Coordination and effectiveness of the support measures for agricultural biogas facilities and viability for the operators

Swiss Federal Office of Energy, Federal Office for the Environment, Federal Office for Agriculture

Key facts

The anaerobic digestion of agricultural biomass is an ingenious process. It allows energy to be produced and green and food waste, as well as farmyard manure, to be exploited. However, this production is costly in terms of investment and operation. In Switzerland, nearly 100 agricultural biogas facilities transform organic matter into electricity and heat. In 2016, 116 GWh of electricity were produced, i.e. 0.24% of inland production. Its resale generate revenues of around CHF 5 million with a market price of 5 centimes per kWh.

Every year, these facilities receive CHF 36 million in aid via three federal support schemes. The first is the feed-in remuneration at cost (CRF), subsidies of which amount to CHF 35 million. The second is linked to the fact that this process allows CO_2 certificates to be obtained as it reduces methane emissions compared to manure left out in the open air. These CO_2 certificates, which are delivered by the Federal Office for the Environment (FOEN), are bought by the KliK Foundation and generate a revenue of around CHF 1 million per year. Investment credits form the last source of support. They concern interest-free loans provided by the Federal Office for Agriculture (FOAG), subsidies of which amount to CHF 47,000 per year.

The Swiss Federal Audit Office (SFAO) has analysed this system. If parliament wishes to continue supporting this type of renewable energy, it will need to look at the future level of financial support federal authorities provide to agricultural biogas.

Very costly electricity production and extremely dependant on federal funds

Unlike photovoltaics which, once installed, require almost no effort and have negligible operating costs, agricultural biogas requires constant care. The agricultural biogas facilities must be continually supplied with a specific mix of biomass. This process requires regular surveillance. Digestate must be spread on the fields which results in very high investment and operating costs.

Within the framework of the CRF, agricultural biogas earns an average 42 centimes per kWh whilst other renewable energies receive between 15 and 34 centimes. On average, again, the "agricultural bonus" included in the CRF is 16 centimes per kWh. The aim of this bonus is to promote the use of farmyard manure by compensating for the low energy value and the resulting loss in earnings. In its present form, this bonus corresponds little to the aims of the energy policy. It is not essential for energy production but rather is more of an indirect aid to farming, paid for by electricity consumers.

On the ground, the SFAO has carried out seven case studies at agricultural biogas facilities. Their viability was calculated and then compared with Federal Office of Energy (SFOE) models for setting the level of the CRF tariff and with the FOEN model for dossiers which are

submitted in order to obtain CO_2 certificates. The SFAO found that the agricultural biogas facilities are highly dependent on financial aid. On average, 69% of proceeds come from the CRF subsidy and 5% from the sale of CO_2 certificates.

Adequate calculation models

According to the SFAO's calculations, five of these seven facilities are viable with the different types of support. The annual rates of return for these facilities vary between 1% and 9% depending on labour costs and scenarios. Four facilities can expect to generate profits of between CHF 1 billion and CHF 2 billion by the end of their lifespan, another can expect to achieve around CHF 300,000. However, the last two facilities are in deficit. They are expected to lose as much as the initial capital invested, if not more. They are the two small facilities from the sample examined by the SFAO.

Agricultural biogas is a riskier investment than others, particularly due to the high costs and the facilities' lack of flexibility. Indeed, it is difficult to resell them when they are directly linked to farming. This is why the rate of return accepted by the FOEN is high (8%) and why the majority of the facilities do not appear viable without the income from the $C0_2$ certificates. The rate accepted by the SFOE at the time of the audit (4.33%) is also higher than for other technologies (3.97%). The SFAO only noted one facility with a return higher than the levels projected by the SFOE and the FOEN, therefore there is no systematic problem.

Long-term viability of agricultural biogas facilities is not guaranteed

According to the law, long-term viability of the technology is a prerequisite for remuneration[1]. However, agricultural biogas is not guaranteed over the long term due to its operating costs and the market price for electricity. Over the last ten years, the price has fluctuated between 5 and 12 centimes per kWh, whilst biogas costs between 37 and 75 centimes to produce. It is unlikely that operating costs and the market price will converge in the near future. As the Austrian example shows, there is a strong risk of the facilities shutting down once the subsidy comes to an end. In Switzerland, the CRF will expire for the first facilities in 2026.

The SFAO does not believe that agricultural biogas should be supported at whatever cost, given that means are limited. Every centime which is allocated to support one renewable energy is not available to support another. Each renewable energy has advantages and disadvantages in terms of supplying energy which is sufficient, diversified, secure, economical and environmentally friendly. Advantages which have nothing to do with energy policy should not be financed by the latter. Priority should be given to producing electricity in a way which prevents the other advantages remunerated under the Energy Act from reducing potential for energy production.

Therefore, should the energy strategy 2050 envisage support for agricultural biogas, the SFAO recommends that the SFOE only finances aspects directly limited to the energy policy and to give preference to renewable energies which best contribute to achieving the objectives of the energy policy.

Original text in French

[1] Cf. Art. 7*a*, para. 2 of the Energy Act (in force up to the end of 2017).