

EnviroCrete Eco Housing Division
Slow down climate change: use EnviroCrete®



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| 1.0 | 24/02/2011 | Addition of “ <i>The contribution of EnviroCrete system</i> ” chapter |
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Distribution List

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Climate change

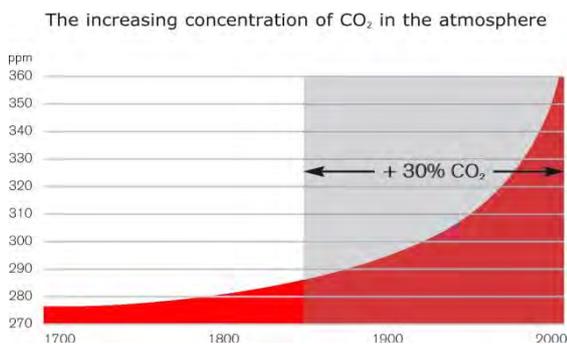
CO₂ emissions are the main cause

The greenhouse effect

The term "greenhouse effect" refers to the way infrared radiation from the Earth is trapped, heating up the atmosphere.

Solar radiation reaches the Earth through the atmosphere and warms its surface. The stored energy is then sent back to space as infrared radiation. However, as it is less powerful than the incoming radiation, it is increasingly unable to cross the barrier of specific atmospheric gases known as "greenhouse gases".

The most important greenhouse gas is carbon dioxide (CO₂), but others include steam (H₂O), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons (CFCs) and sulphur hexafluoride (SF₆).



CO₂ concentrations in the atmosphere have increased by 30% since the middle of the 19th century.
Swedish Forest Industries Federation.



CO₂ emissions are largely due to the burning of fossil

Global Warming

Since the start of the industrial revolution there has been a sharp increase in greenhouse gas emissions into the atmosphere, mainly due to CO₂ from the burning of fossil fuels, but also from tropical deforestation.

As a result, mean temperatures are expected to rise at a rate of 0,1 to 0,4°C per decade during the first half of this century¹.

Most (55-70%) of the additional greenhouse effect is caused by CO₂. Growing by 0,5% a year, according to the most optimistic estimates, the concentration of CO₂ in the atmosphere will double by 2100.





There is an increasing incidence of natural disasters caused by extreme weather.

The first effects

Climate is changing, and this change is amplified by human activity.

According to the latest report of the IPCC (Intergovernmental Panel on Climate Change), the 20th century was the warmest since records began, the '90s the warmest decade, 1998 the warmest year.

The first effects have already been clearly documented and point the way to much more widespread and destructive changes in the future:

- ☉ the North Pole ice cap is melting: between 1950 and 2000 its surface has diminished by 20%
- ☉ global sea levels have already risen by about 15cm in the 20th century alone
- ☉ all over the planet, snow cover is retreating and glaciers are melting
- ☉ there is a significant increase in the frequency and severity of natural disasters such as hurricanes, droughts, earthquakes and floods, tragically borne out by events in the first years of the 21st century.



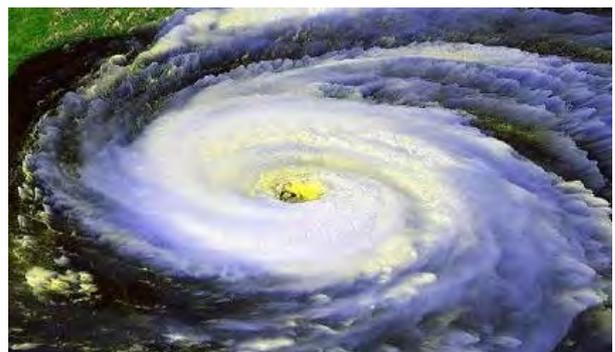
Snow cover is retreating and glaciers are melting.

