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fcn Institute for Future
Energy Consumer Needs
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Climate Policies and the Electricity Sector in Europe: Insights from a Web-based Survey conducted among stakeholders in selected European countries

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Abbreviations and acknowledgements

Abbreviations used

CCS	Carbon capture and storage
CEO	Chief executive officer
ETS	Emission Trading System
EU	European Union
GHG	Greenhouse gases
NGO	Non-governmental organisation
R&D	Research & Development

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Executive Summary

The European electricity sector accounts for some 40% of greenhouse gas emissions in a 'business-as-usual' scenario, and provides about 70% of the emission reductions by 2020 (cf. ADAM Interim Results brochure, p.22). Hence the electricity sector plays a crucial role in any climate change mitigation strategy, and the question of political feasibility of reaching the ambitious EU 2020 target of reducing GHG emissions by 20% is an important one.

The aim of this report is to summarize the results of a web-based questionnaire study on the beliefs and expectations of CEOs of electricity companies and other decision-makers and opinion leaders in selected European countries. The beliefs and expectations concern the feasibility and effectiveness of climate policies with a view on the European electricity sector. The survey was conducted from February till September 2008, while the questionnaire was developed and pre-tested during 2007. Due to budgetary limitations, and the challenge to address CEOs directly, only four European countries are covered by the survey study: Austria, Germany, Norway, and Switzerland.

The questions included in the survey can be categorised in four groups: (1) questions about the general characteristics of the respondents and their organizations; (2) questions with respect to European climate policy targets; (3) questions about technology development; and (4) questions about political feasibility of climate policy targets and influencing activities. This grouping is in line with the emphasis of the related work package "P3c" within the ADAM project with regard to rather low cost and short-term emission reductions that can be achieved by: (1) greater efficiency in the use of electricity and energy in general; (2) fossil fuel substitution at the final energy level, particularly towards natural gas and renewables; (3) deployment of known carbon-free or low-carbon technologies, such as wind power, nuclear energy, biomass and carbon capture and storage (CCS); and (4) reduced output (or relatively slow output growth) due to more efficient use of materials in sectors with energy-intensive products like steel, primary aluminium, fertilizers, cement, pulp & paper, glass and ceramics.

In total 543 invitations to complete the Web-based questionnaire were sent out to high-level decision-makers in the four countries mentioned, of which 57 were returned (rate of response: 10.8%). Due to the relatively small sample size, only a limited number of statistical testing was possible, and the results obtained have to be interpreted with some caution. Moreover, no conclusions with respect to the representativeness of the results obtained for the four countries can be made for Europe as a whole and, specifically, no statistical testing for significant differences in the answering behaviour between the four countries was possible.

1. Findings at the individual question level (over all stakeholder groups)

The main results and conclusions from the study at the individual question level can be summarized as follows (for further details see the individual sections):

a) Policy targets (Q 7-9)

- More than half of the respondents consider the level of ambition of the EU greenhouse gas emission reduction target of 20% about right. On average, the stakeholders agree strongly with the statement that private households will face a significant cost burden due to climate policy measures, and the same applies (to a lesser extent) for electricity producers. Regarding the burden that falls on government and the public budget, on average the respondents are rather indifferent, and they slightly disagree with the statement that the main cost burden will fall on developing countries.
- The assumption that the climate policy target of the EU is too ambitious did not prove right: only one third (31.6%) of all respondents rated the target as too ambitious. Tests show that respondents who rated the target as 'too ambitious' ($N=18$) more often believe that the target will not be achieved or will be abandoned (12 out of 18=66.6%) than the respondents who think it is 'about right' or 'too modest' ($N=39$, 10 out of 39=25.6%). Hence it seems plausible to assume that most of the respondents who consider the target as too ambitious do so because they do not believe in the potential of emission credit purchases. Note, however, that this interpretation does not imply that there are no other reasons for thinking that the target is too ambitious (e.g. costs).
- Among all respondents who are of the opinion that the EU greenhouse gas emission mitigation target will actually be achieved (61.5% of all respondents), two thirds think that a heavy reliance on purchases of emission reduction credits from outside of the EU is necessary.
- The (cost) burden of climate change is believed to be borne mainly by private households ($m=4.18$ on a scale of 1='strongly disagree' to 5='strongly agree'). Most respondents do not believe that the burden is to be borne by poor countries ($m=2.48$).

b) Energy technology development (Q 10-12)

b.1 Technological ability to reduce GHG emissions in a cost-effective way:

- On average, respondents rated energy efficiency improvements among electricity end-users as the most important option for cost-effective, significant greenhouse gas emission reductions in the short and medium term, followed by additional hydro-power, wind power, biomass, and additional nuclear power plants, while solar power, geothermal power and CCS were rated lower than the mean (in decreasing order), indicating a slight disagreement with the statement.

- In contrast, over the next 10-20 years, on average respondents considered again energy efficiency improvements among end-users as most cost-effective and significant, followed this time by hydro power, wind power, and nuclear power. These three are then followed by solar and geothermal power. CCS, in contrast, with a score of 2.89 somewhat below the mean, was considered as less suitable or uncertain to be realised in the short time until 2020..
- With respect to targeted investments in technological R&D to reach significant emission reduction emissions in the coming 10-20 years, respondents again strongly favour efficiency improvements among electricity end-user, followed with some distance but still in a favourable way by solar and wind power, biomass, geothermal power, additional nuclear power and additional hydro-power (in descending order of agreement).
- The potential of wind power, additional hydropower and biomass (but not solar and geothermal power) to deliver significant emission reductions *in a cost-effective way* is perceived as far better than CSS from fossil-fuel plants, and about the same as additional nuclear power.
- Renewables are seen as more important than CCS in Europe and about equally important as nuclear power. CCS is only perceived as equally important as renewables if there are additional impacts through investments in technological R&D.

b.2 Public acceptance (Q 13)

- In terms of public acceptance gains of technological options to combat climate change within the next 5-10 years, respondents rate (on average) energy efficiency improvements among end-users as highest, followed by solar power, biomass, geothermal power, additional hydro power, wind power, CCS, and additional nuclear power. All of these options were rated positively, and are listed again in descending order of agreement with the statement posed.

b.3 Effectiveness of policy instruments supplementary to emission permits (Q14)

- None of the supplementary policy options offered are considered as highly effective by the respondents to deliver significant (e.g. 20%) greenhouse gas emissions by 2020 (all scores were between 3.3 and 4). In relative terms, standards for energy-efficient appliances are ranked highest, followed by governmental R&D support, tax incentives for green power projects, emission taxes, education of professionals, feed-in tariffs, direct investment cost subsidies, green certificates, and energy labelling.

c) Political feasibility and influencing activities

- In this thematic group, we first tried to shed light on opinions about required change of framework conditions with regard to the increased feasibility of more ambitious

greenhouse gas emission targets (Q 15). Respondents consider strong cooperation with industrialized countries highest, followed by cooperation with developing countries, development of new technologies, CCS, international R&D cooperation focusing on new technologies, public reporting in the EU, change in public opinion about nuclear power, and public reporting in poor countries.

- As a second item, we investigated intentions for long-term R&D investments in climate-friendly technologies for electricity supply and end-use (Q 16). Interestingly, more than two thirds confirmed such company activities, of which one third consider governmental support as important in this respect, while the rest apparently undertakes such activities also with little or no governmental support.
- Third, we asked about the credibility of policies with respect to how well they are suited to make climate-friendly policies profitable (Q 17). On average, respondents agreed most strongly with policies coordinated internationally, a combination of policies, emission permit systems, modest emission taxes, and governmental R&D support.
- Fourth, we investigated opinions concerning the favourable configuration of emission trading systems such as the ETS (Q18). The highest ranking of the respondents, on average, was given to grandfathering of permits, while they were indifferent about the statement that even in the long term, given strict emission reduction targets, permits must be given for free to greenhouse-gas intensive firms. Respondents somewhat disagreed (score 2.5) with the statement that firms about to make important decisions (e.g. closure of old or investment in new plants) would invest irrespective of future grandfathering.
- Fifth, we studied the respondents' opinions about the capacity of policy options to enhance political feasibility of strict emission targets alongside a greenhouse gas cap & trade system (Q 19). Only emission taxes starting at a low level and being escalated over time are ranked somewhat higher than "important", while governmental R&D support is considered "important" and, less so, policies shielding industrial users from climate change policies, policies shielding vulnerable groups of society from tariff increases, grandfathered emission permits, and protective policy measures (in decreasing rank order).
- Sixth, we analyzed the importance given to different channels for seeking influence on energy and climate policies (Q 20). All answers, on average, were slightly above the mean value of two (1 indicating "unimportant", 2 "important", and 3 "very important"). Direct interaction with national politicians/governmental administration ranked highest, followed by indirect interaction through intermediaries, indirect EU-level in-

teraction through intermediaries, and direct interaction with EU politicians or officials.

- Next, we investigated successful lobbying activities for or against policies (Q 21). Respondents on average ranked the importance for employment/growth on top, followed by preparedness for lobbying, firm size, production shifts outside of the EU, and production shifts to other EU member countries (the latter receiving a lower ranking than the indifference value).
- Finally, we asked about the rating of current EU climate policy (Q 22). All answers are within a narrow bandwidth and indicate a slight agreement with the statements given. The strongest agreement is with the statement that the EU's current climate policy is of little help to change the global situation, followed by the statement that insufficient consultation with the key stakeholders is taking place, that key shareholders are addressed, and that climate policy is shaped without sufficient stakeholder consultation.

2. Stakeholder group level (significant differences in the answers)

At the stakeholder group level, we find no statistically significant differences in the answers to questions Q 7 (GHG target rating), Q 8 (Actual achievement of GHG target), Q 9 (Burden sharing), Q 16 (R&D investment), Q 20 (Channels for policy influence), Q21 (Firm characteristics influencing lobbying), and some of the sub-questions (for a list of all significant test results see Appendix B). The main results and conclusions at the stakeholder group level can be summarised as follows (we only considered electricity providers, electricity-intensive companies, and technology manufacturers):

- *Energy technology development:* Electricity companies as well as electricity-intensive companies rate the ability of additional nuclear power to deliver significant emission reductions in a cost effective way in the short term *and* in the long term better than technology manufacturers (Q 10 and Q 11). Only in the case of targeted investments in technological R&D in nuclear power there are no significant differences between technology manufacturers and producers/distributors, and users respectively (Q 12). In contrast, technology manufacturers ascribe more potential to the technologies of biomass and wind power than the other two stakeholder groups (Q 10–Q 12). All three groups perceive efficiency improvements among electricity end-users as by far the best way to reduce GHG emissions significantly and in a cost effective way, both in the short as well as in the longer term (Q 10–Q 12). With respect to CCS, no statistically significant difference in the assessment can be found among the three stakeholder groups (Q 10c–Q 12c). Similarly, electricity companies hold a stronger believe than technology manufacturers that over the next 5-10 years additional nuclear power

will gain public acceptance. Whereas electricity-intensive companies correspond to the electricity companies concerning the potential of nuclear power to reduce emissions in the short and long term, they agree with the technology manufacturers concerning the gain of public acceptance of additional nuclear power. All three groups think that the hope for gains in public acceptance of additional nuclear power is smaller than for any other technology (Q 13).

- *Supplementary policy instruments (Q 14):* All three stakeholder groups rate the effectiveness in delivering significant emission reductions by 2020 of all possible supplementary policy instruments (along with the main policy instrument of emission permits) approximately the same. On the stakeholder group level, we find that electricity companies and technology manufacturers rate the effectiveness of feed-in tariffs and green certificates much better than electricity-intensive companies (Q 14c,d). Additionally, electricity providers perceive emission taxes as more effective than electricity-intensive companies (Q 14b). Electricity suppliers and technology manufacturers do not differ in their rating of the three supplementary policy instruments feed-in tariffs, green certificates, and emission taxes. However, they do differ in their rating of two other supplementary policy instruments: Electricity companies rated the effectiveness of governmental support for R&D much better than technology manufacturers (Q 14a). Technology manufacturers as well as electricity-intensive companies rated energy labelling as more effective than electricity companies (Q 14i).
- *Political feasibility of stricter European GHG emission targets:* Concerning the importance of potential developments in terms of how they could strengthen the political feasibility of stricter European GHG emission targets, three developments are seen as most important among the three stakeholder groups: developments of new technologies, strong cooperation with industrialized countries, and strong cooperation with emerging/developing countries. The three groups, however, differ in the rating of less important developments. Corresponding to the finding that electricity companies rated nuclear power as more effective regarding its ability to deliver significant emission reductions than the other two stakeholder groups, electricity companies think more than technology manufacturers and electricity-intensive companies that a change in the public opinion about nuclear power is an important development to strengthen the political feasibility of stricter European GHG emission targets (Q 15d). Electricity companies rate public reporting on observable climate change and costs of adaptation in poor countries as less important than technology manufacturers.
- Regarding the question which policy would be most convincing for actually making climate-friendly technologies, it is not surprising that all three stakeholder groups favour the combination (and international coordination) of all policies stated. At the sin-

gle-policy-instrument level, electricity companies are more convinced of emission permit systems than technology manufacturers.

