BOOSTING RURAL BIOECONOMY NETWORKS FOLLOWING MULTI-ACTOR APPROACHES

Solar hybrid biomass dryer, VTT

Jyrki Raitila, VTT

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101000375

Dryer development at VTT

Background

- Research on drying already in many decades
- Dryer development began after installing solar collectors on the roof of VTT's office
- First lab scale experiments

New dryer

- Need to increase effective operation hours and profitability
- Decided to integrate an industrial size of heat pump, solar collectors and air supply unit

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Dryer

- 2 containers, drying chamber & technology unit
- Biomass feeding
- Solar collectors, 22 m^2
- Air ducts
- Heat pump outdoor unit

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Structure and idea

Two containers

- Biomass chamber
- Drying and heat technology

25 kW industrial heat pump integrated into an air supply unit

- Pump is primarily used for drying incoming air
- Outdoor unit only for start-up in cold weather
- Air supply unit controls air flow, removes moisture and recovers heat → can be used without solar energy

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Operation

Operation modes

- Drying with solar heat alone, no air circulation
- Drying with both solar and pump – closed loop

Biomass chamber

- Air through perforated floor
- Possibility to move and circulate biomass during drying

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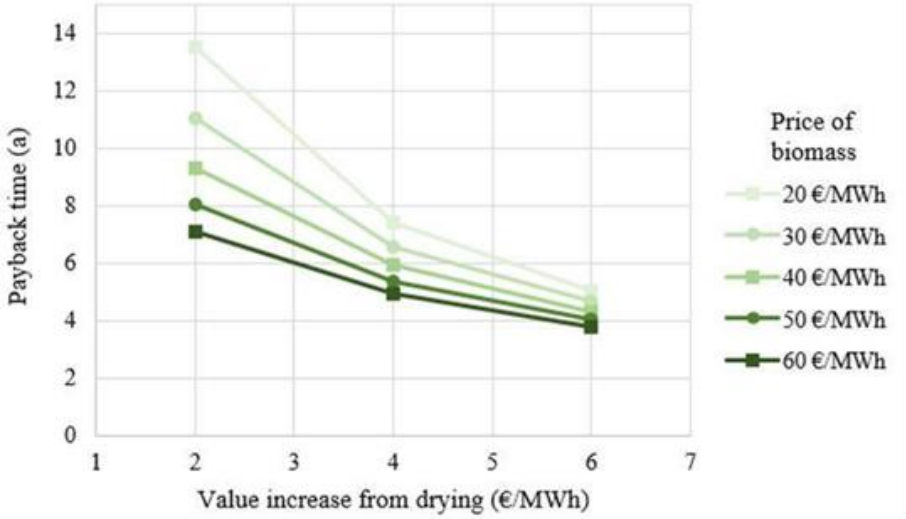
Profitability

Profitable way to dry?

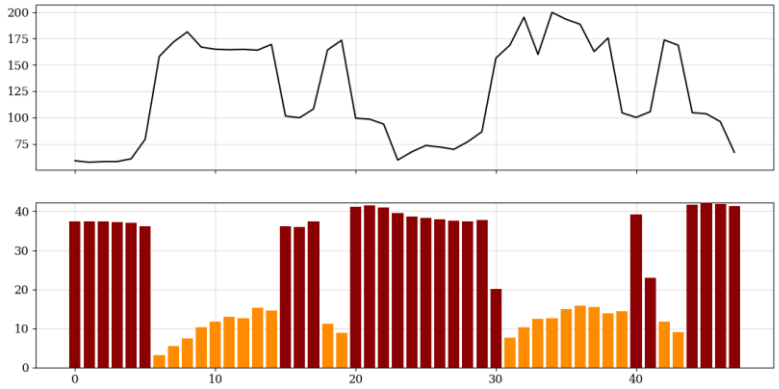
- Depends very much on fluctuation of electricity prices and value increase of biomass



Electricity price (€/MWh)

Removed water (kg/h)

hybrid mode
solar mode



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