Initial reflections on photovoltaic systems in agriculture and forestry

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Introduction

1) For the EU to reach its climate and energy objectives, all sources of renewable energies must be used optimally. Agriculture and forestry play a major role in achieving these goals. At the same time, other important goals like food security and protecting agricultural and forest land cannot be forgotten.

2) The transition to renewable energy will require a mix of many different energy sources. Sustainable certified biomass of European origin and anaerobic digestion, which can provide storable energy, add significant value to photovoltaic systems as they can provide storable energy and are baseload[1] capable. Increased production of solar energy must be accompanied by the expansion of various forms of storage capacity. The transport, heating, cooling and electricity transition towards renewable energies, as well as synergies with the circular bioeconomy, are essential. With renewable electricity becoming the largest energy vector in the EU strategy, rolling out photovoltaic systems represents an opportunity for the agricultural and forestry sectors.

3) Agricultural and forestry companies have a broad range of options when it comes to installing photovoltaic systems on buildings. It can be a great option when photovoltaic installations are used for improving the energy rating of agricultural buildings and stables.

4) Photovoltaic systems on roofs are, in practice, often not economically viable for agricultural and/or forestry holdings due to the lack of network infrastructure or the costs for joining it being too high. In addition to roofs, many other possibilities around, on or between the buildings and the installations of an agricultural and/or forestry holding may be used for setting up innovative photovoltaic systems.

5) Rolling out photovoltaic systems in agricultural areas, which are well situated in terms of access to network infrastructure, constitutes an economic opportunity due to additional and stable income from the sale of renewable electricity and/or brought in from land being rented and/or lower energy bills for farms seeing as the renewable energy produced on them are used for their own consumption. However, possible speculative phenomena and issues in the contractual relationship between farmers and landowners should not be underestimated as new issues emerge. These include maintaining sufficient agricultural production on the plot of land, the hoarding of agricultural land by energy producers and the consequent increase in speculation on land prices, the visual impact of photovoltaic solar plants on the landscape and cultural heritage and their acceptance by citizens, not to mention the issue of sharing the value generated by energy projects between the various communities in the area: energy producers, landowners, farmers, cooperatives and citizens.

6) Agri-Photovoltaics (Agri-PV) combines agricultural and solar energy production on the same plot of land, thus ensuring the expansion of solar energy in the years to come, more in tune with agricultural production. Agri-PV could strengthen the EU's security of food and energy supply, mitigating the impact of climate change on agricultural production and facilitating the continued presence of the agricultural enterprise by limiting pressure from third-party energy producers on the availability and affordability of agricultural land.

7) Agri-PV is an emerging sector, which still needs studies and pilot demonstration projects to reassure farmers and energy producers about the impacts and benefits of agri-PV in terms of yields and climate change mitigation in different regions of the EU. The EU and the Member States must ensure that there is still active farming under or between the solar panels for this effect to occur.

8) Ground-mounted solar panels (ground-mounted PV) on abandoned or marginal agricultural areas, non-productive agricultural land or on land set aside for nature conversation and biodiversity purposes can resolve some conflicts pertaining to land use without the need to amend the initial agricultural status of arable land and grasslands in the land-use plan. Ground-mounted photovoltaic installations for investments made by the farms themselves operating within certain power limitations, where there is synergy and continuity of agricultural and/or livestock production, are always useful for producing more electricity from renewable sources in the short term.

9) European legislation on promoting sources of renewable energy and the REPowerEU Plan aim to increase electricity production from solar energy. The European Solar Charter[2] lays out a series of voluntary actions to be undertaken by the European Commission, Member States and industry to support the EU photovoltaic sector, including by promoting innovative forms of rolling out solar energy such as agri-photovoltaics. With this in mind, Copa and Cogeca outline their preliminary reflections below regarding the EU framework on the roll-out of photovoltaic systems in agriculture and forestry.