- *Configuration of an emission trading system (such as the ETS):* While across all groups of respondents 'grandfathering' gets the highest ranking, electricity-intensive companies rank the statement highest that even in the long term free permits must be given to GHG-intensive firms (Q 18c), significantly higher than electricity companies and technology manufacturers. Technology manufacturers rate free permits from the government considerably lower than electricity companies (Q 18a).
- *Capacity of policy options:* Starting with low emission taxes that are then escalated over time is considered most important for the political feasibility of strict emission reduction targets (Q 19). However, on the stakeholder group level this does not apply for electricity-intensive companies, which rate policies as most important that shield industrial users from electricity tariff increases due to climate change policies (Q 19d, GHG emission and technology manufacturing). Electricity-intensive companies find governmental support for R&D less important than electricity companies and technology manufacturers (Q 19f). Regarding free emission permits as a means to make strict emission reduction targets politically feasible, electricity-intensive companies are between technology manufacturers and electricity companies (Q 19a). Electricity companies rate free emission permits better than electricity-intensive companies, which rate them better than technology manufacturers. Overall, free permits are not seen as a very good means to make strict GHG emission reduction targets politically feasible. Still, evaluating the findings about the two policy options, which overall was rated as the two most important ones (governmental support for R&D, low starting emission taxes), we can learn that there is not much consensus among the stakeholder groups on this subject.
- *Rating and acceptance of current EU climate policy:* Electricity-intensive companies think much more than electricity companies and technology manufacturers that the current policy takes shape without sufficient consultation of stakeholders (Q 22b,d). The acceptance of the EU policy targets is highest amongst technology manufacturers (87.5% of the respondents find them 'about right'), followed by electricity producers/distributors (50% find them 'about right'), and users (25% find them 'about right'). The other respondents found them either as 'too modest' or 'too ambitious'.

1. Introduction

1.1. Aim and scope of the study

This report summarizes the set-up and the main results of a web-based questionnaire study on the beliefs and expectations of Chief Executive Officers (CEOs) of electricity companies and other decision-makers and opinion leaders in selected European countries concerning climate change mitigation and adaptation policies and the electricity sector in Europe. The research was conducted between February and May 2008 (Austria, Germany, Norway) and between August and September 2008 (Norway). The countries covered by the survey study are Austria, Germany, Norway, and Switzerland (for Norway, only addresses of executives from electric utilities were available to us).

The aim of the study was to provide input for improving the Policy Appraisal Framework (PAF), applied to the European electricity sector (cf. ADAM Report D-P1.3a).

The main scope of the study was to better understand

- the impact of adaptation and mitigation policy measures and policy mixes on the demand for electricity services in Europe;
- the impact of market regulation on the behaviour of firms in the electricity sector;
- the long-term implications and investment decisions within the European electricity sector.

Altogether five target groups were initially envisaged for the survey: (1) electric utilities; (2) energy-intensive industries; (3) technology manufacturers; (4) consumer and industry associations/NGOs; and (5) public administrations dealing with electricity and climate policy issues in Europe (i.e. governmental and policy-making bodies). Due to the heterogeneity and also the difficulties of obtaining a sufficient number of email addresses (and thus also responses) from executive stakeholders in the latter two stakeholder groups, we decided to form three stakeholder groups only: electricity producers / distributors, electricity-intensive industries (electricity users), and technology manufacturers.

1.2. Research questions

The aim of this study was to elicit opinions of decision-makers regarding their appraisal of European climate policy.

In the following, we have listed the eight research hypotheses followed in this study. In brackets, we refer to the questions that tackle the hypotheses.

1. Current EU greenhouse gas emission target (-20% by 2020 compared to 1990) are considered about right, but rated as too expensive (Q 7, Q 8).
2. Since the EU greenhouse gas emission target (-20% by 2020 compared to 1990) is considered as too ambitious, targets will not be achieved or abandoned (Q 7, Q 8).
3. If the current EU greenhouse gas emission target (-20% by 2020 compared to 1990) is to be achieved, the belief is that this will only happen with heavy reliance on purchases of emission reduction credits from outside the EU (Q 8).
4. The burden of climate change (impacts, need for adaptation) is believed to be borne by poorer countries (Q 9).
5. Renewables are perceived as being promoted too much at the expense of solutions other than renewables (Q 10).
6. The 20% renewables target of the EU is believed to be too costly and will thus not be reached. (Q 11).
7. Nuclear power and carbon capture and storage (CCS) are seen as more important for delivering significant emission reductions than renewables (Q 10-12).
8. Climate change policy has to be accompanied by supplementary policy measures (Q 14).

1.3. Structure of the report

This report gives an overview of the aim and scope of the study and the specific research questions posed, the methodology adopted for addressing the research questions, the results that were obtained from the survey, and the conclusions that could be reached. The organization of the remainder of this report is the following. Section 2 introduces the methodology adopted, Section 3 presents the results, while Section 4 discusses the findings and concludes.

2. Methodology

The aim of this survey is to ask high-level decision-makers for their appraisal of issues surrounding climate policies affecting the European electricity sector. Since it is very difficult to approach CEOs directly, we decided in favour of a Web-based survey in which we used, and partly constructed, the personal e-Mail addresses of the CEOs instead of using the ones provided on the company's websites (e.g. press officers, secretariats, deputy-heads). This decision can be justified for at least two reasons. First, our budget was limited. Second, we assumed that the chance that a CEO would answer our questionnaire spontaneously in a self-determined moment of time is higher than getting a CEO on the telephone.

The questionnaire used for the survey was developed in 2007 by the four researchers listed on the cover and inside cover page of this report (J. Artho, G. Eskeland, E. Jochem, R. Madlener) along the lines of the research hypotheses posed. Some pre-testing was done with intermediate versions of the questionnaire, eventually leading to the questionnaire reported in the Appendix. A visual impression of the design of the Web version is given by Figure 1.

The survey itself in the four countries studied was then conducted sequentially, starting with Norway, in order to enable necessary modifications in case of any problems that may occur (e.g. misunderstanding with certain questions or the like).

Climate Policies and the Electricity Sector in Europe :: II - Greenhouse Gas Mitigation and Adaption

ADAM
Adaptation and Mitigation

Climate Policies and the Electricity Sector in Europe
0% 100%

The EU has committed itself to achieve a 20% reduction target for greenhouse gas emissions by 2020 compared to 1990 levels.

7. In your opinion of what **should happen**, how would you rate this target for the EU economy as a whole? (please check only one)

Too modest
 About right
 Too ambitious

8. In terms of what **will realistically happen**, do you think that the 20% greenhouse gas reduction target is actually going to be achieved? (please check only one)

Yes, and without much reliance (<25% on emission reduction credits purchases from outside the EU
 Yes, but with heavy reliance (>75% on purchases of emission reduction credits from outside the EU (>75%)
 No, it will either be abandoned early or simply not achieved by 2020

9. In the light of climate change and a **need to adapt to climate change in this century**, in your view how will the cost burden be carried among the following stakeholders?

	Strongly agree		neither agree nor disagree		Completely disagree
In the country you are based in, the principal cost burden of adapting to climate change will fall on government / the public budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the country you are based in, Electricity producers and distributors will face a significant cost burden of adapting to climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the country you are based in, private households will face a significant cost burden of adapting to climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The principal cost burden of adapting to climate change will be borne by poor developing countries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<< prev next >>

Figure 1. The Online Web questionnaire (excerpt)

The addresses of the decision-makers in the various types of companies and/or organizations addressed were compiled by teams in Austria, Germany, Norway and Switzerland as follows:

- Austria: Institute for Future Energy Consumer Needs and Behavior (FCN), RWTH Aachen University, Aachen, Germany;
- Germany: Fraunhofer Institute Systems and Innovation Research (ISI), Karlsruhe, Germany;
- Norway: EBL, Norwegian Electricity Industry Association (provided by Gunnar Eskeland, CICERO, Oslo, Norway);
- Switzerland: Centre for Energy Policy and Economics (CEPE), Swiss Federal Institute of Technology Zurich (ETH Zurich), Zurich, Switzerland.

The survey itself was conducted according to the time schedule depicted in Table 1. As can be seen, with the exception of Switzerland, two reminders were sent out in order to raise the response rate further.

Tabelle 1: Time schedule of the survey, by country, including reminders

	Austria	Germany	Norway	Switzerland
First Mailing	25 Feb 2008	25 Feb 2008	7 Feb 2008	19 Aug 2008
First Reminder	20 Mar 2008	20 Mar 2008	25 Feb 2008	16 Sep 2008
Second Reminder	6 May 2008	6 May 2008	20 Mar 2008	

3. Results

In this section we present the sample size, the characteristics of the respondents’s organisations, and the results. Due to the relatively small sample size by country (between 11 and 20 answers across all stakeholders), we have refrained from presenting the results on a country level, as in general no significant results can be obtained. We have, however, tested for the statistical significance of differences in the answers obtained from the individual groups of stakeholders surveyed. These results are presented in subsection 3.5, while the subsections that follow next present the results as they were grouped in the questionnaire, i.e. in ascending order of the questions posed.

3.1. Overview

Table 2 depicts the sample size by country and the return quota, both in absolute numbers and in %. As can be seen Germany accounts for 35.1% of the respondents, followed by Austria (26.3%), Norway and Switzerland (19.3% each). As can be seen, there is a bias in that the number of respondents from German-speaking countries is much higher than that from Norway. Note that other biases (e.g. regarding the representativeness of the survey results for Europe) cannot be determined.

Table 2. Sample sizes and response rates, by country.

	N					% of cases				
	AT	GE	NO	CH	Total	AT	GE	NO	CH	Total
Sent out	139	163	178	63	543	25.6	30.0	32.8	11.6	100.0
Returned	15	20	11	11	57	26.3	35.1	19.3	19.3	100.0
Return in %	10.8	12.3	6.2	17.5	10.5					

Nomenclature: AT = Austria, GE = Germany, NO = Norway, CH = Switzerland

Table 2 shows the frequency distribution of the respondent’s organizations by type of organisation or company. Electricity users in electricity-intensive sectors are most frequent (21.1%), followed by respondents from electricity transmission or distribution companies (17.5%), electricity producers and technology manufacturers of equipment for electricity producers (14% each), NGOs (10.5%), electricity industry associations (8.8%), and governmental or policy-making bodies (1.8%). The category ‘Others’ accounts for 12.3%.

Table 3: Categorisation of respondent's organisations by function

Question 3: How can your company / organisation be categorised (mainly)?		
	N	% of cases
Electricity producer	8	14.0
Electricity transmission / distribution company	10	17.5
Electricity user in an electricity-intensive sector	12	21.1
Manufacturer of technology / equipment for electricity producers use (e.g. electric motors, appliances)	8	14.0
Industry association for any of the above-mentioned	5	8.8
Governmental or policy-making body	1	1.8
Non-governmental organisation (typically not for profit)	6	10.5
Other	7	12.3
Total	57	100

From

Table 4 it can be seen that most companies or organisations of the respondents are dealing with new renewable energies (28.9%), hydro-electric power (24.4%), fossil fuel-based power (22.2%), and nuclear power (15.6%), while the remaining 8.9% belong to businesses not explicitly distinguished.

Table 4. Categorisation of respondent's organisations by energy source (multiple responses possible)

Question 5: What is your company's / organisation's main business focus? (multiple responses possible)		
	N	% of answers
Fossil fuel-based power	10	22.2
Nuclear power	7	15.6
Hydro-electric power	11	24.4
New renewable energies	13	28.9
Not applicable / other	4	8.9
Total	45	100

3.2. Specific results with respect to policy targets

3.2.1. Rating of general target

Question 7 addressed the level of ambition assigned to the EU greenhouse gas emission reduction target of 20% (2020, relative to 1990 levels), relative to what *should* happen in Europe to combat climate change. As Figure 2 shows, more than half of the respondents (52.6%) consider the target about right, whereas 31.6% consider it as overly ambitious and 15.8% as too modest.

The EU has committed itself to achieve a 20% reduction target for greenhouse gas emissions by 2020 compared to 1990 levels.

Q 7: In your opinion of what should happen, how would you rate this target for the EU economy as a whole?

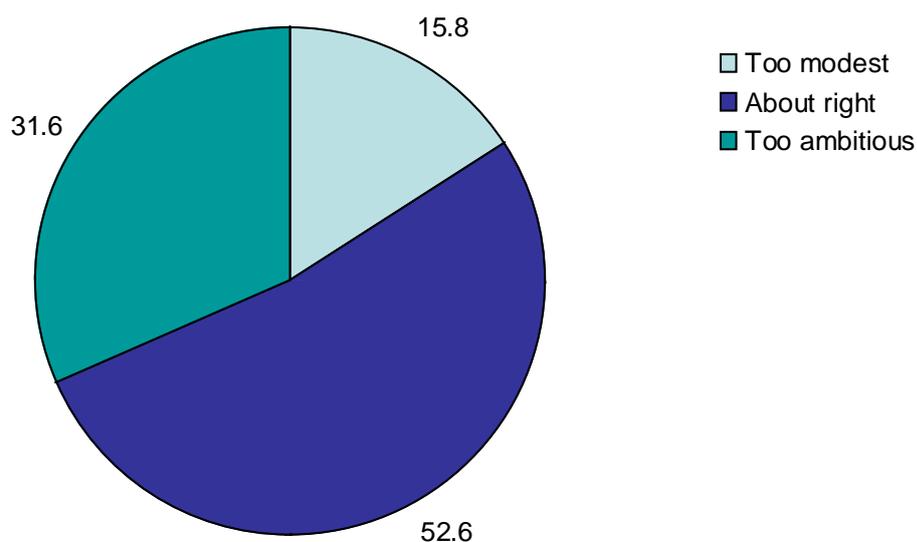


Figure 2. Degree of ambition of the 20% greenhouse gas emission reduction target of the EU, relative of what should happen (in %)

Question 8 addressed the assessment whether the EU policy target for emission reduction will realistically be achieved or not. 38.6% of the respondents do not believe that this will be the case (Figure 3); 40.4% of the respondents think the target will only be achieved with heavy reliance (> 75%) on emission reduction credits purchases from outside the EU, and only 21.1% of the respondents believe in an achievement of the target without much reliance on emission reduction credits purchases from outside the EU.

