

DESCRIPTION

TITLE OF THE INVENTION:

GREENHOUSE GAS REDUCTION SUPPORT DEVICE, GREENHOUSE GAS
5 REDUCTION SUPPORT METHOD, GREENHOUSE GAS REDUCTION SUPPORT
PROGRAM, AND GREENHOUSE GAS REDUCTION SUPPORT SYSTEM

Field

[0001] The present disclosure relates to a greenhouse
10 gas reduction support device, a greenhouse gas reduction
support method, a greenhouse gas reduction support program,
and a greenhouse gas reduction support system that each
assist in achievement of a reduction target of a greenhouse
gas emission amount in a business operator.

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Background

[0002] In recent years, reduction of greenhouse gas
emission amounts has been required as a measure against
global warming. As such, various technologies for
20 realizing reduction of a greenhouse gas emission amount in
a business operator such as a company have been proposed
(e.g., Patent Literature 1).

[0003] Patent Literature 1 describes a technique in
which a CO₂ emission amount is calculated on the basis of
25 energy usage data output from an energy usage measuring
instrument, and an image of a graph representing the
calculated CO₂ emission amount and a target value of the
CO₂ emission amount is displayed to thereby allow a user to
recognize a difference between the actual CO₂ emission
30 amount and the target value.

Citation List

Patent Literature

[0004] Patent Literature 1: Japanese Patent Application
Laid-open No. 2011-34205 (JP 2011-34205 A)

Summary

5 Technical Problem

[0005] The technique described in Patent Literature 1 predicts a CO₂ emission amount based on a slope of a graph representing a past CO₂ emission amount up to the present time. However, in an actual business operator, the CO₂
10 emission amount varies due to, for example, a change of scale thereof, a change of equipment thereof, and/or the like. This imposes a problem that prediction based on the slope of the graph representing a past CO₂ emission amount may lead to poor prediction accuracy.

15 [0006] The present disclosure has been made in view of the above, and an object of the present disclosure is to provide a greenhouse gas reduction support device that provides higher accuracy of prediction of a CO₂ emission amount.

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Solution to Problem

[0007] In order to solve the above-described problems and achieve the object, a greenhouse gas reduction support device according to the present disclosure includes: an
25 information acquisition unit to acquire unique information specific to a business operator to be supported, the unique information including business related information that is various types of information regarding business conducted by the business operator to be supported; a calculation
30 unit to calculate a prediction value of a greenhouse gas emission amount at a time when a specific time period elapses from a present time on a basis of the business related information included in the unique information

acquired by the information acquisition unit, and to calculate a difference between a target value and the prediction value of the greenhouse gas emission amount at the time when the specific time period elapses; and an
5 output unit to output a result of calculation performed by the calculation unit to an outside.

Advantageous Effects of Invention

[0008] According to the present disclosure, an effect is
10 provided that enables a greenhouse gas reduction support device to be provided that provides higher accuracy of prediction of a CO₂ emission amount.

Brief Description of Drawings

15 [0009] FIG. 1 is a diagram illustrating an exemplary configuration of a greenhouse gas reduction support system according to a first embodiment.

FIG. 2 is a diagram illustrating an example of a business related information table.

20 FIG. 3 is a diagram illustrating an example of a target setting table.

FIG. 4 is a diagram illustrating an example of a weighting table.

25 FIG. 5 is a diagram illustrating an example of a business expansion information table.

FIG. 6 is a diagram illustrating an example of an emission factor table.

30 FIG. 7 is a flowchart illustrating an example of operation of a greenhouse gas reduction support device according to the first embodiment.

FIG. 8 is a diagram illustrating an example of an activity amount change prediction table.

FIG. 9 is a flowchart illustrating an example of an

operation of determining a GHG reduction measure to be implemented, by the greenhouse gas reduction support device according to the first embodiment.

FIG. 10 is a diagram illustrating an example of a GHG reduction measure plan table.

FIG. 11 is a diagram illustrating an example of a GHG reduction measure plan presentation screen.

FIG. 12 is a diagram illustrating an example of a GHG reduction measure plan presentation screen that is displayed when GHG reduction measure plans to be implemented have been selected.

FIG. 13 is a diagram illustrating an example of a GHG reduction measure plan presentation screen to be displayed when reselection of a GHG reduction measure plan to be implemented is accepted.

FIG. 14 is a diagram illustrating an example of a GHG reduction measure plan determination notification screen.

FIG. 15 is a diagram illustrating an exemplary hardware configuration of the greenhouse gas reduction support device.

FIG. 16 is a diagram illustrating an exemplary configuration of a greenhouse gas reduction support system according to a second embodiment.

25 Description of Embodiments

[0010] A greenhouse gas reduction support device, a greenhouse gas reduction support method, a greenhouse gas reduction support program, and a greenhouse gas reduction support system according to embodiments of the present disclosure will hereinafter be described in detail with reference to the drawings.

[0011] First Embodiment.

FIG. 1 is a diagram illustrating an exemplary

configuration of a greenhouse gas reduction support system 100 according to a first embodiment. The greenhouse gas reduction support system 100 includes a greenhouse gas reduction support device 1 and a terminal device 2 connected to the greenhouse gas reduction support device 1 via a communication network (not illustrated).

[0012] The greenhouse gas reduction support device 1 includes an information acquisition unit 11, a calculation unit 12, a storage unit 13, and an output unit 14.

10 [0013] The information acquisition unit 11 acquires, from the terminal device 2, information necessary for processing of supporting greenhouse gas reduction, and the like. To support greenhouse gas reduction, the calculation unit 12 performs various types of calculation processing using information acquired by the information acquisition unit 11 from the terminal device 2 and using the information stored in the storage unit 13. The storage unit 13 stores the information acquired by the information acquisition unit 11 from the terminal device 2, in the form of a table. The output unit 14 outputs a result of calculation performed by the calculation unit 12 to the terminal device 2.

