Alphabetical Glossary of RFP Template Terms and Abbreviations

Abatement Price

- The cost of system changes that reduce greenhouse gas emissions. It is expressed in dollars per metric ton of carbon dioxide eliminated, $/tCO$_2$e eliminated

ASHRAE

- The American Society of Heating, Refrigerating and Air-Conditioning Engineers.

Carbon Dioxide Equivalents, CO_2e

- The amount of CO_2 that has the equivalent climate impact as some other amount of a different greenhouse gas (GHG).
- A number, called the global warming potential (GWP), is assigned to each gas and is used to calculate equivalent amounts. GWP's are specified for specific time periods – usually 20 or 100 yrs – because the different gases have different half lives in the atmosphere. CO_2 by definition has a GWP of 1.
- For example, measured over 20 years methane has a GWP of 83. Methane has 83 times the ability to warm the atmosphere as carbon dioxide does. 1 metric ton of methane can be expressed as 83 metric tons of CO_2e.
- Reporting greenhouse gas measurements in units of CO_2e has the advantage of enabling comparisons between sites with different greenhouse gas mixtures, and implies one has measured all the pertinent greenhouse gases of a site.

Carbon Footprint

- A visual metaphor of foot size to the size of GHG's some entity, e.g. a person, a manufacturing facility, a building, or a household, is releasing into the atmosphere. The metaphor utilizes the fact that most GHG's have carbon as a constituent, and that the creator of a footprint is clearly responsible and easily identified. One's carbon footprint may be reported in any of a number of units, but most usefully in units of CO_2e per annum.

CO_2e

- See: Carbon Dioxide Equivalents

Department of Energy

- An executive department of the U.S. federal government created in 1977 that oversees U.S. energy policy and energy production.

DOE

- See: Department of Energy

Embodied Carbon

- The idea of this term is that creating the body of something (as opposed to its operation) will produce a certain amount of CO_2e. Imagine the lifetime of a building, a

car, a road, a boat, a computer, etc. During that lifetime the processes of raw material extraction to make construction materiel, of construction, of maintenance and repairs, and finally of demolition, disposal, or re-cycling will produce a certain amount of CO_2e. This is the embodied CO_2e. Many entities such as a building or a car take energy to operate. The operational energy is not considered part of the embodied carbon.

Emission Reduction Measure

- Any action, of technologic change or strategic planning, that reduces the GHG's (operational or embodied) emitted by anything, e.g. a building or car, during its life cycle.

Energy Use Intensity

- A building's energy consumption relative to its size. Most often expressed as $kBtu/ft^2$, thousands of British thermal units produced per square foot of a building..

ERM

- See: Emission Reduction Measure

EUI

- See: Energy Use Intensity

Fugitive GHG Emissions

- Emissions that result from the intentional or unintentional release of greenhouse gases from extraction and transportation systems, refrigerant systems, or manufacturing processes. These are typically due to leaks, equipment malfunctions or other irregularities.

GHG

- See: Greenhouse Gas

GHG Protocol

- "GHG Protocol establishes comprehensive global standardized frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions.
  Building on a 20-year partnership between World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), GHG Protocol works with governments, industry associations, NGOs, businesses and other organizations."
  Available at: https://ghgprotocol.org/about-us, Accessed on: 5/2/25
- See scope 1 and 2 below.

Global Warming Potential

- Global Warming Potentials (GWP) are numbers that convey the relative ability of different gases to cause planetary warming. For example, methane for a twenty year period has a GWP of 83. This means that it takes 83 metric tons of CO_2 to equal the warming effect of 1 metric ton of methane (83 X units of methane = units of CO_2e). See CO_2e.
- GWP's are specific to period of time (typically 20 or 100 yrs) because different gases are removed at different rates from the atmosphere which will lengthen or shorten their

duration of action. For example, methane's GWP over 20 years is 83, but over 100 years it is 30.

Green House Gas (GHG)

- A gas in the atmosphere that traps heat as a greenhouse does, i.e. it does not interact with the sun's inward bound visible radiation but does absorb and emit the earth's outward bound infra-red radiation. This causes an increase of heat in the atmosphere. Common examples are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons, hydrofluorocarbons, fluorinated ethers, chlorofluorocarbons, and dichlorodifluoromethane (R-12 or Freon) with a 20 yr GWP of 10,800!

GWP

- See: Global Warming Potential

HVAC Systems

- Heating, Ventilation, and Airconditioning systems.

IPCC Synthesis Report

- The United Nation's Intergovernmental Panel on Climate Change. It issues periodic reports that help inform the Paris agreement.
- "The Synthesis Report of the Sixth Assessment Report *(2023*) provides an overview of the state of knowledge on the science of climate change, emphasizing new results since the Fifth Assessment Report (AR5) in 2014." Italics mine. Available at: https://www.ipcc.ch/synthesis-report/, Accessed on: 5/2/25.

