

METHOD FOR ASSESSING CARBON FOOTPRINTS OF PRODUCTS

FIELD OF THE INVENTION

[0001] The present invention relates to carbon footprints of products, and in particular to a method for assessing carbon footprints of products.

BACKGROUND OF THE INVENTION

[0002] Greenhouse gases have become one of the major factors affecting global climate change. For sustainability and environmental protection purposes, organizations (or enterprises) need to know their greenhouse gas emissions, especially the carbon emission quantity of the products (including commodities and services) produced by the organizations, which is helpful to understand the emission quantity of carbon produced throughout a life cycle of a product. Therefore, assessing carbon footprints of products has become an imperative for many organizations.

[0003] Although there have been provisions for product carbon footprint assessment, there are numerous assessment steps entailed in the assessment articles, and the assessment personnel of the organization need to know the steps very well. Those unfamiliar with the steps are often at a loss and do not know where to start. This leads to low efficiency of carbon footprint assessment and waste of time and manpower.

SUMMARY OF THE INVENTION

[0004] In view of this, an objective of the present invention is to provide a method for assessing carbon footprints of products, that can improve the efficiency of product carbon footprint assessment.

[0005] To achieve the above objective, the present invention provides a method for assessing carbon footprints of products, which is implemented by a system for assessing carbon footprints of products. The method for assessing carbon footprints of products includes the following steps:

A. setting product basic data of a product, the product basic data comprising a product life cycle type;

B. obtaining a product category rule corresponding to the product, the product category rule having a plurality of assessment items at each of a plurality of life cycle stages corresponding to the product life cycle type;

C. providing an input interface, the input interface allowing a user to set activity data of each of the assessment items of each of the life cycle stages;

D. providing a distribution principle setting module, the distribution principle setting module allowing the user to set a distribution ratio of each of the assessment items used for the product;

E. obtaining an emission factor of a greenhouse gas corresponding to each of at least part of these assessment items from an emission factor database; and

F. calculating an emission quantity of the greenhouse gas of each of the assessment items, calculating a stage-based emission quantity of the greenhouse gas during each of these life cycle stages, and calculating a total emission quantity of the greenhouse gas of the product according to the activity data, the distribution ratio, and the emission factor of each of the assessment items at each of the life cycle stages.

[0006] The beneficial effect of the present invention is: the user can be guided and assisted in calculating the emission quantity of greenhouse

gases of the product throughout the life cycle, which improves the efficiency of carbon footprint assessment performed by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

FIG. 1 is a schematic diagram of connection of a system for assessing carbon footprints of products according to a first preferred embodiment of the present invention;

FIG. 2 is a flowchart of a method for assessing carbon footprints of products according to a first preferred embodiment of the present invention;

FIG. 3 is a schematic diagram disclosing an input interface;

FIG. 4 is a schematic diagram disclosing a distribution principle setting module; and

FIG. 5 is a flowchart of a method for assessing carbon footprints of products according to a second preferred embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0008] To describe the present invention more clearly, the following is a detailed description with reference to preferred embodiments and in conjunction with the drawings. Referring to FIG. 1, a system for assessing carbon footprints of products 1 according to a first preferred embodiment of the present invention is configured to perform a method for assessing carbon footprints of products of the present invention. The method for assessing carbon footprints of products is used to assess a carbon footprint of a product, that is, a total emission quantity of greenhouse gases of the

product throughout the life cycle. The total emission quantity is CO₂ (or carbon dioxide) equivalent. The product may be a good or a service.

[0009] The system for assessing carbon footprints of products 1 includes a server 10 and a database 20. The server 10 is configured to execute a product carbon footprint assessment program and is connected to the database 20. The server 10 can allow a plurality of electronic devices 30 to connect through a network 40. For example, the network 40 may be the Internet or a local area network. To facilitate description, one electronic device 30 is taken as an example in this embodiment. The electronic device 30, for example, may be a computer, a cellphone, a tablet computer, or other devices that can be connected to a network. The electronic device 30 is controlled by a user of an organization (or an enterprise) that produces the product. The server 10 and the database 20 may be located on the same host, or may be located on different hosts and connected to each other through the network 40.

[0010] The database 20 includes an emission factor database 22, a product category rule (PCR) database 24, and an organizational carbon assessment project database 26.

[0011] The emission factor database 22 stores an emission factor of a greenhouse gas (such as carbon dioxide CO₂) of a plurality of predetermined assessment items. These predetermined assessment items may include various raw materials, fuel oils, gases, electricity, and the like.

