Climate change and the voice of the public

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Decisions on which climate risks to accept and on how to use energy in the future affect every citizen's life. Public participation on these issues is necessary to find policies supported by the public. It is especially important because uncertainties about climate issues allow only descriptions in terms of subjective probabilities, invariably linked to subjective preferences. Subjective probabilities and preferences of experts can be balanced by those of ordinary citizens. IA-focus groups are a promising research method to explore citizens' views on climate change. We discuss this method and its application involving approx. 100 citizens in Switzerland. Three findings are presented. First, the discussion groups emphasize the moral dimension of man-made climate change. Second, they tend to see a future characterized by high levels of energy use as nightmarish, while they tend to see a future characterized by low levels of energy use as an attractive option. Third, while they see energy reduction as desirable, the willingness to engage in high-cost options like a hard-hitting carbon tax is practically nil. This apparent contradiction can be interpreted as follows: the possibility of major climate impacts ignites the public imagination, but subjective probabilities associated with it are rather low. Under these conditions, support for a low-energy society indicates that citizens expect such an option to be achievable at low cost. Rather than dismissing this expectation offhand as unrealistic, we argue that research on how low-cost options could lead to significant reduction in energy use would meet an important social need.

1. Introduction: climate change, uncertainty, and public participation

Assessments of climate change and of related policy options touch issues of major public interest. What climate risks are we as a society ready to accept, not just for ourselves but also for future generations? And what changes in the way our economy uses energy and produces emissions are we willing to support in order to mitigate such risks? Decisions on these issues have strong implications for all citizens. It is thus essential to include citizens' views in policy debates on climate change, mitigation and adaptation options. Only if citizens' views on such a far-reaching issue are taken into account is there a chance of developing policies that are supported by the public in the long run.

Public participation in policy making is no new topic. It comes in many forms in democracies the world over.[1] The traditional way is through the influence of policy networks. These are stable groupings in interests circulating around a policy mode, creating the basis and the specialised knowledge upon which policy makers have traditionally depended [1,2]. This somewhat elitist approach has turned more pluralistic in recent years with the rise of the politicised non governmental organisation [3], and the specialised insider knowledge that such groups offer on the national and international stage [2,4]. Nowadays an even more inclusive approach is being tried. This involves the notion of deliberative democracy [5,6], incorporating various approaches to citizens' involvement such as citizens juries, participatory forums, and study circles. The evaluation of such procedures is still a matter for debate and analysis [7,8]. In general the trend is towards procedures where stakeholders share the outcomes of their commitment. This is particularly noticeable in the planning field [9,10], but is becoming more rooted in environmental decision making generally [11]. Nevertheless, the unwillingness of those used to power, or who expect to remain influential in policy networks remains a prominent feature of the tensions that such pluralistic procedures generate.

Citizen participation on the issue of climate change assessments is different from the application to other issues in at least two dimensions. First, citizen participation has usually been explored for issues of local up to national scales. It is less clear how the voice of the public can be integrated in assessments of global change. Second, climate change is an issue of especially high uncertainties. While human actions may alter the climate system significantly over decades and centuries to come, and while this could have serious implications for basic living conditions, the complexity of the global climate system makes any predictions highly uncertain. Obviously the two dimensions are related. It is precisely the global scope of the issue that makes both citizen participation difficult and assessments highly uncertain. Here we are faced with a problem of risk management [12], but one where both decision stakes and uncertainties are extremely high. For such situations, it has been argued that the participation of an "extended peer community" [13] in assessments should complement more traditional ways of expert assessments.

In this paper we focus on the relation between public participation and uncertainty for the issue of climate change. While probability theory offers a formal framework to think about uncertainties, it is far from trivial to relate this frame-

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[1] The Swiss system of referenda may be seen as a form of public participation, too. However, public participation usually refers to specific activities of deliberation, negotiation, etc., not to casting a vote.

work to the issues of anthropogenic climate change. In this introductory section we want to argue that a sensible way of applying the concept of probability to issues of anthropogenic climate change combines probabilities with preferences, and that along these lines subjective probabilities concerning climate change can be studied empirically.

Probability theory – first formalized for managing risks encountered in games of chance – is deeply rooted in our experience with intuitively appealing features of our environment: rainfall, wind patterns, attacks by dangerous animals, hearing somebody telling a good joke, and many other events do not have a strict rhythm but still show characteristic frequencies. As human beings, we are quite good at perceiving differing frequencies, and certainly there was an evolutionary advantage in having this ability.

This frequentist use of probability theory goes along nicely with much observational and experimental work in the natural sciences. Where long time series can be observed or produced, statements about relative frequencies can be made and used in reliable ways. Probability theory can then be used to study these frequencies. However, with anthropogenic climate change we are faced with possibilities which have never been realized so far – ranging from new forcing conditions on the climate system to the dynamics of todays global economy. As is well known, the concepts and theorems of probability theory are used in such situations, too. This is then often labelled as a "subjectivist" use of probability theory. In such situations it is sometimes suggested that further research is needed until the "true", "objective" probabilities of the relevant events can be pinned down. But decisions have to be taken well before this happens – and in fact there is no guarantee whatsoever that it will ever happen. Therefore, a moment of reflection on how to describe and analyze uncertainty in cases where no data on frequencies are available is in order.