[0014] In the present embodiment, the phrase "to support greenhouse gas reduction" means to assist in operation of determination of a measure for reducing the emission amount of a greenhouse gas in a business operator to bring the emission amount to a target value.

[0015] The terminal device 2 is provided in an office or the like of a business operator that receives support for greenhouse gas reduction. Although not illustrated in FIG. 1, the terminal device 2 includes a display unit, an input unit that receives an operation, a communication unit that is connected to a communication network and transmits and

receives data, and the like. The terminal device 2 is, for example, a personal computer. The terminal device 2 may be a tablet terminal or the like.

[0016] The greenhouse gas reduction support device 1
5 acquires, from the terminal device 2, various types of information regarding business conducted by a business operator that is provided with support therefrom (hereinafter described as "business operator to be supported" or simply as "business operator"), and predicts
10 a future greenhouse gas (hereinafter referred to as GHG) emission amount on the basis of the information acquired. That is, the greenhouse gas reduction support device 1 calculates a prediction value of a GHG emission amount at a time when a specific time period elapses from the present
15 time, on the basis of various types of information acquired from the business operator to be supported. In addition, when the calculated prediction value of the GHG emission amount fails to achieve a predetermined target, specifically, when the prediction value of the GHG emission
20 amount is greater than a target value, the greenhouse gas reduction support device 1 assists in operation of determination to be performed by a business operator, of a measure for enabling the GHG emission amount to achieve the target.

25 [0017] FIGS. 2 to 6 illustrate examples of information stored in the storage unit 13 among information used in providing support in GHG reduction by the greenhouse gas reduction support device 1. Note that the information illustrated in FIGS. 2 to 6 is acquired from the terminal
30 device 2 by the information acquisition unit 11 at a predetermined timing or is calculated using the information acquired from the terminal device 2. The information acquisition unit 11 may acquire some or all of the

information illustrated in FIGS. 2 to 6 not from the terminal device 2 but from another device not illustrated in FIG. 1.

[0018] FIG. 2 is a diagram illustrating an example of a business related information table 201. The business related information table 201 includes various types of information regarding business conducted by the business operator to be supported, registered therein as business related information. For example, the business related information table 201 includes information registered therein such as "equipment management number", "equipment classification" indicating a classification of that piece of equipment possessed by the business operator, "number of pieces" indicating the number of pieces of equipment, "location" indicating an installation place of that piece of equipment, "building" indicating a building in which that piece of equipment is installed, "annual energy usage" indicating an annual usage per energy type in that piece of equipment, "presence or absence of electric energy measuring instrument" indicating whether that piece of equipment includes an electric energy measuring instrument, "presence or absence of air conditioner" indicating whether the installation place of that piece of equipment includes air conditioning equipment, "presence or absence of solar power generation equipment" indicating whether a solar power generation equipment is provided in a place such as the site where that piece of equipment is installed, and "solar power installation feasibility" indicating whether installation of a solar power generation equipment in a place such as the site where that piece of equipment is installed is possible. The latest business related information is registered in the business related information table 201. The latest business related

information indicates the current status of the business conducted by the business operator to be supported.

[0019] FIG. 3 is a diagram illustrating an example of a target setting table 202. In the target setting table 202, target information of a future GHG emission amount of the supported business operator is registered. For example, in the target setting table 202, a "target reduction ratio from present" indicating a target value of a reduction ratio with respect to a current GHG emission amount and a "target number of years" indicating how many years will elapse from the present time to achieve the target value are registered.

[0020] FIG. 4 is a diagram illustrating an example of a weighting table 203. The weighting table 203 is used when a future GHG emission amount fails to achieve the target, that is, when assistance is provided in operation of determination to be performed by a business operator, of a measure for additionally reducing the GHG emission amount. In the weighting table 203, proportions of three respective reduction categories are registered, in which the three reduction categories are an energy saving category (ES category), a renewable energy category (RE category), and an offset category. The proportion of each of the reduction categories indicates the ratio of the additional reduction amount of the GHG emission amount of that reduction category to the total additional reduction amount of the GHG emission amount. The example illustrated in FIG. 4 is illustrated such that the energy saving category has a ratio of 60%, the renewable energy category has a ratio of 40%, and the offset category has a ratio of 0%. In this case, the greenhouse gas reduction support device 1 presents measure plans for reducing the GHG emission amount in such a manner that 60% of the additional reduction

amount of the GHG emission amount will belong to the energy saving category and 40% thereof will belong to the renewable energy category in providing assistance in operation of determination to be performed by the business operator, of a measure for additionally reducing the GHG emission amount.

[0021] In this respect, reduction of the GHG emission amount belonging to the energy saving category refers to reduction of the GHG emission amount by saving energy of equipment. A case applies to this where, for example, the GHG emission amount is reduced by replacement of equipment with equipment that consumes less energy. Reduction of the GHG emission amount belonging to the renewable energy category refers to reduction of the GHG emission amount by changing the energy used by equipment to renewable energy. A case applies to this where, for example, the GHG emission amount is reduced by introducing solar power generation, wind power generation, and/or the like. Reduction of the GHG emission amount belonging to the offset category refers to reduction of the GHG emission amount by utilizing an offset credit scheme.

