**Acceptance of renewable energies in Alpine areas**

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## 1. Introduction

Alpine areas are on the one hand destined for using their natural resources (especially biomass and water) to producing renewable energies. The remoteness of some inner alpine areas has sustained the demand for independent energy supply strategies. On the other hand the implementation of renewable energies in alpine areas is frequently limited by several factors: Firstly the productivity of renewable energy suppliers can be reduced due to topographic and meteorological factors (e.g. the contours of the valley which lead to minor sun intensity, snow cover, and unstable wind situation). Secondly space is limited and conflicts of interest can occur (e.g. between agriculture and energy production). A third aspect is the increased sensitivity of alpine landscapes, which involve an awareness of the susceptibility of alpine species and a stronger focus on the visual aspects. In many (pre) alpine destinations tourism plays an important role. Tourism industry has a double stake regarding energy – on the one hand being a major consumer and on the other hand being significantly at risk from possible negative effects of renewable energy sources (especially visual effects). Furthermore recent studies reveal a different perception of impacts by tourists and residents regarding effects on landscape (see Frantál and Kunc 2011). Planning and assessment needs to consider all these aspects in order to be pro-active and appraise possible impacts at an early stage. This paper analyses diverse approaches of public participation processes in alpine areas. They vary according to the intensity of involvement (Rowe and Frewer 2004, Creighton 2005) as well as the timeframe for the participation process (see Ley and Weitz 2003, Arbter 2010). In contrast to existing studies with participation at national level (Stocker et al. 2011, Madlener et al. 2007) this paper addresses local level. The paper analyses three case studies, which applied individual approaches to participation for impact assessment purposes (see fig.2). One major aim is to compare the timeframe and integration of public participation in the planning process. In order to explain when involvement is foreseen and where public involvement is possible fig. 1 provides an overview about the planning process in Germany which is similar to the one in Austria (except of the mandatory landscape planning).

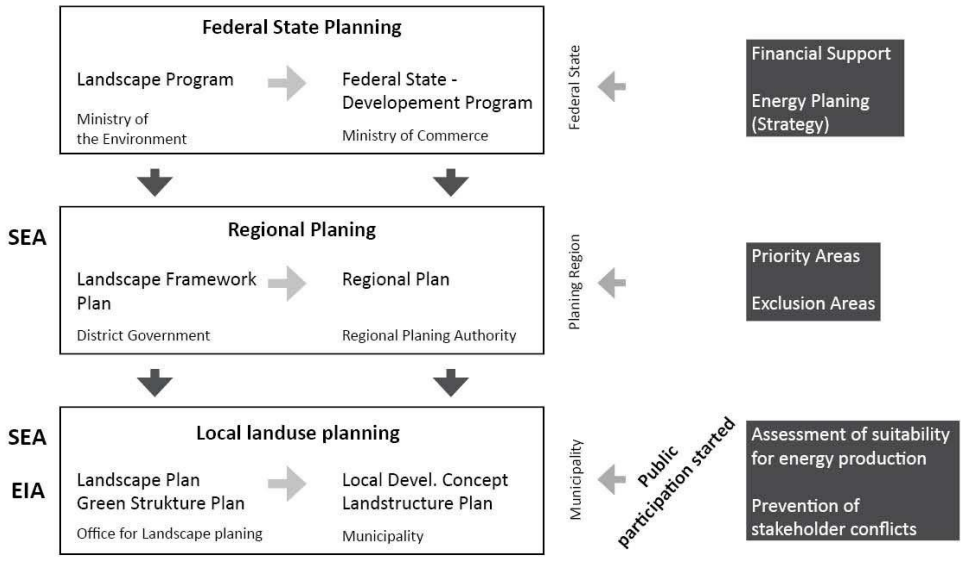


Fig. 1. Public involvement at different planning levels (after Bayrisches Landesamt für Umwelt 2009)

In each case study a different focus is set regarding the stakeholder groups, which are directly involved. In case studies 1 (and partly 2) special focus is set on the role of tourism. We discuss to what extent tourists' perception can be integrated into impact assessment and which form of involvement is possible. The next sections contain the case studies and finally draw conclusions.