The forecast effects

The effects of climate change are difficult to forecast because of the complexity of the various interactions of the Earth's ecosystem. However, several significant trends can be deduced from studies so far:

- ☉ sea levels will continue to rise, with catastrophic results for those living in coastal or river delta areas, or on low-lying land
- ☉ changes in natural habitats will result in the loss of plant and animal species
- ☉ according to the World Health Organization (WHO), a temperature rise as small as 1 or 2°C could enable mosquito species that carry tropical diseases such as malaria and dengue fever to spread and settle into new areas north of their present distribution range.

Anyway this forecast effects are unpredictable.



Cutting CO₂ emissions

At least 60% of climate change can be attributed to CO₂ emissions resulting from human activities - mostly the burning of fossil fuels.

Just to contain CO₂ concentrations in the atmosphere to their current levels would require a reduction in global emissions of more than 40%.

As 85% of the energy necessary to run our societies comes from fossil fuels, a reduction in emissions of this order would involve politically unacceptable cuts in our energy consumption.

In short, the efforts necessary to stabilize the concentrations of greenhouse gases are not consistent with our current vision of development based on a steady increase in global consumption.



The burning of fossil fuels contributes 6 billion tonnes of carbon emission a year.



A way to reduce CO₂ emission

The Kyoto Protocol was a significant step in tackling climate change, providing agreed legally binding targets for the first time.

However, to make the Protocol enforceable, it had to be ratified by enough industrialized countries to account for at least 55% of global CO₂ emissions. The United States, which accounts for 36,1%, refused to sign and later withdrew from the treaty altogether. It was only when Russia, responsible for 17,4%, became the 141st party to the Protocol, that the way was clear for it to come into force on February 16, 2005.



The carbon sink

The Kyoto Protocol

The Kyoto Protocol signed in 1997, set targets for man-made greenhouse gases. Signatories are legally bound not to exceed those levels. While the most effective way of reducing greenhouse gases, and particularly CO₂, is to reduce emissions, increasing the absorption of these gases by **carbon sinks** can also help.

What is a carbon sink?

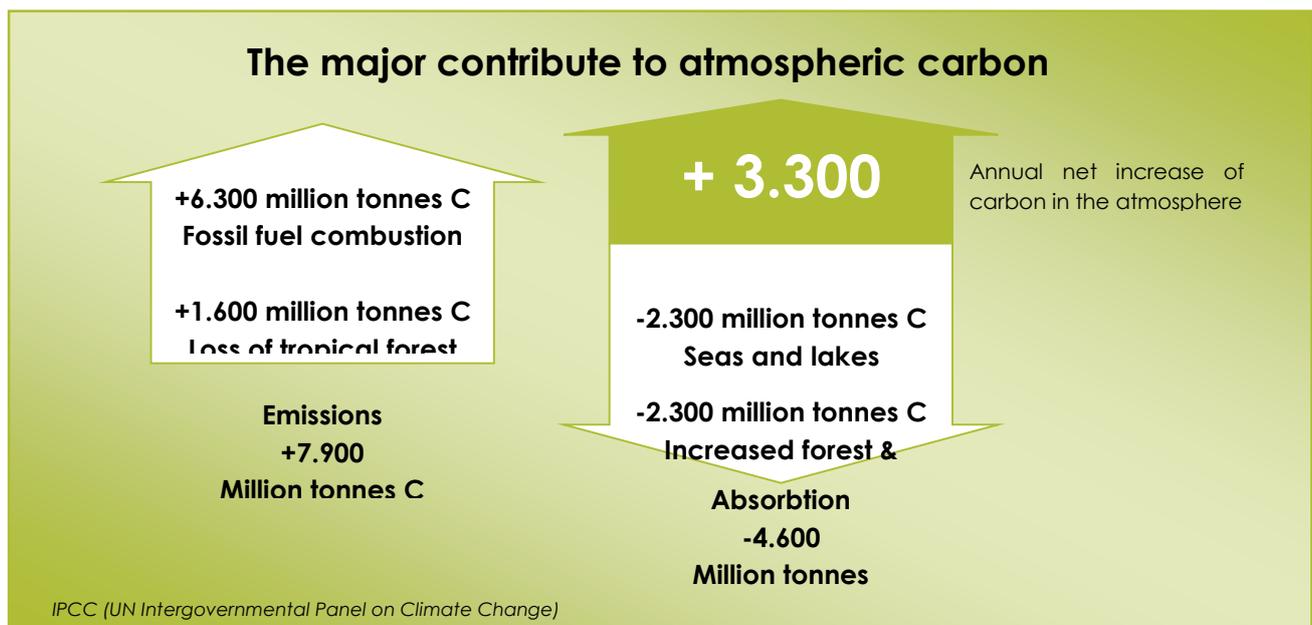
Carbon is present in our environment in different forms and in many different places that act as carbon reservoirs: in the oceans (dissolved in water), in the biomass (vegetal and animal), in the atmosphere (mostly in the form of CO₂), in rocks (limestone, coal...), etc. The regular exchange between these places is known as the carbon cycle.