[0022] Note that a plurality of weighting tables 203 may be used. For example, a plurality of weighting tables 203 having different sets of proportions of the three reduction categories may be stored in the storage unit 13, and priority may be set to the plurality of weighting tables 203. When a measure plan that provides the highest priority weighting (component proportion) cannot be presented in providing assistance in operation of determination to be performed by the business operator, of a measure for additionally reducing the GHG emission amount, the greenhouse gas reduction support device 1 presents a measure plan that provides the second highest

priority weighting. When the greenhouse gas reduction support device 1 cannot present a measure plan that provides the second highest priority weighting, the greenhouse gas reduction support device 1 presents a measure plan that provides the presentable weighting having the highest priority among the weightings having the third and lower priorities.

[0023] FIG. 5 is a diagram illustrating an example of a business expansion information table 204. The business expansion information table 204 is used when the greenhouse gas reduction support device 1 predicts a future GHG emission amount of the business operator to be supported, that is, when the greenhouse gas reduction support device 1 calculates a prediction value of the future GHG emission amount of the business operator to be supported. In the business expansion information table 204, elapsed years and business expansion information are registered. The business expansion information indicates how much expansion will be achieved from the present time (current fiscal year) in terms of the business scale as of when the number of years indicated in the elapsed years field elapses from the present time. Note that information corresponding to the elapsed years=0 is business expansion information at the present time, and the business expansion information at the present time is expressed as 100%. The business expansion information is determined by the business operator on the basis of, for example, a business plan of the business operator. In the example illustrated in FIG. 5, the business scale will be 110% (=expansion rate of 10%) with respect to the business scale at the present time when 10 years elapse, and will be 130% (=expansion rate of 30%) with respect to the business scale at the present time when 20 years elapse.

[0024] FIG. 6 is a diagram illustrating an example of an emission factor table 205. Similarly to the business expansion information table 204, the emission factor table 205 is used when the greenhouse gas reduction support device 1 predicts a future GHG emission amount of the business operator to be supported. In the emission factor table 205, emission factor change information in each of the elapsed years is registered for each type of energy used by the business operator. In the example illustrated in FIG. 6, a ratio of the emission factor to the emission factor at the present time (current fiscal year) is registered as the emission factor change information in each of the elapsed years. For example, when a GHG emission amount of a year in the elapsed years field having an emission factor of 98% is to be predicted, a value at 98% of the current emission factor is the emission factor of the year in the elapsed years field to be predicted. Note that the emission factor is used in calculation of an emission amount of a GHG generated through energy use. The GHG emission amount can be obtained by multiplying the energy usage by the emission factor. It is assumed that the storage unit 13 stores the current emission factor as information different from the information of the emission factor table 205.

[0025] An operation of the greenhouse gas reduction support device 1 according to the first embodiment will next be described. FIG. 7 is a flowchart illustrating an example of operation of the greenhouse gas reduction support device 1 according to the first embodiment.

[0026] The greenhouse gas reduction support device 1 first acquires unique information specific to the business operator (step S11). Specifically, the information acquisition unit 11 acquires unique information specific to

the business operator to be supported from the terminal device 2. The unique information acquired by the information acquisition unit 11 in step S11 constitutes the tables illustrated in FIGS. 2 to 6. That is, the information acquisition unit 11 acquires the various types of information registered in the business related information table 201, the target setting table 202, the weighting table 203, the business expansion information table 204, and the emission factor table 205 stored in the storage unit 13.

[0027] Next, the greenhouse gas reduction support device 1 calculates a current GHG emission amount of the business operator to be supported (step S12). Specifically, the calculation unit 12 calculates the current GHG emission amount on the basis of the business related information of the business operator to be supported registered in the business related information table 201. The calculation unit 12 calculates the current GHG emission amount of the business operator to be supported using the business related information, according to a known calculation method defined in a GHG protocol. The calculation unit 12 uses the annual energy usage illustrated in FIG. 2 and the activity amounts of various emission activities defined in the GHG protocol (not illustrated in FIG. 2) to calculate the current GHG emission amount of the entire business operator to be supported.

[0028] Next, the greenhouse gas reduction support device 1 calculates a target value of the GHG emission amount in a target fiscal year (step S13). Specifically, the calculation unit 12 calculates the target value of the GHG emission amount of the target fiscal year on the basis of the current GHG emission amount calculated in step S12 and the target reduction ratio from the present time registered

in the target setting table 202. The calculation unit 12 calculates a value at which the target reduction ratio from the present time will be achieved, as the target value of the GHG emission amount of the target fiscal year. When
5 the target setting table 202 illustrated in FIG. 3 is used, the target fiscal year is 10 years after the present time. In addition, in this case, the calculation unit 12 determines a value obtained by reducing the current GHG emission amount by 30%, that is, a value at 70% of the
10 current GHG emission amount, to be the target value of the GHG emission amount of the target fiscal year.

[0029] Next, the greenhouse gas reduction support device 1 calculates predicted energy and material usages of each fiscal year (step S14). Specifically, the calculation unit
15 12 calculates the predicted energy and material usages of each fiscal year on the basis of the business expansion information registered in the business expansion information table 204. The calculation unit 12 stores the predicted usages calculated, in the storage unit 13 in the
20 form of, for example, a table illustrated in FIG. 8.

[0030] FIG. 8 is a diagram illustrating an example of an activity amount change prediction table 206. In the activity amount change prediction table 206, the elapsed years, an energy multiplying factor, an energy usage, a
25 material multiplying factor, and a material usage are registered. The predicted energy and material usages of each fiscal year calculated by the calculation unit 12 are registered as the energy usage and the material usage in each of one or more of the elapsed years (elapsed years=1,
30 2, 3, ...). In the activity amount change prediction table 206 illustrated in FIG. 8, the energy usage is expressed by a ratio of future energy usage (predicted energy usage) to the energy usage at the present time (current fiscal year),

that is, a ratio of the energy usage as of when the number of years indicated in the elapsed years field elapses, relative to the energy usage at the present time. The energy usage corresponds to a result obtained by

5 multiplying, by the energy multiplying factor, a value of the business expansion information in the business expansion information table 204. In addition, the material usage is expressed by a ratio of future material usage (predicted material usage) to the material usage at the

10 present time (current fiscal year), that is, a ratio of the material usage as of when the number of years indicated in the elapsed years field elapses, relative to the material usage at the present time. The material usage corresponds to a result obtained by multiplying, by the material

15 multiplying factor, a value of the business expansion information in the business expansion information table 204. It is assumed that the energy multiplying factor and the material multiplying factor are stored in advance in the storage unit 13. The energy multiplying factor and the

20 material multiplying factor may be acquired from the terminal device 2 in step S11 described above. The energy multiplying factor and the material multiplying factor may be different values for different elapsed years.

