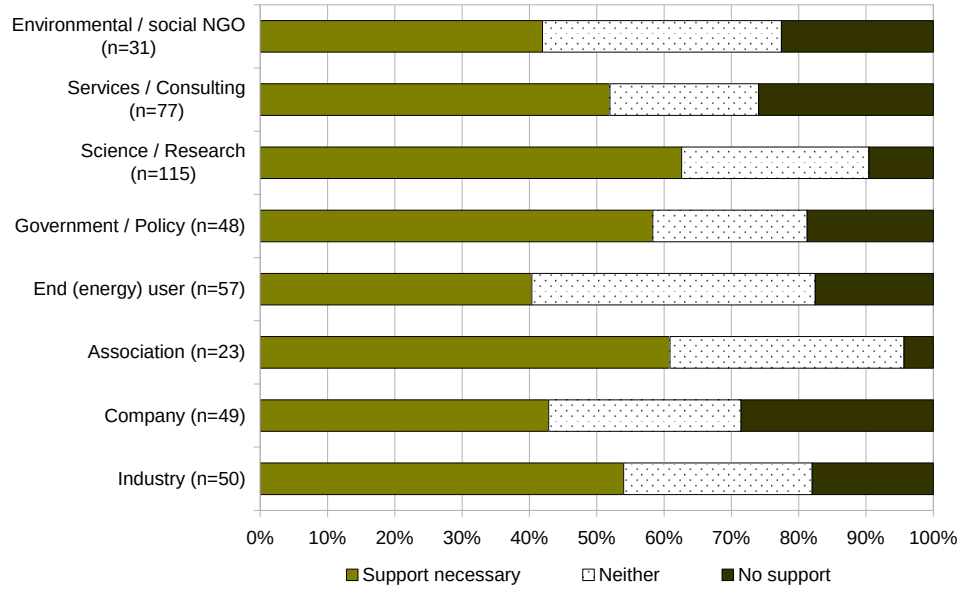
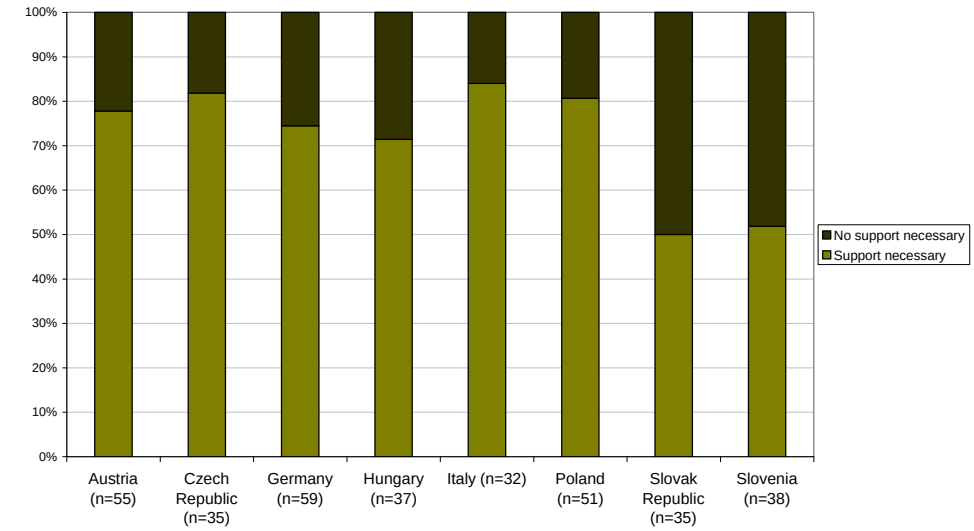


Figure *63*: Liquid biofuels 2nd generation - Which renewable would need the most support for market introduction to contribute according to nREAP?



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 64: Liquid biofuels 2nd generation - support for market integration, country analysis

5.2.1.8 Bio-methane

The need for support for bio-methane was not controversial and was shared by around half of the participating experts without significant differences between the different professional backgrounds (Figure 65).

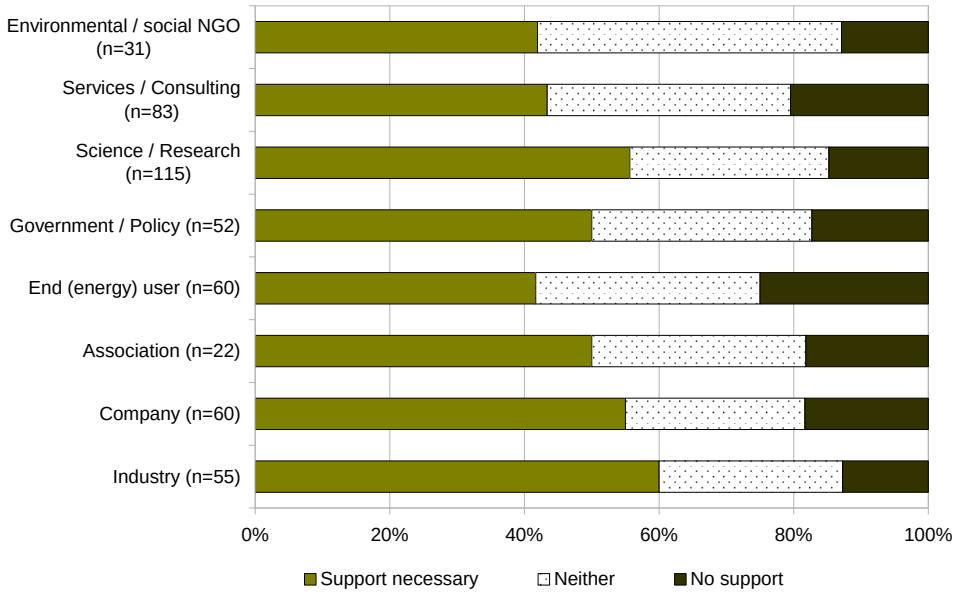
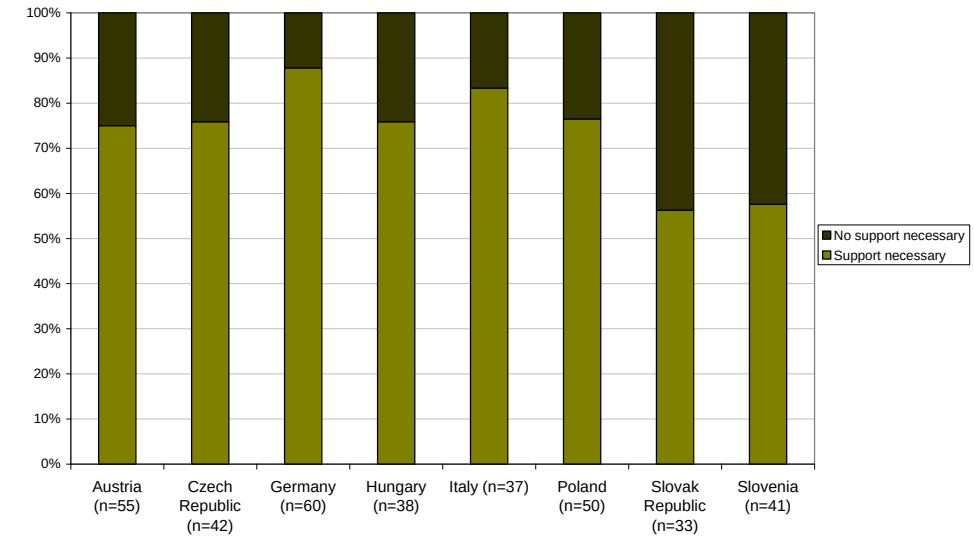


Figure *65*: Bio-methane - Which renewable would need the most support for market introduction to contribute according to nREAP?



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 66: Bio-methane - support for market integration, country analysis

5.2.1.9 Hydrogen from renewable sources

In total, experts thought that hydrogen from renewable sources would need support for market integration. This assessment was shared by most of the professional groups with environmental and social NGOs as an exception (Figure 67).

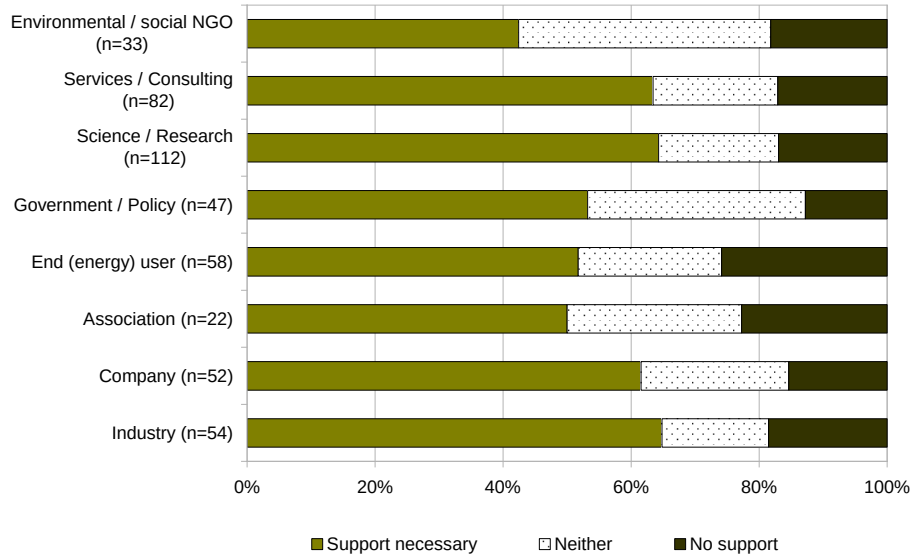
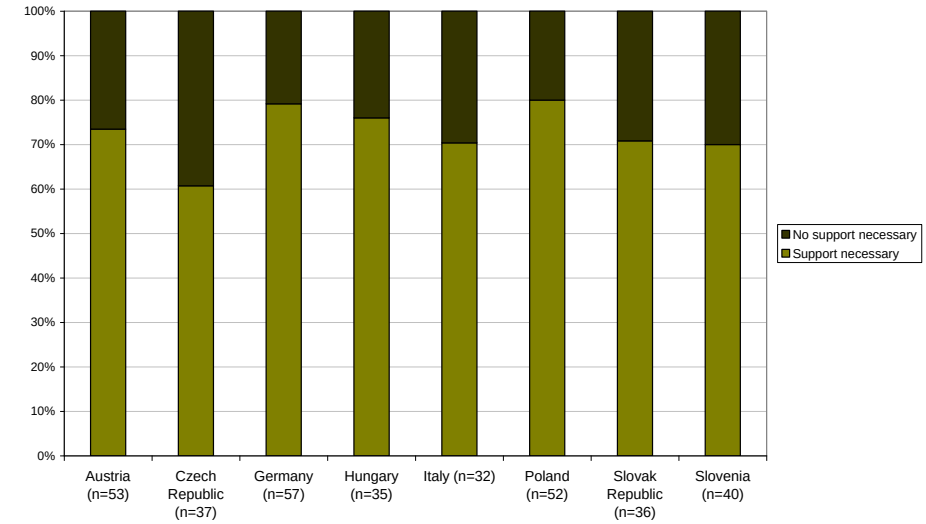