The word "uncertain" can be used in a comparative way: the effects of climate change on Alpine climate may be said to be more uncertain than those on global mean temperature. This way of talking is quite intelligible in the case of frequentist talk. If in some desert serpents are more frequent than scorpions, I may say that I am quite confident not to meet a scorpion but less certain about avoiding snakes. But what about events where frequencies are not known and maybe not even knowable?

One way of tackling such situations is to ask people in more or less sophisticated ways how uncertain they are with regard to different possibilities and to take their answer more or less at face value. Much empirical work on risk perception proceeds along these lines, and there are many valuable insights to be gained along that route. However, this way of proceeding presupposes the concept of subjective probability, it does not clarify it. Such clarification is achieved by a way of looking at subjective probability elaborated by economists working on the theory of choice [14].

Suppose you are going to see a movie and you are a bit late. All of a sudden, you are faced with a robot who is going to kill you unless you take another road and accept to be 10 min late at the movie theater. Of course, you would take the detour. Now suppose that you do not expect the robot to kill you at all, but you know that he might do so in the unlikely, but not impossible case of its software malfunctioning. Would you still accept being late at the movie? Maybe yes. But maybe you would accept a very small probability of being killed in order to avoid being late at the movie. After all, if rather than facing a robot you were just facing car traffic – have you never run the risk of an accident just in order to save a few minutes of time?

The point of these stories is the difference which uncertainty can make for human action. Given a possible event which we do not like, our willingness to avoid it by accepting another undesirable event depends on how uncertain we are about the two events. This can be turned around: to know how uncertain somebody is about some undesirable possibility, one may ask how she will act when faced by that possibility. Of course, the same holds for desirable possibilities.

How then can we assess uncertainty about climate change in those cases where no meaningful relative frequencies are available? For example by investigating what somebody who thinks that climate change would be a dreadful thing would be willing to give up in order to avoid it. The less probable such a person assesses this risk to be, the less will she be willing to give up to avoid it. How can we compare subjective probabilities between different people? If – and only if – they have similar preferences over the relevant possibilities, we can. Suppose that two people have similar preferences with regard to heating comfort, that both consider climate change a dreadful thing and that both have similar preferences with regard to risk taking: If one of them is willing to give up more heating comfort than the other in order to avoid climate change, then the latter one sees drastic climate change as less probable. Although these are quite a few ifs, there are many situations where they are fulfilled. Subjective probabilities of rainfall sometimes do show in whether or not people take an umbrella with them.

This in turn implies that the measurement of subjective probabilities depends on the measurement of preferences or utility. Once a preference ordering of the relevant events is given for a given agent, we can study subjective probabilities, ranging between the extremes of being sure about something and being sure about its negation. Along these lines, then, an investigation about subjective probabilities concerning climate change is conceivable.[2]

It is a remarkable implication of this argument, however, that subjective probabilities are inextricably linked to subjective preferences. This in turn means that the widespread practice of treating the subjective probabilities entertained by experts in some field as a benchmark which both policy makers and ordinary citizens should unquestioningly adopt

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[2] Sophisticated research in social psychology has shown that this match between probability and utility sometimes involves additional complexities (see the path-breaking work by Kahneman and Tversky [15] and the review papers by Machina [16] and Slovic [17]). The link between judgements of likelihood and judgements of desirability is strenghtened, not severed by this research.

is unwarranted. Of course, laypeople will be well advised to take into account the subjective probabilities of experts. By construction, however, they are subjective views, informed by research results but geared to subjective preferences of experts. Given the high uncertainties in climate change research, public participation in climate assessment is crucial among other reasons because an unwarranted bias emerges if the subjectivity of the experts is not balanced by the subjectivity of laypersons.

Just as it is important to know the packages of subjective probabilities and preferences entertained by different experts, it is important to know the analogous packages entertained by different laypersons. Investigations to that effect are indispensable to support sound policy decisions in the face of the many uncertainties which inevitably characterize the climate change issue. The study discussed in this paper is one step in that direction.

Of course, in order to make such investigations we must consider situations where some actions could actually help avoiding climate change. This means that talking just about individual action is not enough. In practice, it is far from clear whether, say, an individual driving slowly on a highway does anything to reduce climate change. First, because its impact is completely negligible. And second, because even at that negligible level that individual may be upsetting other drivers with the perverse effect that these drivers get nervous and consume more additional gas than the original one is saving. Therefore, we need some methodology where people can express whether climate change matters to them and whether they are willing to support collective actions targeted at avoiding climate change, especially actions that would entail great sacrifices.

The IA-focus group methodology described below is well suited for this purpose. After describing this methodology (section 2), we will discuss results from IA-focus groups conducted in Switzerland as part of the CLEAR project. We will concentrate on how the ordinary citizens participating in these groups perceived potential climate impacts, what preferences for different energy use scenarios developed in the social settings of the groups (section 3), and how mitigation options were discussed (section 4). From the combination of energy use preferences of the groups together with their support or not for hard-hitting mitigation measures, inferences on subjective probabilities concerning climate change issues which emerged in the group discussions can be drawn. As discussed above, both preferences and subjective probabilities of ordinary citizens should be taken into account for the formulation of climate policy. This will not reduce the uncertainties related to climate issues, but it can help to make them more manageable by supporting policy-formation which can generate long-term public support.