Important core principles

1) Farmers and their cooperatives want to make this transition to renewable energy while maintaining the safe supply of food and renewable inputs as well as preserving cultural landscapes and vibrant rural areas in all EU regions. Those who install panels in the framework of a project cannot do this except for purpose of self-use and cannot sell any energy during the project. In addition, those which try to diversify and install panels cannot sell them at a profitable price. It would be useful if this energy would be considered a diversification of revenue. It should be feasible and valued by European and national legislation. Rolling out photovoltaic systems in agriculture and forestry must support sustainability, vitality and the economic viability of rural areas without jeopardising their agricultural value.

2) The development of non-biomass based renewable energies is creating tension between possible new outputs from photovoltaic systems and the preservation of productive arable land and grasslands for primary production. The objective should be to ensure that the best agricultural land will not be considered when selecting sites for ground-mounted photovoltaic systems in order to keep the total amount of lost agricultural area for such systems to a minimum.

1 the amount of power made available by an energy producer (such as a power plant) to meet fundamental demands by consumers
2 https://energy.ec.europa.eu/topics/renewable-energy/solar-energy/european-solar-charter_en
3 Article 194 TFEU

3) Copa and Cogeca are in favour of developing photovoltaic potential in a controlled manner, involving farmers and their cooperatives. This is the only way to reconcile contradictory priorities between food, energy production and land use planning. Having cooperatives and farms as a type of lessor should not be the main goal; rather, they should be involved as active partners in photovoltaic power stations with high added value for agriculture and forestry to contribute towards the sustainable development of rural areas.

4) However, each Member State reserves the right to determine its own energy mix, how it uses its own energy resources and how it structures its overall energy provision[3]. The promotion of photovoltaic systems in some regions is hampered by the solar energy yield being adversely impacted by light limitations and/or by overly acute conflicts in agricultural land use.

Policy priorities for photovoltaic systems in agriculture and forestry in the EU

1. Optimising the potential of buildings and farm surroundings

In addition to roofs, other possibilities around, on or between the buildings and the installations of a farm or agricultural and forestry holding may be used for setting up innovative photovoltaic systems.
Ground-mounted solar panels must use land suited to this purpose such as industrial wasteland, contaminated or industrial grounds or agricultural land of poorer quality.
Harnessing the available potential within buildings and in and around agricultural and forestry holdings is a top priority.
Measures must be adopted to support new energy sources in existing and new buildings.
With respect to roof-mounted solar panels in particular, its use for purposes of personal use is of interest. In fact, it is not only necessary to prioritise roofs over land for the installation of solar panels, but it is equally important that every kWh produced on roofs is self-consumed and not fed into the grid as these panels are often tied to a meter tracking the building's energy consumption. This would help achieve the highest possible efficiency and avoid overloading the general grid.

2. Proactively extending the network, fair conditions for accessing the network in rural areas

Possibilities for joining the grid must be guaranteed, along with fair, transparent and competitive grid expansion costs per kilowatt of photovoltaic power produced by roof solar panels and farm structures. These must be taken into consideration before expanding photovoltaic systems in order to leverage the potential of agriculture and forestry. This ensures higher acceptance and a careful use of agricultural and forestry land.

3. Resolving storage infrastructure

Solar energy is intermittent because producing it relies on many factors, such as day/night cycles, weather conditions and seasons. This is the main reason for negative pricing at midday when the sun is at its strongest. The negative price effect for renewable energy will continue and intensify as more solar energy stations are built.
The storage infrastructure (batteries) is very important for regulating the supply and demand of solar energy, where the energy must be used personally or by another consumer, although this is still too costly.
To date, the technology is much less mature in the production of storage systems. In general, financial contributions and incentives should be focused on storage systems, especially in the service of existing plants where the information for proper dimensioning is already known.
There is also another solution, complementary to storage, to solve the problem of simultaneous and massive photovoltaic production in the central hours of the day that leads, in some periods, to a drastic reduction in the cost of electricity. This problem, in fact, could be mitigated by offering incentives to distribute production over several hours without the use of accumulators.

