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Methods to resolve conflicts between energy production and nature conservation

The drive to increase renewable energy production can sometimes be at loggerheads with the desire to preserve natural landscapes. In this study, researchers from across Europe assessed the environmental impacts of renewable energies in the Alps, making key recommendations to resolve conflicts between different users of habitats.

Renewable energy is a core part of strategies to mitigate climate change and ensure a sustainable future for our planet. In line with this, the European Commission has established ambitious targets for the coming years. Known as the 20-20-20 targets, the EU aims to increase the share of renewable energy to at least 20% of gross final energy consumption, decrease greenhouse gas emissions by 20% and increase energy efficiency by 20% — all by 2020.

Mountainous regions can aid in the achievement of these goals, as they can produce lots of energy through water (hydro), solar and wind power, as well as bioenergy, energy derived from organic matter such as plant waste and compost. However, they are also biodiversity hotspots and sites of great natural beauty, meaning they have lots of value to human societies. A conflict therefore emerges: increasing renewable energy production while maintaining the natural landscape.

In order to find a solution that suits both, decision makers need to analyse the advantages and drawbacks of renewable energy developments. To help them to do so, researchers from Austria, Italy, Slovenia and Switzerland assessed the trade-offs in the mountain range that spans all of these countries: the Alps.

The researchers based their findings on a comprehensive review of the scientific literature. Through two rounds of searches, they reviewed several renewable energy sources including wind power, agricultural biomass, solar cells and geothermal energy, and described the ecosystem services impacts of each based on the Common International Classification of Ecosystem Services.

The ecosystem services that most conflicted with energy generation were provisioning services (the products provided by ecosystems, e.g. food and water), regulating services (e.g. air quality and climate regulation) and cultural services (e.g. recreational activities).

The researchers provide key recommendations for addressing conflicts, tailored to different forms of renewable energy. For example, with **biomass energy**, managing agricultural lands in a way that considers their many uses, not only bioenergy production, is key to avoiding conflicts. An example could be scaling down biomass facilities to match the size of Alpine agriculture or available forest residues. As most alpine rivers have already been altered by human activities, any future development of **hydropower** should not expand into rivers which are of high ecological value. The habitat changes caused by **wind energy** in the Alps can be more disruptive than in non-mountainous areas, as wind turbines require land access and therefore roads, so the use and compatibility of wind turbines is contested in the region. The researchers therefore recommend that management strategies focus on increasing social acceptance of wind energy, and assessing how it fits in with other regional development goals. Finally, as the researchers found that **solar panels** had no major impact on the regional environment, they recommend that their use on buildings be promoted in the Alps.

Continued on next page.

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Methods to resolve conflicts between energy production and nature conservation *(continued)*

To increase social acceptance of all renewable energies, the researchers say transparency, the involvement of all stakeholders in the planning process, and providing access to benefits for the local population are key.

The authors close by recommending that decision makers develop an integrated 'landscape vision' for the Alps, comprising concrete targets and steps to implementation, in order to expand renewable energy while protecting biodiversity in the region.

Their results could form the basis of new decision support tools to help policymakers analyse the trade-offs between expanding renewable energy and maintaining ecosystem services in the Alps, and other regions with high renewable energy potential.