2. Method and data: IA-focus groups

The method of integrated assessment (IA-)focus groups [18,19] has been specifically designed to allow the exploration of preferences and subjective probabilities as they emerge in social settings dealing with complex environmental issues. The method is based on the focus group methodology widely used in public opinion research and in marketing [20] which in turn was developed by social scientists studying mass communication [21]. Conventional focus groups are based on a group of people being exposed to some common stimulus. The stimulus usually is a television speech, a prototype of a new product, or some similar experience. The group then is invited to engage in a free-wheeling conversation about that topic. The conversation lasts about 2 h, is recorded and the record is then analysed. The point of the exercise lies in the ability to observe opinions expressed in social processes, in which some new information is taken into account.

IA-focus groups extend this basic pattern in four ways. First, the common stimulus is given by exposure to an interactive IA-computer model or a similar piece of information, like a video-recording or a poster session. In the present case, the computer models used included the ones developed by C. Pahl, C. Schlumpf and others (see their contribution to this issue) within CLEAR, as well as European IA models made available by the ULYSSES project (see [22,23]; the European models used in some of the CLEAR groups were TARGETS [24] for global change and Polestar [25] for the regional dimension). The inclusion of computer model interaction is essential in IA-focus group processes, because the issues explored in such groups are much more complex than in most conventional focus groups. Relevant topics range from what to do about climate change to siting a wastedump, from the risks of some genetically modified food to the pros and cons of a new transport system.

Second, the group meets several times in order to reach a more in-depth discussion of the topic under consideration. Five meetings of 2.5 h each are a sensible default value. Third, the group itself produces a short statement about points of agreement and disagreement (in the present case, this statement was called a citizens' report). This procedure emphasises features of the group setting which are situated at the interface between the private and the public domain. And fourth, the material is analyzed in a more structured way than is usual with focus groups. For this purpose, the empirical material is treated as a sample of discussion sequences drawn from a universe of possible conversations: conversations on climate change happening in Switzerland around the year 2000 at the interface between the private and the public realm. This universe comprises an infinity of possibilities, the sample comprises tens of thousands of discussion sequences. The material is then used to identify ideal types which are relevant for the problem at hand [26].

Ideal types were introduced into social science methodology by Max Weber at the beginning of this century ([27], see also [26,28,29]). Ideal types are related to moral images of the world [30]. They typify possible different futures of a given social system in such a way that moral choices with which the system in question is faced are highlighted. These moral choices are related to the system's own norms and its given historical situation. Thus, ideal types do not primar-

ily typify different people, but different social choices. Of course, different people can then be characterized by how they relate to such different social choices. It is important to notice that ideal types represent a crucial strategy to deal with uncertainty.[3]

As an example, consider the ideal types of democracy and tyranny. They offer a moral orientation which enables one to take a certain course of action even when it is impossible to tell in advance its precise consequences. In a given situation, certain actions count as democratic, and the ideal type of democracy justifies undertaking such actions rather than others without requiring an impossible prediction of the future course of history. Ideal types blend preferences like the ones favouring free speech with factual knowledge like the historical experience of law-making by parliaments. At the same time they engender social risk preferences like the willingness to incur great risks to save democratic institutions where needed or the unwillingness to put these institutions at risk where possible advantages might tempt one to do so. These risk preferences imply a social structuring of major uncertainties along the lines sketched in section 1: the doubt that democratic actions might be ineffective or even counterproductive is kept within narrow limits, while the confidence that they will contribute to the intended goals is stabilized.

In section 3, some ideal types which are relevant for climate policy are presented on the basis of 14 IA-focus groups carried out within the German speaking part of Switzerland. Group size was about 6–8 people. Overall, approximately 100 ordinary citizens participated in these groups. The participants were selected by a stratified random sample from the adult Swiss population. Using the official files of telephone numbers, in different urban and rural regions people were called at random under the constraint that each group should be heterogeneous with regard to gender, age, education, and environmental attitudes. Participants were rewarded with an amount of money corresponding to the reward paid to members of Swiss county parliaments when they engage in committee work.

The group discussions were videotyped and the tapes transcribed with the following procedure. A set of topics of primary interest for the present investigation was designed and the portions of the overall conversation relating to any one of these topics were transcribed on computer files. Next, a list of categories of possible statements was established and for each item a code was defined. Then the transcribed conversations were labelled with these codes in the Atlas software for qualitative content analysis. With this technique, it was possible to scan all transcripts for specific discussion sequences and to experiment with various patterns of such sequences so as to identify relevant ideal types on the basis not just of numerical counts but of meaningful visions of the future displayed in the IA-focus groups.

When interpreting IA-focus group results, it is crucial to disentangle individual from social preferences. The willingness to drive along highways at lower speed while all others stick to current speeds differs from the willingness to accept lower speed limits for everybody. IA-focus groups are situated at the interface between private and public preferences precisely in order to highlight social preferences rather than individual ones. As argued in section 1, it is exactly this dimension of support or not of *collective* actions that is relevant for the present study on citizens views on climate change and climate policy.