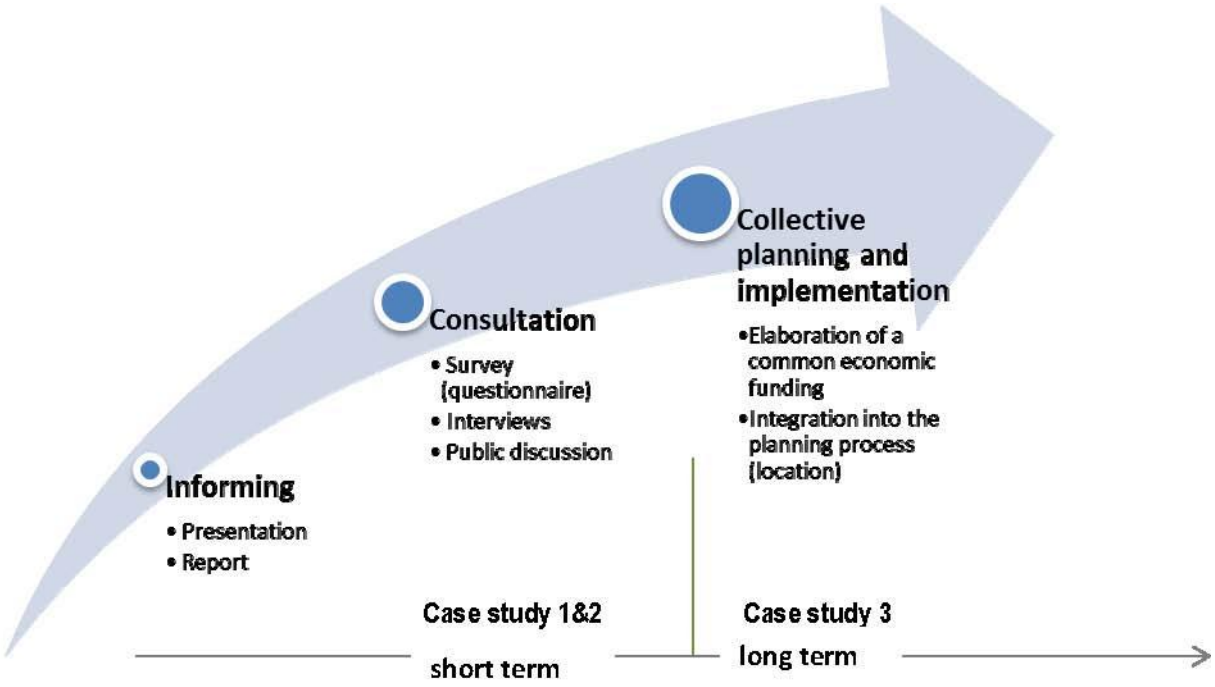


Fig. 2. Intensity and time frame of participation in the case studies (after ExpertInnengruppeLokale Agenda 21)

The following **factors** (based on Sustainable Development Commission 2008, Creighton 2005, www.iap2.org) were applied to attempt an analysis of the influence of diverse forms of participation on the acceptance of renewable energies:

**A Time frame:** Is a long-term involvement possible for the included stakeholder groups? At which stage of the planning process does the participation start? At which stage of the planning process is information needed from the stakeholder, and from which stakeholders? What type of involvement in the planning process encourages the acceptance?

**B Intensity:** What is the appropriate strategy (method) to include the stakeholders? To what extent is stakeholder involvement possible in the planning process? What factors encourage the stakeholder involvement in the participation process?

**C Identification of possible conflicts:** Which principal aspect of sustainable planning is addressed -do the stakeholders consider environmental, social or economic concerns to be more important? What intensity of participation is needed to solve these conflicts (see B)? To what extent is "habituation" (e.g. being exposed to wind power at your home) an important factor for acceptance of renewable energies?