[0031] In this respect, the material multiplying factor

25 and the material usage are information to be used in processes of calculation of values such as an amount of a GHG emitted in a process of manufacturing raw materials, parts, products, and the like purchased by the business operator to conduct business, an amount of a GHG emitted in

30 association with disposal of wastes generated in business, and an amount of a GHG emitted in association with use and disposal of products sold by the business operator. In the present embodiment, the material multiplying factor and the

material usage are used in a process of calculation of an emission amount of a GHG other than the GHGs emitted by use of energy (electric power and fuel) by the business operator.

5 [0032] Note that the calculation unit 12 may calculate the energy usage and the material usage for all the elapsed years in the activity amount change prediction table 206, or may calculate only the energy usage and the material usage for the elapsed years corresponding to the target
10 fiscal year.

[0033] Next, the greenhouse gas reduction support device 1 calculates a prediction value of the GHG emission amount of the target fiscal year (step S15). Specifically, the calculation unit 12 calculates the prediction value of the
15 GHG emission amount of the target fiscal year on the basis of the current GHG emission amount, the business related information table 201, the activity amount change prediction table 206, and the emission factor table 205. Note that the prediction value of the GHG emission amount
20 may hereinafter be referred to as predicted GHG emission amount.

[0034] In step S15, the calculation unit 12 calculates a prediction value of a GHG emission amount associated with energy use and a prediction value of a GHG emission amount
25 associated with material use, and determines a sum of the calculated prediction values as the prediction value of the GHG emission amount of the target fiscal year. For example, the calculation unit 12 calculates a prediction value of the energy usage in the target fiscal year on the
30 basis of the annual energy usage in the business related information table 201 and the energy usage in the activity amount change prediction table 206, and then multiplies the calculated prediction value by the corresponding emission

factor of the target fiscal year, thereby deriving the prediction value of the GHG emission amount associated with energy use in the target fiscal year. Note that the prediction value of the energy usage in the target fiscal year is calculated for each of the energy types, and each of the calculated prediction values is multiplied by a corresponding emission factor of the target fiscal year. In addition, the calculation unit 12 multiplies the GHG emission amount associated with material use, of the current GHG emission amount, by the material usage in the target fiscal year in the activity amount change prediction table 206, thereby deriving the prediction value of the GHG emission amount associated with material use in the target fiscal year.

[0035] Next, the greenhouse gas reduction support device 1 calculates a gap value between the prediction value and the target value of the GHG emission amount of the target fiscal year (step S16). Specifically, the calculation unit 12 calculates a difference between the prediction value of the GHG emission amount calculated in step S15 and the target value of the GHG emission amount calculated in step S13.

[0036] Next, the greenhouse gas reduction support device 1 calculates a target value of an additional GHG reduction amount for each of the energy saving category, the renewable energy category, and the offset category (step S17). Specifically, the calculation unit 12 calculates the target value of the additional GHG reduction amount of each of the reduction categories on the basis of the gap value calculated in step S16 and the weighting table 203. Specifically, the calculation unit 12 multiplies the gap value by the proportion of each reduction category registered in the weighting table 203, and determines each

of the values obtained by this, as the target value of the additional GHG reduction amount of each of the reduction categories. For example, when the target values are calculated on the basis of the weighting table 203

5 illustrated in FIG. 4, the target value of the additional GHG reduction amount of the energy saving category is a value at 60% of the gap value, the target value of the additional GHG reduction amount of the renewable energy category is a value at 40% of the gap value, and the target
10 value of the additional GHG reduction amount of the offset category is zero.

[0037] Next, the greenhouse gas reduction support device 1 determines a GHG reduction measure plan to be implemented among the GHG reduction measure plans corresponding to the
15 energy saving category (step S18). In this step S18, a measure plan to be implemented is determined in such a manner that, for example, GHG reduction measure plans prepared in advance (each of which may hereinafter be referred to simply as "measure plan") are presented to the
20 business operator to be supported, who is then caused to select one or more measure plans to be implemented. A specific example of the operation corresponding to step S18 will hereinafter be described with reference to FIGS. 9 to 13.

25 [0038] FIG. 9 is a flowchart illustrating an example of an operation of determining a GHG reduction measure to be implemented, by the greenhouse gas reduction support device 1 according to the first embodiment. The greenhouse gas reduction support device 1 operates in accordance with the
30 flowchart illustrated in FIG. 9, and determines a GHG reduction measure plan to be implemented from among the GHG reduction measure plans corresponding to the energy saving category.

[0039] FIG. 10 is a diagram illustrating an example of a GHG reduction measure plan table 207. It is assumed that, for example, the GHG reduction measure plan table 207 is generated in advance by the business operator to be supported and is stored in the storage unit 13. Note that the greenhouse gas reduction support device 1 may acquire the GHG reduction measure plan table 207 in step S11 described above and store the table in the storage unit 13. In addition, instead of acquiring a GHG reduction measure plan table 207 that has been generated, the greenhouse gas reduction support device 1 may individually acquire each piece of information to be registered in the GHG reduction measure plan table 207 from the business operator to be supported and generate the GHG reduction measure plan table 207.