For the present investigation, a specific aspect of the IA-focus groups considered was especially important. In the first session, the groups were split in two halves. One sub-group was then asked to produce a collage by thinking about how the region in which the participants live might look like thirty years from now if energy use would develop more or less as in the past – a business as usual (BAU-)scenario, as it were. The other sub-group was given a similar task, this time with the constraint that energy use would be reduced in the order of magnitude of 30–50% in comparison with the present – a scenario of drastic reduction in energy use. The sub-groups would then present the collages to each other, so that the collages can be matched with discussion sequences referring to them.

3. Findings

In the following, two ideal types of clear relevance for climate policy are developed out of the conversations of the IA-focus groups. They establish a contrast between a high-energy world and a low-energy world. Before exploring that contrast, we take stock of what the IA-focus groups tell us about the public perception of the climate change problem. Finally, we will highlight some implications of the group discussions for the management of climatic risks. The overarching theme of the present section is the role of uncertainty in the vein of the discussion given in section 1.

3.1. Public perception of climatic risks

With one partial exception, all groups consider climate change a serious problem. This showed both in the citizens' reports produced by the IA-focus groups in their last session and in the general conversation during the previous sessions. Which aspects of climate change are seen as especially problematic varies considerably. Sea level rise, health problems and disruptions of ecological equilibria are major negative impacts associated to climate change. As illustrations consider the following quotations:[4]

Donato: Well, I would be really glad if in thirty years the seasons would still be more or less ok. This, I think, is my only problem, the discrepancies of the seasons, autumn, spring, summer, winter, it's simply off the tracks. (FG 3)

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[3] We owe this point to discussions with David Tabara.

[4] Quotes from IA-focus groups are identified with the number of the group (FG 1 to 14) and fictitious first names which have been assigned in the course of data analysis.

Mona: Well we would have rather serious health problems. That's just one... one topic. {general agreement in the group.} (FG 10)

Rainer: I think, an important point, also in connection with climate change is the polar ice, which is melting, the sea level, which is rising, and there are many coastal regions which are strongly threatened. Floods! I have heard a lot and I think that's quite realistic. (FG 10)

Economic impacts, however, are not mentioned as a problem. Climate change is seen as a global problem, impacts in the region where one lives are not necessarily in the foreground of the discussions.

As mentioned, one group was less alarmed by the prospect of climate change. Still, the issue was taken seriously by that group, too. On the other hand, in most groups some voices emphasized that the problem should not be exaggerated, either. As an example consider the citizens' report of FG 3:

Today – We think climate change is no problem. If the timberline moves upwards and it gets a bit warmer, that's basically not disturbing.
Future – In the future climate change could bring big problems:

> *increasing ozone hole,*
> *rising sea level rise,*
> *changing oceanic currents,*
> *increasing storms and floods.*

This quote also illustrates the strong tendency across most groups to see climate change as one aspect of the general environmental disruption caused by the reckless behavior of humankind. Specific features of the climate change problem are acknowledged and discussed, but although the IA models used as well as additional information provided had a clear focus on the climate change problem, the conversation kept linking that problem to the broader topic of a severe disruption in the relation between humankind and its environment.

The following sequence from focus group 1 again illustrates the fact that often some voices emphasized that the problem should not be exaggerated, in this case as the reaction of one participant to a very drastic association with climate change expressed by another focus group member:

Martina: In terms of knowledge I agree with all the media, with newspapers, TV reports, etc. where they keep pointing to the danger. Where one gets really scared. But when one then looks at such statistics ... well, what shall I be afraid if it gets one degree warmer in 2100. I will not live then anymore and I don't consider one degree as being that much.
Agnes: But if things go on like this, what are the consequences? It is not only temperature, then comes the rising sea level and there will be less space on earth. Who knows, maybe one will have to move to the moon.

Ernst: But, if we look at the past, that has all happened already. I don't see any danger in this. There have been extreme situations in the past. For example here in Switzerland there have been rain forests and temperatures around 40–50 °C.

In view of the citizens' report, all groups were asked to discuss what they considered main obstacles to effective action with regard to the climate change problem. Surprisingly, perhaps, they usually did not mention uncertainty about climate change in this context.

This is not to say that uncertainty is not important. In particular, the perception that even scientific experts are not able to provide an unanimous forecast of future climate change is seen as reason to worry:

Martina: That further increases the uncertainty of us laypersons. When even the scientists are uncertain. (FG 1)

Occasionally, scientific uncertainties were perceived to make climate protection more difficult.

Agnes: Well, my falling leaves stand for uncertainties, my own and as it seems the ones of the sciences, too. Each falling leave is energy and thirst to act which are falling away as a result of uncertainty. (FG 1, while presenting a drawing)

Usually, however, according to the IA-focus groups, this sort of uncertainty does not mean that there is no problem or that no action is warranted. Quite the opposite.