**2. Case 1 -Perception of renewable energies by winter sport tourists**

This case study deals with the application of renewable energies in winter sport destinations. Within the research project ADAPT (AlpS) a questionnaire was developed directed at winter sport tourists. This questionnaire was applied in four large Austrian ski destinations (Lech am Arlberg, Schladming, Zell am See, Silvretta Montafon) which are all covered by artificial snowing to a great extent. Larger resorts (which means medium to large size in comparison with the Austrian "average") were chosen because of their financial and management potential to introduce and integrate renewable energies into their overall energy concept. Respondents were asked to fill in the questionnaire during the cable car rides, which gave us a response rate of

around 70%. A total of 1165 tourists were involved in the study. 79% were visiting for one week, 13% were day visitors about 6% were ski instructors and local visitors and 2% were other guests. In order to ask tourists about renewable energy supply we had to explain the possible options. To avoid a potential bias we decided not to use pictures, photographs or drawings. The selection of renewable energy supply facilities is based on the existing offers and application in the Alpine ski resorts and cable car enterprises (Zegg 2010, Österreichischer Seilbahnverband 2011). We tried to describe the size and location as clearly as possible (see also Pröbstl et al 2011).

This approach started participation of tourists at an **early stage** (most of the resorts are about to increase their share of renewable energy facilities but did not install a greater share of them yet). Involvement of winter sport tourists is **short term** only since they are on a weekly basis in the resort and could only be involved through "representatives of interest" in a long-term process. Thus only a **consultation process** was possible, which means a **low-to medium intensity** of involvement.

The results illustrate that tourists distinguish between **environmental impacts** and possible **impacts on the landscape**. This is visible in the different evaluation of photovoltaic panels on meadows, small compact wind turbines and small biogas plants. Large exposed wind turbines are least preferred in both cases and small compact wind turbines are also expected to impact the landscape in a negative way (see fig. 2).