[0012] The PCR database 24 stores a plurality of predetermined product category rules. These predetermined product category rules correspond to a plurality of predetermined product names, respectively. Each of these predetermined product category rules has a plurality of

assessment items at each of a plurality of life cycle stages corresponding to a product life cycle type of each of the predetermined products, that is, there is an assessment item to be assessed at each life cycle stage.

[0013] For example, the product life cycle type may be a business-to-business (B2B) type, a business-to-consumer (B2C) type, or a service type. The life cycle stages of the B2B type include a raw material stage, a manufacturing stage and an in-plant waste stage, respectively. The life cycle stages of the B2C type include a raw material stage, a manufacturing stage, an in-plant waste stage, a distribution and sales stage, a use stage and a waste stage, respectively. The life cycle stages of the service type include a raw material obtaining stage, a service stage and a waste disposal stage, respectively.

[0014] The organizational carbon assessment project database 26 is configured to store a greenhouse gas assessment inventory of an organization that produces the product. The greenhouse gas assessment inventory includes activity data of each of a plurality of emission sources (for example, direct greenhouse gas emission sources and energy indirect emission sources). For example, these emission sources are diesel oil, gasoline, natural gas, purchased electricity, purchased steam, purchased heat, and the like.

[0015] With the above system for assessing carbon footprints of products 1, a method for assessing carbon footprints of products of this embodiment can be performed and includes the steps shown in FIG. 2.

[0016] Step S11: set product basic data of a product, the product basic data including a product life cycle type.

[0017] In this embodiment, the electronic device 30 can be operated by a user to be connected to the server 10. A product setting interface is

provided by the server 10 and transmitted to a screen of the electronic device 30 for display. Through the electronic device 30, the user can set the product basic data of the product in the product setting interface. The product basic data may further include a product name and a place of origin of the product, or may further include other data related to the product, such as the year of assessment.

[0018] Step S12: obtain a product category rule corresponding to the product, the product category rule having a plurality of assessment items at each of a plurality of life cycle stages corresponding to the product life cycle type.

[0019] In this embodiment, the server 10 selects one from these predetermined product category rules of the PCR database 24 corresponding to the product to generate the product category rule. For example, according to the product name of the product basic data in Step S11, the server 10 searches in the PCR database 24 for a predetermined product name matched with the product name, and selects the matched predetermined product category rule corresponding to the predetermined product name, so as to generate the product category rule.

[0020] Of course, a user may also upload a product category rule to the server 10 through the electronic device 30, so that the server 10 can obtain the product category rule uploaded by the user.

[0021] Step S13: provide an input interface, the input interface allowing a user to set activity data of each of the assessment items at each of the life cycle stages.

[0022] Referring to FIG. 3, in this embodiment, the server 10 transmits the input interface 50 to a screen of the electronic device 30 for display. A user may set each of the assessment items at each of the life

cycle stages and the activity data thereof in the input interface 50 through the electronic device 30. For example, in FIG. 3, “plastic particle” of direct raw materials in a raw material stage serves as an assessment item. A user types in a name of the raw material of the product, activity data, a unit and the like to generate an assessment item and activity data thereof.

[0023] In this embodiment, Step S13 further includes: connect the server 10 to the organizational carbon assessment project database 26, obtain the greenhouse gas assessment inventory of the organization that produces the product, and obtain the activity data of at least one of the assessment items from the greenhouse gas assessment inventory so as to be imported into the input interface. For example, the assessment items in a manufacturing stage may be a plurality of emission sources responsible for manufacturing the product, such as direct greenhouse gas emission sources and energy indirect emission sources. Since the greenhouse gas assessment inventory of the organization includes the activity data of each of these emission sources, in this step, the activity data of at least one emission source may be obtained from the greenhouse gas assessment inventory, and serve as the activity data of at least one of the assessment items. In this way, the user does not need to assess the activity data of the assessment items of the emission sources again, which improves the efficiency of product carbon footprint assessment.

[0024] Step S14: provide a distribution principle setting module, the distribution principle setting module allowing the user to set a distribution ratio of each of the assessment items used for the product.

[0025] Referring to FIG. 4, in this embodiment, the server 10 generates the distribution principle setting module 60. A user is connected to the server 10 through the electronic device 30, and the distribution

principle setting module 60 is displayed on a screen of the electronic device 30. The distribution principle setting module 60 includes a parameter setting area 62 and an expression setting area 64. The parameter setting area 62 allows a plurality of distribution parameters to be set. The expression setting area 64 sets an expression that calculates the distribution ratio of each of the assessment items according to one or several of the distribution parameters. The server 10 calculates the distribution ratio according to the value of the distribution parameters.

