

# Legion 44 Glossary

Heirloom, California



[legion44.world](http://legion44.world)





44.01, Oman

**Additionality:** an indication that the carbon removal would not have happened without the carbon removal project. An example of this might be a direct air capture machine, which would not have been built otherwise. This can be contrasted to trees that were not threatened by being cut down, in which, they would have removed carbon from the atmosphere, even if they were not explicitly protected. The act of protecting them would not be additional.

**Amines:** group of organic compounds of nitrogen, that are similar to ammonia, where one or more hydrogen atoms have been replaced by a hydrogen group. These chemicals can be used to capture CO<sub>2</sub> from gas streams, and are weak bases.

**Aquaculture:** the cultivation of marine or freshwater organisms under controlled conditions.

**Atmosphere:** the layer of gases that surround a celestial body (i.e., planet). Earth's atmosphere is 78% nitrogen, 21% oxygen, and the rest is a mixture of H<sub>2</sub>O, Argon, CO<sub>2</sub>, and other trace gases.

**Basalt:** dark igneous rock, composed primarily of plagioclase feldspar (solid solution of sodium and aluminum silicates), pyroxenes, and olivine ((Mg,Fe)<sub>2</sub>SiO<sub>4</sub>).

**Biochar:** charcoal derived from biomass, that can be used store carbon and as a soil amendment.

**Biomass:** plant material, vegetation, or agricultural products.

**Borehole:** a hole drilled into the earth to collect samples for analysis or to extract oil, water, or brine.



*Carbon Drawdown Initiative, Germany*

**Carbon Credit:** a certified CO<sub>2</sub> emission displacement credit, supposed to be equal to one tonne of CO<sub>2</sub> removed from the environment.

**Carbon Cycle:** the physical cycle of carbon through Earth's biosphere, geosphere, hydrosphere, and atmosphere. This includes photosynthesis, decomposition, respiration, and mineralization.

**Carbon Mineralization:** turning carbon dioxide into a mineral compound, such as a carbonate material. In the case carbon removal, this is usually calcium carbonate (CaCO<sub>3</sub>), magnesium carbonate (MgCO<sub>3</sub>), or sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>).

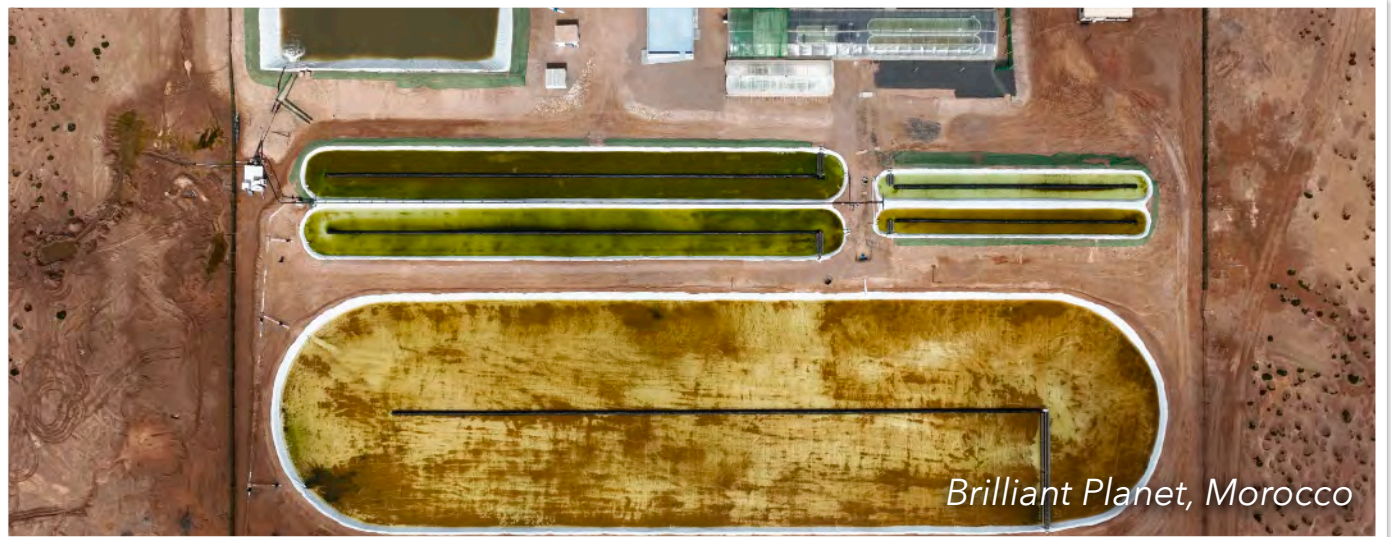
**Carbon Removal:** the physical removal of CO<sub>2</sub> from the atmosphere, where it is then kept securely, where it will not be rereleased to the atmosphere on the geologic timescale.

