

The Solar HexaDryer

Technical Assistant Request

The purpose of the HexaDryer is to dehydrate fruit and vegetable waste at a large scale using direct radiant solar heat, Thin Film Photovoltaics, and Crystalline Silicon Photovoltaics. The product is a desiccated agricultural product, and reclaimed water for irrigation or other needs. Solar power will enable drying agitation, dehumidifiers, preprocessing, and sensor operation. We have two areas that could greatly benefit from technical assistance by American-Made:

First, we are interested in exploring the option of thin-film photovoltaics (TFPV) as a means of facilitating green-house heating while generating additional energy for the drying process. We need assistance in validating TFPV:

1. As a cost-effective option
2. Determining the best type of thin-film to use (e.g., CdTe, CIGS, TF-Si, or third-generation TFPV)
3. Determining production and storage needs
4. Installation, maintenance, etc.

We are interested in partnering with a national laboratory within American-Made's network interested in a real-world application to explore agricultural applications of TFPV.

Second, The HexaDryer moves food waste using sensor managed variable-speed agitators. These sensors monitor:

1. Water content (watermelon takes longer to dry than lettuce)
2. Solar intensity (retention time is longer on cloudy days)
3. Temperature (retention time is shorter on hotter days),
4. Relative and internal humidity (retention time increases with an increase in relative humidity).

Resultantly, the speed of the agitators will need to adjust to ambient conditions continually. We are requesting technical assistance for programming the control system to ensure optimal drying. We have determined which commercial sensors we need though we are looking for input for configuration and installation.

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