



**Energy**

National Research Programmes 70 and 71

Project

Energyscapes



## Recommendations for a landscape strategy with renewable energy systems

It is a dilemma: projects for renewable energy systems frequently fail due to the lack of social acceptance of landscape change. Researchers at ETH in Zurich are currently working on a study to find out in which Swiss landscapes such projects are approved and to what extent.



Renewable energy systems in landscapes that already contain infrastructures are accepted by the Swiss population.

Source: Reto Spielhofer und Ulrike Wissen Hayek





## At a glance

- In the past, many projects for renewable energy systems were rejected in referendums.
- This is often due to the concerns amongst the local population about changes to the landscape.
- These concerns are not the same everywhere, however. A study shows where acceptance is greater and where changes are relatively undesired.

Not everybody likes to see wind farms with dozens of wind turbines. Large-scale photovoltaic systems in pristine environments also tend to be unpopular. In the past: when resistance amongst the population to renewable energy infrastructures existed, this was often linked to the general perception of the landscape. The benefits of new infrastructure do not always outweigh concerns about changes to the landscape.

The Energy Strategy 2050 aims to combine renewable energy infrastructure that needs to be integrated in the landscape. However, there is no Swiss strategy for landscape development with different types of such infrastructure. Furthermore, there is a lack of knowledge about how the population perceives and accepts the types in the different landscapes of Switzerland.

Adrienne Grêt-Regamey, Head of the ETH Chair of Landscape and Urban System Planning, therefore worked together with researchers to investigate the social preferences for renewable energy systems in various Swiss landscapes.



## Preference study

Acceptance depends on aesthetics, but also on the function of the landscape and the values associated with it. In their project "Energyscape", the researchers investigated how the Swiss population perceives landscapes and the changes they undergo - both cognitively and emotionally.

They conducted a laboratory experiment to examine the reaction of around 100 test persons to certain changes in the landscape. Since it has been proven that affect, i.e. the immediate physical reaction, also plays a role in the evaluation of landscapes, the skin resistance of the test subjects was measured. This changes during affective reactions. In addition, the researchers conducted a representative online survey of around 1000 people to also record the cognitive motives for rejecting or accepting landscapes.

Seven different Swiss landscape types were presented to both the respondents and the survey participants: Urban, agricultural, the Jura Arc, the Pre-Alps, urbanised mountain region, tourist mountain region and unspoilt Alpine region. Different audio-visual simulations were presented to the participants: landscapes with a lot of energy infrastructure and those with little. Wind turbines, photovoltaic fields in the landscape and photovoltaic systems on roofs as well as power poles were tested. In addition to the images, the participants listened to the sounds typical for the region. The scientists consulted groups of experts for both the study design and the analysis.

Result: The acceptance of energy infrastructures strongly depends on the type of landscape, the combination of plants for energy generation and the already existing use of the landscape.



## Energy systems accepted in urban areas

One of the research results achieved so far is the following insight: the more pristine a landscape is, the greater the general rejection of energy infrastructure. Solar and wind energy infrastructure is more likely to be accepted in the lowlands by settlements and also in Alpine landscapes with tourist infrastructure such as ski lifts. In the Jura, the foothills of the Alps and the distant Alps, neither electricity pylons nor wind turbines or solar energy systems are welcome. In mountain regions that are urbanised or used for tourism, such measures meet with greater acceptance. In highly urbanised areas, renewable energy systems are best accepted.

The study also shows that large amounts of this infrastructure in particular have a negative impact on the perception of the landscape. Interestingly, the higher the number of visible wind turbines, photovoltaic systems or electricity pylons, the more the test persons physically reacted to the image.

## Solar energy has it easier

Best accepted among the study participants were solar systems on roofs. While solar energy is generally the most popular, electricity pylons meet with the greatest rejection everywhere. Landscapes on which electricity pylons are placed were more likely to be accepted in the study if wind turbines or photovoltaic systems were also installed on them. Renewable energies therefore make electricity pylons more acceptable.

Wind turbines ranked in the middle of the field in terms of preference – but always went down better in combination with solar energy than alone.

A combination of few wind and solar energy plants was preferred over a scenario with a large number of these energy infrastructures.



## Recommendations for planners

In collaboration with energy and landscape experts, the researchers will formulate recommendations for Switzerland's various landscape regions.

Grêt-Regamey is hoping that the study findings will help planners to take possible obstacles and resistance, which is often generated by landscape concerns, into consideration from an early stage. This should enable socially acceptable landscape development to be encouraged with renewable energy sources.



## Produkte aus diesem Projekt

- steuerBAR? Wo wollen wir "Energiewälder" und wo nicht?  
Date of publication: 25.03.20
- Empfehlungen für eine Landschaftsentwicklung durch Anlagen erneuerbarer Energien in der Schweiz  
Date of publication: 30.11.-1
- Empfehlungen für eine Landschaftsentwicklung durch Anlagen erneuerbarer Energien in der Schweiz  
Date of publication: 25.03.20
- 3D-Landschaftsvisualisierung basierend auf LiDAR-Daten  
Date of publication: 30.11.-1



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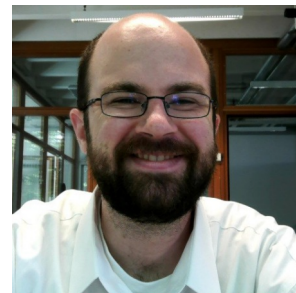
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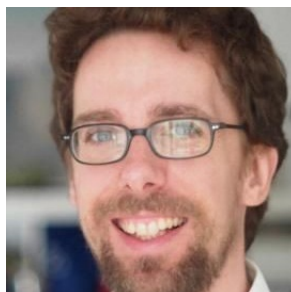
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