

Sweden's forests – their undeveloped potential to alleviate climate change

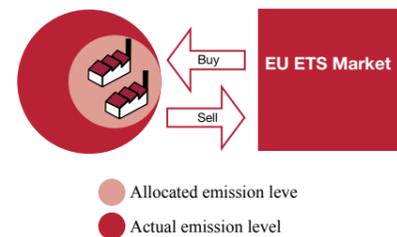
*A trading scheme promoting
more effective forest management*

January 2013



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Emissions of greenhouse gases, as well as the climate changes caused by these emissions, are one of the greatest challenges of our time. Sweden's forests can play an important role in alleviating the climate change caused by these emissions. The solution is to introduce a trading scheme promoting more effective forest management.



EU ETS – Emission Trading Scheme; the EU's system for trade with emission allowances between industrial companies

AAU – Assigned Amount Units; the unit for the emission allowances traded between countries agreeing to the Post Kyoto Agreement

EUA – European Emission Allowances – one EUA represents the right to emit one ton of carbon dioxide within EU ETS

CER:s/ERU:s – Certified emission reductions or Emission reduction units which companies may collect through projects

Carbon sinks – the natural mitigation against climate change

Carbon dioxide is the greenhouse gas that has the greatest impact on climate change. The increased use of coal, oil, natural gas, and other fossil fuels has dramatically hastened the impact of the greenhouse effect, with serious detrimental consequences for the climate and the environment. In order to counteract climate change, emissions must decrease and nature's capacity to offset the greenhouse effect must increase. Natural resources, such as seas, lakes, forests and land, can alleviate climate change by binding carbon dioxide. The Swedish forests play an important role as a carbon sink due to their capacity to bind carbon dioxide through photosynthesis, thereby alleviating climate change.

Sweden's forests – an undeveloped resource

Scientific studies show that it is possible to significantly increase the growth of forests through changes in forest management, subsequently binding larger amounts of carbon dioxide in the ecosystem. At present, the major portion of this potential resource is unutilised as many forest owners experience that there are insufficient economic benefits in increasing the growth of their forests. In order to stimulate forestry to utilise a greater part of the growth potential in the Swedish forests, we propose a scheme which provides a higher level of economic benefit. Following is a description of how such a scheme could be designed.

EU ETS – Europe's Emission Trading Scheme

The concept of trading schemes is not new, these are used in many different markets to efficiently allocate resources. One of the most developed and well-known trading schemes for trading emission allowances has been developed by the EU. Since January 2005, European companies have been able to buy and sell emission allowances in a trading scheme called EU ETS. On the basis of this scheme, Europe is, effectively, allowing the market to determine a price on carbon dioxide. Companies are faced with the choice of acquiring emission allowances, or investing in alternative, more environmental friendly technologies, in order to reduce emissions. The fundamental concept underpinning the scheme is that EU's net target level for carbon dioxide emissions should be achieved in the most cost efficient manner.

A trading scheme based on credits

Thus, today there exists a trading scheme for decreasing emissions from companies, but there are no incentives or schemes addressing increased binding of carbon dioxide in, for example, forests. The Post Kyoto Agreement strongly encourages the use of technologies and forest management methods to improve the forest's ability to bind carbon dioxide. According to the Post Kyoto Agreement regarding "Forest Management", countries are to make use of the forests' ability to bind carbon dioxide in the best possible manner. In order to encourage forest farmers to enhance the binding of carbon dioxide in the forests, it is necessary to create economic incentives for increased forest growth. The solution is to introduce a trading scheme in which credits corresponding to the actual measured increased binding of carbon dioxide in metric tons are allotted to the forest farmer. This credit will represent an economic value as it can be sold to companies doing business under emission restrictions. In that way it becomes profitable to change to forest management methods resulting in an enhanced binding of carbon dioxide.

The trading scheme for the forest – How it works in practice

An efficient trading scheme is designed to maximise the amount of reductions for a set price, i.e. the costs of the scheme are kept as low as possible at the same time that forest farmers are encouraged to increase the forest's potential as a carbon sink. It is important to be able to measure the improvements made regarding the forest's capacity to bind carbon dioxide and allot the corresponding amounts of credits in an accurate and controlled manner. These credits can then be used by companies in the EU ETS, or they can be included in the trade between countries in so-called AAU:s.