Q 8: In terms of what will realistically happen, do you think that the 20% greenhouse gas reduction target is actually going to be achieved?

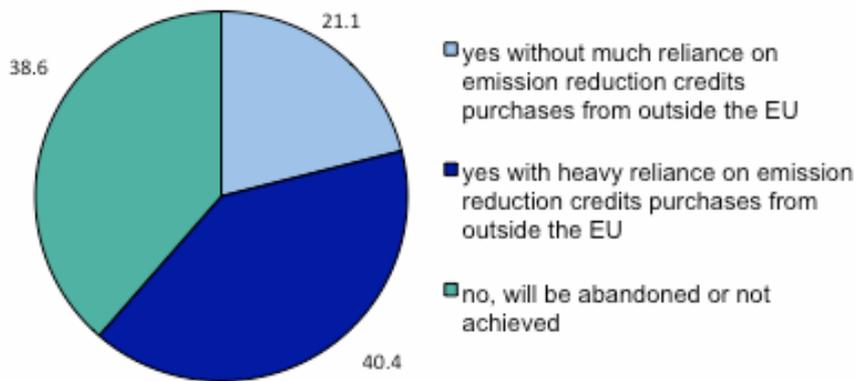


Figure 3. Perceived likelihood of actually achieving the EU greenhouse emission reduction targets

3.2.2. Burden sharing

In Question 9, we have asked the respondents about their opinions with regard to the sharing of the cost burden among stakeholders that arises from the need to adapt to climate change. Figure 4 shows the results. It can be seen that on average the stakeholders agree quite strongly with the statement that private households will face a significant cost burden (mean = 4.18), and tentatively also think that electricity producers will face a significant cost burden (3.39). They are rather indifferent with respect to the statement that the principal cost burden falls on the government/public budget (2.96), while they tend to slightly disagree with the statement that the principal cost burden falls on developing countries (2.48).

Q 9: In the light of climate change and a need to adapt to climate change in this century, in your view how will the cost burden be carried among the following stakeholders?

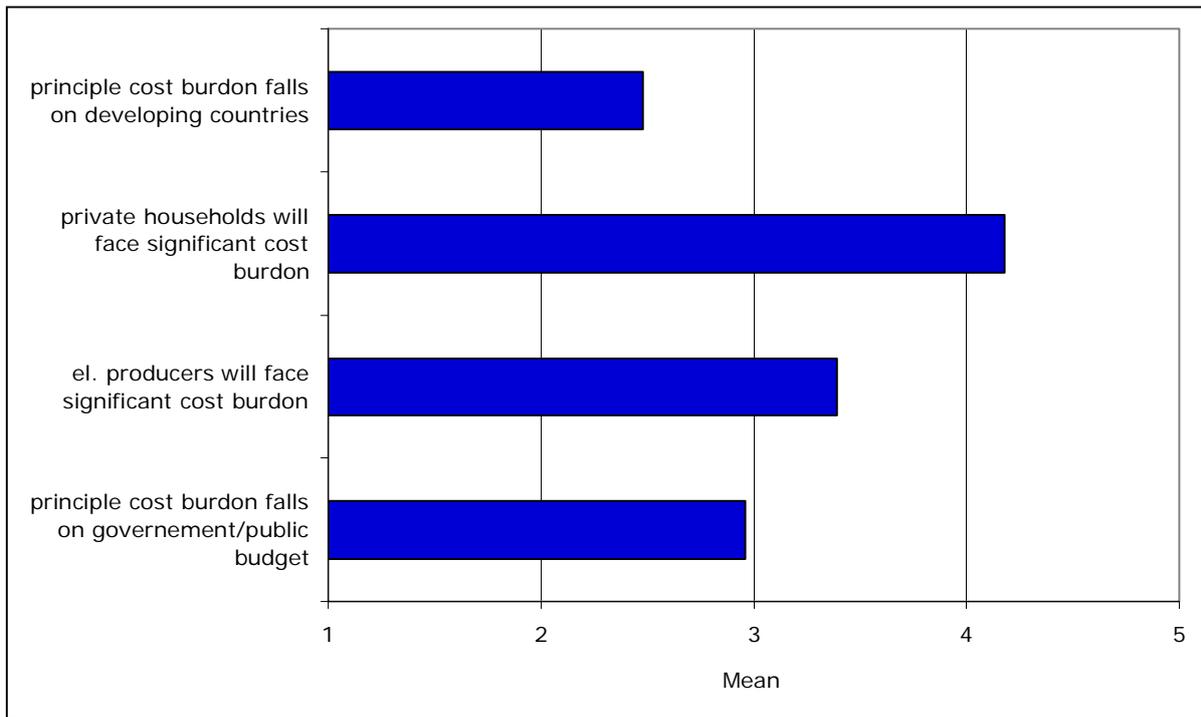


Figure 4. Burden sharing amongst stakeholders (1 = strongly disagree, 5 = strongly agree)

3.3. Energy technology development

3.3.1. Perceived ability of technologies to reduce GHG emissions cost-effectively

In questions 10-12, we have asked respondents about how they rate certain technological options to provide significant and cost-effective emission reductions in the short term (1-5 years into the future) to medium term (10-20 years into the future).

Figure 5 shows the results for the question about the ability of technologies for delivering significant, cost-effective emission reductions in the short run if present policies and technological development are continued (Q 10). It can be seen that the respondents rate efficiency improvements among electricity end-users highest (mean level of agreement: 4.32), followed by additional hydro-power installations (3.68), wind power (3.7), biomass (3.47), and additional nuclear power plants (3.41). Below the mean are solar power (2.96), geothermal power (2.84), and CCS installations (2.67).

Q 10: Considering a continuation of present policies and technological development ('business as usual'), please rate each of the following technologies regarding their ability to deliver significant emission reductions in a cost-effective way in the short term (say, 5 - 10 years from now).

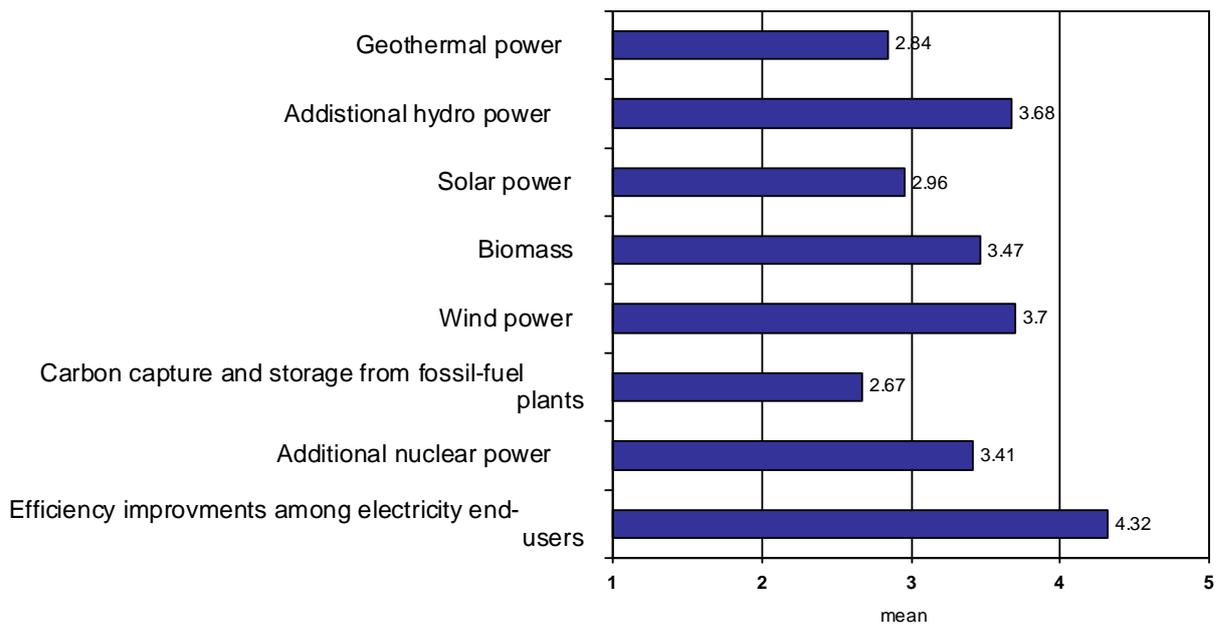


Figure 5. Ability of technologies to deliver significant emission reductions in a cost-effective manner in the short term, considering a continuation of present policies and technological development (BAU) (1 = strongly disagree, 5 = strongly agree)

In question 11 we have asked respondents about how they assess a group of technologies with respect to their ability to deliver significant emission reductions in a cost-effective way within the next 10-20 years. As Figure 6 shows, most respondents favour efficiency improvements among end-users (average level of agreement 4.49), followed by additional hydro-power (3.63), wind power (3.61), nuclear power (3.46), biomass (3.44), solar power (3.33), and geothermal power (3.14). CCS from fossil fuel power plants ranks somewhat lower than the mean, at a score of 2.89.

Q 11: Relative to the 'business as usual' development **considering additional cost reductions through market diffusion support and learning effects**, please rate each of the following technologies regarding their ability to deliver significant emission reductions in a cost-effective way in the next 10 to 20 years.

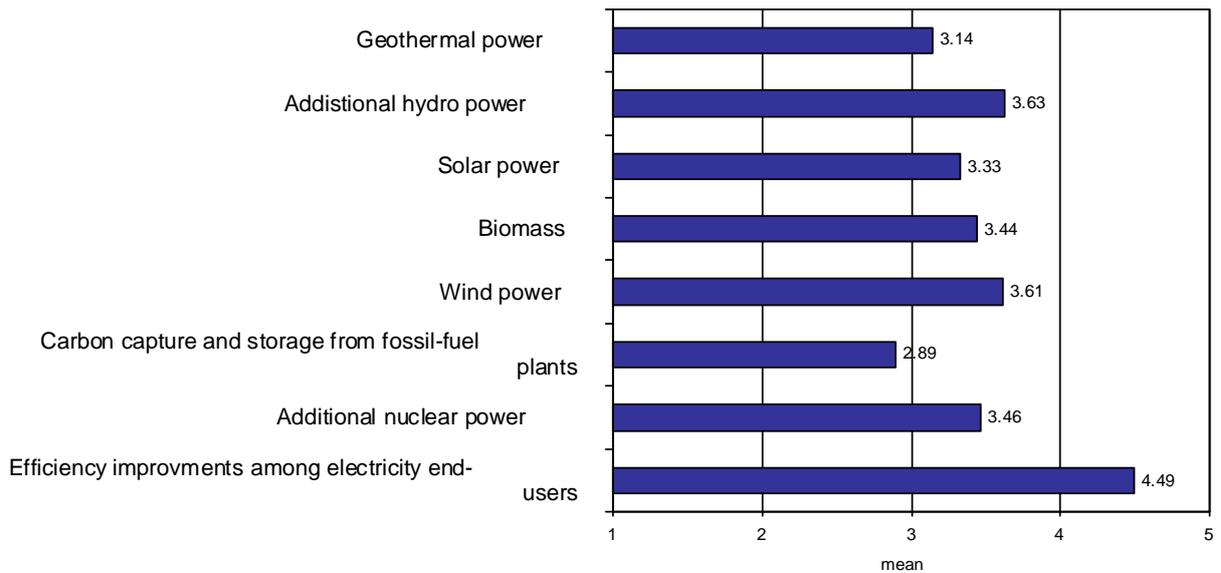


Figure 6. Assessment of the ability of selected technologies to deliver significant emission reductions in a cost-effective manner over the next 10-20 years, relative to BAU, concerning additional cost reductions through market diffusion support and learning effects (1 = strongly disagree, 5 = strongly agree)

Finally, question 12 covered the expected role of targeted investments in technological R&D. As Figure 7 shows, respondents are strongly in favour of efficiency improvements among electricity end-users (average level of agreement 4.5), followed within a narrow bandwidth by solar power (3.68), wind power (3.59), biomass (3.57), geothermal power (3.56), additional nuclear power (3.37), CCS (3.3), and additional hydro-power.

Q 12: Relative to the 'business as usual' development **considering additional impacts through targeted investments in technological research and development (R&D)**, please rate each of the following technologies regarding their ability to deliver significant emission reductions in the next 10 to 20 years.