Figure *67*: Hydrogen from renewable sources - Which renewable would need the most support for market introduction to contribute according to nREAP?



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

Figure 68: Hydrogen from renewable sources - support for market integration, country analysis

5.2.2 Professional Background

Experts with different professional background have slightly different perspectives to the support needed for the market integration of energy technologies.

- There are largely similar views from experts from industry, companies and associations (with the exception of electricity from biomass and biofuels of the second generation).
- Energy end users generally tend to express more demand for support for market integration than experts with other professional background.
- Most professional groups see the need for support for market integration of bioenergy heat.

In order to improve simplicity of the graphs the neutral responses are left out. Since there are no significant differences we provide the graphs and supporting data in the Annex.

6 Additional comments by experts

In cases where the pre-formulated answers were not sufficient, the interviewed experts made use of the opportunity to add comments. In their comments many experts reinforced the argument that **biomass still has a lot of unused potential**.

- **Local use of biomass**: Many experts argued that it is of utmost importance that biomass is used locally. Moreover, in their opinion the capacity of biogas plants should be limited primarily because of logistic barriers and in order to avoid additional transport costs and emissions. They stated, that imports of biomass and long supply routes would by and large annihilate the positive environmental effects of biomass. One expert argued that "the environment gets devastated by excess supply routes in case of major biomass usage."

- **Decentralized and small-scale use of biomass**: As a consequence, many experts suggested a small-scale deployment of biomass and, e.g. instead of one large biogas plant, small plants for every community to avoid transport costs and negative environmental impacts. Additionally, they think that small heating appliances for private use will become more important in the future. However, to support these structural changes and pursue a strategy of decentralized small-scale deployment of biomass, political support is required according to the participating experts.
- **A national strategy for biomass**: Most experts advocated a national strategy to use domestic potentials, because only a collective approach can effectively promote the efficient use of biomass. Experts also suggested an increased use of agro-industrial residues and municipal waste. However, this would need a strategic plan. A national strategy could also support a better cooperation between the municipalities and biogas plants, e.g. by installing CHP plants and using the heat for district heating in municipalities.
- **Efficiency is crucial**: Efficiency, in general, is a major theme of the expert comments. Many experts argue that many biogas plants work inefficiently and that a modernization of biogas plants is crucial in order to increase efficiency: "The use of biomass has the danger that its target is only to improve the statistics. It is possible that in old power plants the high quality wood is co-fired inefficiently, and this is called biomass-based electricity production, rather than building modern biomass power stations." One expert argued that benchmarks may be helpful and financial support should be tied to certain efficiency levels. Another expert comments that "in general it is important to reach a high level of overall efficiency." The production of biofuels (biomass to liquid), for example, was labeld by one expert as „energy dissipation system."
- **Biomass for non-energy use**: Some experts suggested to use new technologies and to employ biomass for plastic production: "The use of biomass for plastics, insulation material, timber, etc. is important."
- **Feed-in biogas into gas grid**: Another expert suggested to feed-in biogas directly into the gas distribution system: "Particularly efficient is the biogas utilization (purified) if directly fed into the gas distribution system and used for heating, cooking, etc. because in that case there are no further conversion losses. This should be supported."
- **Biomass CHP**: Another expert claimed to only support CHP systems and never use biomass for heat without electricity generation while keeping the priority still on heat production.
- **Land use competition and sustainability**: According to some comments it is necessary to primarily use biomass-waste for energy production and only when this resource is depleted, to start with the co-generation with wood and crops. Some experts commented that among farmers there is a desire for perennial and more productive energy crops. However, one expert remarked that the situation in the summer months would need consideration, as there is no use for the surplus heat in these months until now.

7 Trade of biomass

7.1 Imports

Biomass imports from agricultural raw materials is not a very important aspect for the experts that took part in this survey. Only a minority of the total number of respondents (35 % of 1,221) even gave an answer to that item.

The experts were asked their opinion about the future prospects of imports and exports of agricultural biomass to and from their country. Of those who answered this question 40 % (175 replies) consider agricultural biomass imports as very important or important in the future.

Table 3: Importance of imports of agricultural biomass in the future

Very important	53	12 %
Important	122	28 %
Little importance	117	27 %
Not important	138	32 %
Number of replies	430	100 %

Regarding the origins of agricultural imports the experts mentioned the Czech Republic (5 %), Romania (5 %), Slovakia (5 %), Hungary (6 %), Poland (6 %) and Ukraine (7 %).

The import of biomass from forestry is considered by half of the experts (50 % or 216 replies) that responded to this question (again 35 % of 1,221) as very important or important in the future (Table 4).

Table 4: Importance of imports of biomass from forestry raw materials

Very important	82	19 %
Important	134	31 %
Little importance	94	22 %
Not important	116	27 %
Number of replies	426	100 %

Regarding the origins of forestry raw material imports the countries mostly mentioned were Austria (5 %), Poland (5 %), Czech Republic (6 %), Russian Federation (6 %), Slovakia (6 %), and Ukraine (6 %).

7.2 Exports

The export of biomass from agricultural material is considered to be less important then the imports. 35 % consider the export very important or important (140 replies).

Table 5: Importance of exports of agricultural biomass in the future

Very important	44	11 %
Important	96	24 %
Little importance	106	26 %
Not important	161	40 %
Number of replies	407	100 %

Table 6: Importance of exports of biomass from forestry raw materials

Very important	53	14 %
Important	93	24 %
Little importance	104	27 %
Not important	137	35 %
Nr of replies	387	100 %

The destination of these exports for both biomass from agriculture and forestry is diverse. Countries that were mentioned are Austria, Germany, Italy.

8 Annex

8.1 Appraisal of national Biomass Action Plans

Table *7*: How do you rate the nBAP targets of your country?

	Very good	Good	Adequate	Poor	Very poor	Total
Poland (n=70)	3	15	26	18	8	70
Hungary (n=55)	4	14	18	13	6	55
Austria (n=89)	6	25	36	18	4	89
Slovak Republic (n=61)	5	20	28	7	1	61
Czech Republic (n=76)	1	31	34	8	2	76
Italy (n=56)	2	25	15	13	1	56
Germany (n=94)	17	31	36	9	1	94
Slovenia (n=75)	10	34	19	10	2	75
Other (n=4)		1	2		1	4
Total	**48**	**196**	**214**	**96**	**26**	**580**

Table *8*: How do you rate the success rate of your country in reaching these targets in the future?

	Very good	Good	Adequate	Poor	Very poor	Total
Italy (n=50)	1	6	22	17	4	50
Austria (n=86)	0	15	23	35	13	86
Czech Republic (n=74)	1	14	27	23	9	74
Poland (n=70)	3	12	25	24	6	70
Slovenia (n=71)	1	17	28	17	8	71
Hungary (n=48)	2	10	7	20	9	48
Slovak Republic (n=57)	5	12	26	10	4	57
Germany (n=90)	3	37	38	11	1	90
Other (n=4)	0	1	1	1	1	4
Total	**16**	**124**	**197**	**158**	**55**	**550**

8.2 Which kind of biomass usage is most important for achieving national BAP targets?

8.2.1 Data

Table *9*: Which kind of biomass usage do you think is most important to achieve these aims? (1 = most important; 5 = least important)

Total	1	2	3	4	5	Sum
Small scale heating systems using biomass	222	162	121	53	46	604
District heating using biomass	215	191	104	61	32	603
Biomass use in combined heat and power plants	205	166	120	60	36	587
Electricity from biomass	102	107	149	102	90	550
Biogas	152	146	161	65	37	561
Transport biofuels 1st generation	52	95	128	128	94	497
Transport biofuels, 2nd generation	78	127	133	96	66	500
Others	17	11	22	3	11	64

Industry (n=592)	1	2	3	4	5
Small scale heating systems using biomass	40 %	18 %	20 %	9 %	13 %
District heating using biomass	45 %	17 %	18 %	13 %	7 %
Biomass use in combined heat and power plants	41 %	20 %	25 %	6 %	8 %
Electricity from biomass	24 %	12 %	30 %	14 %	19 %
Biogas	38 %	23 %	26 %	6 %	8 %
Transport biofuels 1st generation	21 %	19 %	14 %	29 %	17 %
Transport biofuels, 2nd generation	17 %	21 %	31 %	21 %	10 %