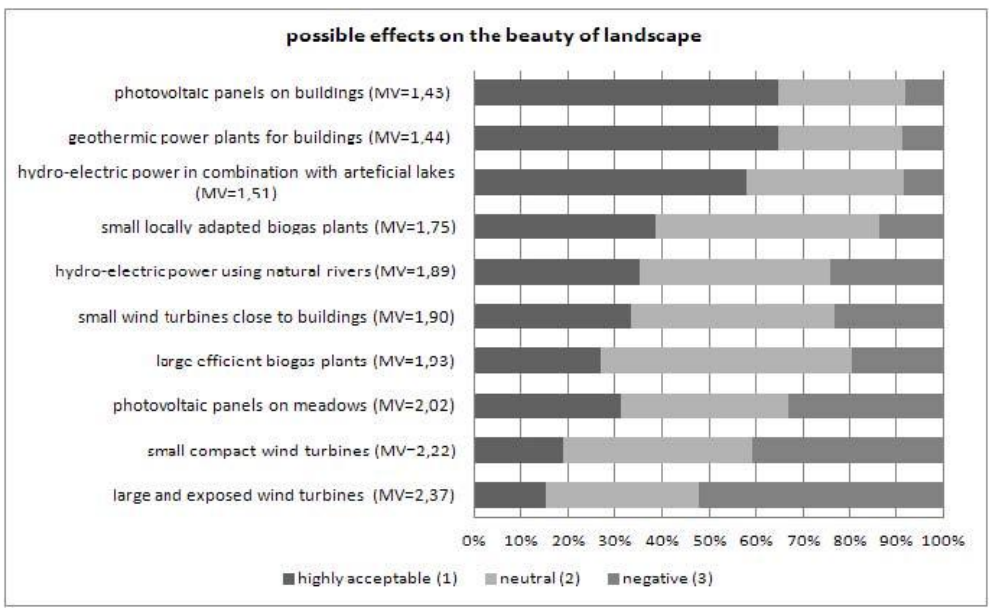


**Fig. 2: possible effects on the environment (mean value: 1=highly acceptable, 2=neutral, 3=negative) n=879**

Another interesting aspect analyses differences in the tourists' perception in case they have been already exposed to renewable energies in skiing areas or have never experienced them during their skiing holiday. A differentiation of winter sport areas with renewable energies in use and those without current application can provide more information about presumed acceptance and expected acceptance (see Frantál and Kunc 2011). Overall this example showed that tourists prefer the use of existing technical infrastructure such as the system for artificial snowmaking or photovoltaic attached to existing buildings to free-standing infrastructure. This emphasises the increased acceptance of well-known infrastructure and could support the hypothesis of increased acceptance of renewable energy facilities after time (e.g. solar shields). Asked directly about their attitude towards a skiing area, which uses 100% renewable energies, around 60% of the tourists consider this fact as important or even very important (see also Pröbstl et. al. 2011). The **general acceptance** of renewable energies in winter sport areas is **relatively high** therefore. However **environmental concerns** – especially regarding the landscape view – turned up and need to be considered within the future planning processes by differentiating the diverse options of facilities and mitigation measures.

**3. Case study 2 -Biomass study Oberaudorf**

The second case study evolved from a research project in Bavaria. Fifteen students and five academic researchers collected data on biomass potential and development options for biomass plants in a skiing area in the village of Oberaudorf. The LDC and SEA in use (2008) mention the higher demand of renewable energy – reflecting the intention of the federal state and regional level -but do not contain an „energy development plan“.[1] The tendency to turning green land (pasture) into intensified agricultural land because of the financial support for renewable energy production is mentioned as a risk in the SEA. Therefore the intention of building a new biomass plant should be linked to a holistic assessment of biomass potentials and side-effects on land use and the environment as well as public health.

Interviews were conducted with the mayor, community planners, hoteliers, restaurant owners and farmers. Biomass potentials for a local biomass plant were evaluated and possible options (size, supply, location) discussed. Tourism companies (hotels, gastronomy) were involved as a potential supplier (waste). Furthermore critical perceptions were listed oriented towards economic productivity, biomass potentials and conflicts of interest between stakeholder groups. The perception of tourists themselves was not included and never taken into account during the whole process (though the tourism suppliers were represented). The students elaborated final options (on biomass productivity and resources from the stakeholders involved in the process) and presented them to the interested public afterwards. Thus participants were exposed to different scenarios. Recommended strategies were made public in a report based on the discussion results.

Since the project was embedded into a **long-term process** of increasing the share of renewable energies in the community (which is already above the German average), the interest towards renewable energies and understanding of the topic biomass utilization for energetic purposes in special was elevated. Thus the **acceptance level** was **relatively high** already at the beginning of the project. During the public discussion the participants expressed merely **economic concerns** regarding the biogas potentials of the community and the productivity of a possible biogas plant. In this context the comparison of concrete scenarios with data about energetic potentials and possible numerical output proved to be a necessary element to question first hand opinions and get to a common vision. This confirms similar results from Austria (Späth and Rohracher 2010; Trumevyte and Stauffacher 2011), which showed benefits of a discursive practice linking visions with concrete energy scenarios in the latter case based on multi criteria assessment. Within the project itself a **medium intensity** of involvement was reached, which ended after the **consultation process**.

**4. Case study 3 -Wind park Spörbichl**

The Windpark Spörbichl is located in Upper Austria in the rural village Spörbichl in the municipality „Windhaag bei Freistadt“ close to the Czech border (www.neueenergie.at). The data and evaluation are gained by **long-term involvement** of the second author in the project. The two spin wheels with 660kW power each -compared to recent technology a small wind park -was built in 1999 about 350 metres away from the next residential buildings with intensive participation of the people living around the site. The level of participation reached from **information and consultation** to **co-implementation**. Already before the wind measurements started for the detailed planning of the wind park, the neighbours were taken to already existing wind parks during an excursion and asked if they would agree to live besides such a facility. As no objections arose at that stage the planning was continued with information meetings about the planning stages. Furthermore economic involvement was proposed. At the beginning 11 people started with founding a limited company a juristic