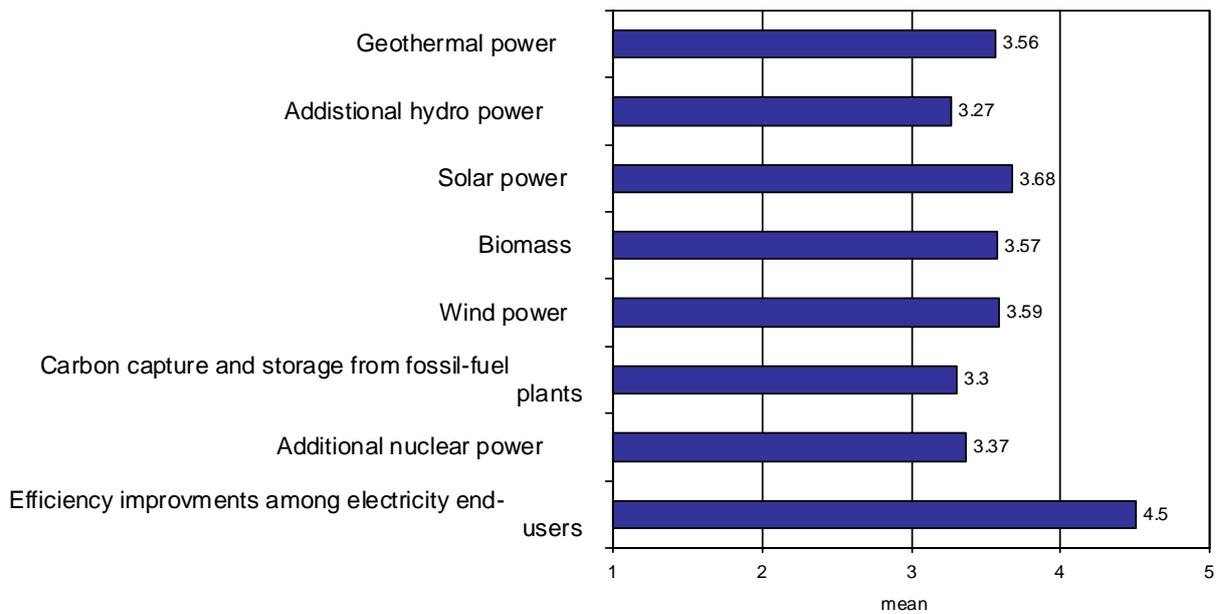


Figure 7. Assessment of the ability of selected technologies to deliver significant emission reductions over the next 10-20 years, relative to BAU, considering additional impacts through targeted investments in technological R&D (1 = strongly disagree, 5 = strongly agree)

3.3.2. Public acceptance

The next topic investigated is public acceptance of a range of technologies in the near future (5-10 years from now). Figure 8 shows that by far the strongest agreement among the respondents, on average, is on efficiency improvements among end-users (average agreement score of 4.72), followed with some distance (in descending order) by solar power (4.21), biomass (4.09), geothermal power (4.02), additional hydro-power (3.86), wind power (3.82), CCS (3.39), and additional nuclear power (3.22). In other words, relatively speaking respondents are not very much convinced that nuclear power and CCS will gain in public acceptance in the short run (5-10 years from now), while they think that efficiency improvements will gain in public acceptance, as will – to a somewhat lower extent – various renewable energy technologies/sources.

Q 13: I believe that in the future (5 - 10 years from now) the following technologies will gain in public acceptance [...]

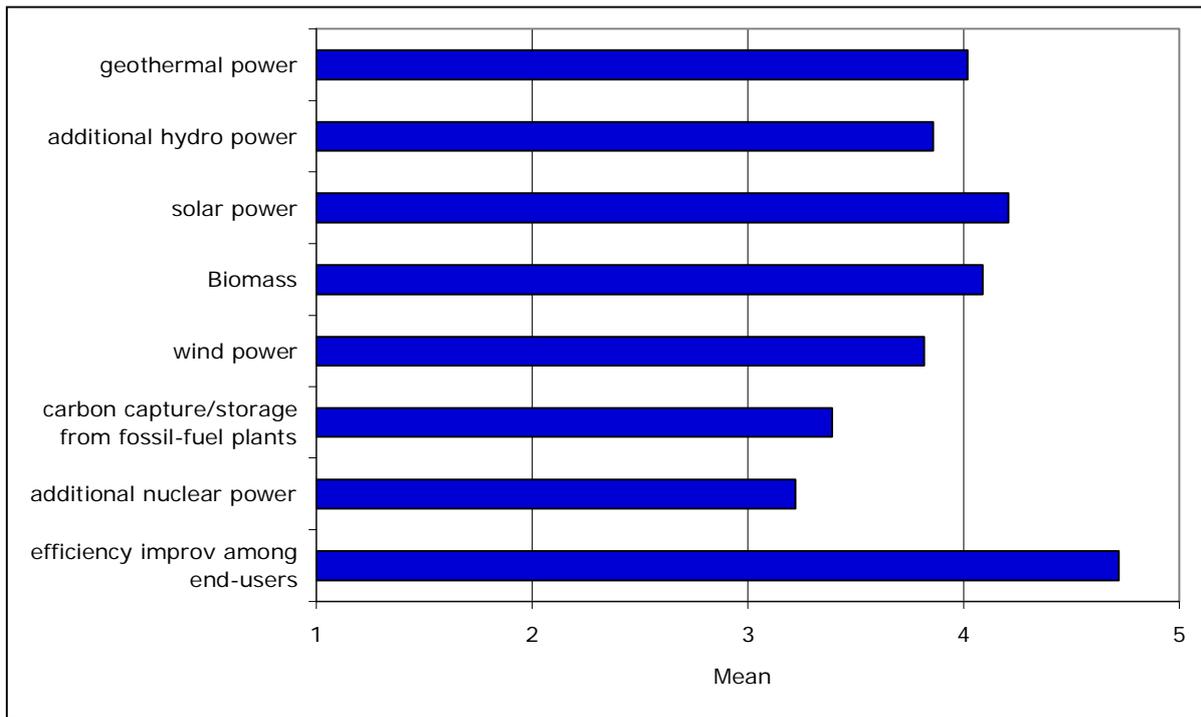


Figure 8. Assessment of public acceptance of various technologies within the next 5-10 years (1 = strongly disagree, 5 = strongly agree)

3.3.3. Rating of supplementary policy instruments

In the following, we assume that the main policy instrument is a system of emission permits and want to find out how the respondents rate the effectiveness of supplementary policy instruments (e.g. energy labels, standards, R&D, or others). Question 14 is formulated along this line of thinking. The results show that none of the options is considered as highly effective and that all options score in a rather close range between 3-4 on average, the most preferred option (i.e. the one considered as most effective) being standards for energy-efficient appliances (mean of 3.98), and the least preferred option being green electricity certificates (mean of 3.36).

Q 14: If implemented along with the main policy instrument of emission permits, which supplementary policy instruments can in your view be effective in delivering significant (e.g. 20%) emission reductions by 2020?

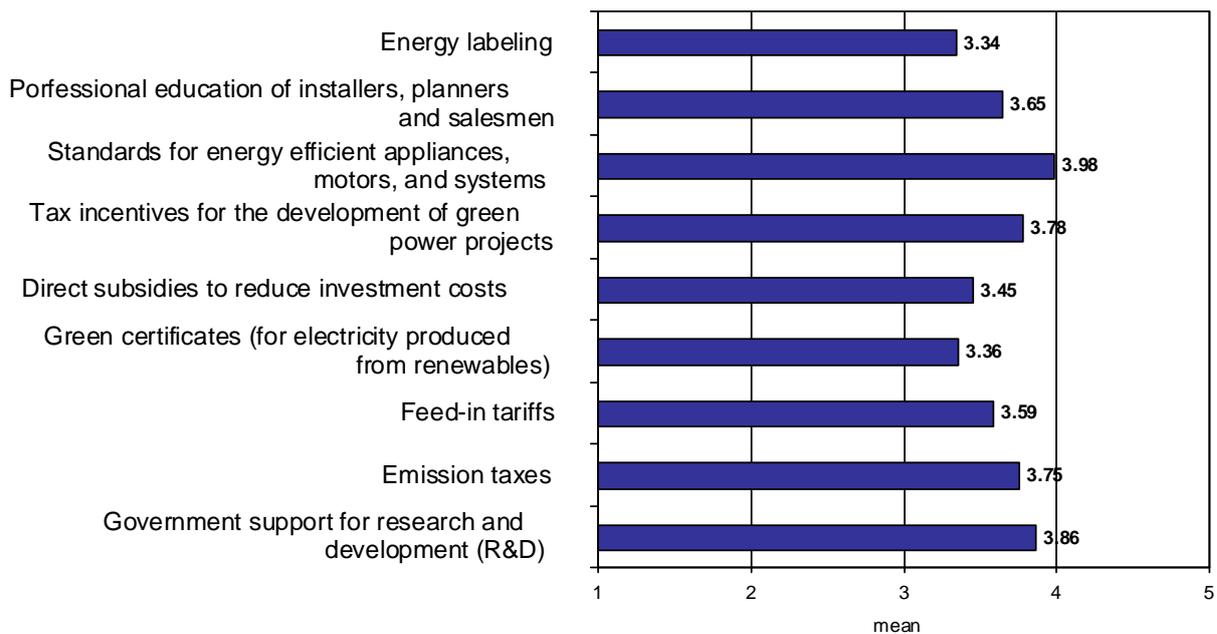


Figure 9. Rating of supplementary policy instruments (1 = ineffective, 5 = highly effective)

3.4. Political feasibility and influencing activities

3.4.1. Development of certain framework conditions

In question 15, we have tried to find out what the respondents think about the impact of changing framework conditions with regard to the increased feasibility of stricter European greenhouse gas emission targets. The items to choose and rank are depicted in Figure 10. The means of the answers across all respondents range from 2.04-2.68 and thus are all on the right-hand side of the indifference line (mean value of 2.0), indicating a slight to fairly strong agreement. As can be seen, on average the respondents rate a strong cooperation with industrialized countries highest (2.68), closely followed by cooperation with developing nations (2.65), and the development of new technologies (2.58). Further down on the list are (in descending order of importance) CCS (2.32), international cooperation in R&D of new technologies (2.30), public reporting in the EU (2.27), change in the public opinion about nuclear power (2.17), and public reporting in poor countries (2.04).

Q 15: How important do you rate the following potential developments in terms of how they could strengthen the political feasibility of stricter European greenhouse emission targets?

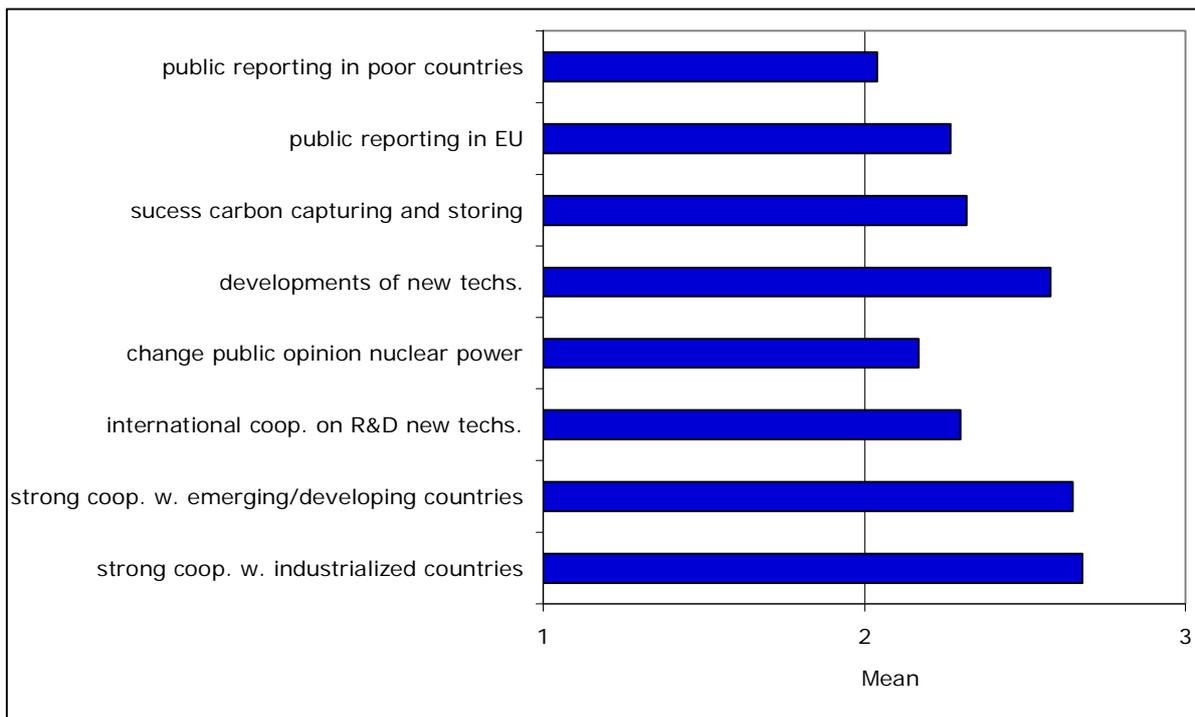


Figure 10. Strengthening of political feasibility of stricter European greenhouse emission targets through potential developments (1 = totally unimportant, 3 = very important)

3.4.2. Intentions for long-term investments in R&D

Another question of our survey addressed activities of companies in terms of long-term investments in R&D of climate-friendly technologies for electricity supply and end-use (Question 16). Figure 11 depicts the results: more than two thirds (68.4%) claim such activities, of which some 33.3% consider governmental support as important in this respect, while some 35.1% undertake such activities with little or even no support from government. Only 7% of the respondents negate such activities, while some 24.6% consider the question as not applicable.

Q 16: Does your company / the companies you represent consider long-term investments in R&D of climate-friendly technologies for electricity supply and end-use?