(1 = most important; 5 = least important)

Companies (n=583)	1	2	3	4	5
Small scale heating systems using biomass	26 %	26 %	24 %	12 %	12 %
District heating using biomass	33 %	30 %	17 %	10 %	10 %
Biomass use in combined heat and power plants	50 %	18 %	18 %	9 %	6 %
Electricity from biomass	31 %	21 %	18 %	18 %	12 %
Biogas	32 %	25 %	20 %	12 %	11 %
Transport biofuels 1st generation	14 %	14 %	30 %	23 %	17 %
Transport biofuels, 2nd generation	14 %	18 %	28 %	21 %	19 %

(1 = most important; 5 = least important)

Association (n=282)	1	2	3	4	5
Small scale heating systems using biomass	59 %	29 %	0 %	5 %	7 %
District heating using biomass	23 %	42 %	14 %	19 %	2 %
Biomass use in combined heat and power plants	19 %	36 %	29 %	7 %	10 %
Electricity from biomass	8 %	15 %	23 %	13 %	41 %
Biogas	20 %	27 %	27 %	14 %	11 %
Transport biofuels 1st generation	6 %	31 %	25 %	22 %	17 %
Transport biofuels, 2nd generation	11 %	43 %	22 %	11 %	14 %

(1 = most important; 5 = least important)

End (energy) user (n=681)	1	2	3	4	5
Small scale heating systems using biomass	43 %	30 %	15 %	6 %	5 %
District heating using biomass	45 %	25 %	14 %	11 %	5 %
Biomass use in combined heat and power plants	29 %	24 %	32 %	10 %	5 %
Electricity from biomass	26 %	15 %	25 %	16 %	17 %
Biogas	31 %	20 %	29 %	8 %	12 %
Transport biofuels 1st generation	16 %	18 %	29 %	19 %	18 %
Transport biofuels, 2nd generation	20 %	17 %	30 %	16 %	17 %

(1 = most important; 5 = least important)

Government / Policy (n=476)	1	2	3	4	5
Small scale heating systems using biomass	41 %	29 %	19 %	7 %	4 %
District heating using biomass	41 %	31 %	20 %	4 %	3 %
Biomass use in combined heat and power plants	37 %	27 %	17 %	9 %	10 %
Electricity from biomass	14 %	20 %	27 %	22 %	17 %
Biogas	34 %	26 %	24 %	11 %	4 %
Transport biofuels 1st generation	13 %	17 %	27 %	30 %	13 %
Transport biofuels, 2nd generation	20 %	30 %	23 %	15 %	12 %

(1 = most important; 5 = least important)

Science / Research (n=1176)	1	2	3	4	5
Small scale heating systems using biomass	46 %	25 %	15 %	8 %	6 %
District heating using biomass	34 %	32 %	18 %	12 %	4 %
Biomass use in combined heat and power plants	35 %	29 %	20 %	10 %	6 %
Electricity from biomass	21 %	19 %	21 %	19 %	21 %
Biogas	27 %	28 %	26 %	13 %	6 %
Transport biofuels 1st generation	11 %	17 %	20 %	28 %	24 %
Transport biofuels 2nd generation	17 %	24 %	27 %	20 %	13 %

(1 = most important; 5 = least important)

Services / Consulting (n=891)	1	2	3	4	5
Small scale heating systems using biomass	38 %	28 %	21 %	7 %	7 %
District heating using biomass	39 %	28 %	22 %	7 %	4 %
Biomass use in combined heat and power plants	38 %	30 %	20 %	6 %	6 %
Electricity from biomass	16 %	19 %	28 %	18 %	19 %
Biogas	26 %	32 %	27 %	11 %	5 %
Transport biofuels 1st generation	9 %	20 %	18 %	30 %	24 %
Transport biofuels, 2nd generation	11 %	27 %	22 %	23 %	17 %

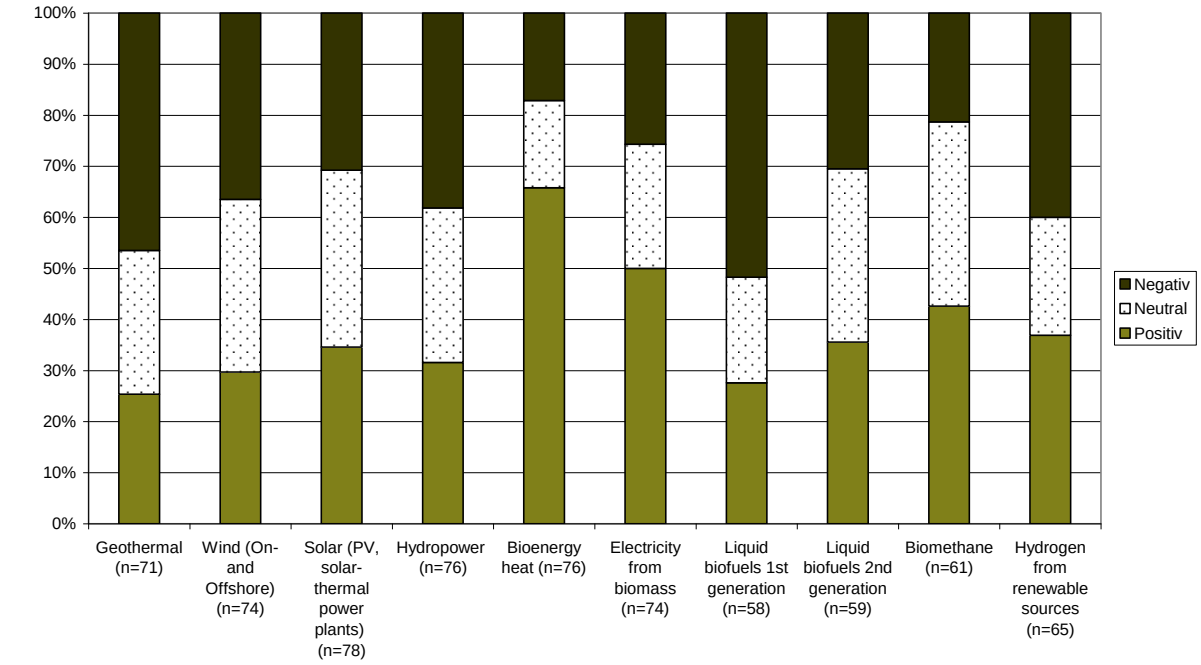
(1 = most important; 5 = least important)

Environmental / social NGO (n=351)	1	2	3	4	5
Small scale heating systems using biomass	45 %	25 %	13 %	9 %	8 %
District heating using biomass	31 %	33 %	17 %	13 %	6 %
Biomass use in combined heat and power plants	31 %	24 %	24 %	17 %	4 %
Electricity from biomass	22 %	10 %	31 %	22 %	14 %
Biogas	33 %	22 %	29 %	14 %	2 %
Transport biofuels 1st generation	13 %	15 %	26 %	17 %	28 %
Transport biofuels, 2nd generation	14 %	30 %	25 %	18 %	14 %

(1 = most important; 5 = least important)