4. Promoting photovoltaic systems in agriculture

A framework of guidelines should be established for defining photovoltaic systems in agriculture according to a list of criteria:

a) Set maximum thresholds for unusable agricultural surface area (ground cover ratio),

b) Maintain those surface areas in agricultural land and eligibility of those surface areas for area-associated support within the CAP regardless of the ratio of income generated by energy production to agricultural production,

c) Make the status of photovoltaic systems dependent on their use by active farmers,

d) Link the purchase of electricity produced by photovoltaic systems to agricultural activity,

e) Ensure that the energy project includes an appropriate end-of-life plant removal phase, for example through a mandatory bank guarantee, with the aim of restoring the land to its original condition,

f) Photovoltaic projects should be subject to annual reporting in the form of monitoring and checks on renewable electricity production and agricultural products to clamp down on fraud, such as in cases of agri-PV projects which do not yield any agricultural production.

All the agri-PV solutions are based on strategies and structures for sharing solar light which require greater initial spending and higher capital and higher farming costs for their entire lifespan than panels fixed into the soil.

The application of horizontal state aid standards is not relevant because farms cannot be put on the same footing as businesses in other sectors. Specific guidelines for state aid linked to the production of renewable energy for farms, determined by the specifics of the agricultural sector, should be established by the European Commission.

5. Value distribution mechanisms and rural energy communities

The production of renewable energy on farms must be spread across all regions and nobody should be disadvantaged. This is necessary to increase the social acceptance of photovoltaic systems. Agricultural cooperatives have a key role to play in pooling different resources to develop serious projects for the solar energy sector which are adapted to the land and to agricultural

production. Beyond increasing farmer revenue, savings on energy costs could be channelled into investments in modern technologies and more efficient production systems.
Energy cooperatives can boost the acceptance of renewable energy projects and help communities participate in the transition to renewable energies. Rural energy communities can also combine energy production with food production via Agri-PV which could increase synergies and reduce conflicts pertaining to land use. The “Rural Energy Community Advisory Hub” initiative should be pursued to continue progressing with the transition towards renewable energies and in order to mitigate the effects of climate change and heightened volatile wholesale prices on energy bills, ensure energy security and access to energy and facilitate economic growth and rural development.

6. Synergy between agriculture, fisheries, photovoltaics and the circular bioeconomy

Synergies between photovoltaic systems and the circular bioeconomy must be explored. This includes biogas production facilities to strengthen the circular bioeconomy and decarbonise equipment and fossil-fuel derived fertiliser.
Considering the European coastline, it is important to develop synergies between the agricultural and coastal territories through pilot plants that combine photovoltaics with hydrogen production. Solar energy produced during peak sunshine hours (with disconnection risks or at low value) can be used to produce hydrogen, which can then be used as a clean fuel for fishing vessels. In a synergistic approach between land and sea, hydrogen produced ashore allows fishing vessels to reduce their dependence on fossil fuels, decreasing CO2 emissions and contributing to the decarbonisation of the maritime sector. In addition to reducing emissions, this approach can lead to economic savings for fishermen through the use of zero-cost, locally produced fuel.

7. Energy producing farmers and agri-coops

The value of energy production carried out directly by farmers and agri-cooperatives (energy producing farm) as an activity related to traditional/mainstream agricultural production and as a means of substituting fossil-fuel sources must be recognised in agricultural accounts. In addition, agricultural practices which are carried out in parallel with renewable energy production should be eligible for certification under the Union certification framework for carbon removals and carbon farming (CRCF).

Conclusion

If these points are taken into consideration, agri-photovoltaics can offer agricultural and forestry businesses and their cooperatives a certain level of energy autonomy and a reliable source of income. They can also boost employment and bolster socio-economic development in rural areas. This document is a non-binding preliminary reflection paper. Copa and Cogeca will set out its stance on potential legislative proposals from the European Commission for implementing an EU solar strategy further down the line.

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Copa and Cogeca are the united voice of farmers and agri-cooperatives in the EU. Together, they ensure that EU agriculture is sustainable, innovative and competitive, guaranteeing food security to half a billion people throughout Europe. Copa represents over 22 million farmers and their families whilst Cogeca represents the interests of 22,000 agricultural cooperatives. They have 66 member organisations from the EU member states. Together, they are one of the biggest and most active lobbying organisations in Brussels.