[0004] The present disclosure provides a management device, a management method, and a management system, which can appropriately apportion the amount of CO2 emissions emitted by manufacturing secondary batteries to a business operator who recycles secondary batteries.

[0005] A first aspect of the present disclosure relates to a management device including a storage, a controller, and a communicator. The storage is configured to store an amount of CO2 emissions emitted by manufacturing a secondary battery. The controller is configured to, when the secondary battery is recycled by a business operator who recycles the secondary battery, apportion the amount of CO2 emissions with the business operator according to a degree of deterioration of the secondary battery at a time of being recycled. The communicator is configured to communicate with a management device of the business operator. The controller is configured to, when the secondary battery is recycled, acquire a burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the management device of the business operator through the communicator.

[0006] According to the first aspect, when the secondary battery is recycled, the amount of CO2 emissions is apportioned with the business operator who recycles the secondary battery according to the degree of deterioration of the secondary battery at the time of being recycled. By apportioning the amount of CO2 emissions according to the degree of deterioration, the business operator can be made to bear an appropriate amount of CO2 emissions.

[0007] In the present disclosure, the management device may further include a communicator. The secondary battery may be mounted on a moving body. The communicator may be configured to communicate with the moving body, and the controller may be configured to acquire information about the secondary battery from the moving body through the communicator, and calculate the degree of deterioration by using the information when the secondary battery is recycled.

[0008] According to the present disclosure, the controller of the management device calculates the degree of deterioration of the secondary battery by using the information about the secondary battery acquired from the moving body. The controller can appropriately apportion the amount of CO2 emissions with the business operator according to the calculated degree of deterioration.

[0009] In the present disclosure, the management device may further include a communicator. The secondary battery may be mounted on a moving

body. The communicator may be configured to communicate with the moving body, and the controller may be configured to, when the secondary battery is recycled, acquire the degree of deterioration from the moving body through the communicator.

[0010] According to the present disclosure, the controller of the management device acquires the degree of deterioration from the moving body. The controller can appropriately apportion the amount of CO2 emissions with the business operator according to the acquired degree of deterioration.

[0011] In the present disclosure, the management device may further include a communicator configured to communicate with a management device of the business operator. The controller may be configured to, when the secondary battery is recycled, acquire the degree of deterioration from the management device of the business operator through the communicator.

[0012] According to the present disclosure, the controller of the management device acquires the degree of deterioration from the management device of the business operator. The controller can appropriately apportion the amount of CO2 emissions with the business operator according to the acquired degree of deterioration.

[0013]

[0014] According to the first aspect, the controller of the management device acquires the burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the management device of the business operator. For example, the controller can update the amount of CO2 emissions stored in the storage based on the acquired burden share. Therefore, it is possible to appropriately apportion the amount of CO2 emissions with the business operator.

[0015] In the first aspect of the present disclosure, the degree of deterioration may

be a capacity maintenance rate of the secondary battery. According to the first aspect, the amount of CO2 emissions can be apportioned with the business operator according to the capacity maintenance rate, and thus the business operator can be made to bear an appropriate amount of CO2 emissions.

[0016] In the first aspect of the present disclosure, the controller may be configured to increase a burden share of the amount of CO2 emissions of the business operator as the capacity maintenance rate when the secondary battery is recycled is higher.

[0017] According to the first aspect, the higher the capacity maintenance rate of the secondary battery, the greater the burden share of the amount of CO2 emissions on the business operator, and thus the business operator can be made to bear an appropriate amount of CO2 emissions.

[0018] A second aspect of the present disclosure relates to a management method. The management method includes storing an amount of CO2 emissions emitted by manufacturing a secondary battery, and when the secondary battery is recycled by a business operator who recycles the secondary battery, apportioning the amount of CO2 emissions with the business operator according to a degree of deterioration of the secondary battery at the time of being recycled. The management method further includes communicating with the business operator, and when the secondary battery is recycled, acquiring a burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the business operator.