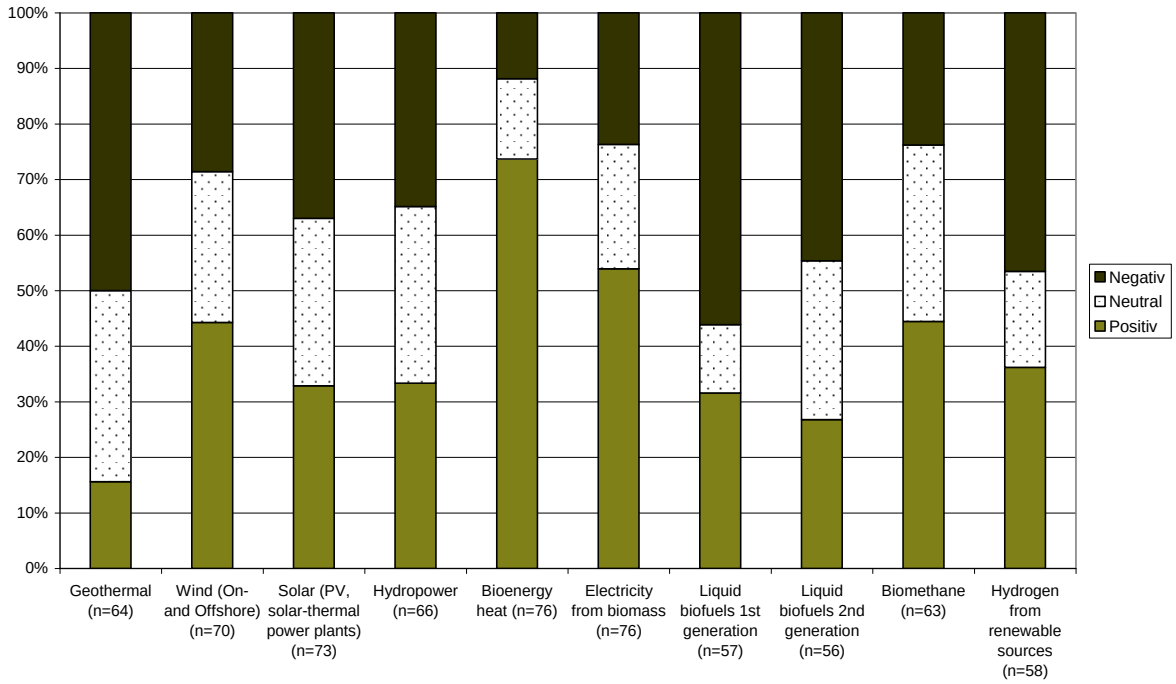
8.2.2 Figures

8.2.2.1 Industry



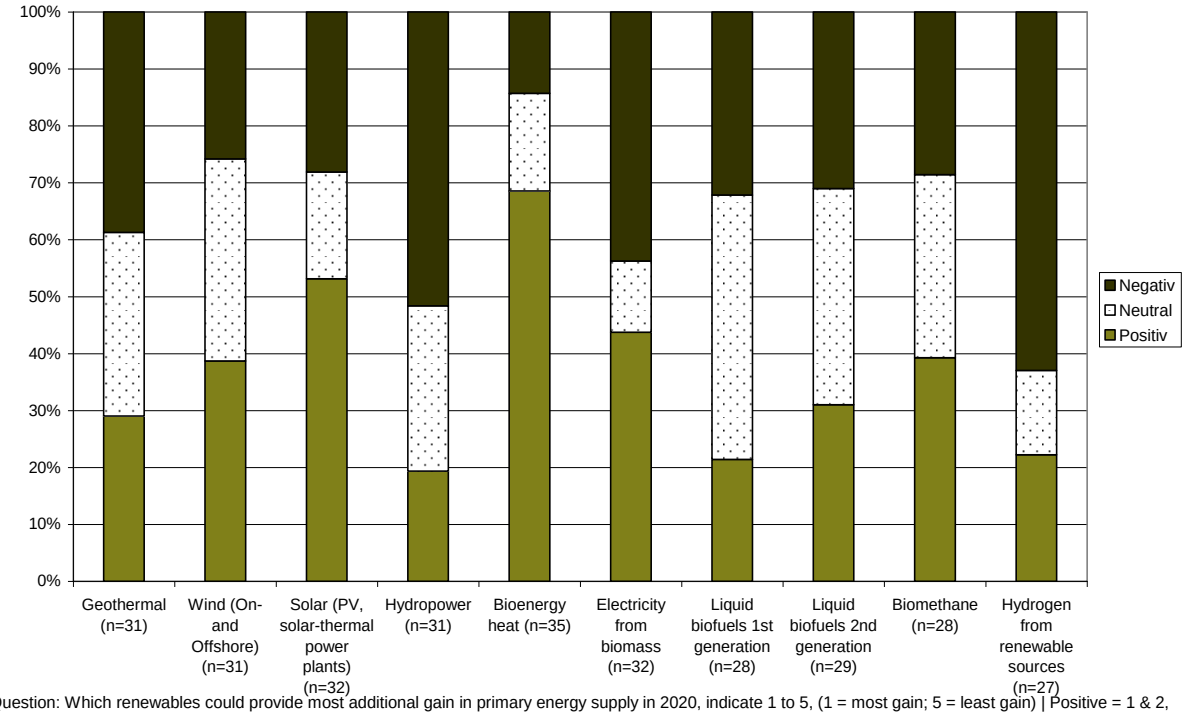
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.2 Company



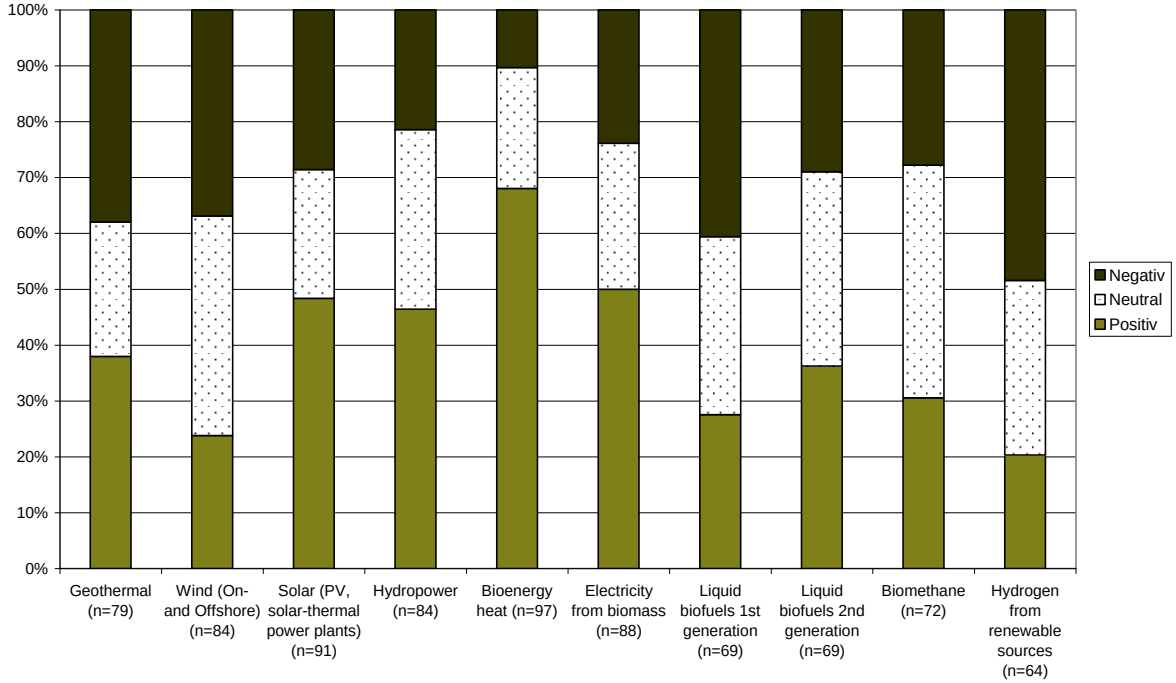
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.3 Association



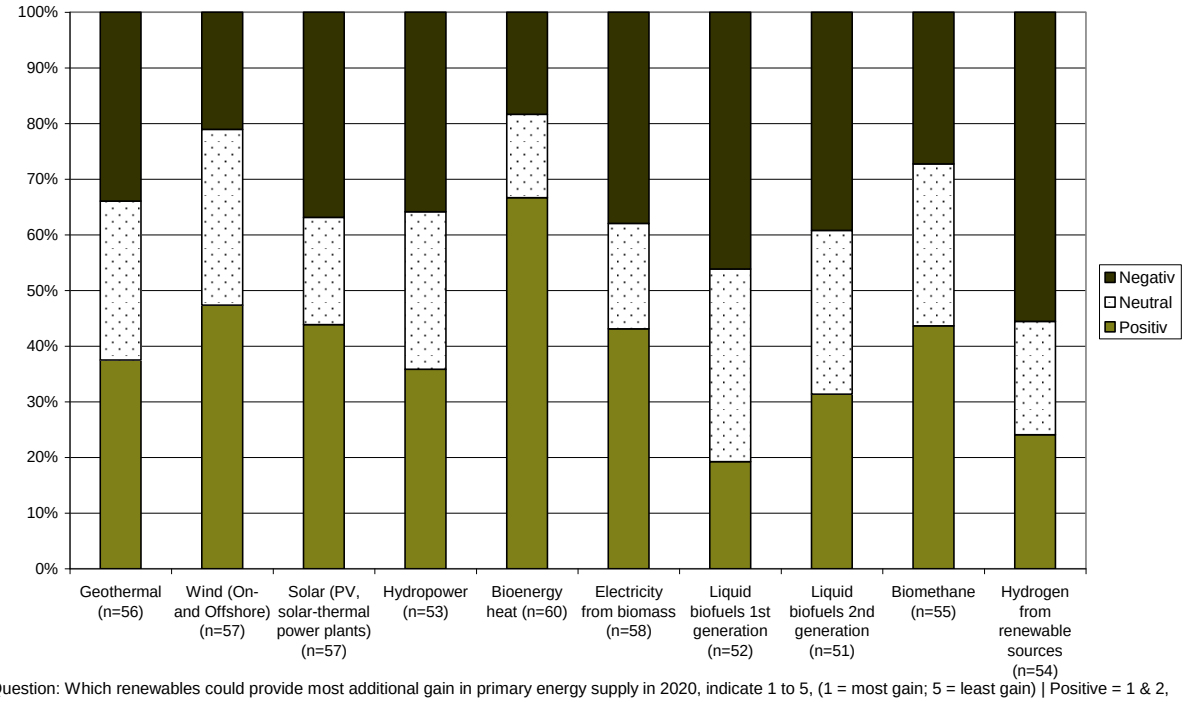
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.4 End (energy) user



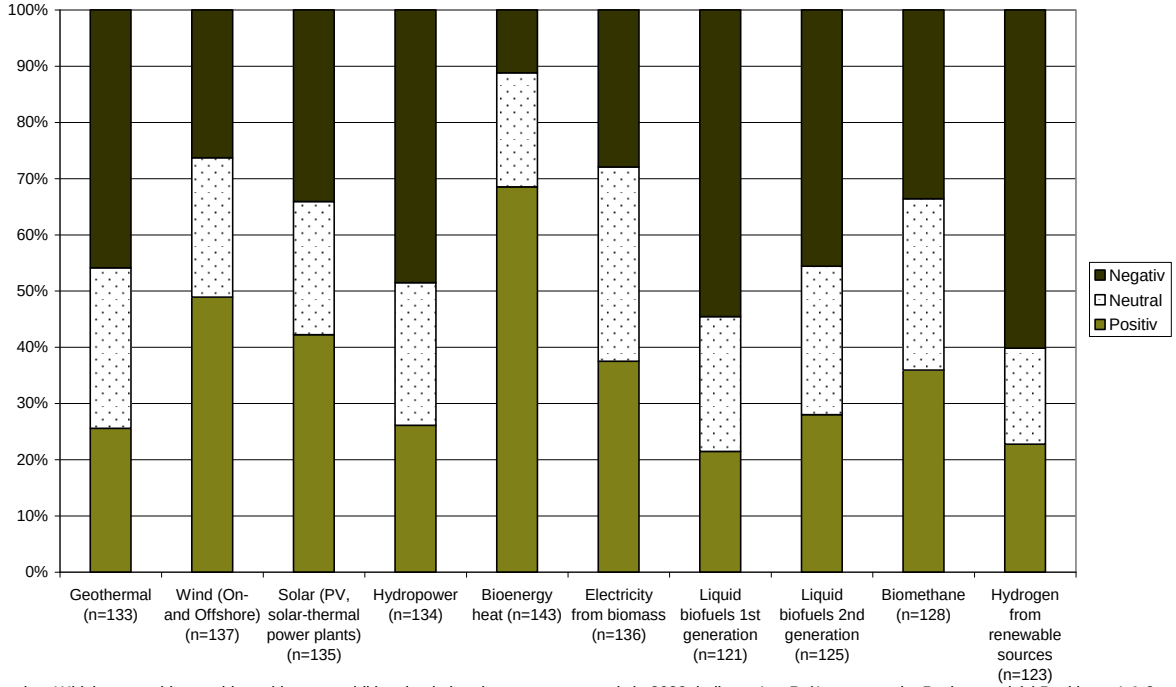
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.5 Government / Policy