Anastasia: In my case there are different squares. One represents science, with the different opinions. For me it is incomprehensible how one can disagree by 500%, but start from the same basis. That's incomprehensible for me why one cannot find a closer consensus here. I also think, from my point of view one does not do enough and I wonder what needs to happen until one does something. In my opinion what is done is really not enough. (FG 1)

Climate change is clearly perceived as a serious problem, and in general uncertainty is not seen as a reason to drop or postpone action with regard to it. The question is what kind of action is appropriate under the given circumstances. To investigate that question we now turn to two ideal types of future energy use.

3.2. A high-energy world

Figure 1 shows details from a collage on business as usual in future energy use. There are graveyards in the middle, animals desperately looking for water, toxic waste, images of power and speed. The collage is highly typical of the images produced by the IA-focus groups when it came to BAU energy futures.

A similar impression is conveyed by the verbal comments. An example from another group:

Figure 1. Detail of collage on business as usual in future energy use (FG 4).

Renato: Well, we have "the world in thirty years with increasing energy use" and we have looked mainly for images of catastrophe. That's because we do imagine that things will get very catastrophic, if they go on like this and energy use keeps increasing, if CFC use keeps increasing. We haven found that much, because in these magazines there were mainly nice and beautiful pictures and we nevertheless have seen a few things: icebears are not so well-off at some stage, at the North-pole and the South-pole, maybe they need an oxygen pill up there, maybe it gets to warm for them somewhen. Then, sea level, it rises, we know that a few centimeters are enough to put the Maledives under water or other flat islands, there will be more hurricanes, then we have thought that "Waldsterben" will not improve, eighter, and so, ironically, that at the end maybe we are left only with the escape route into outer space. (FG 3)

Clearly, these groups do not subscribe to the view that energy is just one of the factors of production leading to ever increasing welfare thanks to ever increasing GDP, and negative consequences of energy use should be treated as external effects which slightly dampen this effect without reversing it. Rather they seem to share the feeling expressed by the story of the window cleaner who fell from the 72th store of a skyscraper. As he was falling, his colleague from the 20th store shouted: "How are you doing?" The answer was: "Ok, so far." A similar feeling is conveyed by the image of the Titanic – an image which has found amazing resonance in the social imagination of the 20th century. It is remarkable that one of the IA-focus groups actually used the image of the Titanic as the central image of its collage for the BAU scenario.

One more thing should be noted with regard to the BAU collages and the related statements. In modern culture, there is a notion of energy – linked to a related notion of power – as something inherently positive: people feel energetic, a great movie is said to be powerful. These are deeply rooted

cultural patterns, they are related to the symbolism of red meat [31] and – no joke – red sports cars. The energy use by traffic cannot be understood simply as an input required to move from A to B. Rather, the ability to use energy as such is often treated as a source of satisfaction and as an important status symbol. In today's economy, energy is not only a factor of production, but also a good in itself. Under these circumstances it is all the more remarkable that the IA-focus groups clearly do not subscribe to that view of energy. Bluntly put, they do not treat energy as a good. They treat it as an input which within limits is needed and useful to sustain human welfare, but which beyond those limits actually impairs that welfare.

How such messages relate to climate policy options will be discussed in subsection 3.4 and again in section 4. For the moment we can take stock of the observation that the IA-focus groups express a consensus view of one possible future of human society. It is characterized by high levels of energy use which for privileged minorities of humankind go along with luxury, while for humankind as a whole they go along with negative stress, environmental disruption, and social conflict. This is neither a forecast nor a description of some inevitable mechanism, it is a moral image which is used in social conversations to make sense of certain aspects of the world and of certain opportunities of action. It is the ideal type of a high-energy world, an ideal type of obvious relevance for the problem of climate change.

3.3. A low-energy world

How then did the IA-focus groups picture the alternative scenario of a future where energy use would be substantially lower than today?

Selina: We found it should be a positive development, on the rise and upbeat, and endowed with children and women, to represent a nice world. It should express leisure, time for pleasure, too, we have a few of these.

Figure 2. Collage on drastic reductions in future energy use (FG 1).

It should express leisure time, communication. Well it should simply express this whole complex, and it does, if I look at it. But then things are not over, but go on. That's documented somewhere, too. (FG 8)

This view, illustrated in figure 2, again expresses a remarkably strong consensus, both within and across groups.

Nadja (facilitator): So you had no quarrels. Can someone briefly say what you have written down? The first question was: what idea do you link with a low-energy society. And then it says: beautiful.
Meike: For me, the idea of a low-energy society is simply beautiful. (FG 14)

While the ideal type of a high energy society has a nightmarish quality, here we are faced with positive dreams. This is stated quite explicitly:

Emily: It's simply our dreams, maybe one could put it like that. (FG 3)

Two things deserve special attention here. First, there is a peculiar moral situation involved: what is morally requested is also desirable on aesthetic and even hedonistic grounds.

Renato: I also think that it would be positive and first it is really necessary to limit energy consumption and this certainly has positive effects. (FG 3)

Under such conditions, one would expect any morally decent and well-informed person to pursue that goal. Why then does it not provide the obvious future for society, why is the ideal type of a high-energy world relevant at all? Two fac-

tors are mentioned several times without being questioned by other participants: individuals let themselves be driven by greed, and economic institutions override society as a whole.

