UTILIZATION OF POWER PLANT SOLAR POWER (PLTS) AS A SOURCE POWER IN DRYER DESIGN SHELF TYPE FISH

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Abstract

The drying process here can use a fumigation system and oven. The water content achieved is approximately 25% -30% for fish to produce results drying can be durable for storage. Things that must be done to get itproduce fish with a water content of 25% -30%, that is, do not dry the fishwhole but split the fish in a butterfly style (split into 2) with3 cm thick then dried at a maximum temperature of 45 degrees witwind speed 1-2 m per second for 8-12 hours. Required toolsthe drying process is not too complicated. The tool is an internal drying rackvarious shapes and sizes that can also be made yourself to any sizeneeded... The use of solar power is currently being discussedwhich is very often done by researchers because of the researchersare looking for renewable energy to sustain lifeman. The use of solar energy has actually been around for quite a long timeHowever, currently it is still very limited to small or high power systemsbetter known as a solar home system (SHS). This SHS is assistance from government which is provided as a subsidy to rural communities for usereduce the use of non-renewable energy. Forexpansion of the use of solar power is availability equipment and components of the PLTS equipment.

Keywords: Fish, Electricity, Renewable Energy,

Introduction

Rack type dryer

The rack type dryer (Tray Dryer) has a square shape and Inside there is a shelf that is used as a place for materials to be prepared dried, the material is placed on a rack placed in a closed room and a 7 watt lamp is provided as lighting for the dryer at night, and holes for air intake. (Basmal, 2013)
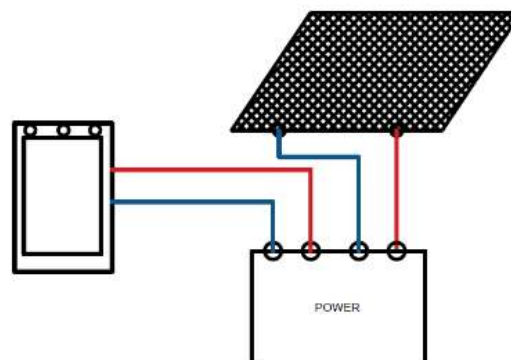

Figure 1 Scheme of off-grid PLTS on a fish dryer

Solar Energy

Solar energy is the source of all energy on earth. Man, like animals and plants, depend on the sun forget warmth and food. However, humans also take advantage solar energy in various ways. based on solar radiation 1000(W/m2). This number is often called watt-peak (Wp) and shows how much solar power the panels can produce under conditions ideal. A solar radiation of 1,000 watts per square meter is what we can expect it to be received in the midday summer sunat the equator. The potential for solar energy in Indonesia is very large, namely around 4.8KWh/m2 or theequivalent of 112,000 GWp, but which has already been utilized 6 only around 10 MWp. Currently the government has issued a roadmap utilization of solar energy targeting installed PLTS capacity until 2025 is 0.87 GW or around 50 MWp/year. This number is an illustration of the market potential which is quite large future development of solar energy.

Planning

Design is the process of defining something will be carried out using a variety of techniques as well it involves descriptions of architecture and details components and also limitations that will be experienced in the process workmanship. The final product that has been completed by the system manufacturing decisions are decided as a result of planning, strategic stage 1 of the production procedure. As shown in the image below, sales volume and sales for a particular new product tend to be increases in the initial period of product launch. There are following a period of growth as recognition from customers and others acceptance increases with a tending increase in purchasing power fast. (Adiguna, 2018)

Drying Heat Requirements

In the process of drying fish, we need power which is used for drying such as in heaters and blower and we also need a power source that comes from The sun is absorbed through solar panels and stored in batteries
channeled to the heater and blower.
Calculation of electrical power requirements
$$P = V \ x \ I$$
The heat used to heat fish meat
$$Q_{ikan} = \dot{m}_i C p_{ikan} dt$$
The heat used to evaporate the water in the fish
$$Q_{air} = \dot{m}_{air} C p_{air} dt$$
Energy released = Energy received
$$Q_{in} = U + Q_{out} + Q_{loses}$$
The heat for heating water can be calculated with the equation as following:
$$Q_{k1} = M_1. \ Cp_{air}. \ (Tp - Tu)$$
Where:
M1= mass of water in the fish (kg)
Cpair = specific heat of water (kcal/kg°C)
Tp = Drying room temperature (°C)
Tu = Outside air temperature (°C)

