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AKIS in action:

Diversifying farm income: Providing advice and training for new energy solutions

Networking event on May 13, 2026 - Online

Farming with Power: Structuring energy solutions for farmers
Fien van Esch, Energy Consultatn at Boerenbond, Belgium

Agricultural Energy Advice in Austria – Focus on Comprehensive Energy Concepts and Energy Communities
Klaus Engelmann, Advisor on energy, climate and bioresources at Styrian Chamber of Agriculture, Austria

Turning manure into value: How farmers can engage with biogas systems in Finland
Miika Kahelin, Agricultural economist and project manager at Savonia UAS, Finland

Moderation: Julia Eberharter, Austrian Chamber of Agriculture

Q&A Session

Q: In the case of small-scale digesters, have you seen that there is economic viability at farm scale? What is the minimum feedstock amount production and farm size? Which feedstock have been explored and in which countries?

A: Fien van Esch:
We indeed already saw that there is economic viability at farm scale, and there are not many farmers who have yet introduced the technique. I think there are around 40 farms in Flanders that have small-scale digesters. The feedstock used is, I think, with two exceptions, mainly cow manure, as Miika also already mentioned. They say that at least 60 to 80 cows are needed to start with a very small digester. I think it is coupled with an 11-Kilowatt CHP unit.
They have also tested other feedstock like pig manure, but pig manure is more unstable, and you need a large amount of it—many pigs—before it becomes viable at farm-scale.

I know they have already tested other feedstock as well, but I am not very familiar with those. I hope this answers your question.

Q: On what ground do farmers decide to use new energy sources besides saving money? So what is actually the main source of motivation to start using new energy sources?

Klaus Engelmann: That's a good question. I think we have different types of motivation. Of course, money is one important factor and one driver of innovation, but also reducing dependencies and increasing self-sufficiency are very important factors.

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Especially regarding self-sufficiency, we are also talking about emergency electricity. If we have failures in public grids—for example, in pig farming where ventilation must keep running—this is quite important. We also have ideas like peak shaving.
Yes, that's also a cost factor. One thing I wanted to mention: especially in Austria, we are quite small-scale and our agricultural products are mainly sold regionally. So we also say: buy local, buy from a local farm.
Therefore, it is really important to also have local sources of energy in the whole process. It may not be very credible for customers if we import all our resources to the farm and then say to them: buy locally. I think it creates a much more comprehensive picture of the farm if we also produce locally, have local processes, and local energy as a selling point for customers.

Fien van Esch: I follow the explanation of Klaus. I think, in general, farmers love testing new technologies. If the conventional technologies don't work on the farm, because we see many different farms, I think they will look further than that and test things themselves and implement things that can work.
I think it is mainly because they want to be self-sufficient, as Klaus already told us.

Q: What is the approach to make energy efficiency more attractive to farmers, and not just build a new solar panel and bring it onto the farm, but actually look at energy efficiency before thinking about what could be added to produce more energy?

Fien van Esch: That's why we have the structure. In this structure, the third point is energy savings and the fourth point is energy production. You first need to save as much energy as possible, and then, for the remaining energy you need, you can look at producing it yourself. That's why we always go through the structure step by step, starting with point one and ending with point six, and not jumping from one to four to three to six, because I don't think that works.

Q: Klaus, how do you engage farmers in having a look at their energy efficiency?

Klaus Engelmann: Maybe first, I saw that the question came from Pascal. We've already worked on a project together that is related to self-service, Pascal. Maybe two points:
We have been offering energy products for quite a long time, and for quite a long time we have had specialized products. So we offer solutions for PV, for biomass heating systems, and so on, and farmers always came for these specialized products. They came for PV, and they never came for energy efficiency. We are really glad that we managed, together with the ministry, to offer these comprehensive energy concepts, which are subsidized for farmers by the ministry.

This also enabled us to have a more comprehensive view of the farm. Farmers were not willing to pay for a whole comprehensive concept because they knew: I want to install PV and I want advisory on my PV system, but not on the whole farm. This was a very good enabling starting point for us.
And maybe as a second topic, we also see some changes in electricity legislation in Austria. Currently, for most farms, grid costs depend on their consumption, meaning they pay per kilowatt hour. But larger companies already have a significant share of grid costs based on peak electrical load. Starting next year, this will change for all Austrian customers, and peak power will become more important. So efficiency

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measures to reduce peaks, such as peak shaving, are becoming more and more important in our advisory work, as farmers will see the impact on their energy bills if they do not take action.

So, to summarize: a mix of subsidies, incentives, and legislation will encourage farmers to focus more on energy efficiency, along with information materials and advisory support. But as we know, it is often quite difficult—so a mix of different strategies is needed.

Q: How big are the average on one farm biogas plants in Finland in terms of kilowatt hours installed electrical capacity?

Miika Kahelin: Yes, it varies quite a lot. It depends on the electricity demand of the farm. For example, if there are greenhouses, they need more electricity than a normal dairy farm.

In a normal dairy farm, the electrical capacity of the CHP unit is usually between 30 and 70 kilowatts. But if there is a high electricity demand, I have seen CHP units with up to 300 kilowatts of electrical capacity.

Q: How can small scale farms also use such systems in a profitable way? Is this possible? And do you have any approach how it could be done?