Five steps in the design of the trading scheme:

- 1. Changed forest management** – the forest farmer establishes a project leading to increased forest growth and an increased level of binding of carbon dioxide which is possible to measure. This increased binding must be higher than the baseline scenario in which no extra effort is made.
- 2. Auditing and validation processes** – The increased capacity to bind carbon dioxide as a result of forest management is validated by the Swedish Forest Agency. The Swedish Forest Agency is the controlling body ensuring that the projects actually lead to a real reduction of carbon dioxide in the atmosphere.
- 3. The allotment of credits** – Approved projects are allotted credits. The project to increase the level of carbon dioxide binding is registered in the land registry, and the credits are registered in a trade register, with suitable authority.

- 4. Emission credits** – Forest farmers sell their allotted carbon sink credits to industry, which, in turn, utilise these in their trade within the European Trading Scheme for emission allowances.
- 5. Trade between countries** – Each EU country is allotted a certain number of emission allowances which the country in question subsequently distributes to companies, to a certain degree. An increased binding of carbon dioxide in, for example, the forest, can thus also be used in the trade between countries.

The system has been trialed in simplified version in Övertorneå Municipality, where a number of smaller forest owners, government owned forest company Sveaskog, and government owned mining company LKAB participated. The credits created from the changed forest management activities were bought by LKAB at market price.

The trading scheme for the forest – How binding of carbon dioxide is measured

One of the building blocks of the trading scheme will be the efficient measurement of the amount of carbon dioxide that has been bound due to the realisation of the projects. Methods for measuring the binding of carbon dioxide are crucial for the system to work. Problems in establishing base levels, leakage, and risk management create difficulties in the measurement of carbon dioxide binding.

- Baseline** – The existing forest binds carbon dioxide through photosynthesis. Only those measures leading to an increased reception of carbon dioxide compared to a baseline reception shall be entitled to carbon sink credits (see chart).
- Leakage** – Is defined as the increase in emissions, or decrease in carbon dioxide binding not encompassed by the project.
- Risk management** – Risk management procedures are required in order to ensure that binding of carbon dioxide actually occurs over a long period of time. Natural carbon sinks may be exposed to external influences, reducing the capacity of the forest

to bind carbon dioxide. How shall the growth be restored rapidly if the forest's capacity to bind carbon dioxide is reduced due to fire, wind throw, or infestation by vermin? A sustainable, long-term carbon sink is ensured through the prevention and counteraction of a decrease in the capacity of binding carbon dioxide.

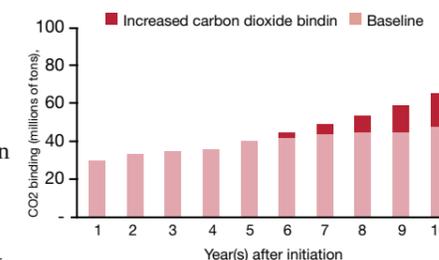
Changed forest management – the potential of the Swedish forest

So, how large is the potential in the Swedish forests to bind carbon dioxide? Scientific studies show that changed forest management can lead to an increase in forest growth of 25%, within only 40 years. This results in an increase in the supply of raw material from the forest. The annual increase in carbon dioxide reception during the 50 subsequent years may be as high as 26 million tons, which is more than the annual emissions from the entire Swedish transport industry.

A trading scheme – promoting changed forest management

Today, there is a large growth potential in the Swedish forests which is not fully utilised as there is a lack of economic incentives. A European Trading Scheme for carbon sink credits can stimulate forest management activities increasing the binding of carbon dioxide in the Swedish forest in relation to the baseline. By this, the forest management contributes to a decrease of the greenhouse effect. Therefore, we should act swiftly in Sweden in order to initiate a trading scheme encouraging effective forest management which, ultimately, counteracts climate change.

An example of increased carbon dioxide binding in relation to the baseline



Forest Management: Carbon dioxide sequestration through forest management from carbon sinks are included in the new Post Kyoto Agreement, that was agreed in the latest UN climate summit in Doha, December 2012. Forest management includes methods and technological solutions with the purpose of improving the forest's capacity to bind carbon dioxide through photosynthesis.

Trade with carbon sink credits creates a win win situation for the climate:

- Increased production of biomass
- Local job development
- Rural development



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