What are commonly known as carbon sinks are in fact sinks of carbon dioxide (CO₂), the elements of the cycle that can absorb and store CO₂, thereby reducing the carbon concentration in the atmosphere that is one of the main causes of Global Warming.

The main carbon sinks are the oceans and the biomass - forests and plants.

Atmospheric carbon

The concentration of carbon in the atmosphere is currently increasing by 3.300 million tonnes of carbon a year. While loss of tropical forest contributes a significant amount of this, it is more than balanced by the forestation and increased biomass which occurs in other parts of the world - especially in Europe.



The contribution of EnviroCrete®

How to reduce CO₂

There are two ways to reduce CO₂ in the atmosphere: either by reducing emissions, or by removing CO₂ and storing it: reducing "carbon sources" and removing "carbon sinks".

Reducing carbon sources

The reduction of CO₂ emissions is a great challenge and a major commitment that each of us must take: by industry and research institutes that invest money, time and energy to improve and implement new "green technologies" to small consumers, ordinary people, with their daily choices and lifestyle.



Advanced technologies now exist in many sectors that can reduce CO₂ emissions significantly. The massive use of these technologies would save a lot tons of carbon each year, with a consequent improvement in living conditions for all.

Moreover very often these new technologies also allow saving money, improving not only the energy balance but also financial ones.

No excuses. Change is underway.

Removing carbon sources

Another way to reduce carbon CO₂ in the atmosphere is by removing carbon sources. This process can be implemented by using material able to capture and store CO₂.

EnviroCrete® is the answer.

EnviroCrete® is a new and unique construction material formed by concrete and chipped wood.

The energy used to create the materials that make up a building is typically 22% of the total energy expended over the lifetime of the building, so it is worth paying attention to the materials specified, as well as to the energy-efficiency of the structure.

EnviroCrete® has both characteristics; these make it a very good construction material, useful for find a new use for wood waste, to improve thermal efficiency of the structures, reduce carbon emission and increase carbon storage.

ENVIROCRETE
BIOCLIMATIC - BUILDING



The choice of materials

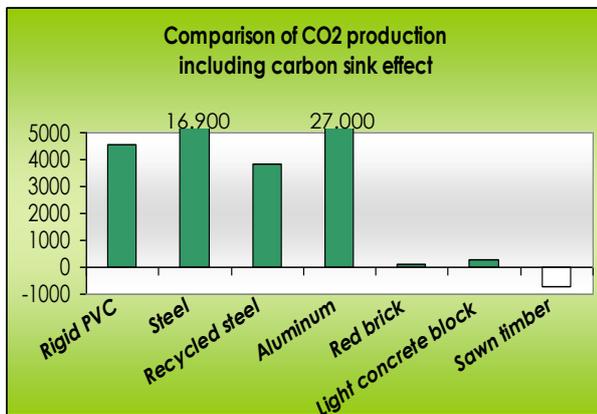
CO₂ emissions from materials production

The choice of material, and especially building materials, is becoming a major factor in the climate policies of many countries.