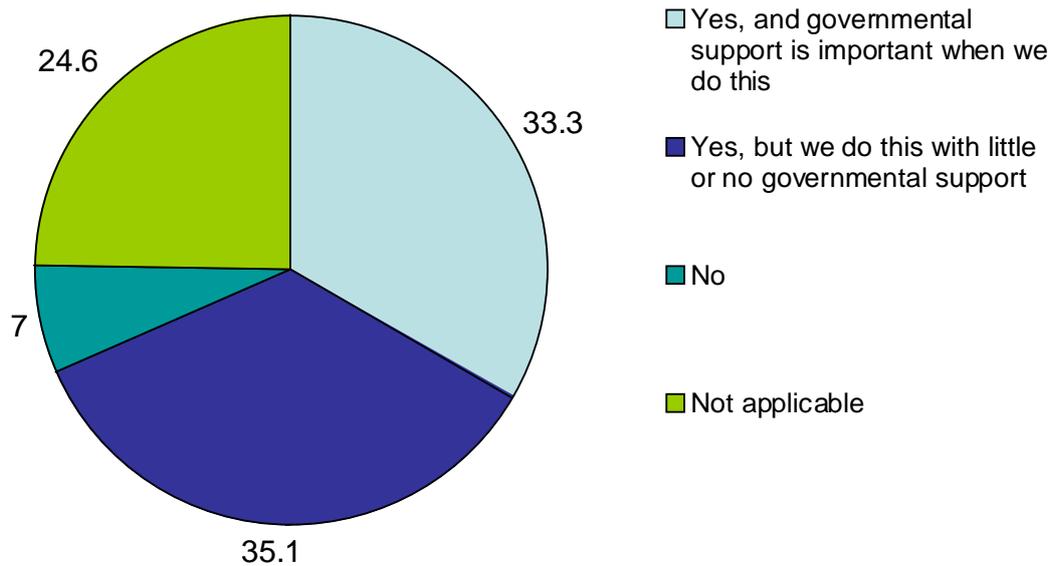


Figure 11. Long-term investments in R&D (in %)

3.4.3. Policy impact to make climate-friendly technologies profitable

Question 17 was aimed at finding out whether certain policies are considered as credibly suited to make climate-friendly technologies profitable. Figure 12 shows that on average the respondents agree most strongly with policies that are coordinated internationally (average of 4.55), a combination of policies (4.06), emission permit system (3.30), emission taxes at a low level (3.24), and finally governmental support for R&D (3.06).

Q 17: Which policy would most credibly convince you that climate-friendly technologies will actually also become profitable?

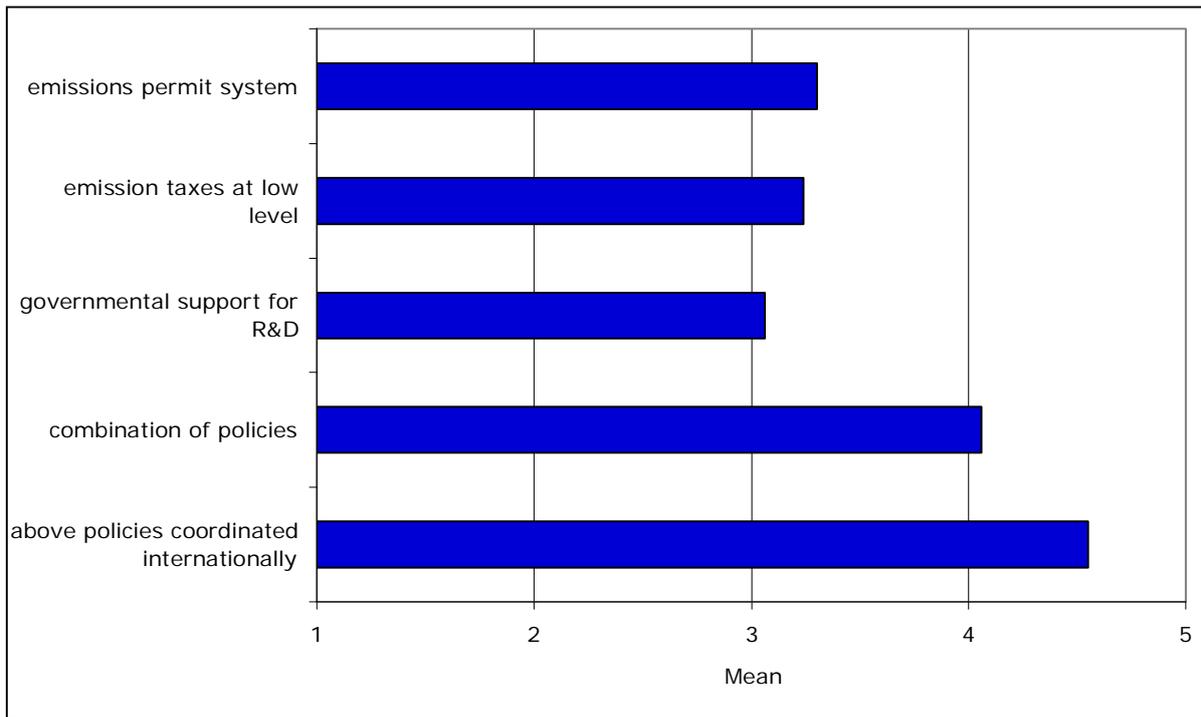


Figure 12. Perspective of certain policies to make climate-friendly technologies profitable (1 = strongly disagree, 5 = strongly agree)

3.4.4. Configuration of emission trading systems

Next, we have asked the respondents about their opinion on how an emission trading system such as the European ETS should be configured (Question 18). As can be seen from Figure 13 respondents give the highest ranking to ‘grandfathering’ of permits as a means to make stringent targets politically feasible (average level of agreement 3.4), while in the presence of strict targets, respondents are on average indifferent whether permits must be given to greenhouse-gas intensive firms even in the long run (3.0). Slight disagreement is shown for the question that firms taking important decisions in the near future will invest independently of the existence of free permits in the future (2.5).

Q 18: In quota systems such as the European emission trading system (ETS), please rate the following statements:

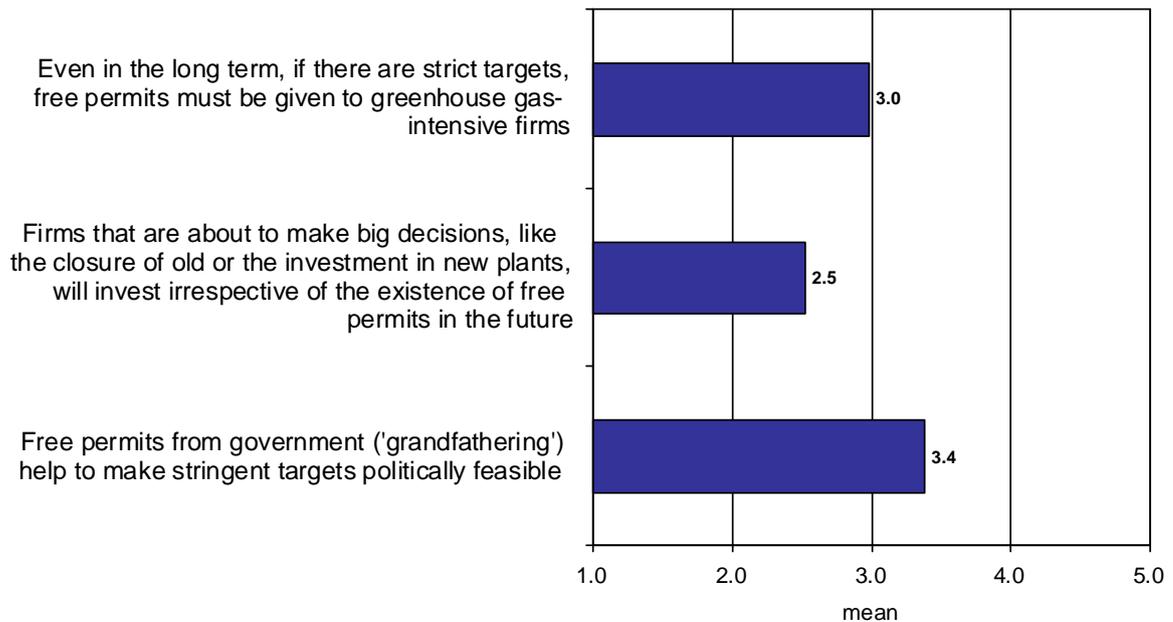


Figure 13. Average ratings of statements regarding quota systems such as the European emission trading system (ETS) (1 = strongly disagree, 5 = strongly agree)

3.4.5. Capacity of policy options to enhance the political feasibility of strict emission targets

Question 19 looks at policy options (alongside a cap & trade system for greenhouse gas emissions) aimed at making strict emission reduction targets politically feasible. As can be seen, only emission taxes that start at a low level and are escalated over time are (on average) considered as more than “important” (i.e. have a mean value of > 2), while governmental support for R&D is close to the category “important” (1.98). For all other options, the valuation of the respondents is in a range between 1.49-1.90, i.e. somewhere between important and unimportant, led by policies that shield industrial users from climate change policies (1.90), policies shielding vulnerable groups of society from tariff increases (1.76), emission permits that are given away for free (1.56), and protective policy measures (1.49) (cf. Figure 13).

Q 19: How important do you rate the following policy options (implemented alongside an emission cap and trade system) in making strict emission reduction targets politically feasible?

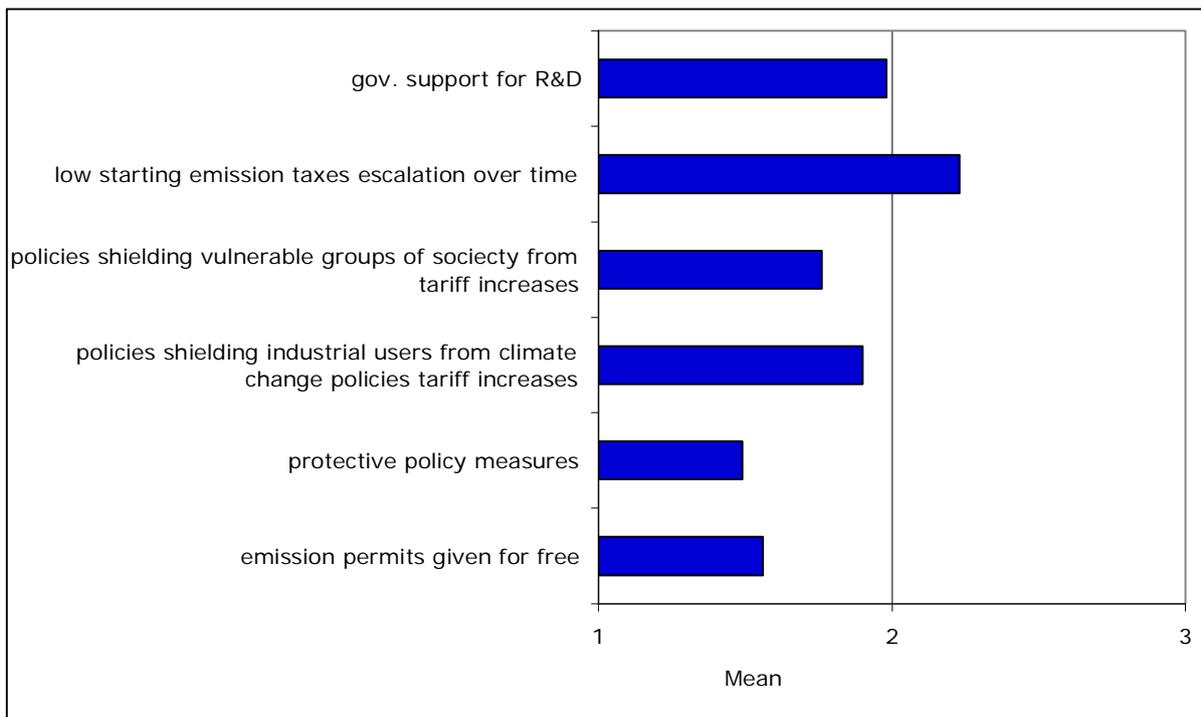


Figure 14. Ability of policies to enhance the political feasibility of strict emission targets (1 = unimportant, 2 = important, 3 = very important)

3.4.6. Channels for seeking influence on energy and climate policies

Question 20 looks at the importance of different channels for seeking to have an influence on energy and climate policies. As Figure 15 shows, direct interaction with national politicians/government administration is considered as most important (mean of 2.40), followed by indirect interaction through intermediaries (2.28), indirect interaction on the EU level through intermediaries (2.13), and direct interaction with EU politicians or officials (2.02).

Q 20: How important do you rate the following channels, for companies / organisations like yours, for seeking to influence energy and climate policies?

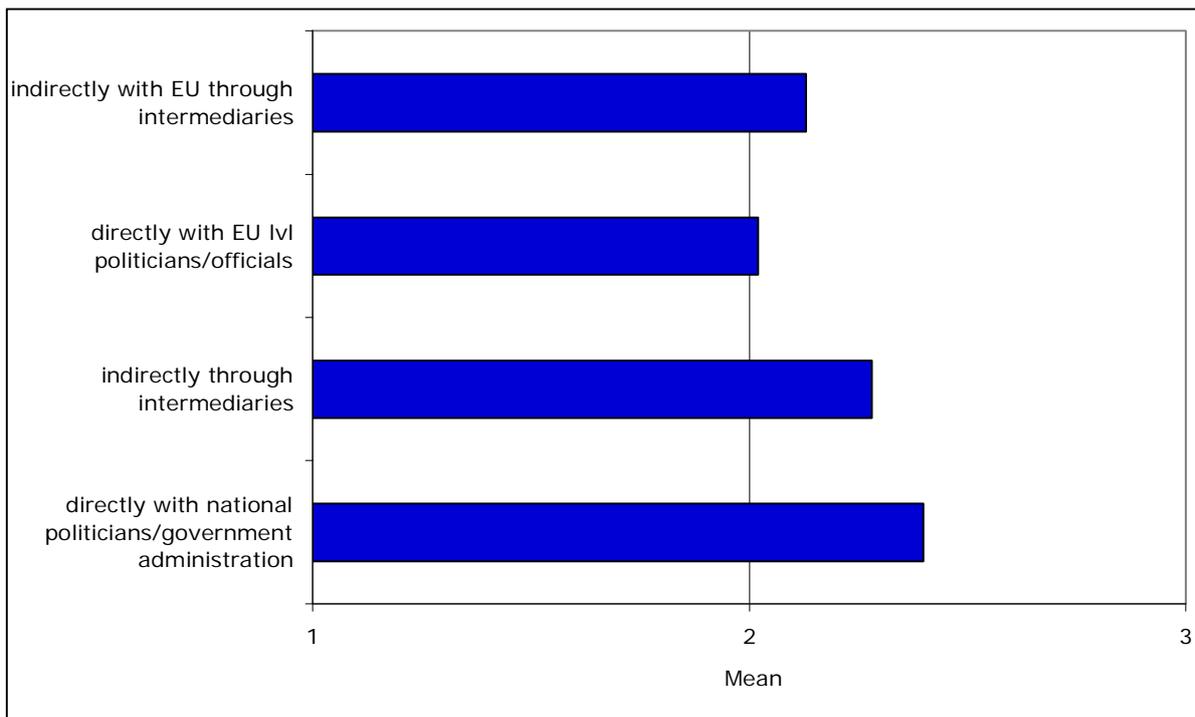


Figure 15. Relevance of channels for influencing energy and climate policies (1 = unimportant, 2 = important, 3 = very important)

3.4.7. Successful lobbying

Question 21 deals with the opinions concerning aspects that affect successful lobbying of firms in favour or against policies. Figure 16 shows that the respondents consider the importance for employment/growth highest (mean level of importance of 2.57), closely followed by ‘to be well organised for lobbying’ (2.54), the size of the firm (2.20), that production can be shifted outside of the EU (2.09), and – below the indifference value of two – that production can be shifted to other EU countries (1.58).

