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About Trees, Carbon Absorption and 'Green' Marketing

A Generic 100 year model

Report written by

Carbon-info.org™

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Executive Summary

This report establishes a firm understanding of the history of trees and forests and identifies the huge impact trees have had and continue to have on the planet and it's climate. Of particular interest to global warming is the fact that the world's coal reserves (carbon dioxide absorbed by pre-historic forests and locked away underground for millions of years) are almost identical to the volume of CO2 in today's atmosphere - measured at 383 ppm.

Those individuals hoping for a simple answer to the question: "How much CO2 does a tree absorb per day?" may be surprised to learn that this is a very complicated question indeed and one that is almost impossible to answer. If the answer is rephrased to: "How much CO2 does a 10 year old oak tree absorb in its total above and below ground biomass on the 24th August, if it is located at latitude X and longitude Y, has no known illnesses and is growing in soil rich in nutrients?" then it may be possible to provide a estimated answer.

The fact is that both questions are almost equally impossible to answer. Hence the need for a generic model of a tree. Based on real research projects in various locations around the world, this report establishes a model of a generic tree, which makes it possible to understand how much CO2 is being absorbed during a 100 year growth cycle.

Finally, the report compares the generic tree model with the products promoted by many carbon offset companies. The report discovers how come carbon offset products actually leads to significant increases in atmospheric carbon dioxide rather than reduce individuals emissions in a timeframe that fits in with the UN's and IPCC's approach of reducing CO2 emissions by 50-85% by 2050.

But most important of all this report confirms that tree planting is a really good, ethical and sustainable activity to undertake by anyone. Even just a single tree - bought through an ethical offset company or from the local garden centre, will help absorb CO2 from the atmosphere and make a difference for many years to come.

Any feedback on this report, be it praise or not, please send to feedback@carbon-info.org

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Definitions and Terms

Mya
Million years ago.

Boreal Forest
A coniferous forest of the northern hemisphere characterized by evergreen conifers such as spruce, fir, and pine.

Carboniferous
Geological period from about 354 to 290 million years ago. The term "Carboniferous" comes from England, in reference to the rich deposits of coal that occurred during the period.

Conversions and Rates

Gigaton
Metric unit of mass, equal to 1,000,000,000 (1 billion) metric tons.

Chapter 1 - A history about Trees

Trees have inhabited this planet for a long time. Millions of years in fact, which is a lot longer then humans have been about. We may not often get the chance to stand back and consider what this actually means in terms of the impact trees and forests have had on the life on earth and the climate in general. This chapter summarises the significant contribution the earliest forests had in shaping our planet, and the threats and opportunities this continues to provide for our modern day civilisation as it struggles to identify effective means of reducing the impact of global warming.

To really understand the power of trees we need to travel back in time. About 350 million years ago, which is about 200 million years before the dinosaurs roamed the continents. At this point in time the world map looked a lot different from today's. North America was located along Earth's equator[4], South America and Africa had not yet started to separate due to the effect of continental drift, while large parts of the planet continued to be covered by oceans.

The oceans were already teaming with primitive life forms and life would slowly continue to evolve and start to inhabit the land. This migration of life took place during a geological period known as the Devonian period and continued into the Carboniferous period that followed.

Full chapter available in complete report

Chapter 2 - Trees and Carbon Absorption

"How much carbon does a tree absorb per day?" or "How much CO2 is stored in an acre of forest?" are typical questions asked by individuals looking to offset their carbon emissions. It is also the question carbon offset companies *must* have asked themselves in order to suggest how many trees a person flying to New York and back again will have to purchase to offset the carbon released by the airplane. However, as demonstrated in this section, these simple questions are actually impossible to answer.

Trees absorb CO2 from the atmosphere through photosynthesis and in the process releases oxygen (O). Carbon dioxide, water and nutrients found in the soil is the foundation for tree growth. Similar to humans, tree growth involves the formation and expansion of new cells, tissues or organs[14]. Hence, the more growth can be observed the more CO2 the tree has absorbed.

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Chapter 3 - The Generic Tree - A Model

As discovered in chapter 2, many different factors influence the ability of trees to absorb CO2 and store this in their biomass. This makes is relatively difficult to create a generic tree model, though not impossible as long as it is clear what assumptions are made and what data is utilised when generating the model.

There exist well defined mathematical methods of calculating the volume of CO2 absorbed by most trees in a year, based on the increase in biomass, or how much CO2 has been absorbed by a 10 year old tree with a given trunk size at breast height. While clearly useful when calculating on specific, individual trees, this method is not very useful when creating a generic tree model. For one thing, it would be very laborious, maybe even impractical, to identify and select a number of trees that could be utilised. Furthermore, selecting a few individual trees is unlikely to generate a very precise result. For completeness, one of the mathematical methods that can be utilised to calculate the CO2 absorbed by a tree is available in Appendix C, though ***not*** utilised in the development of a generic tree model.

Full chapter available in complete report

Chapter 4 - About Carbon Offsetting and going "Carbon Neutral"

Before looking at specific carbon offsetting claims, it is worth defining 'carbon offsetting' to ensure we clearly understand the concept.

A common definition is:

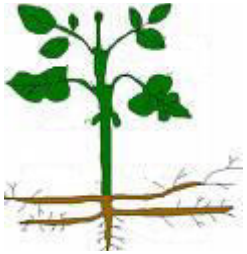
"Any action specifically taken to remove carbon dioxide from the atmosphere in order to balance emissions taking place elsewhere[19]"

As discussed in previous sections, a very natural and effective way to remove carbon dioxide is to plant trees. However, the effectiveness and feasibility of carbon absorption through planting of trees varies widely depending on factors such as site, type of trees and general forestry management practices[19].

It is also important to recognise that not all forests automatically generate carbon offsets, which can be sold on. As an example, consider an existing national park. As this forest is already in existence it can not be said to generate carbon offsets. However, by creating a new forest or carrying out reforestation with the sole objective of removing CO2 from the atmosphere would must likely constitute carbon offsets[19].

Full chapter available in complete report

Conclusion



In closing, what this report has tried to do is ***not*** highlight the shortcomings of tree planting as an effective tool in the fight against global warming, but to provide answers to common questions about trees and highlight some of the 'green' marketing practices, which unfortunately continues to exist and which continues to give tree planting an undeserved bad reputation.

This report is highlighting the many shortcomings of some carbon offset companies, who appears more interested in profit than providing clear and ambiguous offset products, which will actually help reduce CO2 emissions in a timeframe that fits in with the urgent objectives of the IPCC and other public bodies.

Their practices are putting people off tree planting due to lack of clarity, use of confusing terms such as 'carbon neutral' and general trust in the offset companies operating practices. The offset industry has tried to clean itself up in the last few years by introducing voluntary codes, but the evidence suggests that there is still some way to go.

Full conclusion and all appendices available in complete report.