**Carbonate (Minerals):** minerals that contain the carbonate ion (CO<sub>3</sub><sup>2-</sup>). In Legion 44, these typically show up as calcium carbonate (CaCO<sub>3</sub>) and magnesium carbonate (MgCO<sub>3</sub>).

**Carbonic Acid (H<sub>2</sub>CO<sub>3</sub>):** a weak, unstable acid that forms when CO<sub>2</sub> is dissolved in water.

**Circular Economy:** an economy that keeps materials and products in circulation for as long as possible. These materials and products also apply to what would otherwise be considered waste, in some cases, leading to innovations that minimize or utilize waste streams.

**Climate Change Mitigation:** activities that reduce the ongoing activities and impacts of climate change.



**Climate Justice:** recognizes the disproportionate impacts of changing climate on low-income communities, communities of color around the world, and the people and places least responsible for the CO<sub>2</sub> emissions that are driving these changes.

**Democratize:** increasing access to; synonymous with access

**Direct Air Capture (DAC):** a carbon process that is driven by chemical reactions that selectively take CO<sub>2</sub> out of atmospheric air. For DAC to be part of a carbon removal pathway, it needs to be coupled to secure, permanent storage.

**Domesticate:** to adapt wild plants or animals for use by humans.

**Drought:** a long period with abnormally low or sparse rainfall. Periods like this can result in adverse effects to growing or living conditions.

**Emissions Reduction:** reducing CO<sub>2</sub> emissions that are emitted to the atmosphere. This differs from carbon removal, in which CO<sub>2</sub> emissions already in the atmosphere are removed.

**Energy Access:** refers to the availability of reliable, affordable, and sustainable energy services.





**Enhanced Rock Weathering:** the acceleration of the natural weathering conditions for rocks, in which the rocks react with carbonic acid to form carbonate minerals, which results in CO<sub>2</sub> sequestration from the atmosphere. See Carbonic Acid, Carbonate, Rock Weathering, Sequester

**Exponential Growth:** a pattern where a quantity increases at a rate proportional to its current size, leading to faster and faster growth over time. This differs from linear growth, which is a function of steady growth over time.

**Geochemistry:** the science that uses tools and principles of chemistry to explain major geological systems, such as the Earth's crust and oceans.

**Geologic Time Scale:** a representation of time based on the rock record of the Earth. Changes to geologic systems happen at a much slower rate than changes to, say, human life. When the term geologic time scale is used, it often means for a time that is a far ways away, which could be anywhere from 1,000 - 100,000 yrs.

**Geosphere:** solid parts of the Earth, including rocks, minerals, and landforms on the surface and within the interior.

**Geothermal Energy:** heat under the ground that is used to heat water and make steam, that directly turns generator turbines (or heat a secondary fluid to turn generator turbines), and makes electricity.

**Gigatonne:** one billion tonnes

**Global North:** countries within regions (often associated with those north of the equator), that are considered relatively prosperous and concentrate international power. The regions included are: North America (north of Mexico), Europe, Asia (North of Mongolia), and Australia. See Global South.



*Climeworks, Iceland*

**Global South:** countries within regions (often associated with those south of the equator), that are considered less prosperous and hold less international power. The regions included are: Mexico, Latin America, South America, Africa, the Middle East, and Asia (south of Mongolia). See Global North.

**Great Rift Valley:** geographic and geologic feature running north and south for approximately 4,000 miles, running from Syria to Mozambique in East Africa. It is home to 30 active or semi-active volcanoes and many hot springs. It is a bed for geothermal energy and igneous rocks (such as basalt). See Carbon Mineralization.

**Inert:** non-reactive

**Leap-Frog:** to hop over or to skip. In the context of leap-frogging over carbon-intensive energy sources, it is when developing countries can utilize renewable and less carbon-intensive energy sources to facilitate development, rather than using fossil fuels, as most developed countries today have used.