Nowadays there are many different products, materials and solutions to choose from. That choice can have a significant effect on CO₂ emissions.

For example, substituting EnviroCrete® for heavy concrete blocks would result in a saving of a tonne of CO₂ for every cubic metre of wood.

The study below illustrates the net negative CO₂ emissions from the production of saw wood (used for EnviroCrete®) compared with significant emissions from the production of other building materials (see chart below).



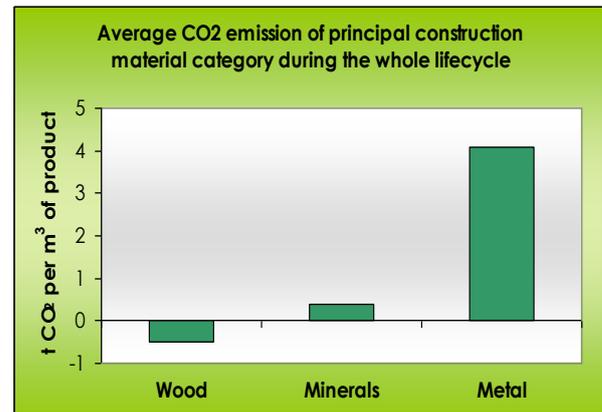
Several countries are trying to include specific clauses in public tenders to encourage the use of more ecological construction material such as EnviroCrete®, because of their Climate Change benefits, in order to improve countries' living condition by using more green materials.

CO₂ lifecycle emissions

But CO₂ emissions resulting from the production of different building materials is just part of the story.

Consideration needs to be given to the emissions throughout the whole lifecycle of a material in a building, from sourcing, to manufacturing, to transport, construction, maintenance and in-use energy costs (see chart below).

Here wood does similarly well.



What EnviroCrete® can do

EnviroCrete® is a very good construction material with great properties, useful in order to achieve high level of energy and cost saving, even giving importance to ecological matters.

Using EnviroCrete® as the main construction material in building, countries can significantly reduce carbon source, for at least **5 reasons**.

1. EnviroCrete® reduces waste

In contrast with other construction materials, EnviroCrete® don not use virgin wood, but use **wood waste**, recycling it.

Usually wood waste has two destinations: it can be burn in order to produce energy, but this operation produce new carbon emission, or can be left to decoy.

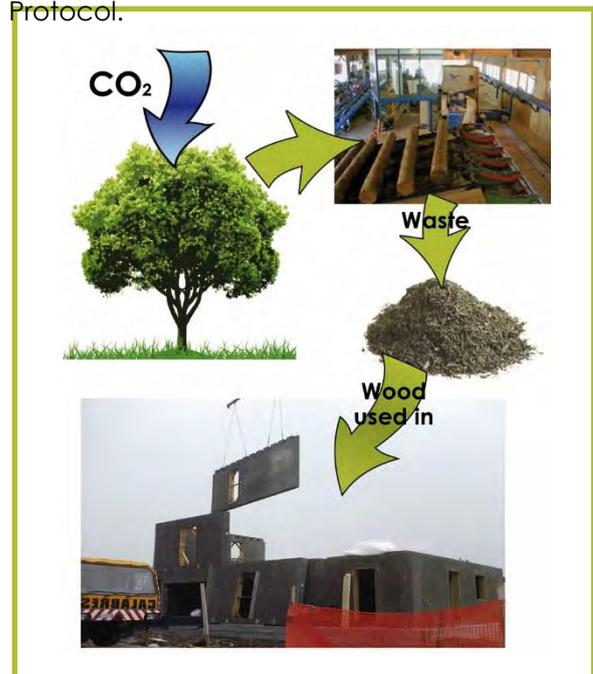
Producing EnviroCrete®, it can be creating a new more productive and profitable destination for wood waste (see *image opposite*).

Each wood waste from any woody species can be used in order to produce EnviroCrete®.