Carol: If people were closer to each other, in the sense that they would deal differently with each other. Then nature would profit, too. So one can see profit independently from money as well, but today this is nearly impossible. (FG 5)
Agnes: I find it strange to discuss this problem, because money makes the world go round and industries are the big issue, not families. (FG 1)

The second thing to notice is the cultural heritage expressed in these collages and statements. It is not difficult to recognize core elements of the old image of Paradise here. One participant even remarks:

Konrad: I mean, if we begin to rave about a future, how it would be if energy use were cut by half, my God! With these images one could . . . one could put together a landscape which seamlessly turns into paradise. (FG 9)

3.4. Managing climatic risks

We have looked at two ideal types which present a moral choice for society. The choice is much broader than between a climate system untouched by humankind and one influenced by human action. And the choice seems rather easy, as a clear preference is expressed for the ideal type of a low energy world.[5]

The preference for a low-energy world is geared to a whole array of associations. In particular, positive images of children and women, of animals, of nature are clearly associated with a low-energy, but not with a high-energy world (figure 3). The reverse is true for all kinds of catastrophes ranging from war to the appearance of monsters and symbols of death. These are clearly linked to the image of a high-energy world (figure 4).

Managing climatic risks, then, would seem to imply a straightforward policy of reducing energy use. Such a policy is sometimes seen as advisable even on purely economic grounds:

Horst: I do not see this only because of energy use. After all, we are also talking about how to maintain the strength of our economic location. We said before that all that energy saving technology is rather expensive for the moment. If we take the lead there, then we can save our own jobs. And globally. That would be enough of a reason to stick to this road. The great Sulzer (Swiss man-

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[5] Similar preferences were expressed across Europe in the IA-focus groups organized within the ULYSSES project [18]. However, the groups organized within the CLEAR project in the French speaking parts of Switzerland showed a different pattern. Unfortunately, no comparable data are available for France. It would be very interesting to explore the hypothesis that in the French speaking parts of Switzerland as in France energy is treated much more as an essential requirement for economic growth and progress than in the rest of Europe.
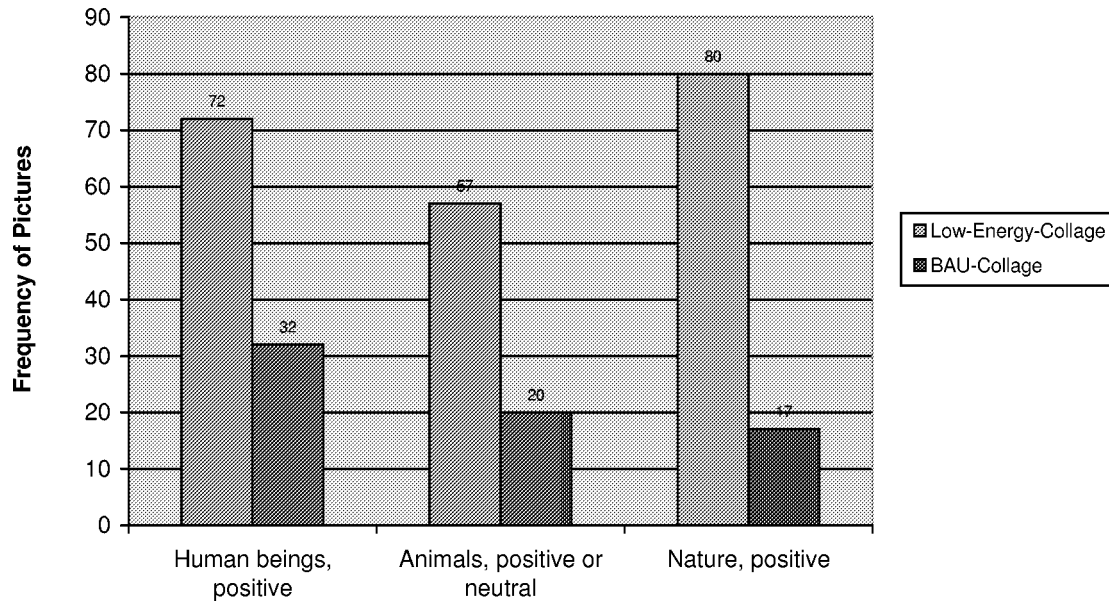
Figure 3. Frequencies of emotionally positively charged images in collages of a low-energy world (light grey) and a high-energy world (dark grey).
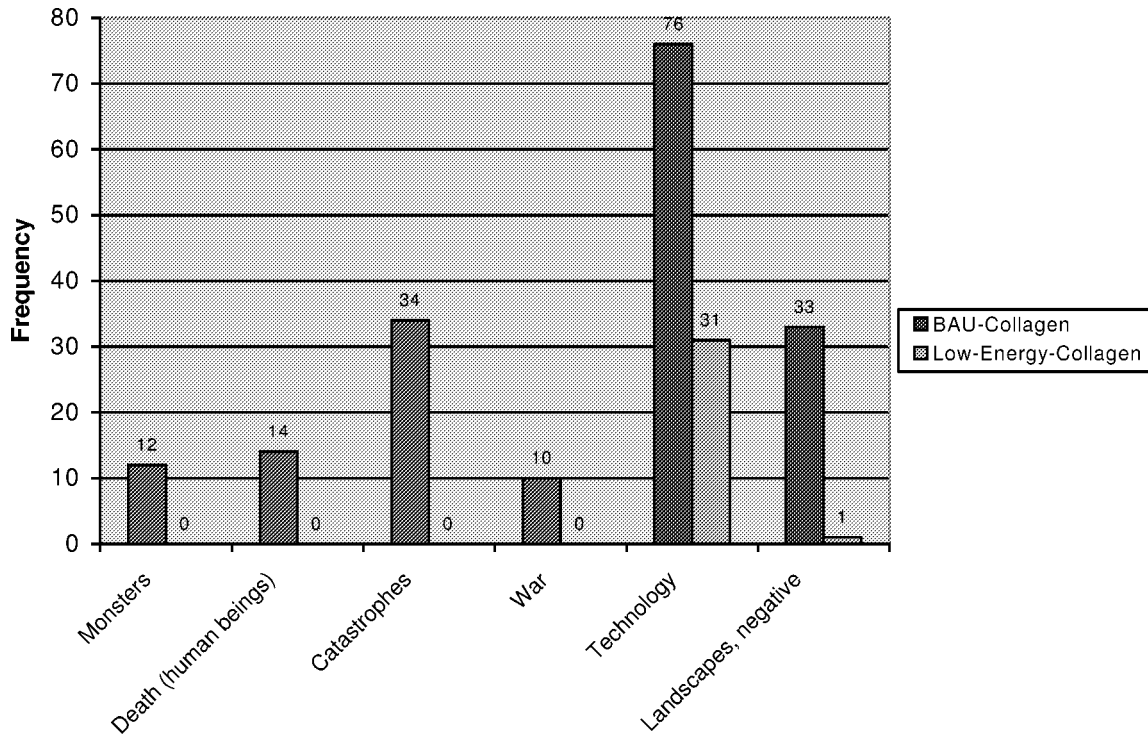