**Legacy Emissions:** CO<sub>2</sub> emissions already in the atmosphere from previous activities.

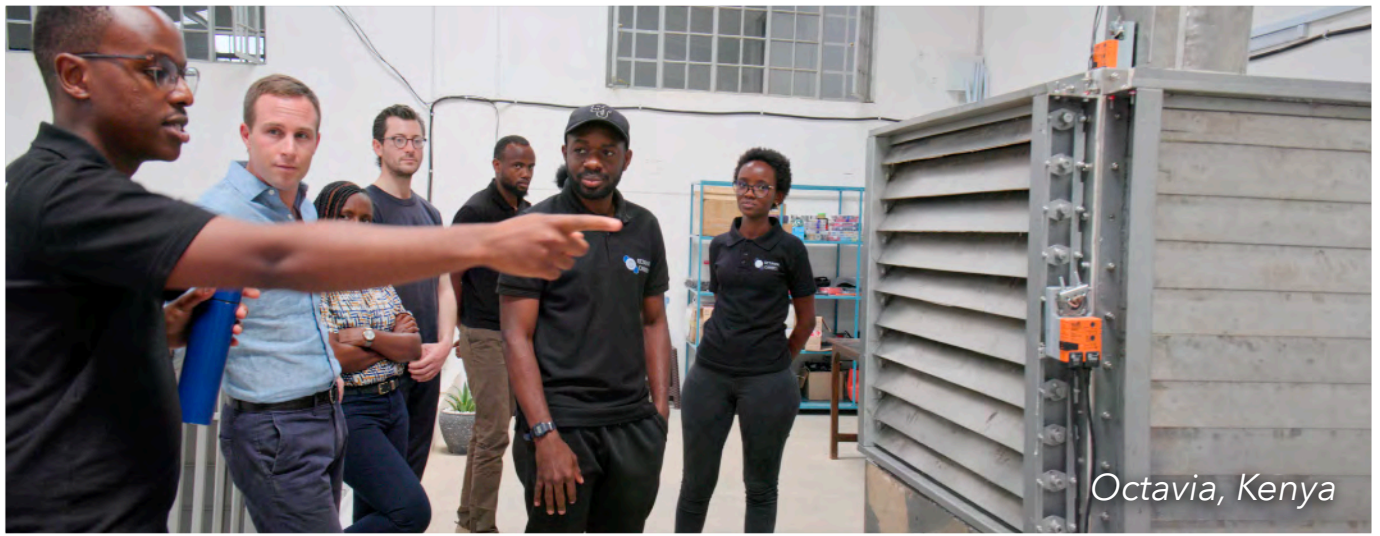
**Lime/Liming Material:** powdered basic rocks that are applied to field operations to elevate the pH of commonly acidic soils. These basic rocks are typically forms of calcium or magnesium oxides and hydroxides.

**Megatonne:** one million tonnes

**Mineral Storage:** pathways that result in CO<sub>2</sub> being mineralized, by turning into carbonate minerals (i.e., forming calcium carbonate:  $\text{CaO} + \text{CO}_2 \rightarrow \text{CaCO}_3$ )

**Obituary:** a brief biography of the deceased.

**Outfall:** a place where a sewer, drain, or stream discharges.



**Parts per million (ppm):** measure of concentration, illustrating how many out of 1 million parts are the substance of interest. For example, the CO<sub>2</sub> concentration in the atmosphere today is close to 420 ppm, so 420 out of every 1 million gas particles, is CO<sub>2</sub>.

**Peridotite:** dense, magnesium-rich igneous rock, composed primarily of olivine ((Mg,Fe)<sub>2</sub>SiO<sub>4</sub>) and pyroxenes, in which silica (SiO<sub>2</sub>) makes up less than 45%. The magnesium in peridotite makes it a rock that is suitable for CO<sub>2</sub> mineralization. See Carbon Mineralization, Mineral Storage.

**pH:** a measure of acidity, where the lower the pH, the most acidic a solution is. The higher the pH, the most basic the solution is.

**Photosynthesis:** a natural process where plant cells utilize sunlight and CO<sub>2</sub> to produce energy, resulting in plant growth, and the production of oxygen that is released back into the environment.

**Rock Weathering:** natural deterioration or chemical reactions between rocks, soils, and minerals through contact with water, atmospheric gases, sunlight, and biological organisms. In the case of carbon removal, rock weathering using refers to calcium or magnesium silicate rocks reacting with carbonic acid, to form calcium or magnesium carbonates. See Carbonic Acid, Carbon Mineralization.

**Sargassum:** also known as gulf weed, a brown algae found in tropical Atlantic waters.

**Sequester:** to remove or set apart. In the case of carbon removal, the act of sequestering the carbon ensures that is removed from the atmosphere, with nearly no chance of it being rereleased.





**Silica (SiO<sub>2</sub>):** silicon dioxide; white or colorless crystalline compound that makes up quartz, opal, and sand. The amorphous silica resembles white sand and is often used as a drying or dehumidifying agent.

**Silicate Rock:** minerals that contain silica (SiO<sub>2</sub>; silicon dioxide). In the case of carbon removal, calcium (CaSiO<sub>2</sub>) and magnesium (MgSiO<sub>2</sub>) silicates are of interest because they can be used in ways to sequester CO<sub>2</sub> from the atmosphere on the geologic time scale. See Basalt, Peridotite, Sequester, Geologic Time Scale.

**Sorbent:** a chemical that has the capacity or tendency to take up another substance. In the case of carbon removal, sorbent material is usually referred to with relation to DAC, where the sorbent material takes up CO<sub>2</sub> from the atmospheric air stream.

**Volcanism:** volcanic activity

**Whaling:** the business or practice of hunting, killing, and possessing whales.





**For more  
information:  
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*Brilliant Planet, Morocco*