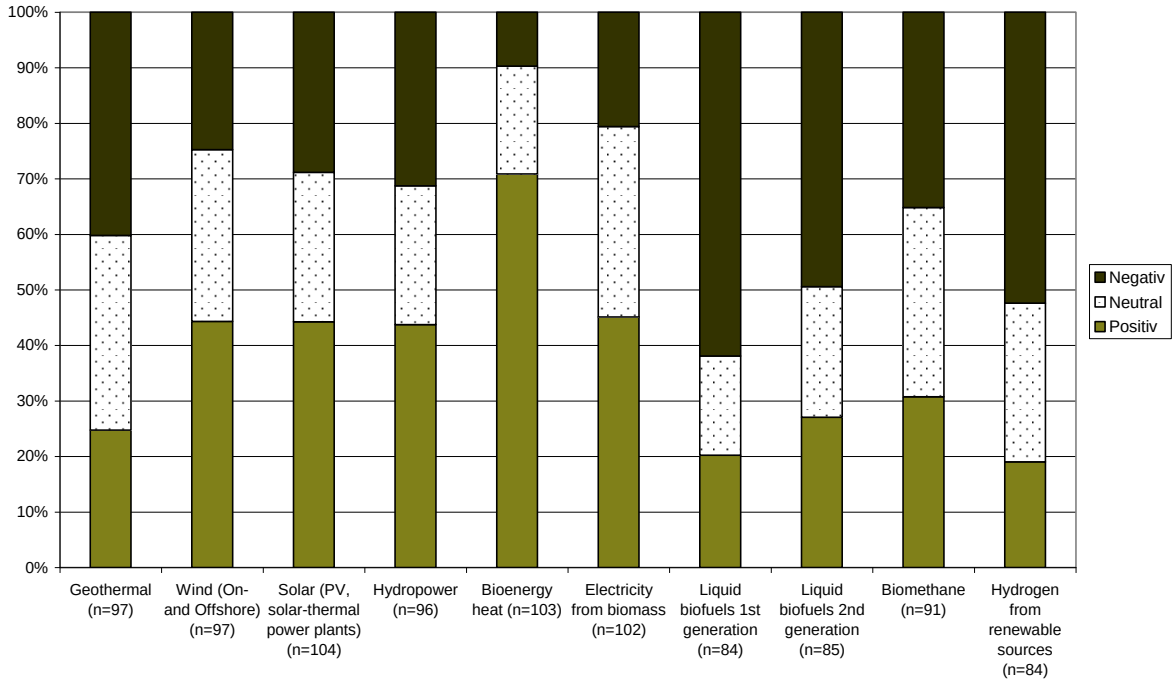
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.6 Science / Research



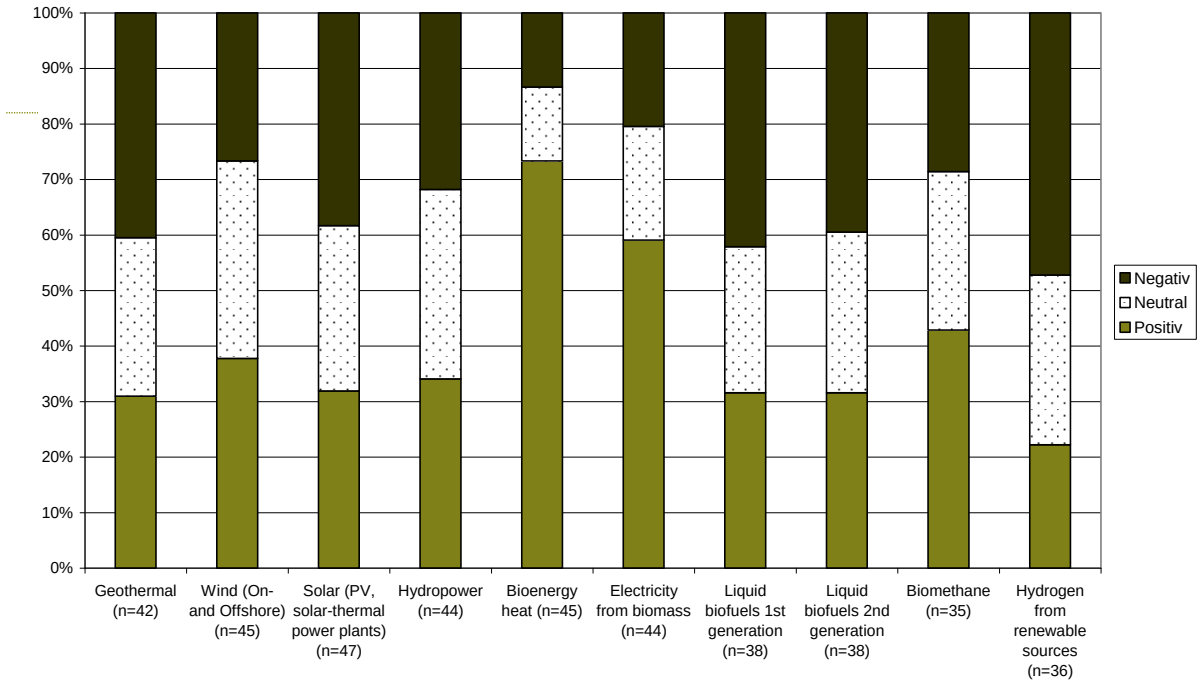
Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.7 Services / Consulting



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.2.2.8 Environmental / social NGO



Question: Which renewables could provide most additional gain in primary energy supply in 2020, indicate 1 to 5, (1 = most gain; 5 = least gain) | Positive = 1 & 2, Negative = 4 & 5

8.3 Sectoral data on renewables and their role in providing additional gains for energy supply in 2020

Table *10*: Which renewables could provide most additional gain in primary energy supply of your country in 2020 (in percent)

Total	Positiv	Neutral	Negativ
Liquid biofuels 1st generation	24 %	25 %	51 %
Hydrogen from renewable sources	25 %	23 %	52 %
Geothermal	28 %	30 %	42 %
Liquid biofuels 2nd generation	30 %	29 %	40 %
Hydropower	35 %	29 %	37 %
Biomethane	38 %	33 %	29 %
Wind (On- and Offshore)	40 %	31 %	29 %
Solar - PV, solar-thermal power	41 %	26 %	33 %
Electricity from biomass	47 %	27 %	27 %
Bioenergy heat	69 %	18 %	13 %

Industry	Positiv	Neutral	Negativ
Geothermal	25 %	28 %	46 %
Wind (On- and Offshore)	30 %	34 %	36 %
Solar - PV, solar-thermal power	35 %	35 %	31 %
Hydropower	32 %	30 %	38 %
Bioenergy heat	66 %	17 %	17 %
Electricity from biomass	50 %	24 %	26 %
Liquid biofuels 1st generation	28 %	21 %	52 %
Liquid biofuels 2nd generation	36 %	34 %	31 %
Biomethane	43 %	36 %	21 %
Hydrogen from renewable sources	37 %	23 %	40 %

Company	Positiv	Neutral	Negativ
Geothermal	16 %	34 %	50 %
Wind (On- and Offshore)	44 %	27 %	29 %
Solar - PV, solar-thermal power	33 %	30 %	37 %
Hydropower	33 %	32 %	35 %
Bioenergy heat	74 %	14 %	12 %
Electricity from biomass	54 %	22 %	24 %
Liquid biofuels 1st generation	32 %	12 %	56 %
Liquid biofuels 2nd generation	27 %	29 %	45 %
Biomethane	44 %	32 %	24 %
Hydrogen from renewable sources	36 %	17 %	47 %

Association	Positiv	Neutral	Negativ
Geothermal	29 %	32 %	39 %
Wind (On- and Offshore)	39 %	35 %	26 %
Solar - PV, solar-thermal power	53 %	19 %	28 %
Hydropower	19 %	29 %	52 %
Bioenergy heat	69 %	17 %	14 %
Electricity from biomass	44 %	13 %	44 %
Liquid biofuels 1st generation	21 %	46 %	32 %
Liquid biofuels 2nd generation	31 %	38 %	31 %
Biomethane	39 %	32 %	29 %
Hydrogen from renewable sources	22 %	15 %	63 %

End (energy) user	Positiv	Neutral	Negativ
Geothermal	38 %	24 %	38 %
Wind (On- and Offshore)	24 %	39 %	37 %
Solar - PV, solar-thermal power	48 %	23 %	29 %
Hydropower	46 %	32 %	21 %
Bioenergy heat	68 %	22 %	10 %
Electricity from biomass	50 %	26 %	24 %
Liquid biofuels 1st generation	28 %	32 %	41 %
Liquid biofuels 2nd generation	36 %	35 %	29 %
Biomethane	31 %	42 %	28 %
Hydrogen from renewable sources	20 %	31 %	48 %