Figure 4. Number of collages containing emotionally negatively charged images: low-energy world (light grey) and high-energy world (dark grey).

ufacturing firm) turbines, somewhen the market dries up. But sophisticated solar technology, there the market does not dry up for a long time. (FG 14)

This may be related to the issue of lifestyles, as the market for energy efficient devices depends not only on their technical characteristics and economic costs, but also on their symbolic value. One group discussed this quite explicitly:

Max: He had quite a good idea. Now, if energy saving devices became trendy. Or if energy saving itself became

trendy. If electric cars or the Smart car became trendy. (FG 14)

So far, we have established two social alternatives and a clear preference relation between them. Now it is time to come back to the role of uncertainty discussed in sub-section 3.1. As noticed there, the negative impacts of climate change are taken seriously, but although the ideal type of a high energy world is catastrophic, these catastrophes may still be highly uncertain.

In section 1 we argued that the degree of uncertainty in such a situation should show in the willingness to incur great sacrifices in order to avoid the risk in question. Before the backdrop of our two ideal types, a good measure of those sacrifices is the increase in energy prices which would be accepted in order to realize a low energy world. The IA-focus groups are well aware of the importance of energy prices in this respect. The following statement is instructive:

Manfred: We now started from the assumption that the only way to educate the Swiss towards using energy more efficiently is to hit him somewhat on his wallet. (FG 14)

The statement is instructive not only because it emphasizes the role of monetary incentives, but also because it immediately limits the degree to which one can – "somewhat" – hit the citizens on their purse for purposes of energy saving. At no moment did any IA-focus group advocate a drastic increase in energy prices. More than anything else, this absence shows the degree of uncertainty implicit in the treatment of negative impacts from climate change.

The judgement that only moderate increases in energy prices are feasible is also made explicitly:

Manfred: The question simply is, do people want to go in such a direction? They know, if they say yes here, it will cost again later on. (FG 14)

Fabian: I don't think that this would be accepted, higher gasoline prices.
Klaus: Increasing gasoline prices by one Swiss Franc.
Fabian: That would not be accepted. 50 Cents would already be difficult.
Nadja (facilitator): So, you feel, price increases would not be the right way?
Fabian: It's a question of measure. One sees it in Germany, that's what the Greens said in the election campaign, that gasoline should cost 5 Francs, to protect the environment. Now they have the greatest troubles to reach the 5% of the vote, to stay in parliament at all. So that's what it leads to. Put up such exaggerated things and then expect to get elected. (FG 12)

Christa: Basically, I find this quite a good way of proceeding: To say, everything takes its time, nothing happens from today to tomorrow, to say, one tries for 10 or 15 years on a voluntary basis, and if it doesn't work, then there will be a law. (FG 13)

When interpreting these results, it is essential to remember that IA-focus groups are targeted at social rather than at individual preferences. What our results show is not that Swiss citizens are eager to use less energy as individuals faced with today's infrastructure for mobility, housing, etc. They show that Swiss citizens are interested in the possibility of creating a different infrastructure which would enable them to use less energy while enjoying greater welfare. But they also indicate that Swiss citizens are interested in that possibility as far as the transition towards it represents a low cost option for them as individuals. This is consistent with

a view which sees serious climatic risks arising as a consequence of anthropogenic climate change, but which treats these risks as highly uncertain.

