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AGRICULTURE & INNOVATION

Renewable energy on the farm

How to enhance production and use of renewable energy on the farm?

Many different forms of renewable energy are produced in rural areas, ranging from wind, solar and geothermal sources to different forms of bioenergy. They bring employment and economic development to rural regions, replace fossil fuels and contribute to energy security.

New technologies are available to meet energy use on the farm for heating, cooling, traction and other energy functions. In other settings, renewable energy produced on the farm can be delivered to power or gas grids. Both at the scale of the individual farm and the whole agricultural sector, there is a wide range of options and potential for renewable energy generation and deployment with a potentially major contribution to Europe's energy mix.

However, this large portfolio of options also creates complex questions, since the potential, performance and impacts of renewable energy technologies depend on natural conditions (climate, soils), size and type of farm, management techniques, degree of mechanisation, geographic location and socio-economic factors, such as investment and advisory support for farmers, as well as the surrounding energy system and energy infrastructure.

The case studies highlighted by the experts of the EIP-AGRI Focus Group 'Renewable energy on the farm' show that there are a variety and combination of factors promoting successful implementation and use of renewable energy on farms. Economically viable business models are essential. Furthermore, success often depends on whether new technologies perform effectively and are easily accessible for farmers. Support, such as training and capacity building, investments, grants or subsidies, is an important enabling condition. However, technical, economic, societal and regulatory barriers often hamper further scale-up of renewable energy on farms. The Focus Group formulated a range of recommendations for further research and ideas for Operational Groups that can help address these barriers.

"In these tough times for farmers, renewable energy production may provide alternative income streams, while keeping the farm operations viable."

- Anna Trettenero , farmer (Italy) member of the Focus Group -

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Ideas for Operational Groups

- ▶ Biomass production from short-rotation coppice: testing of novel techniques, innovative harvesting and conditioning machinery, etc.
- ▶ Small-scale wood-based energy systems: testing various options for small-scale on-farm use of woody side streams for energy self-consumption
- ▶ Exploring technological options for mobile heating units (e.g for seasonal grain drying)
- ▶ Testing and assessing energy storage techniques and energy control systems for farm energy-intensive operations (heating, ventilation, lighting, feed preparation, etc.), for different farm types
- ▶ Low-tech methods for upgrading biogas into biomethane
- ▶ Combining biogas with small-scale ethanol production
- ▶ Valorising biogas digestate as biofertiliser

Research needs

- ▶ Screening existing solutions and developing best practices and implementation strategies for using woody biomass to produce renewable energy at farm or community level. This could be achieved through a thematic network.
- ▶ Decentralised sustainable wood gas production, especially targeting cost reduction of technology
- ▶ Identify and inventory opportunities and possible settings (configurations) for renewable energy production on-farm, and disseminate it to potential users in appropriate ways
- ▶ Developing energy storage solutions suitable for farms
- ▶ Screening and benchmarking biomass pre-treatment technologies
- ▶ More knowledge is needed on alternative feedstock sources and best feedstock mixes for biogas production
- ▶ Development of engines and machinery enabling the use of energy from renewable sources, such as biogas-powered tractor engines
- ▶ Exploring innovative business models for farmers producing energy, including collective sales approaches that could potentially enhance profitability for smaller and medium farms

More ideas for Operational Groups and research needs available in the Focus Group report

More information on the EIP-AGRI website

[Focus Group webpage](#)

[Focus Group report](#)

Press article:

[- Italian farmers develop circular economy for clean electricity](#)

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