

Research and Development - Examples

SYN-ENERGY II

Synergetic biogas production from catch crops and sustainable crop rotation systems

The central objective of Syn-Energy II is to identify the potential for synergetic expansion of agricultural biogas production. This is an expansion that focuses primarily on biomass from catch crops and thus not only enables an increase in crop rotation yield, but at the same time aims to reduce the risk of groundwater pollution, erosion and emissions of climate-relevant gases without resulting in any reduction in food security. Whether and to what extent these synergies can be exploited is also being investigated for biological crop rotation systems and methods of conservation tillage. In addition, the effects on the soil-water balance and the energy efficiency of agricultural production will be investigated.

KOMEOS

Conception of models of multifunctional energy centres for Eastern Styria

1. Initial situation

The motivation for this project arose from the conviction and the will to promote the implementation of renewable forms of energy. Since the actors work with these technologies in their operational practice, they also know problem areas and weak points in the area of regional raw material supply (logistics and organisation). Actors from the Eastern Styria region, most of whom are integrated into the Eastern Styria Ecocluster, have already pioneered the establishment and implementation of renewable forms of energy in Austria in the past. The motivation to make further significant progress and contributions to sustainable energy supply in this area is still unrestricted among the actors today.

Eastern Styria is a very varied landscape, stretching from the foothills of the Alpine foothills in the north (approx. 1400 m a.s.l.) to the hills of Eastern Styria (300 m a.s.l.) in the south. From this starting position the diverse agricultural use is derived, which includes intensive farming with pig and poultry fattening in the south, up to extensive alpine pasture farming with a very high proportion of forest in the north. Therefore, a wide range of raw materials is available for renewable energy production plants in Eastern Styria (biomass for wood chip heating, NAWAROS and liquid manure for biogas production, vegetable oils for the operation of motor vehicles, etc.).

2. Contents

The project team designed various model situations for multifunctional energy centres, which are particularly suitable for implementation in the rural region. The model situation of the multi-energy centres was basically based on different "technology modules", such as biomass heating systems, biogas systems, wood gasification and energetic use of vegetable oil technology, or these modules and uses were combined with each other.

An essential aspect in this context was the identification and creation of synergy and coupled-use concepts, which enable a higher overall benefit of the energy centre. Not only the technologically oriented solutions were examined, but also model variants that could be represented by possible regional socio-economic boundary conditions. Concrete experiences from the planning and above all also from the operational practice of such technology modules flowed into this conception process. Examples in this context are the necessity of the best possible utiliza-

tion of summer waste heat in biogas plants, or measures to increase / secure the calorific value of wood chips. This planning approach was illustrated using a scenario for the multifunctional energy centre. Suitable locations were particularly suitable where individual renewable energy supply technologies (e.g. biogas, wood chip district heating, wood gasification, etc.) had already been implemented regionally.

Agriculture 2020

Fundamentals of a sustainable development of energy technology in society

In the future, agriculture and forestry will represent an essential basis for the sustainable energy supply of society. It manages the largest part of the area and thus the solar income of society. Agriculture and forestry are thus also managers of those resources that will replace fossil fuels. Agriculture can only fulfil this task in a future-proof manner if it itself is sustainable in its energy supply and uses sustainable production processes. The project showed implementation steps to achieve agricultural sustainability in the region of Eastern Styria. The future structure of agriculture, energy supply and food supply in the region was discussed in three basic scenarios (current situation, medium-term view, long-term view).

Today, even in an agricultural region like Eastern Styria, agriculture and forestry is an economic "marginal phenomenon", dependent on transfer payments and based on fossil fuels. However, the analysis showed that agriculture and forestry can play an important role in the regional economy if they seize their opportunity in the regional energy supply. The "Energy Region of Eastern Styria" has the potential to achieve a high level of energy self-sufficiency in the medium term.

However, taking advantage of these opportunities requires a far-reaching restructuring of agriculture and forestry as well as the rapid implementation of measures. The time window in which agriculture can secure its position in the regional supply of energy and raw materials is very narrow and must be used consistently. If this opportunity is not seized, agriculture and forestry will be degraded to pure suppliers of raw materials. Against the background of global competition, intensification, overexploitation and loss of independence then form concrete threats.

The study presents a comprehensive and cross-sectoral restructuring of regional agriculture and forestry, downstream commercial and industrial sectors and household energy supply for discussion. In contrast to many sectoral potential analyses, this study explicitly addresses the question of competition for land and resources. The results of the study make it clear that a comprehensive resource plan and the political will to implement it are essential for sustainable agriculture and forestry. In addition, a basic societal consensus is needed that defines the supply obligation of regional agriculture with regard to the areas to be supplied and the services to be provided.

A multifunctional, needs-based agriculture and forestry that uses sustainable energy-extensive cultivation systems such as mixed cultures (production) will form the backbone of the region of Eastern Styria. The farmer of the future is a "regional farmer" who offers services and has learned to network. The "Regionalwirt" will participate economically in enterprises beyond sector borders. The energy (near) supply is thereby a "shoe spoon", which can initiate this cross-linking. The provision of biogenic industrial raw materials and high-quality, authentic food can build on the emerging networks between agriculture, trade and industry and regional consumers. The energy supply alone can create 10,900 new jobs in Eastern Styria in the long term and dramatically increase regional added value. The scenarios developed in this project have al-

ready been successfully introduced into the social discourse of the region. They now form the technical background against which future planning in Eastern Styria is taking place.