[0026] For example, the user may set a distribution parameter as “output of the whole factory” and the value thereof as “100000”, and set another distribution parameter as “target product output” and the value thereof as “500”. In the expression setting area 64, the expression for the assessment item (paint) can be set as “target product output/output of the whole factory/target product output”. Then, the server 10 calculates the distribution ratio according to the expression (which is $500/100000/500$), that is, the amount of paint distributed to each product is 0.00001 times that used by the whole factory. Of course, the user may not need an expression, and directly type in the distribution ratio of the assessment item.

[0027] To facilitate the use of a set expression, the distribution principle setting module 60 in this embodiment further includes a setting interface 66. The setting interface 66 has a plurality of operand images 662, a plurality of operator images 664 and an expression display area 668. These operand images 662 are linked to these distribution parameters set in the parameter setting area, respectively. These operator images 664 correspond to a plurality of operators, respectively. The setting interface 66 may further have a plurality of numeric images 666 corresponding to

different numbers. These operand images 662, these operator images 664 and these numeric images 666 in the setting interface 66 are available for a user to select. By selecting an operand image 662, an operator image 664 and/or a numeric image 666 on a screen of the electronic device 30, the user can link a corresponding distribution parameter, operator and/or number to generate a predetermined expression, and display the predetermined expression in the operation display area 668 accordingly, such as “target product output/output of the whole factory/target product output”. The server 10 will set the predetermined expression displayed in the expression display area 668 as the expression of an assessment item of the expression setting area 64. This allows a user to set an expression of a distribution ratio of each of the assessment items more intuitively.

[0028] Step S15: obtain an emission factor corresponding to the greenhouse gas of each of at least part of these assessment items from the emission factor database 22.

[0029] In this embodiment, the server 10 searches in the emission factor database 22 for a corresponding emission factor of a predetermined assessment item according to each of the assessment items typed in by a user, and sets the emission factor as the emission factor of the greenhouse gas of each assessment item. The emission factors of all the assessment items may be obtained from the emission factor database 22; or the emission factors of one part of these assessment items may be obtained from the emission factor database 22, while the emission factors of other parts of these assessment items are obtained based on the place of origin in the basic data. For example, different places of origin have different emission factors for energy (taking electricity as an example). The server 10 can store emission factors for electricity of a plurality of places of

origin in advance. With the place of origin in the basic data, the emission factor for electricity is obtained rapidly.

[0030] Step S16: calculate an emission quantity of the greenhouse gas of each of the assessment items, calculate a stage-based emission quantity of the greenhouse gas during each of these life cycle stages, and calculate the total emission quantity of the greenhouse gas of the product according to the activity data, the distribution ratio, and the emission factor of each of the assessment items at each of the life cycle stages.

[0031] The server 10 can obtain the emission quantity of the greenhouse gas of each of the assessment items by multiplying the activity data of each of the assessment items by the distribution ratio and then by the emission factor. The stage-based emission quantity of each of these life cycle stages can be obtained by adding up the emission quantity of each of the assessment items throughout the life cycle stage. The total emission quantity of the greenhouse gas can be obtained by adding up the stage-based emission quantity at these life cycle stages.

[0032] By the above method for assessing carbon footprints of products, a user can be guided and assisted in calculating a total emission quantity of greenhouse gases of the product throughout the life cycle, which improves the efficiency of carbon footprint assessment performed by the user. The distribution principle setting module 60 can further allow a user to conveniently set a distribution ratio of each assessment item used for the product.

[0033] FIG. 5 is a method for assessing carbon footprints of products according to a second preferred embodiment of the present invention. The method for assessing carbon footprints of products is based on the first embodiment, but differs from the first embodiment in that: the database 20

includes a template database. The template database stores a plurality of predetermined assessment templates, and each of the predetermined assessment templates corresponds to a product life cycle type (a B2B type, a B2C type, or a service type).

[0034] The method for assessing carbon footprints of products in this embodiment further includes Step S11a between Steps S11 and S12: the server 10 selects one from these predetermined assessment templates in the template database corresponding to the product life cycle type in the basic data according to the product life cycle type in the product basic data of Step S11 so as to generate an assessment template. The assessment template has these life cycle stages corresponding to the product life cycle type.

[0035] In addition, the method further includes Step S17 after Step S16: the server 10 generates a product carbon footprint inventory according to the assessment template. The product carbon footprint inventory includes the product basic data, the activity data of each of the life cycle stages of each of the assessment items, the distribution ratio and the emission factor, the stage-based emission quantity of the greenhouse gas at each of the life cycle stages, and the total emission quantity of the greenhouse gas.

[0036] In this way, the system for assessing carbon footprints of products can automatically generate the product carbon footprint inventory, thereby saving the user's time spent on compiling data. The product carbon footprint inventory can be stored in the database 20 for future inquiry and use.