[0040] In the GHG reduction measure plan table 207, measure plans for realizing reduction of the GHG emission amount are registered. The measure plans each include information of "measure plan No", "reduction category", "action (or content)", "device classification", "applicability to device category", "cost", and "reducing effect". The "action (or content)" information indicates a specific action to be implemented in that measure. The device classification indicates a classification of a device related to the measure action. A device related to the measure action is indicated as "applicable". The "applicability to device category" information indicates whether that measure is aimed at a device to be introduced into equipment, and is indicated as "applicable" for a measure aimed at such device. The "cost" information indicates cost required for implementing the measure. The "reducing effect" information indicates the quantity of the GHG emission amount to be reduced when that measure is

implemented.

[0041] When a GHG reduction measure plan to be implemented is to be determined from among the GHG reduction measure plans that correspond to the energy saving category, the greenhouse gas reduction support device 1 first calculates cost effectiveness for each of the GHG reduction measure plans corresponding to the energy saving category (step S31). Specifically, the calculation unit 12 calculates cost effectiveness of each of the GHG reduction measure plans corresponding to the energy saving category on the basis of the cost and the reducing effect included in that GHG reduction measure plan.

[0042] Next, the greenhouse gas reduction support device 1 sorts and presents the GHG reduction measure plans corresponding to the energy saving category on the basis of the cost effectiveness (step S32). Specifically, for example, the calculation unit 12 generates a list including the GHG reduction measure plans corresponding to the energy saving category and sorted in descending order of the cost effectiveness, and transmits the list generated from the output unit 14 to the terminal device 2, thereby causing the list to be displayed thereon. The terminal device 2 displays, for example, a GHG reduction measure plan presentation screen 301 illustrated in FIG. 11 on the display unit thereof and presents the screen to the user. Note that FIG. 11 is a diagram illustrating an example of the GHG reduction measure plan presentation screen 301. Note, in addition, that the greenhouse gas reduction support device 1 may sort and present the GHG reduction measure plans corresponding to the energy saving category on the basis of the reducing effect instead of the cost effectiveness. A configuration may be used that allows the user to specify whether sorting is conducted on the basis

of cost effectiveness or reducing effect. This can further improve convenience of the user. In addition, the greenhouse gas reduction support device 1 may classify the GHG reduction measure plans corresponding to the energy saving category into the GHG reduction measure plans corresponding to the device category and the GHG reduction measure plans not corresponding to the device category, and then sort and present the GHG reduction measure plans on the basis of the cost effectiveness. For example, the greenhouse gas reduction support device 1 may sort, in descending order of the cost effectiveness, the GHG reduction measure plans having an "applicability to device category" value in the GHG reduction measure plan table 207 of "applicable" and then present the sorting result on an upper portion of the GHG reduction measure plan presentation screen 301, and sort, in descending order of the cost effectiveness, the GHG reduction measure plans having an "applicability to device category" value of "not applicable" and then present the sorting result on a lower portion of the GHG reduction measure plan presentation screen 301.

[0043] Next, the greenhouse gas reduction support device 1 accepts a selection of the GHG reduction measure plan to be implemented (step S33). In this step S33, the terminal device 2 accepts a selection operation by the user, and transmits a selection result to the greenhouse gas reduction support device 1. The user confirms the GHG reduction measure plan presented on the GHG reduction measure plan presentation screen 301, and performs a selection operation using an input device such as a mouse. The user selects the GHG reduction measure plan to be implemented by, for example, clicking the column displayed as "selection" on the GHG reduction measure plan

presentation screen 301 using a mouse. FIG. 12 is a diagram illustrating an example of a GHG reduction measure plan presentation screen 302, which is displayed when GHG reduction measure plans to be implemented have been

5 selected. When the user selects a GHG reduction measure plan to be implemented, the terminal device 2 switches the screen to display the GHG reduction measure plan presentation screen 302. Pressing a confirm button 3021 included in the GHG reduction measure plan presentation
10 screen 302 terminates the selection operation by the user, and causes the selection result to be transmitted from the terminal device 2 to the greenhouse gas reduction support device 1.

[0044] Next, the greenhouse gas reduction support device
15 1 calculates a GHG reduction amount that will be achieved when the selected GHG reduction measure plan is implemented (step S34). Specifically, the calculation unit 12 calculates a sum of the reducing effects of the respective GHG reduction measure plans selected in step S33.

20 [0045] Next, the greenhouse gas reduction support device 1 checks whether the GHG reduction amount calculated in step S34 is equal to or greater than a target value (step S35). The target value described here is the target value of the additional GHG reduction amount in the energy saving
25 category calculated in step S17. When the GHG reduction amount is equal to or greater than the target value (step S35: Yes), the greenhouse gas reduction support device 1 terminates the operation of determining a GHG reduction measure plan to be implemented from among the GHG reduction
30 measure plans corresponding to the energy saving category. When the GHG reduction amount is not equal to or greater than the target value (step S35: No), the greenhouse gas reduction support device 1 checks whether there is an

unselected GHG reduction measure plan, that is, whether there is a GHG reduction measure plan that has not been selected in step S33 (step S36). When an unselected GHG reduction measure plan no longer exists (step S36: No), the greenhouse gas reduction support device 1 terminates the operation of determining a GHG reduction measure plan to be implemented from among the GHG reduction measure plans corresponding to the energy saving category. When there is an unselected GHG reduction measure plan (step S36: Yes), the greenhouse gas reduction support device 1 causes the process to return to step S33, and again accepts a selection of a GHG reduction measure plan to be implemented (step S33). In this case, the greenhouse gas reduction support device 1, for example, displays a screen illustrated in FIG. 13 on the terminal device 2, notifies the user that the GHG reduction amount is insufficient, and requests the user to additionally select a GHG reduction measure plan to be implemented. Note that FIG. 13 is a diagram illustrating an example of a GHG reduction measure plan presentation screen 303, which is displayed when reselection of a GHG reduction measure plan to be implemented is accepted. When the user reselects a GHG reduction measure plan to be implemented, the greenhouse gas reduction support device 1 performs steps S34 to S36 once again. The greenhouse gas reduction support device 1 thereafter repeats the process of steps S33 to S36 until the GHG reduction amount reaches or exceeds the target value or until there is no longer an unselected GHG reduction measure plan.

