

REVIEW ON THE POSSIBLE DIRECT/INDIRECT SOURCES OF ENERGY FOR ORGANIC GREENHOUSE IN POLAND, EAST AND SOUTH-EAST EUROPE

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INTRODUCTION AND AIM

Overview of options for energy sources suitable for use for organic crops under cover was made within the Cost Action FA 1105 "Biogreenhouse" and activities of WG4 "Energy saving and climate neutral production".

In 2020, a target for share of energy from renewable sources replace fossil fuel is on 20% of renewable energy in the economy of central-eastern and southern countries of Europe..

Present share in the region ranges from ca. 14% -16% (Poland, Slovakia, Czech Republic, Bulgaria) to 23% -25% (Estonia, Lithuania, Romania, Slovenia) and up to 40% in Latvia.

The volume of this energy consumption for protected organic horticulture will depend on economic conditions affecting the amount of production and the demand for plant products.



MATERIAL METHODS

- » Data were collected from the literature, own observations as well as interviews with energy producers and growers
- » The use of renewable energy sources was checked for several countries in central-eastern and southern Europe
- » Renewable energy sources are divided into active and passive, as well as energy storage systems
- » Energy sources were verified in terms of opportunities to use the protected organic cultivation
- » The most economically efficient systems meeting the requirements of environmental protection was selected



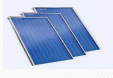
RESULTS

DIRECT (ACTIVE)

SOLAR ENERGY



photovoltaic systems



solar collectors (photovoltaic cells)



vaccum-liquid collectors



liquid collectors



air collectors



solar ponds

WIND ENERGY



WATER ENERGY



GEOTHERMAL



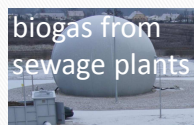
BIOGAS



agricultural
biogas plants



landfill gas



biogas from
sewage plants

BIOMASS



wood or plant
briquets



sawdust



straw

RENEWABLE ENERGY SOURCES

INDIRECT (PASSIVE)

STORAGE & ACCUMULATE SYSTEMS

buffer to
under
changer

CROP MANAGEMENT

light transmtion

ventilation

humidity

plant design

mulching



BioGreen

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CONCLUSION

DIRECT ENERGY SOURCES for organic horticulture:

- » **purchasing power of the common system**: photovoltaic systems (s E), wind-, hydro- and geothermal plants (c-e E)
 - potentially for all farms within reach of power plant
- » **solar, air, liquid collectors** (c-e&s E, summertime) – for prosperous farms
- » **biogas** (c-e&s E): ag.biogas plant (private or common) – for prosperous farms
- » **biomass** (c-e&s E) – for all kind of farms

INDIRECT ENERGY SOURCES for organic horticulture:

- » **storage and energy accumulate syst.**(c-e&s E, summ.) - for prosperous farms
- » **passive heating systems** (c-e&s E) - for small farms with seasonal production
- » **effective crop management** (c-e&s E) - for all farms