[0037] Further, the method includes Step S18: generate a product carbon footprint report that conforms to a provision according to the

product carbon footprint inventory. For example, the template database stores a plurality of report templates, and each of the templates corresponds to the range of a provision (for example, ISO 14067:2018, or other provisions). Each of the servers 10 can provide another input interface that is transmitted to the electronic device 30, allowing a user to select one of these report templates through the another input interface, and the server generates the product carbon footprint report that conforms to a provision according to the report template chosen by the user and the product carbon footprint inventory. This can effectively save a user's time spent on transcribing inventory reports. The product carbon footprint report may be stored in the database 20 for future inquiry and use.

[0038] The above are only the preferred and feasible embodiments of the present invention, and all equivalent changes made by applying the specification of the present invention and the claims should be included in the patent scope of the present invention.

WHAT IS CLAIMED IS:

1. A method for assessing carbon footprints of products, implemented by a system for assessing carbon footprints of products, the method for assessing carbon footprints of products comprising the following steps:

A. setting product basic data of a product, the product basic data comprising a product life cycle type;

B. obtaining a product category rule corresponding to the product, the product category rule having a plurality of assessment items at each of a plurality of life cycle stages corresponding to the product life cycle type;

C. providing an input interface, the input interface allowing a user to set activity data of each of the assessment items of each of the life cycle stages;

D. providing a distribution principle setting module, the distribution principle setting module allowing the user to set a distribution ratio of each of the assessment items used for the product;

E. obtaining an emission factor of a greenhouse gas corresponding to each of at least part of these assessment items from an emission factor database; and

F. calculating an emission quantity of the greenhouse gas of each of the assessment items, calculating a stage-based emission quantity of the greenhouse gas during each of these life cycle stages, and calculating a total emission quantity of the greenhouse gas of the product according to the activity data, the distribution ratio, and the emission factor of each of the assessment items at each of the life cycle stages.

2. The method for assessing carbon footprints of products according to claim 1, wherein in Step A, the product basic data comprises a place of origin; and in Step E, in one part of these assessment items, the

corresponding emission factor is obtained according to the place of origin of the basic data.

3. The method for assessing carbon footprints of products according to claim 1, wherein in Step B, one of these predetermined product category rules of a product category rule database corresponding to the product is selected to generate the product category rule.

4. The method for assessing carbon footprints of products according to claim 3, wherein in Step A, the product basic data comprises a product name; and in Step B, these predetermined product category rules in the product category database correspond to a plurality of predetermined product names, respectively, and in Step B, a predetermined product name matched with the product name is searched from the product category database according to the product name of the product basic data to select a corresponding predetermined product category rule.

5. The method for assessing carbon footprints of products according to claim 1, wherein Step C further comprises: connecting to an organizational carbon assessment project database, obtaining a greenhouse gas assessment inventory of an organization that produces the product, and obtaining the activity data of at least one of the assessment items from the greenhouse gas assessment inventory so as to import the activity data into the input interface.

6. The method for assessing carbon footprints of products according to claim 1, wherein in Step D, the distribution principle setting module comprises a parameter setting area and an expression setting area, the parameter setting area allows a plurality of distribution parameters to be set, and the expression setting area allows an expression that calculates the distribution ratio of each of the assessment items to be set according to one

or several of these distribution parameters.

7. The method for assessing carbon footprints of products according to claim 6, wherein in Step D, the distribution principle setting module comprises a setting interface, the setting interface has a plurality of operand images, a plurality of operator images and an expression display area, these operand images are linked to these distribution parameters, respectively, and these operator images correspond to a plurality of operators, respectively; these operand images and these operator images in the setting interface are available for a user to select, so as to display a corresponding predetermined expression in the expression display area; and the predetermined expression displayed in the expression display area is set as the expression of the expression setting area.

8. The method for assessing carbon footprints of products according to claim 1, wherein the method comprises a step between step A and step B: selecting one from a plurality of predetermined assessment templates corresponding to the product life cycle type in a template database according to the product life cycle type in the product basic data so as to generate an assessment template, the assessment template having these life cycle stages corresponding to the product life cycle type; and

after Step F, the method comprises: generating a product carbon footprint inventory according to the assessment template, the product carbon footprint inventory comprising the activity data of each of the assessment items of each of the life cycle stages, the distribution ratio and the emission factor, the stage-based emission quantity of the greenhouse gas at each of the life cycle stages, and the total emission quantity of the greenhouse gas.

9. The method for assessing carbon footprints of products according to

claim 8, wherein after Step F, the method comprises: generating a product carbon footprint report according to the product carbon footprint inventory and a report template.