[0046] Note that when the GHG reduction amount is not equal to or greater than the target value and an unselected GHG reduction measure plan no longer exists (step S35: No and step S36: No), the greenhouse gas reduction support

device 1 may notify the user that the target value of the additional GHG reduction amount of the energy saving category is not achievable. In this case, the greenhouse gas reduction support device 1 may accept an operation for changing the weighting table 203 from the user via the terminal device 2, and then determine again a GHG reduction measure plan to be implemented, on the basis of the weighting table 203 obtained by the changing.

Alternatively, on the basis of a difference between the GHG reduction amount that will be achieved when all the GHG reduction measure plans of the energy saving category are implemented and the target value of the additional GHG reduction amount of the energy saving category, the greenhouse gas reduction support device 1 may automatically change the target value of the additional GHG reduction amount of another reduction category and perform each of the processing described later using the target value obtained by the change.

[0047] Returning to the description of FIG. 7, when the operation of step S18 is completed, that is, when the operation of determining the GHG reduction measure plan to be implemented among the GHG reduction measure plans corresponding to the energy saving category is completed, the greenhouse gas reduction support device 1 determines the GHG reduction measure plan to be implemented among the GHG reduction measure plans corresponding to the renewable energy category (step S19). The operation of step S19 is similar to the operation of step S18 described above. That is, the operation of step S19 can be described by replacing the word of "energy saving category" in the operation of step S18 described above with the word of "renewable energy category". Detailed operation thereof will therefore be omitted. The greenhouse gas reduction support device 1

determines a GHG reduction measure plan to be implemented on the basis of the GHG reduction measure plans belonging to the renewable energy category and a target value of an additional GHG reduction amount of the renewable energy category.

[0048] Next, the greenhouse gas reduction support device 1 determines a GHG reduction measure plan to be implemented among the GHG reduction measure plans corresponding to the offset category (step S20). The operation of step S20 is similar to the operation of step S18 described above. That is, the operation of step S20 can be described by replacing the word of "energy saving category" in the operation of step S18 described above with the word of "offset category". Detailed operation thereof will therefore be omitted. The greenhouse gas reduction support device 1 determines a GHG reduction measure plan to be implemented on the basis of the GHG reduction measure plans belonging to the offset category and a target value of an additional GHG reduction amount of the offset category.

[0049] Next, the greenhouse gas reduction support device 1 outputs a determination result (step S21). Specifically, the greenhouse gas reduction support device 1 outputs, to the terminal device 2, the GHG reduction measure plans to be implemented determined in steps S18 to S20 and presents these GHG reduction measure plans to the user. The greenhouse gas reduction support device 1 displays, for example, a GHG reduction measure plan determination notification screen 304 illustrated in FIG. 14 on the terminal device 2 and presents the screen to the user.

Note that FIG. 14 is a diagram illustrating an example of the GHG reduction measure plan determination notification screen 304. The GHG reduction measure plan determination notification screen 304 illustrated in FIG. 14 includes a

list of the GHG reduction measure plans to be implemented, and a sum (total reduction amount) of the GHG emission amounts that will be reduced when the GHG reduction measure plans included in the list are implemented.

5 [0050] Note that when the gap value between the prediction value and the target value of the GHG emission amount of the target fiscal year is zero or negative, that is, when the prediction value of the GHG emission amount is equal to or less than the target value, the greenhouse gas
10 reduction support device 1 does not need to additionally reduce the GHG emission amount and thereby skips steps S17 to S21 illustrated in FIG. 7. In this case, the greenhouse gas reduction support device 1 may output, to the terminal device 2, a prediction result indicating that the GHG
15 emission amount of the target fiscal year can achieve the target. A prediction result including a result of comparison (e.g., the gap value) between the GHG emission amount and the target value in the target fiscal year may be output to the terminal device 2.

20 [0051] A hardware configuration of the greenhouse gas reduction support device 1 will next be described. FIG. 15 is a diagram illustrating an exemplary hardware configuration of the greenhouse gas reduction support device 1. The greenhouse gas reduction support device 1
25 includes, for example, a processor 91, a memory 92, and a communication circuit 93 illustrated in FIG. 15.

[0052] The processor 91 is a central processing unit (CPU) (also referred to as a processing unit, an arithmetic unit, a microprocessor, a microcomputer, and a digital
30 signal processor (DSP)), a system large scale integration (LSI), or the like. The memory 92 is a nonvolatile or volatile semiconductor memory such as a random access memory (RAM), a read-only memory (ROM), or a flash memory,

a magnetic disk, or the like. The communication circuit 93 is an electronic circuit for performing transmission and reception of data and the like through connection to a communication network in a wired or wireless manner.

