power amount generated by the solar cells may be consumed. Consequently, application efficiency of solar energy may decrease. Also, even if electric power more than the generated electric power is not consumed, energy efficiency is not still enough in the disclosed systems.

[0005]

Embodiments of the present invention are oriented for solving the above problems and seek to provide a solar energy application system which is capable of improving application efficiency of solar energy over the prior art.

MEANS TO SOLVE THE PROBLEMS

[0006]

As a result of diligent endeavor to solve the problems, the inventors found to solve the problems by providing at least a heat exchanger and a heat pump or another heat exchanger and a circulation pump to control circulated amount of a heating medium.

[0006a]

According to an aspect, there is provided a solar energy application system having a solar cell and obtaining electric power by the solar cell comprising: a first heat exchanger that cools the solar cell; a heat pump that is connected to the first heat exchanger; a circulation pump that circulates a heating medium between the first heat exchanger and the heat pump; and a flow control unit that controls the circulation pump to change circulated amount of the heating medium, wherein the flow control unit is a calculation control unit that calculates flow amount of the circulating heating medium to control the circulation pump to flow the calculated flow amount, and the calculation control unit calculates electricity consumption in the solar energy application system and electric power generated by the solar cell, and controls the flow amount of the heating medium by the circulation pump such that difference between the calculated electricity consumption and the generated electric power is set at a maximum.

[0006b]

According to another aspect, there is provided a solar energy application system having a solar cell and obtaining electric power by the solar cell comprising: a first heat exchanger that cools the solar cell; a second heat exchanger that is connected to the first heat exchanger; a circulation pump that circulates a heating medium between the first heat exchanger and the second heat exchanger; and a flow control unit that controls the circulation pump to change circulated amount of the heating medium wherein the flow control unit is a calculation control unit that calculates flow amount of the circulating heating medium to control the circulation pump to flow the calculated flow amount, and the calculation control unit calculates electricity consumption in the solar energy application system and electric power generated by the solar cell, and controls the flow amount of the heating medium by the circulation pump such that difference between the calculated electricity consumption and the generated electric power is set at a maximum.

EFFECT OF THE INVENTION

[0007]

Embodiments of the invention may provide a solar energy application system which improves application efficiency of solar energy over the prior art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is a diagram illustrating a structure of a solar energy application system according to a first embodiment;

FIG. 2 is a graph illustrating recovered heat amount to a heating medium temperature supplied to a heat exchanger 2 and electric power amount generated by a solar cell 1;

FIG. 3 is a flowchart illustrating control in a solar energy application system 100;

FIG. 4 is a diagram illustrating a structure of the solar

CLAIMS

1. A solar energy application system having a solar cell and obtaining electric power by the solar cell comprising:

a first heat exchanger that cools the solar cell;

a heat pump that is connected to the first heat exchanger;

a circulation pump that circulates a heating medium between the first heat exchanger and the heat pump; and

a flow control unit that controls the circulation pump to change circulated amount of the heating medium~~,~~.

~~2. The solar energy application system according to claim 1,~~ wherein

the flow control unit is a calculation control unit that calculates flow amount of the circulating heating medium to control the circulation pump to flow the calculated flow amount, and

the calculation control unit calculates electricity consumption in the solar energy application system and electric power generated by the solar cell, and controls the flow amount of the heating medium by the circulation pump such that difference between the calculated electricity consumption and the generated electric power is set at a maximum.

~~3~~2. A solar energy application system having a solar cell and obtaining electric power by the solar cell comprising:

a first heat exchanger that cools the solar cell;

a second heat exchanger that is connected to the first heat exchanger;

a circulation pump that circulates a heating medium between the first heat exchanger and the second heat exchanger; and

a flow control unit that controls the circulation pump to change circulated amount of the heating medium~~,~~.

~~4. The solar energy application system according to claim 3,~~ wherein

the flow control unit is a calculation control unit that calculates flow amount of the circulating heating medium to control the circulation pump to flow the calculated flow amount, and

the calculation control unit calculates electricity consumption in the solar energy application system and electric power generated by the solar cell, and controls the flow amount of the heating medium by the circulation pump such that difference between the calculated electricity consumption and the generated electric power is set at a maximum.

~~5~~3. The solar energy application system according to claim ~~2~~ 1 or ~~4~~2, wherein

the calculation control unit calculates radiation amount from the solar cell to an outside and heat exchange amount between the solar cell and the first heat exchanger.

~~6~~4. The solar energy application system according to ~~either one of~~ claim~~s~~ 1 ~~to 4~~ or 2 further comprising:

a pair of heat pumps and a heat exchanger that are connected in parallel with the first heat exchanger, wherein

either one of the pair of heat pumps or the heat exchanger is supplied with the heating medium based on a temperature of the heating medium discharged from the first heat exchanger.

~~7~~5. The solar energy application system according to ~~either one of~~ claim~~s~~ 1 ~~to 4~~ or 2, wherein

the flow amount of the heating medium is controlled based on a temperature of fluid as heated object by the heating medium.