Metric Ton

- 1 metric ton = 1,000 kilograms; 1 kilogram = 1,000 grams; "tonne" is a synonym for "metric ton", and a metric ton's symbol is "t".

Net Present Value

- The calculated value *now* of money expended and gained over time by an investment.
- Central to the calculation is the notion that a dollar gained tomorrow is worth less than a dollar in hand today. Thus any future gains are *discounted* a certain amount. The degree of discounting chosen (the discount rate) is influenced by interest rates, inflation rates, or alternative investments – "opportunity costs"). The losses and gains are summed to give the net present value (NPV).
- The NPV may be calculated with the formula:

$$NPV = \sum_{t=0}^{n} \frac{R_t}{(1+i)^t}$$

Where:

R_t = Net cash inflow-outflows during a single time period, t
i = Discount rate
t = Number of the time period in chronological order, e.g. 1st time period, 2nd time period, …

One can see that the denominator grows (and thus the NPV diminishes) the greater i is and the greater t is (the further out in time one is).

- If the NPV is positive, the investment is expected to generate more value than it costs (within the accounting of an organization); if negative, it may not be financially viable.

NPV

- See: Net Present Value

Paris Agreement

- "The Paris Agreement is a **legally binding international treaty on climate change**. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016." Available at: https://unfccc.int/process-and-meetings/the-paris-agreement, Accessed on: 5/2/25. It is an outgrowth of the UN Framework Convention on Climate Change (UNFCCC) adopted in 1992.
- As expressed by the IPCC of the U.N. it's main goal is to limit climate warming to less than 1.5°C above pre-industrial levels, and it states explicitly, "To limit global warming to 1.5°C, greenhouse gas emissions must peak before 2025 at the latest and decline 43% by 2030." Available at: https://unfccc.int/process-and-meetings/the-paris-agreement, Accessed on: 5/2/25.

SCC

- See: Social Cost of Carbon

Scopes: 1, 2, and 3

- These are areas of a business's, or city's, or any organization's greenhouse gas accounting that are defined and are periodically updated in the GHG protocol which is created and maintained by a partnership between World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). See: https://ghgprotocol.org
- It is important to keep in mind that whether a GHG emission is scope 1,2, or 3 is dependent on the organization it is being "viewed" from, and that scopes pertain only to organizations and not to individual things such as a building. In most of SSAFE's documents the viewpoint of a CCRC or Life Plan corporation is assumed.
    - Scope 1 – emissions from owned or controlled sources. For example, the CO_2 and methane emitted by the gas furnaces of a life plan community.
    - Scope 2 – indirect emissions from the generation of purchased energy. For example, the CO_2 emitted by the coal burning plant producing the electricity purchased by a life plan community.
    - Scope 3 – all other indirect emissions (not labeled scope 2) further back or forward on the "value chain" of an organization – sometimes referred to as "everything else". For example, the GHG's emitted in the mining and transportation of coal to the generating plant making the electricity.
        - One can see this is beginning to border on an entire life cycle analysis (of electricity in this example), and could represent a tremendous amount of greenhouse gases not under the direct control of a life plan community. For that reason scope 3 has not been emphasized in the RFP template.

Simple Payback Period

- The amount of time required for an investment to recover its initial cost through savings or revenues. It does not consider current devaluing of future expected money as does the NPV. For example, if one installs a heat pump and decommissions a gas furnace for $10,000 and thus saves $100 a month in operational costs, then the simple payback period is 100 months.

Social Cost of Carbon

- The expected cost of damages caused by a metric ton of CO_2e emissions. Damages considered are such things as changes in agricultural productivity, health outcomes, property damage from sea level rise, floods, fires, and storms, and declines in labor productivity. These costs often do *not* make their way into the fossil fuel markets and thus into end user operational costs, but remain economic externalities for both of them. As such the costs are born by society and by neither the fuel producer nor the GHG emitter.
- Estimated SCC costs can vary greatly.
  - 1st Trump - $3-$5 per tonne CO_2e
  - Biden – $51 per tonne (interim estimate)
  - IPCC - ~$100 per tonne
  - Recent (2024) peer reviewed research – up to $1,367 per tonne
    Available at:
    https://www.nber.org/papers/w32450?utm_campaign=ntwh&utm_medium=email&utm_source=ntwg1. Accessed on: 5/2/25
- Sources of this variation are:
  - Differing integrated climate-economic models by virtue of variables, estimated parameters, or assumptions.
  - Underestimating feedback loops
  - Political influence

t

- Metric ton or tonne

U.S. Nationally Determined Contribution

- The progress report of the U.S. giving national climate action plans as called for by the Paris accord. It commits to sector by sector pathways for the goal of a 61% to 66% reduction below 2005 levels of GHG emissions by 2035 (the 2030 goals are 50-52%).
  Available at: https://unfccc.int/sites/default/files/2024-12/United%20States%202035%20NDC.pdf and
  https://unfccc.int/sites/default/files/NDC/2022-06/United%20States%20NDC%20April%2021%202021%20Final.pdf
  Accessed on: 7/1/25.