4. A crucial question

Many strands of analysis are invited by this situation. Clearly, it would be interesting to look in more detail at the relations between preferences stated verbally without engendering far-reaching commitments and preferences enacted in everyday life, both in individual and in collective choices (see, for example, [32]). Another fascinating task is to study how the IA-focus groups process the scientific information with which they are faced [26]. Many more subjects deserve careful study, but this cannot be done here.

In the present context, it is important to distinguish confusion from uncertainty. One may be confused about what's going on to the extent to which one is left paralysed, unable to act. This is not the situation with climate change, neither for scientific experts nor for ordinary citizens. Scientific experts are not uncertain about the *possibility* of anthropogenic climate change involving serious impacts ranging from sea level rise to increasing desertification, from disappearing Alpine glaciers to more frequent mud slides in Alpine valleys [33]. These events are possible, and they represent obvious risks to things which are valued in aesthetic, moral and even monetary terms by many people. But as anthropogenic climate change is not one of a long series of events characterized by recognizable frequencies, subjective probabilities are inevitable even for scientific experts in this domain. Experts have no compelling authority when it comes to subjective probabilies, and there is no reason why they should not disagree on them much as they can disagree on, say, aesthetic tastes.

Under these conditions, citizens must make up their own minds about what degree of uncertainty to assume for their decisions. This is not necessarily a discursively explicit process, it may as well happen implicitly. In our IA-focus groups, the social futures and the policy options discussed imply that major negative impacts from climate change are seen as a possibility which must be taken seriously. But they also imply that catastrophic climate impacts are treated with a low subjective probability, which rules out high-cost policy options.

In spite of this, the ordinary citizens participating in the IA-focus groups supported strong reductions of energy use. This seems to be linked to the fact that they associated different positive effects with reduced energy use, not just climate protection. And they advocated a social system of the future using much less energy in connection to their expectation that this can be achieved without major economic costs.

It has been discussed above that for the issue of climate change the subjective probabilities and linked preferences of experts should be complemented with the corresponding package of preferences and subjective probabilities of ordinary citizens as a support to policy making. The clear preference of most participants in the focus groups for strong

reductions in energy use, and the high subjective probability that this could be achieved at low cost, contrast with preferences and subjective probabilities of many experts. There are basically two possible reactions to this discrepancy. One could assume that the citizens are just ignorant, that the in-depth discussions in the IA-focus groups did not do anything to change this ignorance, and that citizens should be educated until they share the experts' views. Or one could argue that the preferences and subjective probabilities expressed by the citizens participating in the groups should be taken as a motivation for intense research on the following crucial question: How can low-cost policy options be designed which lead to significant reduction in energy use? Information on that issue provided by further research on the climate change problem would meet an important social need.

Along these lines, listening to the voices of the citizenry as elicited by IA-focus groups can make an important difference for the debate about climate change. Not in the naïve sense of "*vox populi, vox Dei*", of an alleged superior truth embodied in public opinion, but in the sense of taking seriously the subjective judgement of citizens where scientists rely on subjective judgement, too. In the present case, this might lead to major research efforts being devoted to the study of low-cost options leading towards a low-energy society, rather than either dismissing such options as unrealistic dreamwork or treating them as obviously feasible.

In this vein, preferences and subjective probabilities of both citizens and expert assessments should not be taken as the gospel truth, but should be critically assessed. For example, it is hard to see how a low-energy society could be designed without taking advantage of sophisticated technological possibilities. This contrasts with the flatly romantic touch with which our IA-focus groups often discuss the ideal type of a low energy world.

> Gilbert: Finally all the nice things.
> Emily: How we hope to see Switzerland and our world in thirty years. Healthy animals, healthy children and still to be able to look at flowers, at green meadows.
> Simon: And still seeing tortoises, too.
> Emily: Yes, and the tortoises, unfortunately threatened by extinction. (FG 3)

The globalized high-tech culture, in which the participants of the IA-focus groups actually live and some transformation of which would be vital for any plausible perspective of a low-energy world, seems at odds with those images. To put it in slightly ironic terms: Swiss citizens seem to use the book of Genesis as the hitch-hikers guide to the galaxy. (Results from the ULYSSES project indicate that the same holds for a significant part of the European citizenry [34]). Already in the Bible, however, there is an alternative to the nostalgia for paradise, namely the hope for a New Jerusalem, the idea of a future urban life as beautiful as the paradise lost in some mythical past. Our IA-focus groups show drastically that visions of such new ways of life are largely absent from the social imagination of Switzerland, while the notion of a lost paradise of the past is a crucial element of debates about the environment in general and climate change in particular.

The core question raised by our IA-focus groups, then, is not simply how to deal with the alternative futures which they discuss in the face of climatic risks. And it is not only how to reduce the uncertainties which are embodied in their social preferences between these futures. The task of designing low-cost policy options leading to significant reductions in energy use requires the ability to enlarge the very space of historical alternatives taken into consideration.

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