Government / Policy	Positiv	Neutral	Negativ
Geothermal	38 %	29 %	34 %
Wind (On- and Offshore)	47 %	32 %	21 %
Solar - PV, solar-thermal power	44 %	19 %	37 %
Hydropower	36 %	28 %	36 %
Bioenergy heat	67 %	15 %	18 %
Electricity from biomass	43 %	19 %	38 %
Liquid biofuels 1st generation	19 %	35 %	46 %
Liquid biofuels 2nd generation	31 %	29 %	39 %
Biomethane	44 %	29 %	27 %
Hydrogen from renewable sources	24 %	20 %	56 %

Science / Research	Positiv	Neutral	Negativ
Geothermal	26 %	29 %	46 %
Wind (On- and Offshore)	49 %	25 %	26 %
Solar - PV, solar-thermal power	42 %	24 %	34 %
Hydropower	26 %	25 %	49 %
Bioenergy heat	69 %	20 %	11 %
Electricity from biomass	38 %	35 %	28 %
Liquid biofuels 1st generation	21 %	24 %	55 %
Liquid biofuels 2nd generation	28 %	26 %	46 %
Biomethane	36 %	30 %	34 %
Hydrogen from renewable sources	23 %	17 %	60 %

Services / Consulting	Positiv	Neutral	Negativ
Geothermal	25 %	35 %	40 %
Wind (On- and Offshore)	44 %	31 %	25 %
Solar - PV, solar-thermal power	44 %	27 %	29 %
Hydropower	44 %	25 %	31 %
Bioenergy heat	71 %	19 %	10 %
Electricity from biomass	45 %	34 %	21 %
Liquid biofuels 1st generation	20 %	18 %	62 %
Liquid biofuels 2nd generation	27 %	24 %	49 %
Biomethane	31 %	34 %	35 %
Hydrogen from renewable sources	19 %	29 %	52 %

Environmental / social NGO	Positiv	Neutral	Negativ
Geothermal	31 %	29 %	40 %
Wind (On- and Offshore)	38 %	36 %	27 %
Solar - PV, solar-thermal power	32 %	30 %	38 %
Hydropower	34 %	34 %	32 %
Bioenergy heat	73 %	13 %	13 %
Electricity from biomass	59 %	20 %	20 %
Liquid biofuels 1st generation	32 %	26 %	42 %
Liquid biofuels 2nd generation	32 %	29 %	39 %
Biomethane	43 %	29 %	29 %
Hydrogen from renewable sources	22 %	31 %	47 %

8.4 Need for support for market introduction

8.4.1 Data

Table *11*: Which renewable would need the most support for market introduction to contribute according to nREAP (national Renewable Energy Action Plan)? (in percent)

Total	Support necessary	Neither	No support
Hydropower	26 %	29 %	45 %
Wind - On- and Offshore	32 %	28 %	41 %
Liquid biofuels 1st generation	33 %	30 %	36 %
Geothermal	49 %	26 %	25 %
Biomethane	50 %	32 %	18 %
Electricity from biomass	53 %	27 %	20 %
Liquid biofuels 2nd generation	53 %	29 %	18 %
Solar - PV, solar-thermal power	55 %	24 %	21 %
Hydrogen from renewable sources	59 %	23 %	18 %
Bioenergy heat	60 %	21 %	19 %

Industry	Support necessary	Neutral	No support
Geothermal	50 %	27 %	23 %
Wind (On- and Offshore)	26 %	23 %	51 %
Solar - PV, solar-thermal power	52 %	18 %	29 %
Hydropower	25 %	29 %	46 %
Bioenergy heat	63 %	19 %	18 %
Electricity from biomass	56 %	21 %	23 %
Liquid biofuels 1st generation	43 %	24 %	33 %
Liquid biofuels 2nd generation	54 %	28 %	18 %
Biomethane	60 %	27 %	13 %
Hydrogen from renewable sources	65 %	17 %	19 %

Company	Support necessary	Neutral	No support
Geothermal	42 %	25 %	34 %
Wind (On- and Offshore)	31 %	22 %	47 %
Solar - PV, solar-thermal power	46 %	28 %	26 %
Hydropower	24 %	22 %	55 %
Bioenergy heat	68 %	14 %	18 %
Electricity from biomass	58 %	25 %	17 %
Liquid biofuels 1st generation	23 %	39 %	39 %
Liquid biofuels 2nd generation	43 %	29 %	29 %
Biomethane	55 %	27 %	18 %
Hydrogen from renewable sources	62 %	23 %	15 %

Association	Support necessary	Neutral	No support
Geothermal	55 %	14 %	32 %
Wind (On- and Offshore)	36 %	40 %	24 %
Solar - PV, solar-thermal power	54 %	23 %	23 %
Hydropower	17 %	17 %	65 %
Bioenergy heat	53 %	20 %	27 %
Electricity from biomass	25 %	33 %	42 %
Liquid biofuels 1st generation	41 %	23 %	36 %
Liquid biofuels 2nd generation	61 %	35 %	4 %
Biomethane	50 %	32 %	18 %
Hydrogen from renewable sources	50 %	27 %	23 %

End (energy) user	Support necessary	Neutral	No support
Bioenergy heat	78 %	10 %	11 %
Electricity from biomass	66 %	22 %	12 %
Solar - PV, solar-thermal power	61 %	20 %	19 %
Geothermal	54 %	22 %	25 %
Hydrogen from renewable sources	52 %	22 %	26 %
Hydropower	42 %	31 %	27 %
Biomethane	42 %	33 %	25 %
Liquid biofuels 2nd generation	40 %	42 %	18 %
Wind - On- and Offshore	38 %	24 %	39 %
Liquid biofuels 1st generation	27 %	44 %	29 %

Government / Policy	Support necessary	Neutral	No support
Geothermal	51 %	29 %	20 %
Wind (On- and Offshore)	26 %	32 %	42 %
Solar - PV, solar-thermal power	59 %	22 %	20 %
Hydropower	21 %	36 %	43 %
Bioenergy heat	43 %	30 %	28 %
Electricity from biomass	40 %	34 %	26 %
Liquid biofuels 1st generation	29 %	27 %	44 %
Liquid biofuels 2nd generation	58 %	23 %	19 %
Biomethane	50 %	33 %	17 %
Hydrogen from renewable sources	53 %	34 %	13 %

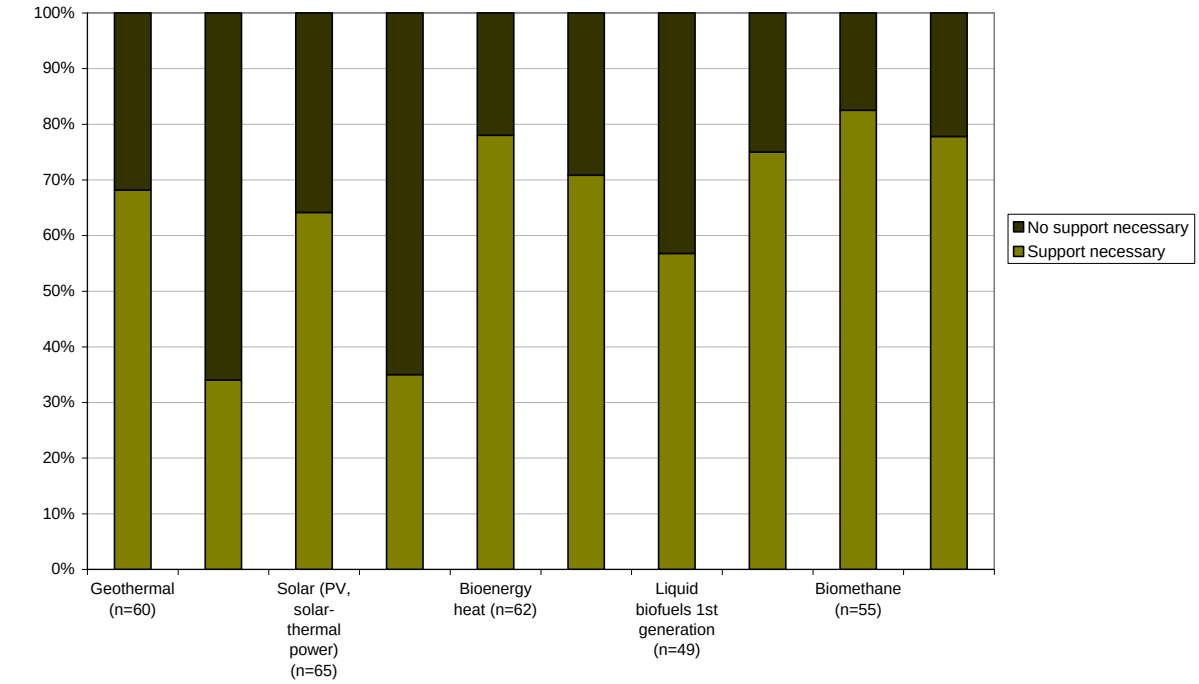
Science / Research	Support necessary	Neutral	No support
Geothermal	47 %	25 %	27 %
Wind (On- and Offshore)	31 %	29 %	40 %
Solar - PV, solar-thermal power	56 %	26 %	19 %
Hydropower	20 %	25 %	55 %
Bioenergy heat	53 %	26 %	20 %
Electricity from biomass	50 %	29 %	21 %
Liquid biofuels 1st generation	35 %	30 %	35 %
Liquid biofuels 2nd generation	63 %	28 %	10 %
Biomethane	56 %	30 %	15 %
Hydrogen from renewable sources	64 %	19 %	17 %