Q 21: How important do you rate the following aspects for a firm to be successful in lobbying for or against policies?

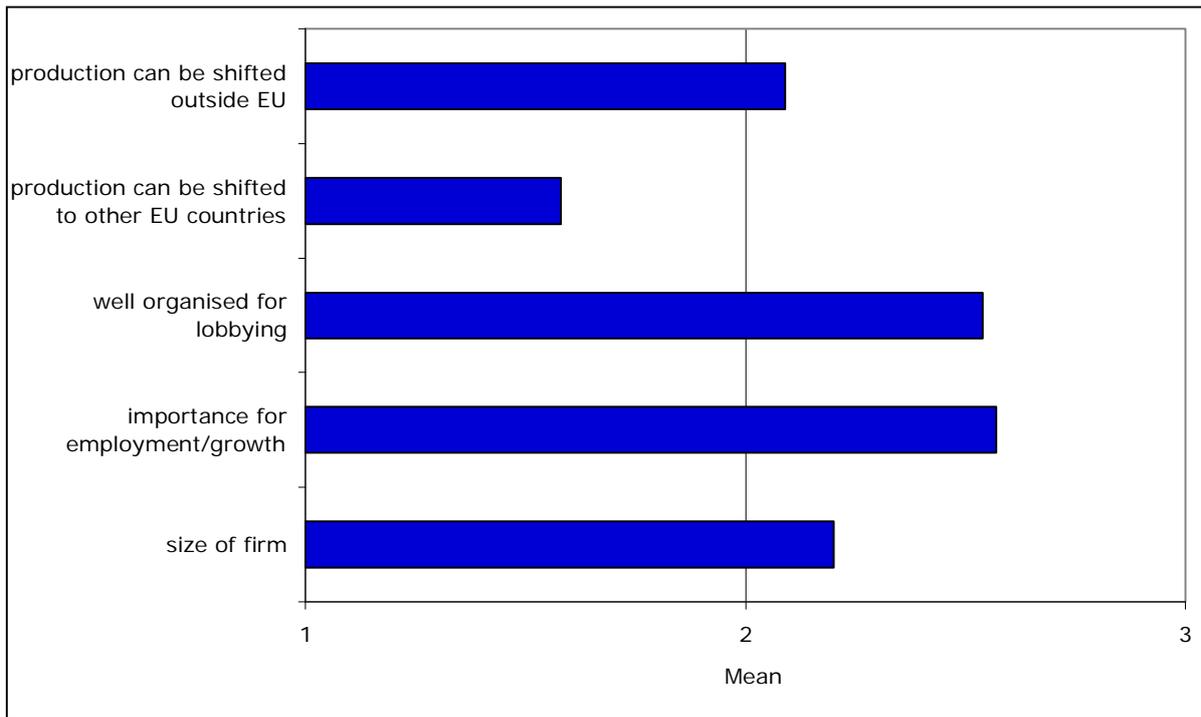


Figure 16. Success factors for lobbying (1 = unimportant, 2 = important, 3 = very important)

3.4.8. Rating of the current climate policy of the EU

Question 22 targets the respondents' opinion with respect to how they assess current EU climate policy. According to Figure 17, there is neither strong disagreement nor strong agreement with the policy statements posed, and all means are in a narrow bandwidth of between 3.11 and 3.53. Within this narrow bandwidth, the highest level of agreement is with the statement that EU's current climate policy is of little help to change the global situation (3.53), followed by 'there is not enough consultations with key stakeholders' (3.36), that it addresses key shareholders (3.3), and that it takes shape without sufficient stakeholder consultation (3.11). Overall, across all stakeholder groups, no strong conclusions in favour or against current EU climate policy can be drawn.

Q 22: How would you rate the EU's current climate policy according to the following criteria?

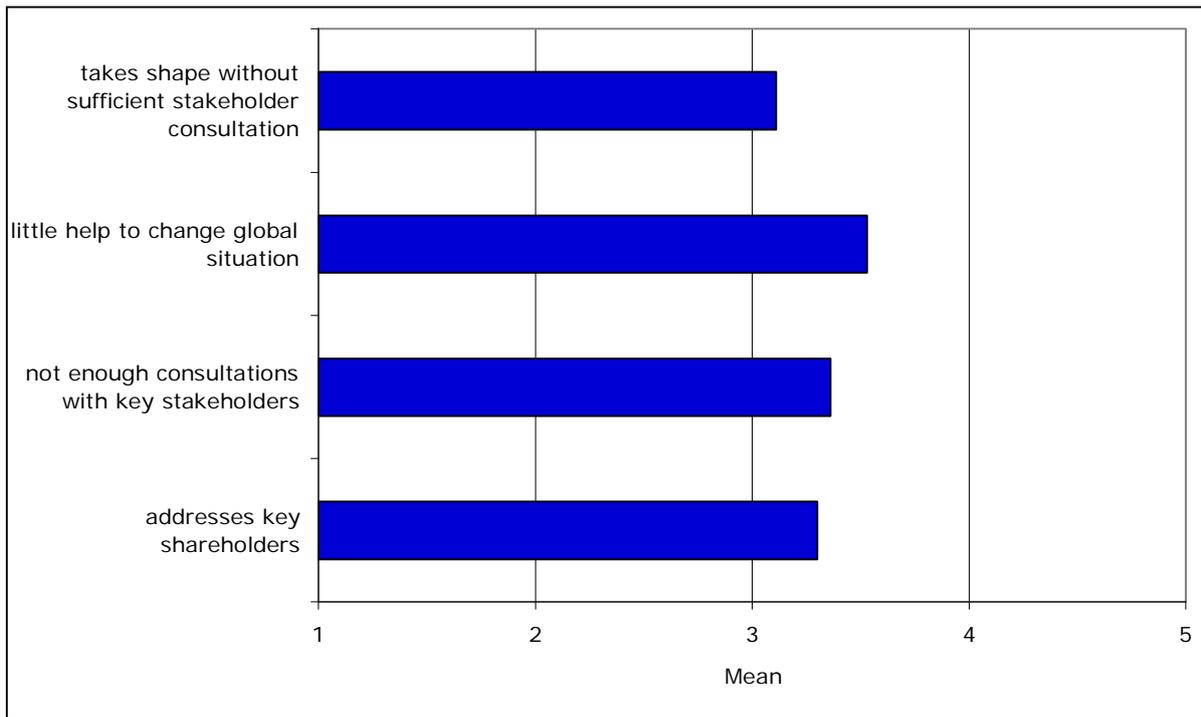


Figure 17. Rating of the current EU climate policy (1 = disagree, 5 = strongly agree)

3.5. Results on the stakeholder group level

In this section, we report on those results where the differences in the answers by stakeholder category were statistically significant. In our evaluation, we only distinguish between three main groups of stakeholders: electricity companies (producers and transmission/distribution operators), electricity-intensive companies, and technology manufacturers.

While we could detect no significant differences in the answers of the various stakeholder groups for questions Q 9 (Burden sharing), Q 16 (Considering investments in R&D), Q 20 (Channels for seeking policy influence), Q 21 (Firm characteristics influencing lobbying) and some sub-questions, we found such differences for a number of other questions, the statistical test results of which are reported in detail in the Appendix.

Note that for questions Q 7, Q 8 and Q 16 statistical testing is not possible, since no statistically significant differences can be detected (nominal scaling requires χ^2 testing; in our case the minimum required N per cell is five, which is not given). Therefore, we recoded Q 7 (Target rating) and Q 8 (Achievement of target) to binary variables. In Q 7 the value 1 was assigned to the answers that the target is 'too modest' or 'too high'; the value 2 was assigned to the answer that 'the target is about right'. In Q 8 the value 1 means that the reduction target will be achieved, while a value of 2 means that the reduction target will not be achieved.

With these recoded answers we found that more manufacturers than users or producers/distributors rated the emission reduction target about right. Specifically, the acceptance of

the EU policy targets is highest amongst technology manufacturers (87.5% of the respondents find them ‘about right’), followed by electricity producers/distributors (50% find them ‘about right’), and users (25% find them ‘about right’). The other respondents found them either as ‘too modest’ or ‘too ambitious’. The difference between electricity producers/distributors and technology providers was statistically significant (at $p=0.05$) and also that between electricity producers/distributors and users ($p=0.01$). No statistically significant difference could be detected between energy users and energy producers/distributors, respectively.

No differences between the stakeholder groups have been found for the recoded Q 8 (Achievement of target). However, there are some differences to report on how this target should be achieved.

Concerning energy technology development, electricity companies as well as electricity-intensive companies rate the ability of additional nuclear power to deliver significant emission reductions in a cost effective way in the short term *and* in the long term better than technology manufacturers (Q 10 and Q 11). Only in the case of targeted investments in technological R&D in nuclear power there are no significant differences between technology manufacturers and producers/distributors, and users respectively (Q 12).

Technology manufacturers, on the other side, ascribe more potential to the technologies of biomass and wind power than the other two stakeholder groups (Q 10–Q 12). However, all three groups perceive efficiency improvements among electricity end-users as by far the best way to reduce GHG emissions significantly and in a cost effective way, both in the short as well as in the longer term (Q 10–Q 12). With respect to CCS, no statistically significant difference in the assessment can be found among the three stakeholder groups (Q 10c, Q 11c, Q 12c).

Similarly, electricity companies hold a stronger believe than technology manufacturers that over the next 5-10 years additional nuclear power will gain public acceptance. Whereas electricity-intensive companies correspond to the electricity companies concerning the potential of nuclear power to reduce emissions in the short and long term, they agree with the technology manufacturers concerning the gain of public acceptance of additional nuclear power. It has to be noticed though, that in all three groups the hope for gains in public acceptance of additional nuclear power is smaller than for any other technology (Q 13).

Q 14 addressed the rating of supplementary policy instruments. As shown in section 3.3.3, over all three groups the effectiveness in delivering significant emission reductions by 2020 of all possible supplementary policy instruments (along with the main policy instrument of emission permits) are rated approximately the same. On the stakeholder group level, it can be revealed that electricity companies and technology manufacturers rated the effectiveness of feed-in tariffs and green certificates much better than electricity-intensive companies (Q 14c,d). Additionally, electricity supply companies perceive emission taxes as more effec-

tive than electricity-intensive companies do (Q 14b). Electricity companies and technology manufacturers do not differ in their rating of these three supplementary policy instruments (feed-in tariffs, green certificates, emission taxes). However, they do differ in rating two other supplementary policy instruments: Electricity companies rated the effectiveness of governmental support for R&D much better than technology manufacturers (Q 14a). On the other hand, technology manufacturers as well as electricity-intensive companies rated energy labelling as more effective than electricity companies (Q 14i).

Concerning the importance of potential developments in terms of how they could strengthen the political feasibility of stricter European greenhouse emission targets, across all three stakeholder groups three developments are seen as most important: (1) developments of new technologies, (2) strong cooperation with industrialized countries, and (3) strong cooperation with emerging/developing countries (see section 3.4.1.). This result can be found among all three stakeholder groups. The three groups, however, differ in the rating of less important developments. Corresponding to the finding that electricity companies rate nuclear power as more effective regarding its ability to deliver significant emission reductions than the other two stakeholder groups (see above), electricity companies think more than technology manufacturers and electricity-intensive companies that a change in the public opinion about nuclear power is an important development to strengthen the political feasibility of stricter European GHG emission targets (Q 15d). On the other hand, electricity companies rate public reporting on observable climate change and costs of adaptation in poor countries as less important than technology manufacturers.

Regarding the question which policy would be most convincing for actually making climate-friendly technologies, it is not surprising that all three stakeholder groups favour the use of a combination of all policies stated – if possible internationally coordinated. On the level of single policy instruments, electricity companies are more convinced than technology manufacturers of emission permit systems.

With regard to the question about configuring an emission trading system, such as the ETS, three statements had to be rated. While across all groups of respondents 'grandfathering' received the highest ranking (see section 3.4.5), electricity-intensive companies rank the statement highest that, even in the long term, free permits must be given to GHG-intensive firms (Q 18c) – significantly higher than electricity companies and technology manufacturers. On the other hand, technology manufacturers rate free permits from the government ('grandfathering') considerably lower than electricity companies (Q 18a).