Miika Kahelin: I think the only possibility is that they do it together and build bigger plants and produce that manure for that plant. Then you can have that profitability.

Because, for example, of that 300 animal farm, if you are building their biogas plants, the cost might be something like 1.5 million euros. And you have subsidies. If you use that energy all in the farm, then you can have subsidies of 50 percent of that investment.

Q: Which are the most used agri-voltaics in your country? How long is the payback period for the investment? Are there cases where agri-voltaics negatively influence yields or farm production? Is there a risk that farms might stop using fields for agricultural production and instead use them solely for energy production? And do you have any experimental projects with agr-voltaics? What are your conclusions? So, a lot of questions here.

Fien: Indeed and to be clear, we have, I think, three pilot projects—small projects that are still testing.
So, testing projects, and only one agri-voltaic installation on a farm. There is only one farmer in Flanders who has a viable agri-voltaic system, and he combines it with blueberries. Blueberries need shade, so in that way they can combine it. These are semi-transparent panels.
instead of the whole panel being black, it is semi-transparent—about 50% transparent. In combination with shade plants, it can work well and there will be no yield loss.
But we also see on the test farms, where there is just an installation of around 24 panels, also semi-transparent, and beneath that there are apples, pears, or strawberries. For pears, we currently see a yield loss of about 5 to 20%. It depends on frost, on whether it is a sunny year or not.
That is why it is so difficult. As a farmers' organization, we still want farmers to farm and not have yield losses. We are also working together with policymakers on how to

integrate agri-voltaics into agricultural systems, because we want farmers to remain farmers, not energy producers.
That is why there is currently only one farmer in Flanders doing this—it is still a more expensive technology, about 50–100% higher installation costs than standard solar panels.

Q: These are highly complex technologies. What opportunities are there for small-scale farmers with limited land and financial resources?

Fien van Esch: I think, first of all, it is important to look at your rooftop. Is there still space to install solar panels? Agri-voltaics cannot be compared with rooftop PV, because rooftops are always cheaper due to lower construction costs. So first, look at your roof.

Klaus Engelmann: Some insights from Austria. The first thing we see in Austria is that the definition of agri-voltaics is still highly debated. We already have some agri-voltaic plants in operation, including some at megawatt scale.
There are systems that are basically standard ground-mounted PV systems, sometimes called agri-PV simply because sheep are grazing underneath. Whether this really qualifies as agri-PV is still debated. There are different definitions in spatial planning, tax law, and agricultural subsidy schemes.
Accordingly, there are also different cost levels. The simpler forms are relatively cheap. However, systems installed higher up—for orchards or crop farming—are more expensive.
At the same time, we see promising results. For example, with vertical PV in soybean production, yield losses are about 5%, which is relatively low considering the electricity generated. There is also ongoing research on apples and berries, as well as different approaches in grassland systems (e.g. movable PV panels), poultry farming, and other applications.
Overall, definitions differ widely, and further research and regulatory development are still needed.

Q: What is the payback period for biogas systems on farms in Finland? Do you see a trend toward increased adoption? And what motivates farmers to invest?

Miika Kahelin: The payback period should be less than 15 years, in my opinion. If it is 20 or 25 years, that is too long, because the technology would need significant upgrades within that time.

Q: Do you expect biogas to become more common in the Nordic countries?

Mika Kahelin: If I look ahead to 2030 in Finland, the number of farms with biogas plants might increase to around 70. They are being built gradually. One reason is that the number of dairy farms is decreasing, while the average herd size is increasing. Larger farms make biogas more profitable.

Q: And what motivates farmers to invest?

Mika Kahelin: Environmentally friendly energy is one key motivation. And of course, profitability—if it works well. Out of the 12 farms we studied, 11 said they would invest again, knowing what they know now. Only one said they would not.

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Q: Regarding the technology providers for farm-scale biogas plants, have you seen any start-up or engineering provider that is adequate for implementation with different agricultural feedstock in Europe? And is the technology for pre-treatment, anaerobic digestion, and digestate storage manufactured in Europe competitive?

Klaus Engelmann: You caught me there—I am definitely not an expert regarding all those technical terms.

Maybe not directly answering the question, because it is quite complex technologically, but I can give a general overview of the biogas situation in Austria. Biogas is currently not very common and not strongly supported by legislation.

We have some older biogas plants, mostly built between 2002 and 2010, producing electricity and heat. However, legislation is changing, and this model will no longer be viable in the future. Larger plants are expected to shift towards biomethane production and injection into the natural gas grid.

At the farm scale, biogas plants are mostly not feasible in Austria due to the small-scale structure of agriculture. In addition, small plants face the same strict regulations (e.g. explosion safety), which creates significant barriers.

Overall, large-scale plants are needed, but the regulatory framework—especially for biomethane—is still not fully developed.

Q (follow-up): Regarding technology providers—are there capable providers with reasonable Capital Expenditure (CAPEX) for different feedstock?

Fien van Esch: I am not very deeply involved in that matter. In Belgium, farm-scale digesters are usually coupled with CHP and are not primarily used to upgrade biogas.

Miika Kahelin: I hope that more operators will enter the biogas sector, because competition is always beneficial and can help reduce investment costs.

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