5 [0053] In a case where the greenhouse gas reduction support device 1 includes the processor 91, the memory 92, and the communication circuit 93, the information acquisition unit 11, the calculation unit 12, and the output unit 14 described above are implemented in the
10 processor 91, which executes programs for functioning as these units. Programs for functioning as the information acquisition unit 11, the calculation unit 12, and the output unit 14 are stored in the memory 92 in advance. The processor 91 functions as the information acquisition unit
15 11, the calculation unit 12, and the output unit 14 by reading the programs from the memory 92 and executing the programs. In addition, the storage unit 13 described above is implemented in the memory 92.

[0054] Note that the programs for functioning as the
20 information acquisition unit 11, the calculation unit 12, and the output unit 14 stored in the memory 92 may be provided to a user or the like as being written in a storage medium such as a compact disc (CD) ROM or a digital versatile disc (DVD) ROM, or may be provided to a user or
25 the like via a network.

[0055] As described above, the greenhouse gas reduction support device 1 according to the first embodiment calculates a prediction value of a GHG emission amount in a target fiscal year and calculates a gap value indicating a
30 difference between the prediction value and a target value of the GHG emission amount of the target fiscal year on the basis of business related information including various types of information related to business conducted by a

business operator to be supported, and on the basis of business expansion information and the like. In addition, when the GHG emission amount of the target fiscal year fails to achieve the target, that is, when the prediction value of the GHG emission amount of the target fiscal year is greater than the target value, the greenhouse gas reduction support device 1 assists in operation of determination of a measure plan to be implemented, by, for example, presenting to the user a measure plan for additionally reducing the GHG emission amount. In presenting measure plans for additionally reducing the GHG emission amount to the user, the greenhouse gas reduction support device 1 also presents therewith cost effectiveness values of the plurality of respective measure plans, and sorts the measure plans in descending order of the cost effectiveness to allow easy comparison between the cost effectiveness values of the respective measure plans.

[0056] The greenhouse gas reduction support device 1 according to the first embodiment calculates the prediction value of the GHG emission amount of the target fiscal year using the business expansion information indicating a future situation of the business operator, thereby enabling accuracy of prediction of the GHG emission amount to be increased. In addition, the need is eliminated for the user to manually calculate the prediction value of the GHG emission amount of the target fiscal year, thereby enabling the workload of the user to be reduced. Moreover, the user can select a measure to be implemented to reduce the GHG emission amount from among a plurality of measure plans with reference to cost effectiveness. Furthermore, the user can specify the additional reduction ratio of the GHG emission amount for each of the reduction categories such as the energy saving category, the renewable energy

category, and the offset category, thereby enabling a measure plan that is to be implemented to be determined according to a request of the user.

[0057] Second Embodiment.

5 In the first embodiment, the description has been given of the greenhouse gas reduction support system 100 in which a single terminal device 2 is connected to the greenhouse gas reduction support device 1 and which supports reduction of a GHG of a business operator having
10 the terminal device 2 provided therein. However, a plurality of business operators to be supported may be supported by the greenhouse gas reduction support system.

[0058] FIG. 16 is a diagram illustrating an exemplary configuration of a greenhouse gas reduction support system
15 110 according to a second embodiment. The greenhouse gas reduction support system 110 includes a greenhouse gas reduction support device 1a, and a plurality of terminal devices 2-1 to 2-n and a plurality of databases 3-1 to 3-n which are provided in a plurality of respective business
20 operators 20-1 to 20-n. The terminal devices 2-1 to 2-n are connected to the greenhouse gas reduction support device 1a via a communication network 5.

[0059] The greenhouse gas reduction support device 1a is configured similarly to the greenhouse gas reduction
25 support device 1 according to the first embodiment, and assists each of the business operators 20-1 to 20-n in operation of determination of a measure to be implemented for reducing the GHG emission amount. The greenhouse gas reduction support device 1a performs an operation for each
30 of the business operators 20-1 to 20-n, that is, an operation of assisting in the operation of determination of a measure to be implemented by each of the business operators for reducing the GHG emission amount, similarly

to when the greenhouse gas reduction support device 1 according to the first embodiment performs an operation for the terminal device 2. Details of the operation thereof will therefore be omitted.

5 [0060] Each of the databases 3-1 to 3-n manages tables respectively corresponding to the business related information table 201, the target setting table 202, the weighting table 203, the business expansion information table 204, the emission factor table 205, the activity
10 amount change prediction table 206, and the GHG reduction measure plan table 207 described in the first embodiment. Each of the databases 3-1 to 3-n transmits the tables managed thereby to the greenhouse gas reduction support device 1a via a corresponding one of the terminal devices
15 2-1 to 2-n in response to a request from the greenhouse gas reduction support device 1a.

[0061] As described above, in the greenhouse gas reduction support system 110 according to the second embodiment, the greenhouse gas reduction support device 1a
20 assists in operation of determination of a measure to be implemented for reducing the GHG emission amount, for the plurality of business operators 20-1 to 20-n having the plurality of respective terminal devices 2-1 to 2-n installed therein and connected to the greenhouse gas
25 reduction support device 1a via the communication network 5.

[0062] The greenhouse gas reduction support system 110 according to the second embodiment enables the operation assistance for the plurality of different business
30 operators 20-1 to 20-n to be collectively performed by the single greenhouse gas reduction support device 1a.

[0063] The configurations described in the above embodiments are each an example of the aspects, and can be

combined with another known technique. The embodiments can be combined with each other. Part of the configurations can be omitted or modified without departing from the gist.

5 Reference Signs List

[0064] 1, 1a greenhouse gas reduction support device;
2, 2-1, 2-n terminal device; 3-1, 3-n database; 5
communication network; 11 information acquisition unit; 12
calculation unit; 13 storage unit; 14 output unit; 20-1,
10 20-n business operator; 100, 110 greenhouse gas reduction
support system.