Solar Panel Characteristics

Solar cells in conditions without radiation have characteristics which is similar to a diode. When a solar cell receives light, it will flow constant current whose direction is opposite to the diode current. To obtain voltage and current characteristics of solar cells, the solar cell to be tested must be connected to an electrical load that can be varied. Apart from that, tools measuring voltage and current must be installed as appropriate. Cell testing This sun must be in a standard state, namely strong light irradiation 1000 W.m2 and at a temperature of 25 °C. When the load is equal to zero or with In other words, the load is removed, then in this situation a voltage will be obtained zero load Voc (Open Circuit Voltage) which is the maximum voltage solar cell because I = 0. When the load continues to increase until it reaches the state short circuit, the solar cell voltage will be equal to zero and the current will be maximum Isc (Short Circuit Current). Solar cells in general has a

thickness of 0.3 mm, which is made from slices of semiconductor material with poles (+) and poles (-). When a light falls on surface, then at the two poles a voltage difference arises of course it can turn on the lights, drive a powerful electric motor D.C. To get more power, you can connect solar cells in series or parallel depending on the nature of their use. (Bambang Hari Purwoto, 2019)

Research Method

System planning
a. Battery Requirements

Capacity	Load
300watt	Heater Blower
5 watt	lighting lamp
Losses	(Batteries, Cables, Inverters,etc.)
20%	

Load = $305 \; x \; 2 = 610WH$
Load $losses = 610 \; x \; 1.2 = 732WH$
$P = V \; x \; I$
$732 = 12volt \; x \; I$
$I = 61 \; amperehour(AH)$
In accordance with the results of the calculations above, requirements are determined
The amperage is 61Ah, so the battery chosen is 12V80Ah

Solar Panel Needs According to the calculation above, the power consumption is 732Wh. Can 20 Select the required solar panel size according to the following calculations. 732 : 5 = 146.4 For example, the solar panel used is 200WP, then the amount solar panels required is 146.4 : 200 = 0.732 ~ rounded to top becomes 1 solar panel module

Solar Charge Controller Requirement To calculate the need for a solar charge controller, You must first know the specifications of the solar panel, namely
Tabel 1.Spesifikasi Solar Panel 200watt

| Spesifikasi Solar Panel *Monocrystalline*	
Pmax	200W
Imp	10,96A
Vmp	18,24V
Voc	21,8V
Isc	11,62A

From the table above it can be seen that the Isc is 11.62 ampere, the Isc value multiplied by the number of solar panels, the result obtained is minimum value of the solar charge controller required. $Daya \; solar \; charge \; controller = 1 \; x \; 11.62A$, then solar charge The controller must have a minimum power of 11.62A, and that is used is a controller that has 20A power. d. Inverter Requirements As a medium for converting DC current from the battery into AC so that Can be used for AC current based instruments. The size of the inverter What is needed is at least equal to the total power of the instrument needed, in this calculation, is 600 watts

Analisis sistem Desain

Analysis of the design system carried out in the drying machine Rack type fish that have 2 blowers and 1 heater are as follows: a. system flow on the machine