Services / Consulting	Support necessary	Neutral	No support
Geothermal	47 %	34 %	19 %
Wind (On- and Offshore)	35 %	28 %	36 %
Solar - PV, solar-thermal power	60 %	27 %	13 %
Hydropower	24 %	34 %	41 %
Bioenergy heat	54 %	27 %	19 %
Electricity from biomass	54 %	30 %	16 %
Liquid biofuels 1st generation	33 %	27 %	40 %
Liquid biofuels 2nd generation	52 %	22 %	26 %
Biomethane	43 %	36 %	20 %
Hydrogen from renewable sources	63 %	20 %	17 %

Environmental / social NGO	Support necessary	Neutral	No support
Geothermal	49 %	24 %	27 %
Wind (On- and Offshore)	30 %	30 %	40 %
Solar - PV, solar-thermal power	44 %	22 %	34 %
Hydropower	31 %	36 %	33 %
Bioenergy heat	64 %	19 %	17 %
Electricity from biomass	62 %	23 %	15 %
Liquid biofuels 1st generation	38 %	25 %	38 %
Liquid biofuels 2nd generation	42 %	35 %	23 %
Biomethane	42 %	45 %	13 %
Hydrogen from renewable sources	42 %	39 %	18 %

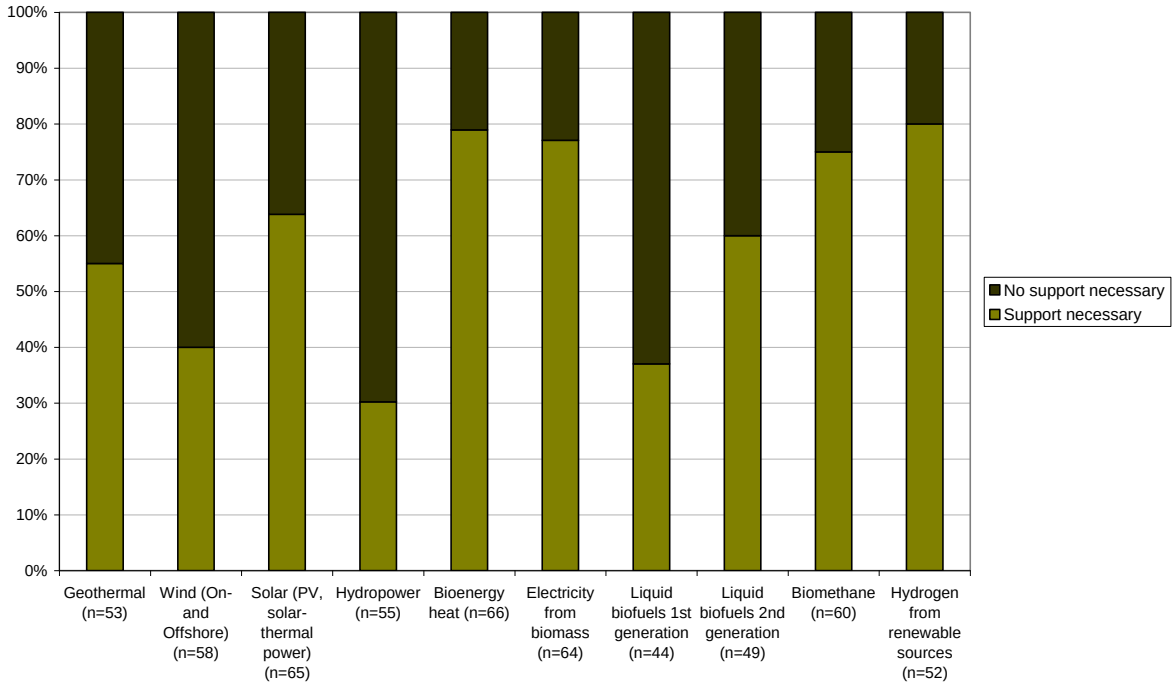
8.4.2 Figures

8.4.2.1 Industry



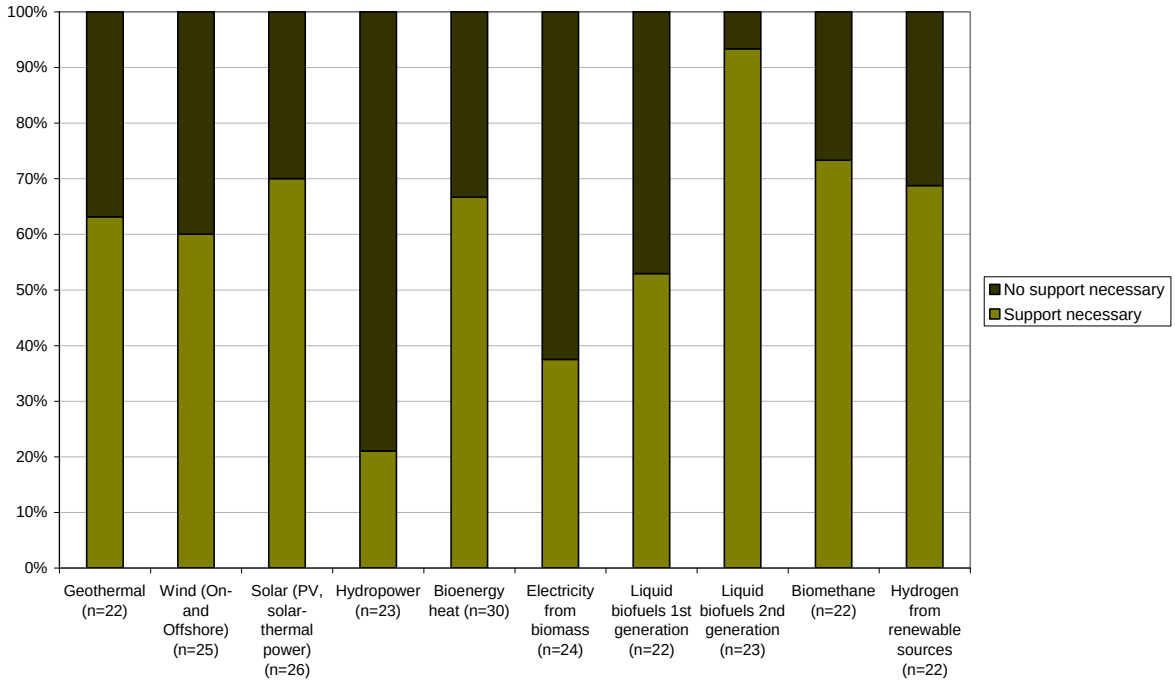
Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.2 Company



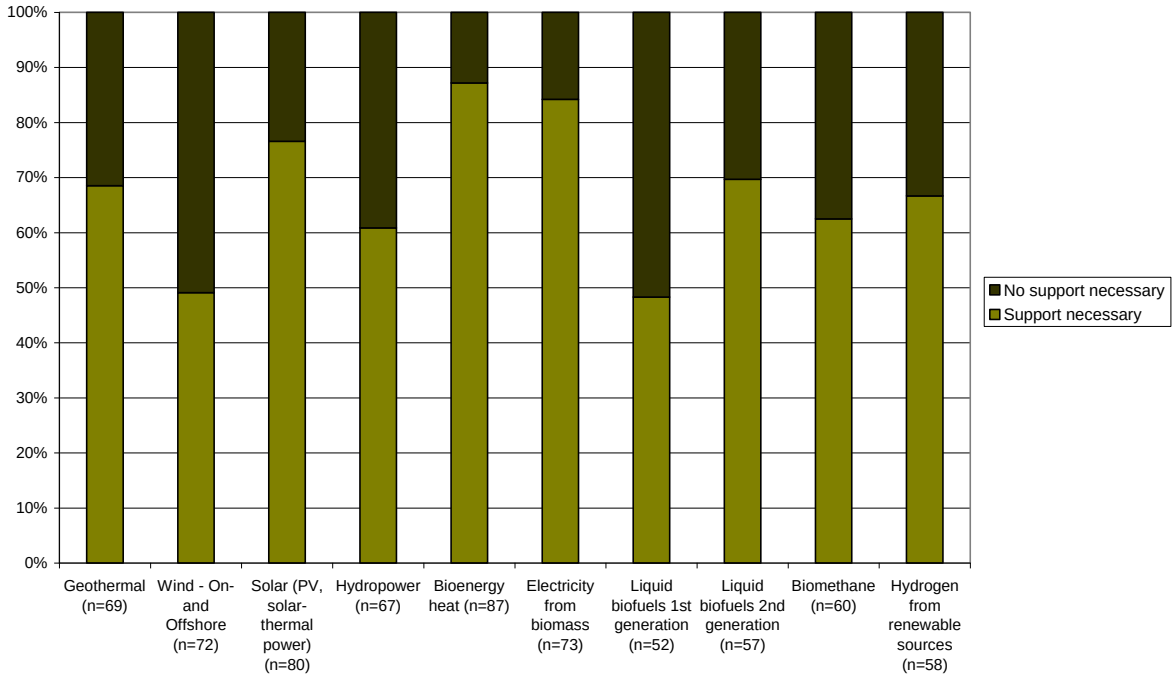
Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.3 Association