CLAIMS

1. A greenhouse gas reduction support device comprising:
an information acquisition unit to acquire unique
information specific to a business operator to be
5 supported, the unique information including business
related information that is various types of information
regarding business conducted by the business operator to be
supported;
a calculation unit to calculate a prediction value of
10 a greenhouse gas emission amount at a time when a specific
time period elapses from a present time on a basis of the
business related information included in the unique
information acquired by the information acquisition unit,
and to calculate a difference between a target value and
15 the prediction value of the greenhouse gas emission amount
at the time when the specific time period elapses; and
an output unit to output a result of calculation
performed by the calculation unit to an outside.
- 20 2. The greenhouse gas reduction support device according
to claim 1, wherein
the unique information includes business expansion
information of the business operator to be supported, and
the calculation unit calculates the prediction value
25 on a basis of the business related information and the
business expansion information.
3. The greenhouse gas reduction support device according
to claim 2, wherein
30 the calculation unit calculates a first prediction
value on a basis of an energy usage included in the
business related information and the business expansion
information, calculates a second prediction value on a

basis of a current greenhouse gas emission amount and the business expansion information, and determines a sum of the first prediction value and the second prediction value as the prediction value of the greenhouse gas emission amount
5 at the time when the specific time period elapses, the first prediction value being a prediction value of an emission amount of a greenhouse gas associated with energy use in a target fiscal year, the target fiscal year being a fiscal year when the specific time period elapses from the
10 present time, the second prediction value being a prediction value of an emission amount of the greenhouse gas associated with material use in the target fiscal year.

4. The greenhouse gas reduction support device according
15 to any one of claims 1 to 3, wherein

when the prediction value of the greenhouse gas emission amount at the time when the specific time period elapses is greater than the target value,
the calculation unit sorts, in descending order of
20 cost effectiveness, a plurality of measure plans, prepared in advance, for reducing the greenhouse gas emission amount, presents the plurality of measure plans sorted to a user, and causes the user to select a measure plan to be implemented from among the plurality of measure plans to
25 bring the prediction value of the greenhouse gas emission amount at the time when the specific time period elapses, to a value equal to or less than the target value.

5. The greenhouse gas reduction support device according
30 to claim 4, wherein

the plurality of measure plans include a measure plan of an energy saving category for reducing the greenhouse gas emission amount by energy saving of equipment, a

measure plan of a renewable energy category for reducing the greenhouse gas emission amount by changing energy used by equipment to renewable energy, and a measure plan of an offset category for reducing the greenhouse gas emission amount by use of an offset credit scheme, and

the calculation unit causes the user to select a measure plan to be implemented to cause a reduction amount of the greenhouse gas that will be provided by implementation of the measure plan of the energy saving category, a reduction amount of the greenhouse gas that will be provided by implementation of the measure plan of the renewable energy category, and a reduction amount of the greenhouse gas that will be provided by implementation of the measure plan of the offset category to have respective predetermined proportions.

6. The greenhouse gas reduction support device according to claim 5, wherein

the calculation unit performs a first process, a second process, and a third process, the first process being a process of sorting measure plans of the energy saving category in descending order of cost effectiveness, presenting the measure plans sorted to the user, and causing the user to select a measure plan to be implemented, the second process being a process of sorting measure plans of the renewable energy category in descending order of cost effectiveness, presenting the measure plans sorted to the user, and causing the user to select a measure plan to be implemented, the third process being a process of sorting measure plans of the offset category in descending order of cost effectiveness, presenting the measure plans sorted to the user, and causing the user to select a measure plan to be

implemented.

7. A greenhouse gas reduction support method comprising:
an information acquisition step of acquiring unique
5 information specific to a business operator to be
supported, the unique information including business
related information that is various types of information
regarding business conducted by the business operator to be
supported;

10 a calculation step of calculating a prediction value
of a greenhouse gas emission amount at a time when a
specific time period elapses from a present time on a basis
of the business related information included in the unique
information acquired in the information acquisition step,
15 and of calculating a difference between a target value and
the prediction value of the greenhouse gas emission amount
at the time when the specific time period elapses; and
an output step of outputting a result of calculation
performed in the calculation step to an outside.

20

8. A greenhouse gas reduction support program that causes
a computer to perform:

an information acquisition step of acquiring unique
information specific to a business operator to be
25 supported, the unique information including business
related information that is various types of information
regarding business conducted by the business operator to be
supported;

a calculation step of calculating a prediction value
30 of a greenhouse gas emission amount at a time when a
specific time period elapses from a present time on a basis
of the business related information included in the unique
information acquired in the information acquisition step,

and of calculating a difference between a target value and the prediction value of the greenhouse gas emission amount at the time when the specific time period elapses; and

an output step of outputting a result of calculation
5 performed in the calculation step to an outside.

9. A greenhouse gas reduction support system that supports a measure determination operation for reducing an emission amount of a greenhouse gas in each of a plurality
10 of business operators to be supported to bring the emission amount to a target value, the greenhouse gas reduction support system comprising:

a database and a terminal device, each provided in each of the plurality of business operators to be
15 supported, the database being a database to manage unique information specific to a corresponding one of the business operators to be supported, the unique information including business related information that is various types of information regarding business conducted by the
20 corresponding one of the business operators to be supported, the terminal device being to be used in the measure determination operation; and

a greenhouse gas reduction support device to assist in the measure determination operation, wherein
25 the greenhouse gas reduction support device comprises an information acquisition unit to acquire the unique information from the database,

a calculation unit to calculate a prediction value of a greenhouse gas emission amount at a time when a specific
30 time period elapses from a present time on a basis of the business related information included in the unique information acquired by the information acquisition unit, and to calculate a difference between a target value and

the prediction value of the greenhouse gas emission amount at the time when the specific time period elapses, and an output unit to output a result of calculation performed by the calculation unit to the terminal device.