Dryer machine design system flow
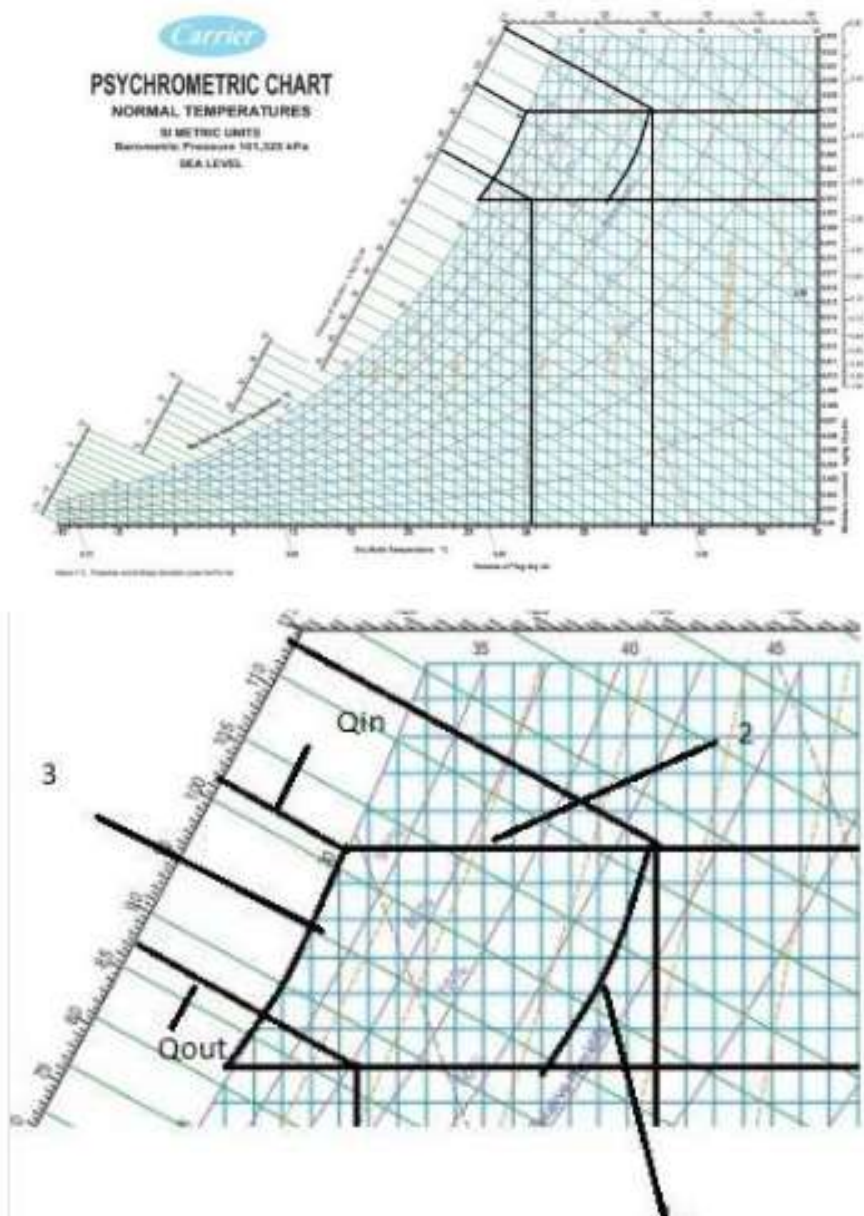
The flow process that occurs in the rack type fish drying machine is process system as follows:

1. Process 1 is the process of increasing the temperature the blower goes to the heater which will be fired inward dryer.
2. Process 2 is the drying process that occurs in the oven with hot air that has been fired blower through heater
3. Process 3 is a temperature reduction process discharged to normal outdoor temperature
4. Process 4 is the process of releasing temperature with conditions room temperature with 100% humidity

Conclusion

In the process of designing and manufacturing a rack type fish drying machine with the use of solar-powered electricity generation, it can be withdrawn conclusion as follows: 1. Machine design uses two processes, namely drawing using a rough sketch (paper) and using a fine sketch (application). 2. The design process for heating fish can be influenced by mass fish. 3. At temperatures between 41º and 42º, get the drying time exactly 2 hours. 4. Heat and temperature can affect the capabilities of Photopalvic. 5. Power and drying time according to the design determined.

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