[0019] According to the second aspect, when the secondary battery is recycled, the amount of CO2 emissions is apportioned with the business operator who recycles the secondary battery according to the degree of deterioration of the secondary battery at the time of being recycled. By apportioning the amount of CO2 emissions according to the degree of deterioration, the business operator can be made to bear an appropriate amount of CO2 emissions.

[0020] A third aspect of the present disclosure relates to a management system that includes a first device configured to manage an amount of CO2 emissions emitted by manufacturing a secondary battery and a second device of a business operator who recycles the secondary battery. The first device is configured to, when the secondary battery is recycled, update the amount of CO2 emissions according to a degree of deterioration of the secondary battery at the time of being recycled, and the second device

is configured to manage the amount of CO2 emissions corresponding to the degree of deterioration. The first device is configured to communicate with the second device of the business operator. The first device is also configured to, when the secondary battery is recycled, acquire a burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the second device of the business operator.

[0021] According to the third aspect, the amount of CO2 emissions is apportioned between the first device and the second device according to the degree of deterioration of the secondary battery. Therefore, the amount of CO2 emissions can be appropriately apportioned between the first device and the second device. Therefore, the business operator can be made to bear an appropriate amount of CO2 emissions.

[0022] According to the present disclosure, it is possible to appropriately apportion the amount of CO2 emissions emitted by manufacturing secondary batteries with a business operator who recycles secondary batteries.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Features, advantages, and technical and industrial significance of exemplary embodiments of the invention will be described below with reference to the accompanying drawings, in which like signs denote like elements, and wherein:

FIG. 1 is an overall configuration diagram of a management system according to Embodiment 1;

FIG. 2 is a diagram for describing an example of the amount of CO2 emissions of a vehicle that is stored in a database;

FIG. 3 is a functional block diagram of a control device of a management device and a control device of another management device;

FIG. 4 is a flowchart showing a procedure of a process executed at the time when a battery is recycled;

FIG. 5 is a flowchart showing a detailed process for S21 in FIG. 4;

FIG. 6 is a flowchart showing a detailed process for S21 in FIG. 4, according to Modification Example 1;

FIG. 7 is a functional block diagram of a control device of a management device and a control device of another management device according to Embodiment 2;

CLAIMS

1. A management device characterized by comprising:

a storage configured to store an amount of CO2 emissions emitted by manufacturing a secondary battery;

a controller configured to, when the secondary battery is recycled by a business operator who recycles the secondary battery, apportion the amount of CO2 emissions with the business operator according to a degree of deterioration of the secondary battery at a time of being recycled; and

a communicator configured to communicate with a management device of the business operator,

wherein the controller is configured to, when the secondary battery is recycled, acquire a burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the management device of the business operator through the communicator.

2. The management device according to claim 1, wherein the degree of deterioration is a capacity maintenance rate of the secondary battery.

3. The management device according to claim 3, wherein the controller is configured to increase a burden share of the amount of CO2 emissions of the business operator as the capacity maintenance rate when the secondary battery is recycled is higher.

4. A management method characterized by comprising:

storing an amount of CO2 emissions emitted by manufacturing a secondary battery;

when the secondary battery is recycled by a business operator who recycles the secondary battery, apportioning the amount of CO2 emissions with the business operator according to a degree of deterioration of the secondary battery at a time of being recycled;

communicating with the business operator; and

when the secondary battery is recycled, acquiring a burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the business operator.

5. A management system characterized by comprising:

a first device configured to manage an amount of CO2 emissions emitted by manufacturing a secondary battery; and

a second device of a business operator who recycles the secondary battery, wherein:

the first device is configured to, when the secondary battery is recycled, update the amount of CO2 emissions according to a degree of deterioration of the secondary battery at a time of being recycled;

the second device is configured to manage the amount of CO2 emissions corresponding to the degree of deterioration;

the first device is configured to communicate with the second device of the business operator; and

the first device is configured to, when the secondary battery is recycled, acquire a burden share of the amount of CO2 emissions corresponding to the degree of deterioration from the second device of the business operator.