2. EnviroCrete® store CO₂

Every cubic metre of wood store average 1t of CO₂ (even on the form of waste). When this wood is used to produce EnviroCrete® panels, this CO₂ will be stored forever (see *image opposite*). Based on this facts, increasing the using of EnviroCrete® to build houses, countries would produce significant CO₂ saving to account of the reductions prescribed by the Kyoto Protocol.



EnviroCrete® then can be used to extend the carbon store: the longer the life of

EnviroCrete® products, the greater the benefit to the environment!!

According to recent estimates, the average life of wood products varies from 2 months for newspapers to 50 years for structural timber. EnviroCrete® life exceeds 100 years!!

3. Reduce pollution

(replacing other construction material)

While the carbon store effect of EnviroCrete® products helps keep CO₂ out of the atmosphere, an even greater carbon gain comes from the substitution effect of using EnviroCrete® in place of other, more fossil fuel-intensive, construction materials.

On average, a cubic metre of wood used in producing EnviroCrete®, store around 1 tonnes CO₂ (thanks to chipped wood waste), while the production of an equivalent amount of fossil fuel-intensive materials, such as steel, concrete or plastics produce CO₂ emission.

This means that if we shall use EnviroCrete® as main construction material, this will reduce CO₂ emission and carbon store will increase.

These effects are even amplified by thermal efficiency of EnviroCrete® panels and EnviroCrete construction system.

EnviroCrete® used to build structures is the right way to sustainable building industry growth, while protecting the environment, building healthy and comfortable homes, which in addition to saving CO₂ emissions allow save money.

Replacing traditional construction material with EnviroCrete®, brings a **triple gain**:

- ☑ carbon emissions are decreased in the production process
- ☑ national recycling rates are increased thanks to using wood waste in EnviroCrete® panels
- ☑ carbon store increase by using more EnviroCrete®, so more and more carbon is removed from the atmosphere.

Material substitution by EnviroCrete® products, with an estimated life of 100 years and more, is effective in removing carbon from the atmosphere. It can **play a significant role in mitigating Climate Change**.



4. Energy saving

EnviroCrete® has very good energetic and thermal properties.

As show the table below, EnviroCrete® has the best value of **transmittancy** if compared with traditional construction material.

| TRASMITTANCY | | |
|--------------------------------------|-----|-------------------------|
| Material | cm. | Watt/(m ² K) |
| Red alveolar bricks | 30 | 0,540 |
| Cellular cement (Siporex) | 30 | 0,530 |
| EnviroCrete® 300 load-bearing | 30 | 0,372 |

This mean a best value of thermal insulation which translates into energy saving.

To cool a room in a EnviroCrete® house takes less energy than a traditional house, thanks to his very good insulation that does not allow cool air to escape.

Less energy mean smaller power plant of energy production so less pollution. But also mean less money, saved thanks to lower cool air losses and energy saved.

5. It does not pollute

EnviroCrete® is a totally ecological material, totally free of synthetic substances or pollutants. It is bio-compatible so does not create new pollution, even in case of future disposal or when it has finished is long life cycle.



Climate change is undergoing... ...but we can slow it!!

An asset

EnviroCrete®'s carbon storage, energy saving and bio- compatible properties, **make it an asset in the fight to reduce Climate Change.**

EnviroCrete®, together with EnviroCrete Know-how, represents one of the most advanced construction technology on the market today.

A target

Reduce by 20% of emissions and increase by 20% energy efficiency for 2020. Each European nation must reduce CO₂ emission following these targets (in order to avoid the penalties set) and using more EnviroCrete® products, such as houses and structures, can contribute to reaching the target.

A market

The growing attention to ecological and environment respect matters are creating new markets related to these topics.

This trend will grow in coming years, making consumers more aware of their purchases and they will be willing to spend more resources for ecological and green products.

Be part of these markets mean a great long term investment. The critical success factor is the control of advanced technologies related on these matters in order to achieve a strong control on the market.

Now is the right time to enter in the market by taking over advanced technology.