[1] Intention of the regional planning level: *In addition to reducing the energy demand energy production from biomass, geothermic power and solar energy are to be favored. Furthermore wind and water energy bear an important role. But have to be environmental friendly and integrated well into the landscape* (B V, Abs. 7.2 (Z)).

person in order to screen the land use plan amendments, development consents, contract the company to build the wheels and apply for public subsidies that were available at that time. On total, the needed private equity capital was about €582,000 for the 1,44 Mill. € project. The rest of the money was collected by subsidies, advance payments for future energy delivery and bank loans. From the beginning the initiators wanted to build a bottom-up project with as many participating people as possible. They also wanted to create environmental awareness for renewable energy carriers. Therefore, they chose a model for the equity acquisition in which private natural persons could buy between 1 and 10 shares of € 2.200 each, with which the average yearly electricity demand of the Austrian household can be covered by wind power production in the local wind park, at least in the energy balance. A leaflet to households and two evening events in local meeting places in the municipality Windhaag and the close district capital town Freistadt advertised the project. It only took 10 days to collect the required financial means. 100 persons participated who mostly come from the neighbourhood and the region of the wind park.

As the people were actively involved in the project from the beginning and could participate in the investment and the financial benefits up to now no objections against the wind power plant arose. Overall the level of **acceptance is high**. Furthermore, it is interesting that people identify with the project, and at shareholder meetings discussion does not focus on the **financial benefits** (which are there) but on produced energy, saved emissions and reduced environmental pressures. From this project we conclude that a high level of participation in the development and planning process, and especially the possibility to invest in a renewable energy project and participate in the benefit, considerably increases the acceptance. It even seemed to raise environmental consciousness of the people participating. Therefore, such projects also incorporate the notion of environmental education initiatives.

**5. Conclusions**

The case studies are directed to two different groups: tourists as short-term users especially seeking recreation (case 1) and domestic population (cases 2 and 3) who are constantly exposed to renewable energy facilities (and are sub-divided in additional stakeholder groups). For the first group it is interesting to see that small-scale facilities are preferred to large scale ones. Furthermore, the combination with existing infrastructure increases the acceptance significantly. The exposure at their home location seems to influence also their acceptance. Further verification is needed, however, to identify whether the familiarity with the technology and/or the information about renewable energies in general is influencing the acceptance. For the second group the mitigation of direct negative impacts on their dwellings, recreation areas etc. and the possibility to get direct benefits of renewable energy projects are the most important criteria for their acceptance. Following the initially presented factors of acceptance, we can conclude that:

**A Time frame:** Creating acceptance takes time and involves awareness raising, joint visioning for energy futures and the possibility to participate in the project implementation. Therefore, “classical” planning and assessment processes need a pre-phase of awareness rising.

**B Intensity:** We conclude that information and consultation, as normally granted in formal planning and assessment regimes, might not be enough as far as residents are concerned. At least, the possibility to join a visioning process as in case study 2 should be guaranteed, whereas (financial) participation in the implementation of the projects creates a strong identification with renewable energy projects by the people (case study 3).

**C Identification of possible conflicts:** Some of the tourists see conflicts with environmental and recreational aspects which can hardly be mitigated. The domestic population equally considers economic aspects whereas tourists only see the visual negative aspects. In future, it will be interesting to survey if habituation effects will change the perception. Due to the high identification with the projects (also economically) in the case studies 2 and 3, we could not observe the “*Not in my backyard-phenomenon”*.

A strong participation of local residents as showed in case study 2 and 3 is, therefore, able to increase the acceptance of renewable energies in general. Whereas in case study 2 limitations of biomass were discussed at the economic and resource level, case study 3 dealt with concerns regarding the quality of life as well as environmental and economic aspects. We can also detect that a clear locally agreed vision for renewable energy production combined with the possibility for the local people to take part in the project implementation and financially benefit from renewable energy projects provides for the highest level of acceptance.

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