As shown in section 3.4.5, starting with low emission taxes, which are then escalated over time, is considered most important for the political feasibility of strict emission reduction targets (Q 19). However, on the stakeholder group level, this does not apply for electricity-intensive companies, which rate policies as most important that shield industrial users from

climate change policies tariff increases (Q 19d, GHG emission and technology manufacturing). On the other hand, electricity-intensive companies find governmental support for R&D less important than electricity companies and technology manufacturers (Q 19f). Regarding free emission permits as a means to make strict emission reduction targets politically feasible, electricity-intensive companies find themselves between technology manufacturers and electricity companies (Q 19a). Electricity companies rate free emission permits better than electricity-intensive companies, and these again rate them better than technology manufacturers. But it should be noted that, overall, free permits are not seen as a very good means to make strict GHG emission reduction targets politically feasible (see section 3.4.5). Nevertheless, evaluating the findings about the two policy options, which overall had been rated as the two most important ones (governmental support for R&D, low starting emission taxes), the findings show that there is not much consensus among the stakeholder groups on this subject.

The last important finding on the stakeholder group level refers to the rating of the EU's current climate policy according to the consultation of stakeholders (Q 22b,d). Electricity-intensive companies think much more than electricity companies and technology manufacturers that the current policy takes shape without sufficient consultation of stakeholders.

4. Discussion and conclusions

In this report we have summarised the aim and scope of, the methodology adopted, and the results obtained from a web-based study among high-level decision-makers in the electricity sector, as well as among other influencing groups (e.g. NGOs), conducted in 2007 in four selected European countries.

Specifically, the study was conducted in Austria, Germany, Norway and Switzerland. Of the 543 invitations sent out in total, 57 completed questionnaires were returned, resulting in a response rate of 10.5%. The small sample size did not allow statistical testing in all cases of interest, restricting the analysis. Still, a number of insights could be gained. It can be argued that the size of the data sample used is too small to deliver valid results. There is no doubt that the results would be more trustworthy if the sample size were larger. Nonetheless, the results provide some interesting first insights into the estimation of targets, policy and technology regarding the emission reduction.

The aim of this study was to elicit opinions and assessments of high-level decision makers and opinion leaders in the electricity sector, electricity-intensive industries, and technology manufacturers supplying these two. To get in contact with these people proved to be very difficult, as typically there are several hurdles to overcome until the final target person is reached.

We assessed the possibility to reach the proper persons directly by email as higher than by telephone, even if an invitation letter could have been sent instead. Additionally, we considered the chance to answer the question spontaneously in a self-chosen moment as an important element for success. These two reasons as well as economic considerations (budget limitations) led to the decision in favour of an online questionnaire with an invitation to participate sent by email.

Even though the response rate was disappointingly low, we still think a telephone survey would not be the better choice *per se*. From our perspective, and only regarding the response rate, it is not crucial in which form the questions are asked or answered respectively. But it is crucial how much resources are available for all the actions needed to reach these target persons. So from our experience gained, we would strongly recommend the following:

- a) to *personally* get in touch with the target people,
- b) to provide different options of the questionnaire (telephone, paper & pencil, personal interview, online, etc.),
- c) to consider different ways to get in touch with the target persons (email, postal mail, personal contacts etc.) and to be flexible in combining them as the situation commands it,

- d) to set aside enough financial resources and time to reach the target persons and, last but not least,
- e) to budget enough resources for collecting the addresses.

References

ADAM Interim Results brochure, June 2008.

ADAM Report D-P1.3a “A first set of reports on the first iterations of the application of the PAF in the case studies and lessons learnt” (UEA).

ADAM Report D-P1/P3c.1 “Web-based application on insights and guidelines for climate change appraisal in the European electricity sector” (IVM/CICERO) (forthcoming).

ADAM Report D-P3c.2 “Policy appraisal for the Electricity sector” (CICERO), May 2008.

ADAM Report D-P3c.4b “Final report on impacts, mitigation and adaptation policy mixes for the EU electricity sector” (CICERO) (forthcoming).

Appendix A: Questionnaire used (facsimile copy)

Climate Policies and the Electricity Sector in Europe

This survey is part of an EU project on climate policies and the electricity sector in Europe. The research aims at analysing how beliefs and expectations underpin real decisions. Answers will be treated as absolutely confidential, and only aggregated data will be used for the analysis and reporting.

I - Information about You and Your Company/Organisation

1.1: 1.1 Name of your company / organisation:
Please write your answer here: _____

1.2: 1.2 Country in which you work:
Please write your answer here: _____

1.3: 1.3 Country of your company's / organisation's headquarters:
Please write your answer here: _____

1.4: 1.4 Your position in the company / organisation?
Please choose **only one** of the following:
 CEO or top manager
 Board member
 Mid-level manager / technical expert
 Other _____

1.5:
Please keep your company and the country you are based in mind when answering the following questions.

2: 2. How many branches / sisters (i.e. more than just sales representations) in other countries does your company have?

- Please choose **only one** of the following:
- None
 - Between 1 and 3
 - More than 3
 - Do not know / not applicable

3: 3. How can your company / organisation be categorised (mainly)?
(Please check **only one**)

- Please choose **only one** of the following:
- Electricity producer
 - Electricity transmission / distribution company
 - Electricity user in an electricity-intensive sector
 - Manufacturer of technology / equipment for electricity producers or electricity use (e.g. electric motors, appliances)
 - Industry association for any of the above-mentioned
 - Governmental or policy-making body
 - Non-governmental organisation (typically not for profit)
 - Other _____

[Only answer this question if you answered 'Other' or 'Industry association for any of the above-mentioned' to question '3']
3e: Please specify: _____

Please write your answer here: _____

4: 4. Within the category chosen above in Question 3, what is the approximate ranking in size of your company / organisation (measured by no. of employees) within your country?
(Please check **only one**)

- Please choose **only one** of the following:
- Among the three largest
 - Between fourth and tenth
 - Smaller than tenth

[Only answer this question if you answered 'Non-governmental organisation (typically not for profit)' or 'Governmental or policy-making body' or 'Manufacturer of technology / equipment for electricity producers or electricity use (e.g. electric motors, appliances)' or 'Electricity producer' to question '3']
5: 5. What is your company's / organisation's main business focus?
(multiple answers possible)

- Please choose **all** that apply:
- Fossil fuel-based power
 - Nuclear power
 - Hydro-electric power
 - New renewable energies
 - Not applicable / other _____

[Only answer this question if you answered 'Not applicable / other' to question '5']
5e: Please specify:
 Please write your answer here: _____

6: 6. What is the broad ownership structure of your company / organisation?

- Please choose **only one** of the following:
- Private, closely held company (few owners)
 - Private stock company with widely held shares
 - Public, i.e. owned by government / semi-government / municipality etc.
 - Not for profit entity / other _____

II - Greenhouse Gas Mitigation and Adaption
 The EU has committed itself to achieve a 20% reduction target for greenhouse gas emissions by 2020 compared to 1990 levels.
6: 1:
 The EU has committed itself to achieve a 20% reduction target for greenhouse gas emissions by 2020 compared to 1990 levels.
The EU has committed itself to achieve a 20% reduction target for greenhouse gas emissions by 2020 compared to 1990 levels.

7: 7. In your opinion of what should happen, how would you rate this target for the EU economy as a whole?
(Please check **only one**)

- Please choose **only one** of the following:
- Too modest
 - About right
 - Too ambitious

8: 8. In terms of what will realistically happen, do you think that the 20% greenhouse gas reduction target is actually going to be achieved?
(Please check **only one**)

Please choose **only one** of the following:

- Yes, and without much reliance (<25%) on emission reduction credits purchased from outside the EU
- Yes, but with heavy reliance (>75%) on purchases of emission reduction credits from outside the EU (<75%)
- No, it will either be abandoned early or simply not achieved by 2020

9. In the light of climate change and a need to adapt to climate change in this century, in your view how will the cost burden be carried among the following stakeholders?

Please choose the appropriate response for each item:

	Strongly agree	agree	neutral	disagree	Strongly disagree
In the country you are based in, the principal cost burden of adapting to climate change will fall on government / the public budget	<input type="checkbox"/>				
In the country you are based in, electricity producers and distributors will face a significant cost burden of adapting to climate change	<input type="checkbox"/>				
In the country you are based in, private households will face a significant cost burden of adapting to climate change	<input type="checkbox"/>				
The principal cost burden of adapting to climate change will be borne by poor developing countries	<input type="checkbox"/>				

III - Energy Technology Development

10: 10. Considering a continuation of present policies and technological development ('business as usual'), please rate each of the following technologies regarding their ability to deliver significant emission reductions in a cost-effective way in the short term (say, 5 years from now).

Please choose the appropriate response for each item:

	Strongly agree	agree	neutral	disagree	Strongly disagree
Efficiency improvements among electricity end-users	<input type="checkbox"/>				
Additional nuclear power	<input type="checkbox"/>				
Carbon capture and storage from fossil-fuel plants	<input type="checkbox"/>				
Wind power	<input type="checkbox"/>				
Biomass	<input type="checkbox"/>				
Solar power (photovoltaics, other)	<input type="checkbox"/>				
Additional hydro power	<input type="checkbox"/>				
Geothermal power	<input type="checkbox"/>				
Other	<input type="checkbox"/>				

Only answer this question if you answered 'Strongly agree' or 'neutral' or 'Strongly disagree' to question '10 ']

10.i: Please specify:

Please write your answer here:

11: 11. Relative to the 'business as usual' development considering additional cost reductions through market diffusion support and learning effects, please rate each of the following technologies regarding their ability to deliver significant emission reductions in a cost-effective way in the next 10 to 20 years.

Please choose the appropriate response for each item:

	Strongly agree	agree	neutral	disagree	Strongly disagree
Efficiency improvements among electricity end-users	<input type="checkbox"/>				
Additional nuclear power	<input type="checkbox"/>				
Carbon capture and storage from fossil-fuel plants	<input type="checkbox"/>				
Wind power	<input type="checkbox"/>				
Biomass	<input type="checkbox"/>				
Solar power (photovoltaics, other)	<input type="checkbox"/>				
Additional hydro power	<input type="checkbox"/>				
Geothermal power	<input type="checkbox"/>				
Other	<input type="checkbox"/>				

Only answer this question if you answered 'Strongly agree' or 'neutral' or 'Strongly disagree' to question '11 ']

11.i: Please specify:

Please write your answer here:

12: 12. Relative to the 'business as usual' development considering additional impacts through targeted investments in technological research and development (R&D), please rate each of the following technologies regarding their ability to deliver significant emission reductions in the next 10 to 20 years.

Please choose the appropriate response for each item:

	Strongly agree	agree	neutral	disagree	Strongly disagree
Efficiency improvements among electricity end-users	<input type="checkbox"/>				
Additional nuclear power	<input type="checkbox"/>				
Carbon capture and storage from fossil-fuel plants	<input type="checkbox"/>				
Wind power	<input type="checkbox"/>				
Biomass	<input type="checkbox"/>				
Solar power (photovoltaics, other)	<input type="checkbox"/>				
Additional hydro power	<input type="checkbox"/>				
Geothermal power	<input type="checkbox"/>				
Other	<input type="checkbox"/>				

Only answer this question if you answered 'Strongly agree' or 'neutral' or 'Strongly disagree' to question '12 ']

12.i: Please specify:

Please write your answer here:

13: 13. I believe that in the future (5 - 10 years from now) the following technologies will gain in public acceptance (please rate each):

Please choose the appropriate response for each item:

	Strongly agree	agree	neutral	disagree	Strongly disagree
Efficiency improvements among electricity end-users	<input type="checkbox"/>				

Additional nuclear power	<input type="checkbox"/>				
Carbon capture and storage from fossil-fuel plants	<input type="checkbox"/>				
Wind power	<input type="checkbox"/>				
Biomass	<input type="checkbox"/>				
Solar power (photovoltaics, other)	<input type="checkbox"/>				
Additional hydro power	<input type="checkbox"/>				
Geothermal power	<input type="checkbox"/>				
Other	<input type="checkbox"/>				

[Only answer this question if you answered 'Strongly agree' or 'neutral' or 'Strongly disagree' to question 13.]

13.: Please specify

Please write your answer here:

IV - Policy Instruments

14: 14. If implemented along with the main policy instrument of emission permits, which supplementary policy instruments can in your view be effective in delivering significant (e.g. 20%) emission reductions by 2020?

Please choose the appropriate response for each item:

	Highly effective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ineffective
Government support for research and development (R&D)	<input type="checkbox"/>					
Emission taxes	<input type="checkbox"/>					
Feed-in tariffs	<input type="checkbox"/>					
Green certificates (for electricity produced from renewables)	<input type="checkbox"/>					
Direct subsidies to reduce investment costs	<input type="checkbox"/>					
Tax incentives for the development of green power projects	<input type="checkbox"/>					
Standards for energy efficient appliances, motors and systems	<input type="checkbox"/>					
Professional education of installers, planners and salesmen	<input type="checkbox"/>					
Energy labelling	<input type="checkbox"/>					
Other	<input type="checkbox"/>					

[Only answer this question if you answered 'Highly effective' or 'neutral' or 'Ineffective' to question 14.]

