CLAIMS

1. A method for accounting carbon emission of a water system in a building operation period, characterized by comprising the following steps:

acquiring energy consumption Q_i of the building water system, a building design life y, and a building area A; and

calculating carbon emission C_M per unit of building area in the building operation period with the following formula:

$$C_M = \frac{(\sum_{i=1}^{n} Q_i q_i)\ y}{A}$$

wherein q_i denotes a carbon emission factor of an i-th type of energy; and

the energy consumption Q_i of the building water system at least comprises annual heat consumption Q_w of a building domestic hot water system and electricity consumption Q_e for operation of electric devices in the building water system, a calculation formula of the annual heat consumption Q_w of the building domestic hot water system is as follows:

$$Q_w = \frac{\frac{Q_r}{\eta_r} - Q_s}{\eta_w}$$

wherein Q_r denotes annual heat consumption of domestic hot water;

Q_s denotes domestic hot water heat provided by renewable energy;

η_r denotes transportation and distribution efficiency of domestic hot water; and

η_w denotes average annual efficiency of a heat source of the domestic hot water system, a calculation formula of the domestic hot water heat Q_s provided by the renewable energy is:

$$Q_s = Q_{S,\ x} + Q_{S,sol}$$

wherein $Q_{s,sol}$ denotes annual renewable energy utilization of a solar domestic hot water system;

$Q_{s,x}$ denotes annual renewable energy utilization of the domestic hot water system except solar energy;

when the renewable energy used by the building only comprises solar energy, $Q_{s,x}$ is zero; and

when the building uses renewable energy other than the solar energy, $Q_{s,x}$ is one or more of $Q_{s,geo}$, $Q_{s,air}$ and $Q_{s,bio}$, $Q_{s,geo}$ denoting annual renewable energy utilization of a geothermal

heat pump domestic hot water system, $Q_{s,air}$ denoting annual renewable energy utilization of an air source heat pump domestic hot water system, $Q_{s,bio}$ denoting annual renewable energy utilization of a biomass domestic hot water system.

2. The method for accounting carbon emission of a water system in a building operation period according to claim 1, characterized in that a calculation formula of the annual heat consumption Q_r of the domestic hot water is:

$$Q_r = TQ_{rp}$$

$$Q_{rp} = \frac{4.187mq_r c_r(t_r - t_l)\rho_r}{3600 \cdot T_1}$$

wherein T denotes the number of hours of domestic hot water use per year; $T=T_1 \times T_2$, T_1 denotes the number of hours of domestic hot water use per day, and T_2 denotes the number of days of domestic heat use per year;

Q_{rp} denotes average daily heat consumption of domestic hot water;

m denotes a water consumption calculation unit;

q_r denotes a hot water consumption norm;

C_r denotes a heat loss coefficient of a hot water supply system, and C_r =1.10–1.15;

t_r denotes a design hot water temperature;

t_l denotes a design cold water temperature; and

ρ_r denotes density of hot water.

3. The method for accounting carbon emission of a water system in a building operation period according to claim 1, characterized in that a calculation formula of the annual renewable energy utilization $Q_{s,sol}$ of the solar domestic hot water system is:

$$Q_{S,sol} = \frac{0.28A_C J_T(1 - \eta_L)\eta_{cd}}{3.6}$$

wherein A_c denotes an area of a solar collector;

J_T denotes average annual solar irradiation of a lighting surface of the solar collector;

η_{cd} denotes average heat collection efficiency of the collector based on a total area; and

η_L denotes a heat loss rate of a pipeline and a heat storage device.

4. The method for accounting carbon emission of a water system in a building operation period according to claim 1, characterized in that a calculation formula of the annual renewable energy utilization $Q_{s,geo}$ of the geothermal heat pump domestic hot water system is:

$$Q_{S,geo} = Q_{w,geo} - E_{w,geo}$$

wherein $Q_{w,geo}$ denotes annual domestic hot water heat supply of the geothermal heat pump system, and

$E_{w,geo}$ denotes annual electricity consumption of a geothermal heat pump unit for supplying domestic hot water; and

a calculation formula of the annual domestic hot water heat supply $Q_{w,geo}$ of the geothermal heat pump system is: $Q_{w,geo} = T_5 Q_{rprb}$

$$Q_{rprb} = \frac{4.187 m q_r c_r (t_r - t_l) \rho_r}{3600 \cdot T_3}$$

wherein Q_{rprb} denotes average daily heat supply for hot water by a heat pump;

T_5 denotes the number of hours of domestic hot water use per year, $T_5=T_3\times T_4$, T_3 denotes design working time of the heat pump unit, and T_4 denotes the number of days of heat pump use per year;

m denotes a water consumption calculation unit;

q_r denotes a hot water consumption norm;

C_r denotes a heat loss coefficient of a hot water supply system, and C_r =1.10–1.15;

t_r denotes a design hot water temperature;

t_l denotes a design cold water temperature; and

ρ_r denotes density of hot water.

5. The method for accounting carbon emission of a water system in a building operation period according to claim 1, characterized in that a calculation formula of the annual renewable energy utilization $Q_{s,air}$ of the air source heat pump domestic hot water system is:

$$Q_{S,air} = Q_{w,air} - E_{w,air}$$

wherein $Q_{w,air}$ denotes annual domestic hot water heat supply of the air source heat pump system, and

$E_{w,air}$ denotes annual electricity consumption of an air source heat pump unit for supplying domestic hot water; and

a calculation formula of the annual domestic hot water heat supply $Q_{w,air}$ of the air source heat pump system is:

$$Q_{w,air} = T_5 Q_{rprb}$$

$$Q_{rprb} = \frac{4.187 m q_r c_r (t_r - t_l) \rho_r}{3600 \cdot T_3}$$

wherein Q_{rprb} denotes average daily heat supply for hot water by a heat pump;

T_5 denotes the number of hours of domestic hot water use per year, $T_5=T_3\times T_4$, T_3 denotes design working time of the heat pump unit, and T_4 denotes the number of days of heat pump use per year;

m denotes a water consumption calculation unit;

q_r denotes a hot water consumption norm;

C_r denotes a heat loss coefficient of a hot water supply system, and C_r =1.10–1.15;

t_r denotes a design hot water temperature;

t_l denotes a design cold water temperature; and

ρ_r denotes density of hot water.

6. The method for accounting carbon emission of a water system in a building operation period according to any one of claims 1 to 5, characterized in that a calculation formula of the electricity consumption Q_e for operation of the electric devices in the building water system is:

$$Q_e = \sum_{j=1}^{k} N_j \cdot P_{dj} \cdot T_{dj}$$

wherein P_{dj} denotes electric power of each of electric devices of a j-th type;

T_{dj} denotes the number of average annual operation hours of the electric devices of the j-th type; and

N_j denotes the number of the electric devices of the j-th type.

7. The method for accounting carbon emission of a water system in a building operation period according to of claim 6, characterized in that when the electrical devices are capable of calculating the operation electricity consumption, summation is performed by using the operation electricity consumption during calculation of Q_e.

8. The method for accounting carbon emission of a water system in a building operation period according to of claim 7, characterized in that the electric devices are secondary water supply devices, and a calculation formula of operation electricity consumption Q_c of the secondary water supply devices is:

$$Q_c = P_d \cdot Q_d \cdot H \cdot T_d$$

wherein P_d denotes unit water supply energy consumption;

Q_d denotes water supply flow;

H denotes a head of a water pump; and

T_d denotes the number of average annual operation hours of the water pump.