The contribution of EnviroCrete system

The environment every day sent us clear signal. Atmospheric pollution, the greenhouse effect and ozone depletion are some obvious demonstrations of the current environmental situation of our planet.

With the current development model, the man is dangerously approaching the breaking point.

Building industry activity is often source of environmental degradation. Today even the building industry must give its contribute to improve living condition in the planet.

It was born the need to include in the architecture context a new discipline: the bio-ecological architecture.



Bio-ecological architecture

Bio-ecological architecture is a new discipline which aims to restore a healthy territory, where infrastructure and service do not pollute and that are supportive to urban living condition.

Bio-ecological architecture considers buildings as living organisms, which should fit naturally in the environment, allowing humans to live in perfect harmony with the environment.

In this contest EnviroCrete offer a valuable contribution to achieve these important targets.

As said before, **EnviroCrete is a material with a strong ecological soul**, which allows to build bio-compatible structures that respect the environment and improve living condition for human.



EnviroCrete is a Bio-ecological construction material.

The importance of the know-how

Orientation

In building bio-ecological houses or structures in general, the know-how construction is one of the more important elements to consider, in order to obtain a building able to respect the bio-ecological criteria.

Our construction system, the **EnviroCrete system**, is fully compliant with bio-ecological architecture.

This thanks to EnviroCrete®, our innovative construction material, together with our special know-how.

In building up a house, is better using good constructions materials in order to obtain a structure able to respect the environment.

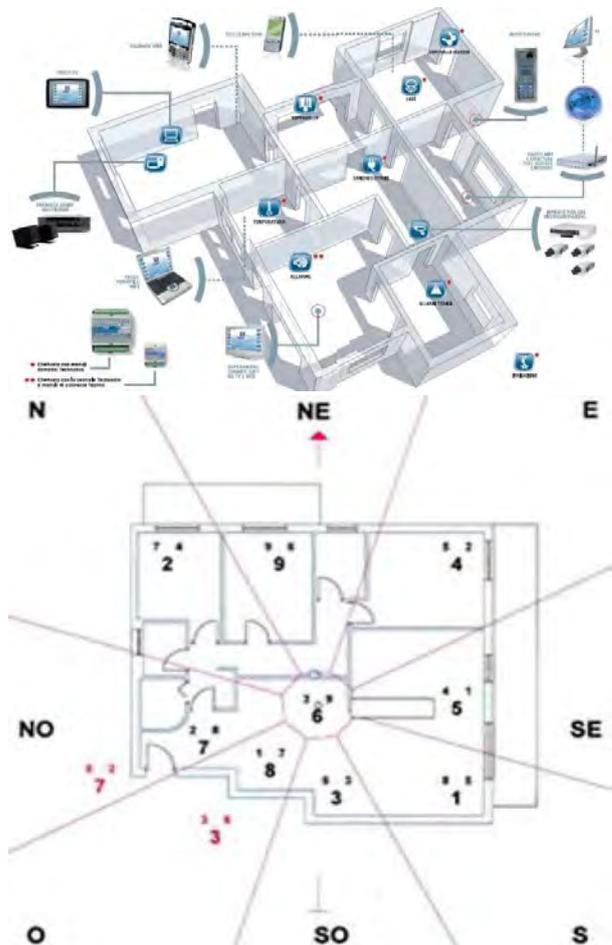
But it is not sufficient.

Our know ledges are able to fully exploit the properties and potential of every material.

In building a house is very important pay attention on matters like orientation.

Both if you need to cool or heat a room, **orientation can play a critical role**, especially in countries with extreme climate condition like cool countries on Scandinavian peninsula or warm countries like middle east's nations.

In these particular conditions, a strong know-how in build up houses, can allow to save much energy, and money too.



Flexibility

Another important issue to consider is the flexibility of the system construction.

Flexibility means the ability of the system to adapt to customer needs and the environment

EnviroCrete system is extremely flexible in each component. A house built in EnviroCrete® with the EnviroCrete system allows to have a structure designed or adaptable for any kind of technology you want to install: solar panels, home automation, ...



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