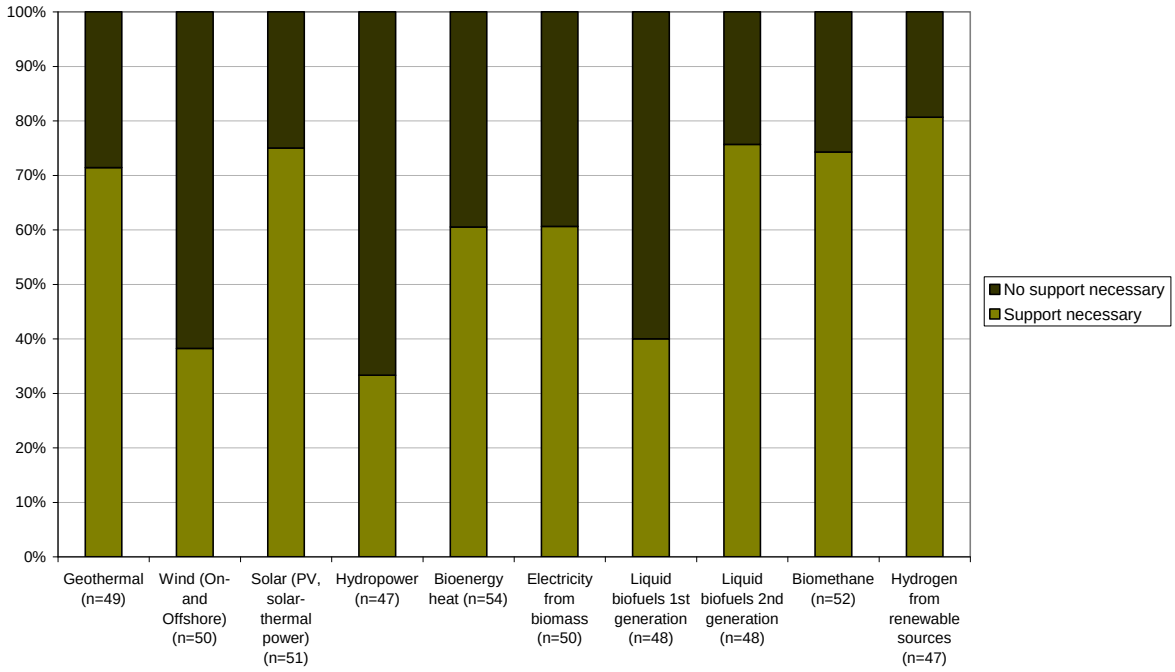
Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.4 End (energy) user



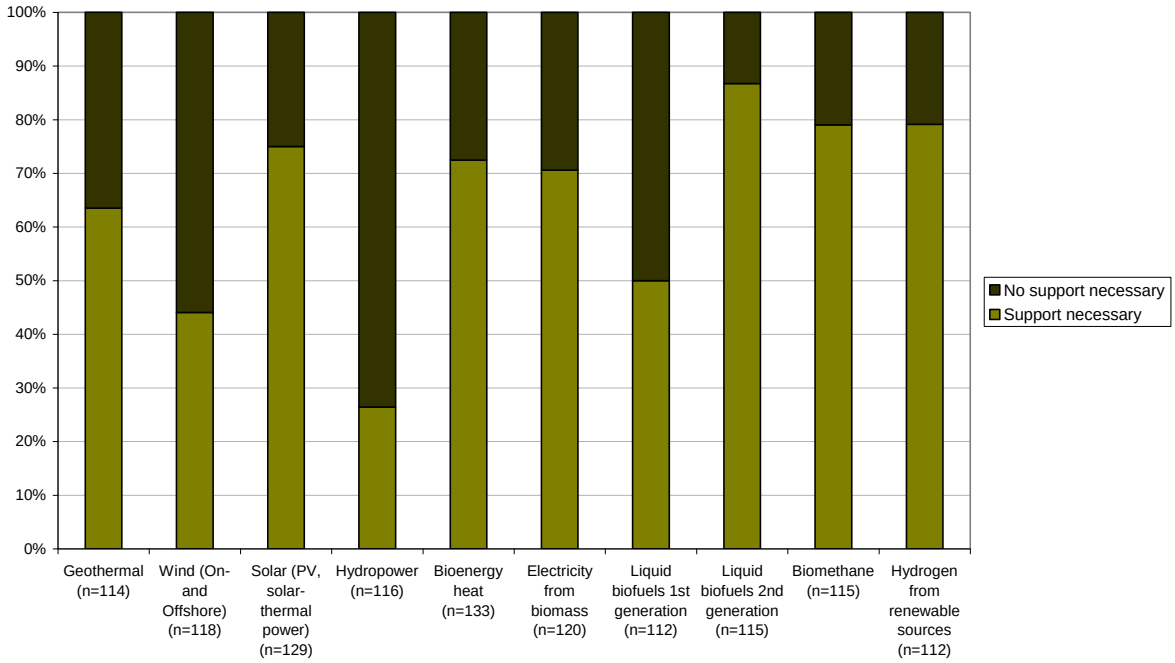
Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.5 Government / Policy



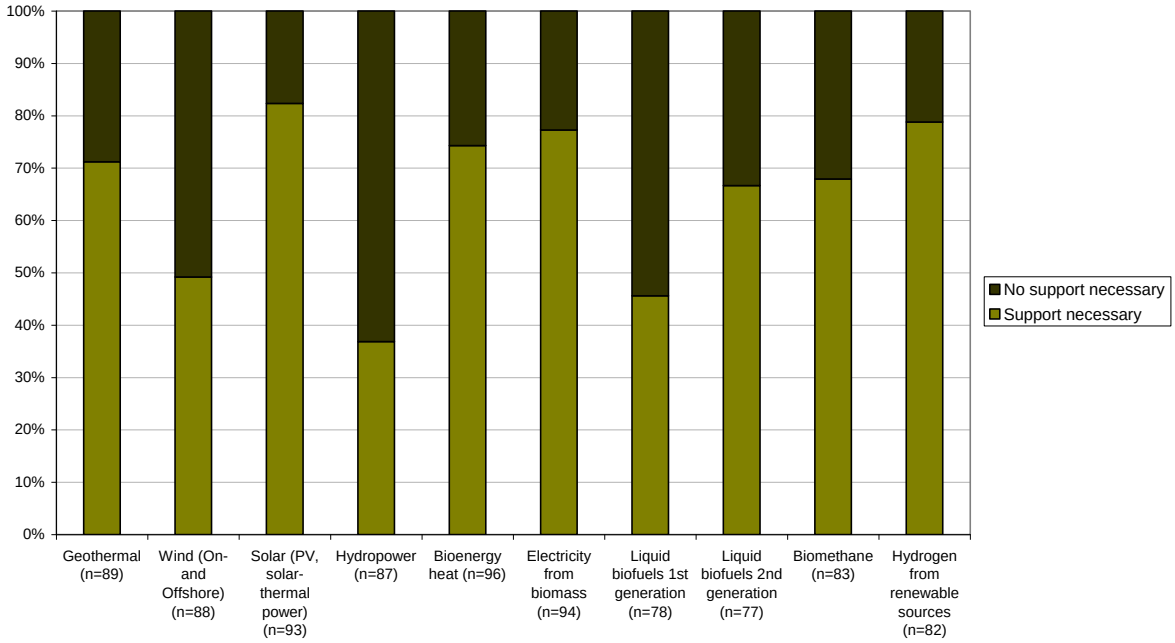
Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.6 Science / Research



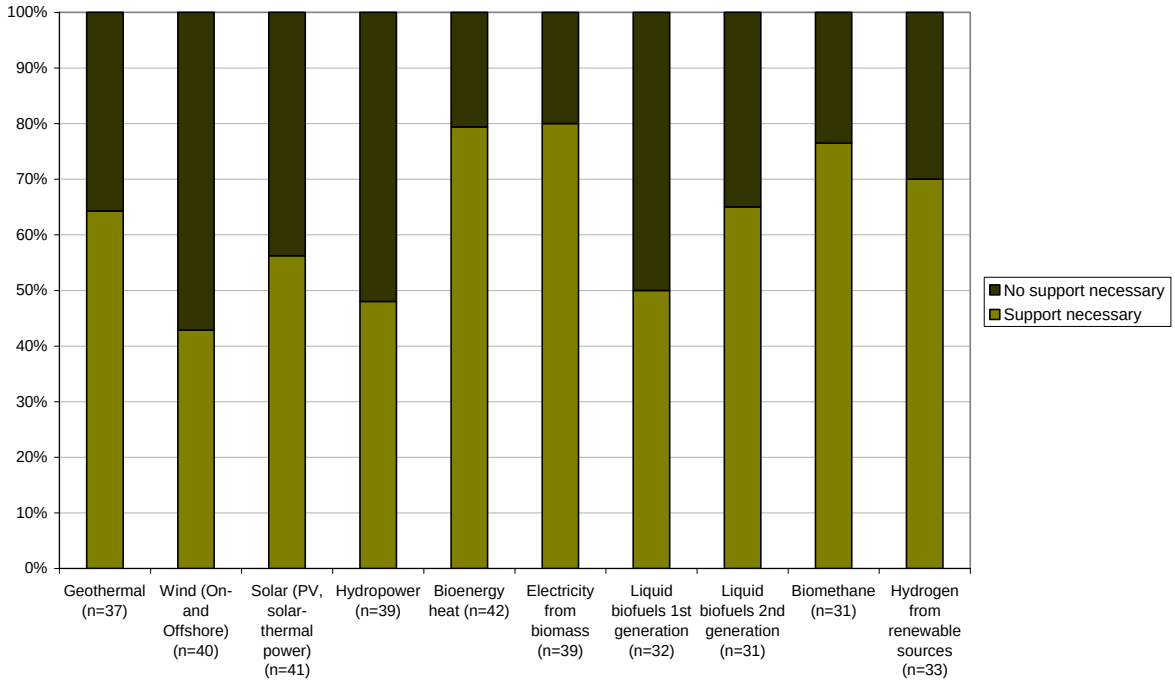
Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.7 Services / Consulting



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5

8.4.2.8 Environmental / social NGO



Question: Which renewable would need the most support for market introduction to contribute according to nREAP (indicate 1 to 5, 1 = most support, 5 = least support) | Support necessary = categories 1 & 2, No support = categories 4 & 5