14.: Please specify:

Please write your answer here:

V - Political Feasibility and Influence Activities

15: 15. How important do you rate the following potential developments in terms of how they could strengthen the political feasibility of stricter European greenhouse emission targets? (Please rate each)

	Very important	<input type="checkbox"/>	<input type="checkbox"/>	Totally unimportant	<input type="checkbox"/>	Do not know
Strong cooperation with the U.S. and other industrialized countries on emission reductions	<input type="checkbox"/>					

Strong cooperation with emerging and developing countries on emission reductions	<input type="checkbox"/>				
International cooperation on research and development of new technologies (for electricity supply and end-use)	<input type="checkbox"/>				
Change of public opinion in favour of nuclear power	<input type="checkbox"/>				
Successful and marketable developments of new technologies (for electricity supply and end-use)	<input type="checkbox"/>				
Success with carbon capturing and storing from large fossil-fueled power plants	<input type="checkbox"/>				
Public reporting on observable climate change and costs of adaptation in the EU	<input type="checkbox"/>				
Public reporting on observable climate change and costs of adaptation in poor countries	<input type="checkbox"/>				
Other	<input type="checkbox"/>				

[Only answer this question if you answered 'Very important' or 'Totally unimportant' or 'Do not know' to question 15.]

15.: Please specify:

Please write your answer here:

16: 16. Does your company / the companies you represent consider long-term investments in R&D of climate-friendly technologies for electricity supply and end-use?

Please choose **only one** of the following:

- Yes, and governmental support is important when we do this
- Yes, but we do this on with little or no governmental support
- No
- Non applicable

[Only answer this question if you answered 'Yes, but we do this on with little or no governmental support' or 'Yes, and governmental support is important when we do this' to question 16.]

17: 17. Which policy would most credibly convince you that climate-friendly technologies will actually also become profitable? (Please check only one)

Please choose the appropriate response for each item:

	Strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	Neutral	<input type="checkbox"/>	<input type="checkbox"/>	Strongly disagree
An emissions permit system alone, with stringent targets for permits in the future	<input type="checkbox"/>						
Emission taxes only, introduced at low levels, with stringent plans for escalation	<input type="checkbox"/>						
Governmental support for R&D alone	<input type="checkbox"/>						
A combination, which also involves emission- and energy efficiency standards set long in advance	<input type="checkbox"/>						
The above policies, strongly coordinated internationally	<input type="checkbox"/>						

18: 18. In quota systems such as the European emission trading systems (ETS), please rate the following statements:

Please choose the appropriate response for each item:

	Strongly agree	Neutral	Strongly disagree
Free permits from government (grandfathering) help to make stringent targets politically feasible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Firms that are about to make big decisions, like the closure of old or the investment in new plants, will invest irrespective of the existence of free permits in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Even in the long term, if there are strict targets, free permits must be given to greenhouse gas-intensive firms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I do not know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19: 19. How important do you rate the following policy options (implemented alongside an emission cap and trade system) in making strict emission reduction targets politically feasible? (Please rate each)

Please choose the appropriate response for each item:

	Very important	Important	Unimportant	Do not know
Emission permits given to power producers for free	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protective policy measures that help to shield industries from too much competition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Separate policies shielding electricity-intensive industrial users from electricity tariff increases due to climate change policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Separate policies that shield vulnerable groups of society (e.g. working poor) from electricity tariff increases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government support for R&D on more efficient technologies in electricity supply and use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emission taxes that start low, escalating over the decades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Only answer this question if you answered 'Very important' or 'Important' or 'Unimportant' or 'Do not know' to question 19]

19.g: Please specify:

Please write your answer here:

20: 20. How important do you rate the following channels, for companies / organisations like yours, for seeking to influence energy and climate policies? (Please rate each)

Please choose the appropriate response for each item:

	Very important	Important	Unimportant	Do not know
Directly with national politicians/government administration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indirectly, through national industry associations or other intermediaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Directly with EU level politicians/officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Indirectly with EU, through industry associations/other intermediaries

Other

	Very important	Important	Unimportant	Do not know
Indirectly with EU, through industry associations/other intermediaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Only answer this question if you answered 'Very important' or 'Important' or 'Unimportant' or 'Do not know' to question 20]

20.e: Please specify:

Please write your answer here:

21: 21. How important do you rate the following aspects for a firm to be successful in lobbying for or against policies? (Please rate each)

Please choose the appropriate response for each item:

	Very important	Important	Unimportant	Do not know
That the firm is big within its sector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
That the industry is an important sector for employment and growth nationally and in the EU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
That the industry is well organised at the national and EU level for influencing policy-making	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
That production can be shifted to other countries in the EU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
That production can be shifted to countries outside the EU	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[Only answer this question if you answered 'Very important' or 'Important' or 'Unimportant' or 'Do not know' to question 21]

21.f: Please specify:

Please write your answer here:

22: 22. How would you rate the EU's current climate policy according to the following criteria? (multiple answers possible)

Please choose the appropriate response for each item:

	Strongly agree	Disagree
Addresses the energy security and environmental concerns of key shareholders	<input type="checkbox"/>	<input type="checkbox"/>
The EU has not made enough consultations with key stakeholders when the policy was shaped	<input type="checkbox"/>	<input type="checkbox"/>
Will do little help to change the global situation, as other big emitters are not included	<input type="checkbox"/>	<input type="checkbox"/>
Typically takes shape without sufficient stakeholder consultation in the process	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

[Only answer this question if you answered 'Disagree' or 'Strongly disagree' to question 22]

22.e: Please specify:

Please write your answer here:

23: 23. If there is any point about climate and electricity that you consider important and has not been addressed in the questions, please write it here:

Please write your answer here:

24: Questions about this survey can be directed either to CEPE/ETH Zurich (Prof. Dr. Reinhard Madener, rmadener@ethz.ch) or CICERO (Dr. Gunnar Eskeland, gunnar.eskeland@cicero.uio.no).

Submit Your Survey.

Thank you for completing this survey. Please fax your completed survey to:

Appendix B: Test statistics

Table A1. Test statistics for all variables which are already included in the report

		Group statistics			Test statistics		
		Group	N	Mean	SD	T	Significance (2-sided)
Producers / Distributors vs. Users							
Q13_c	gain in public acceptance: carbon capture/storage from fossil-fuel plants	Prod./distr.	18	3.83	1.295	2.187	0.037
		Users	12	2.83	1.115		
Q14_b	Effectiveness of emission taxes	Prod./distr.	18	4.06	0.802	2.256	0.04
		Users	12	2.92	1.621		
Q14_c	Effectiveness of feed-in tariffs	Prod./distr.	16	3.75	0.577	2.331	0.035
		Users	12	2.83	1.267		
Q14_d	Effectiveness of green certificates	Prod./distr.	18	3.89	0.963	3.299	0.003
		Users	12	2.75	0.866		
Q14_i	Effectiveness of energy labelling	Prod./distr.	18	3.00	0.840	-2.082	0.047
		Users	12	3.67	0.888		
Q17_d	combination of policies	Prod./distr.	11	4.27	0.467	2.22	0.041
		Users	7	3.43	1.134		
Q18_c	Free permits given to greenhouse gas-intensive firms	Prod./distr.	15	2.67	1.345	-3.424	0.002
		Users	11	4.27	0.905		
Q19_a	emission permits given for free	Prod./distr.	17	1.88	0.600	2.178	0.038
		Users	12	1.42	0.515		
Q19_c	policies shielding industrial users from climate change policies tariff increases	Prod./distr.	15	1.87	0.743	-2.291	0.031
		Users	12	2.50	0.674		
Q19_f	gov. support for R&D	Prod./distr.	13	2.38	0.506	4.101	0
		Users	12	1.42	0.669		
Q22_b	not enough consultations with key stakeholders	Prod./distr.	17	3.00	1.061	-2.604	0.015
		Users	12	4.00	0.953		
Producers / Distributors. vs. Technology Manufacturers							
Q7	Rating of target (20% reduction of greenhouse gas emissions)	Prod./distr.	18	1.5	0.515	-2.153	0.044
	[1 = too modest/too; high; 2 = about right]	Users	8	1.88	0.354		
Q10_b	Additional nuclear power will deliver sign. emission reductions	Prod./distr.	18	4.00	0.970	3.057	0.005
		Technol. manufact.	8	2.50	1.512		
Q10_d	Wind power will deliver sign. emission reductions	Prod./distr.	18	3.50	1.098	-2.627	0.015

		Group statistics			Test statistics		
		Group	N	Mean	SD	T	Significance (2-sided)
		Technol. manufact.	8	4.63	0.744		
Q10_e	Biomass will deliver sign. emission reductions	Prod./distr.	18	3.39	0.979	-2.232	0.035
		Technol. manufact.	8	4.25	0.707		
Q11_b	Additional nuclear power will deliver sign. emission reductions	Prod./distr.	18	4.11	0.900	3.146	0.004
		Technol. manufact.	8	2.63	1.506		
Q11_d	Wind power will deliver sign. emission reductions	Prod./distr.	17	3.35	1.057	-4.038	0.001
		Technol. manufact.	8	4.63	0.518		
Q11_e	Biomass will deliver sign. emission reductions	Prod./distr.	18	3.44	0.856	-2.326	0.029
		Technol. manufact.	8	4.25	0.707		
Q12_d	Wind power will deliver sign. emission reductions	Prod./distr.	18	3.28	0.958	-3.714	0.001
		Technol. manufact.	8	4.63	0.518		
Q12_e	Biomass will deliver sign. emission reductions	Prod./distr.	18	3.44	1.042	-3.039	0.006
		Technol. manufact.	8	4.38	0.518		
Q13_b	Gain in public acceptance: additional nuclear power	Prod./distr.	17	3.71	1.047	3.132	0.005
		Technol. manufact.	8	2.25	1.165		
Q14_a	Effectiveness of government support for R&D	Prod./distr.	18	4.06	0.998	2.541	0.018
		Technol. manufact.	8	3.00	0.926		
Q14_i	Effectiveness of energy labelling	Prod./distr.	18	3.00	0.840	-3.51	0.002
		Technol. manufact.	7	3.86	0.378		
Q15_d	change public opinion nuclear power	Prod./distr.	18	2.33	0.485	1.749	0.115
		Technol. manufact.	8	1.75	0.886		
Q15_h	public reporting in poor countries	Prod./distr.	15	1.87	0.640	-2.125	0.047
		techn. manufact.	6	2.50	0.548		
Q17_a	emissions permit system	Prod./distr.	11	3.73	0.647	2.227	0.057
		Technol. manufact.	7	2.57	1.272		
Q18_a	Free permits from government	Prod./distr.	17	3.59	1.228	2.503	0.02
		Technol. manufact.	7	2.29	0.951		

		Group statistics			Test statistics		
		Group	N	Mean	SD	T	Significance (2-sided)
Q19_a	emission permits given for free	Prod./distr.	17	1.88	0.600	6.061	0
		Technol. manufact.	6	1.00	0.000		
Q22_d	takes shape without sufficient stakeholder consultation	Prod./distr.	16	3.31	0.946	2.441	0.023
		Technol. manufact.	8	2.38	0.744		

Users vs. Technology Manufacturers							
Q7	Rating of target (20% reduction of greenhouse gas emissions) [1 = too modest/too; high; 2 = about right]	Users	12	1.25	0.452	-3.458	0.003
		Technol. manufact.	8	1.88	0.354		
Q10_b	Additional nuclear power will deliver sign. emission reductions	Users	12	3.75	1.055	2.186	0.042
		Technol. manufact.	8	2.50	1.512		
Q10_d	Wind power will deliver sign. emission reductions	Users	12	3.08	0.669	-4.833	0
		Technol. Manufact.	8	4.63	0.744		
Q10_e	Biomass will deliver sign. emission reductions	Users	12	2.92	0.793	-3.84	0.001
		Technol. manufact.	8	4.25	0.707		
Q11_b	Additional nuclear power will deliver sign. emission reductions	Users	12	3.92	0.900	2.411	0.027
		Technol. manufact.	8	2.63	1.506		
Q11_d	Wind power will deliver sign. emission reductions	Users	12	3.08	0.669	-5.499	0
		Technol. manufact.	8	4.63	0.518		
Q11_e	Biomass will deliver sign. emission reductions	Users	12	2.75	1.055	-3.513	0.002
		Technol. Manufact.	8	4.25	0.707		
Q12_d	Wind power will deliver sign. emission reductions	Users	12	3.00	0.853	-4.807	0
		Technol. manufact.	8	4.63	0.518		
Q12_e	Biomass will deliver sign. emission reductions	Users	12	3.17	1.115	-2.849	0.011
		Technol. Manufact.	8	4.38	0.518		
Q14_c	Effectiveness of feed-in tariffs	Users	12	2.83	1.267	-2.526	0.021
		Technol. manufact.	8	4.25	1.165		
Q14_d	Effectiveness of green certificates	Users	12	2.75	0.866	-2.507	0.022

		Group statistics			Test statistics		
		Group	N	Mean	SD	T	Significance (2-sided)
		Technol. manufact.	8	3.75	0.886		
Q15_d	change public opinion nuclear power	Users	12	2.42	0.515	1.922	0.083
		Technol. Manufact.	8	1.75	0.886		
Q18_a	Free permits from government	Users	11	4.18	0.982	4.042	0.001
		Technol. manufact.	7	2.29	0.951		
Q18_c	Free permits given to greenhouse gas-intensive firms	Users	11	4.27	0.905	2.414	0.029
		Technol. manufact.	6	3.00	1.265		
Q19_a	emission permits given for free	Users	12	1.42	0.515	2.803	0.017
		Technol. manufact.	6	1.00	0.000		
Q19_c	policies shielding industrial users from climate change policies tariff increases	Users	12	2.50	0.674	3.709	0.002
		Technol. manufact.	6	1.33	0.516		
Q19_f	gov. support for R&D	Users	12	1.42	0.669	-2.258	0.037
		Technol. manufact.	7	2.14	0.690		
Q22_d	takes shape without sufficient stakeholder consultation	Users	11	3.55	0.934	2.926	0.009
		Technol. manufact.	8	2.38	0.744		