




SGS

**Satisfied Green Soil Project**



The  
Satisfied  
Green Soil

SGS 

- Climate Change
- Soil
- Biomass
- CO<sub>2</sub> Reduction and Storage
- CO<sub>2</sub> to Carbon
- SGS Carbon
- What we all win with SGS Carbon



Hurricanes of class 4 and 5 have doubled during the last 30 years

Emanuel, K. 2005. Nature 436: 686-688.

Climate  
Change

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[www.climatecrisis.net/thescience/](http://www.climatecrisis.net/thescience/)



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Climate  
Change

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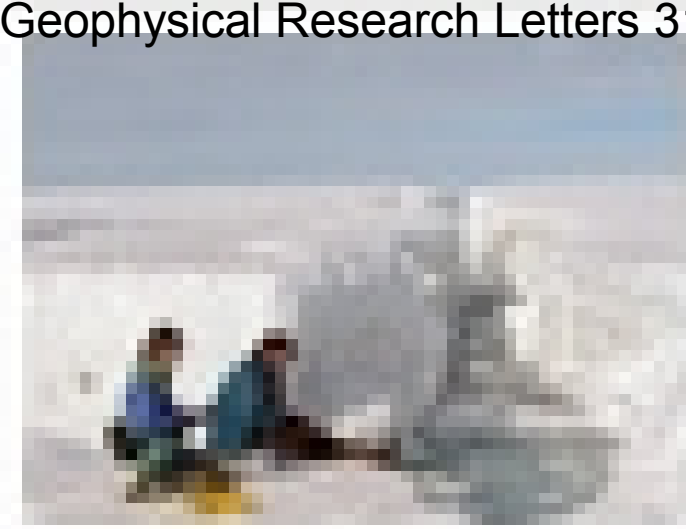
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Glaciers are melting.  
The flow of ice in Greenland has doubled during the past decade

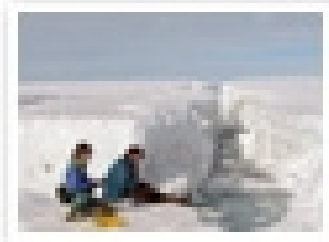
Karbil, W. Et al. 2004.  
Geophysical Research Letters 31.



<http://www.climatecrisis.net/thescience/>



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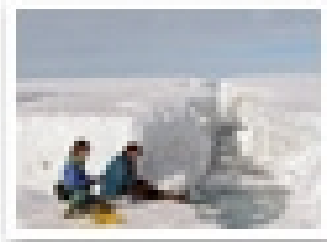
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Climate  
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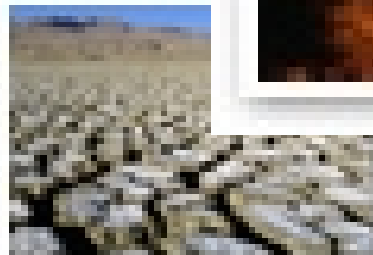
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Climate  
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You know all  
that

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- Death from global warming – 300.000 people a year (WHO)
- More than 1,000,000 species worldwide could be driven to extinction by 2050

Time Magazine, Feeling the Heat, David Bjerklie, March 26, 2006.

- Global sea levels will rise more than 20 feet Juliet Eilperin Jan 2006
- .....



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- .....

You know all that


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Take action  
- now!

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Soil has  
gone  
bankrupt


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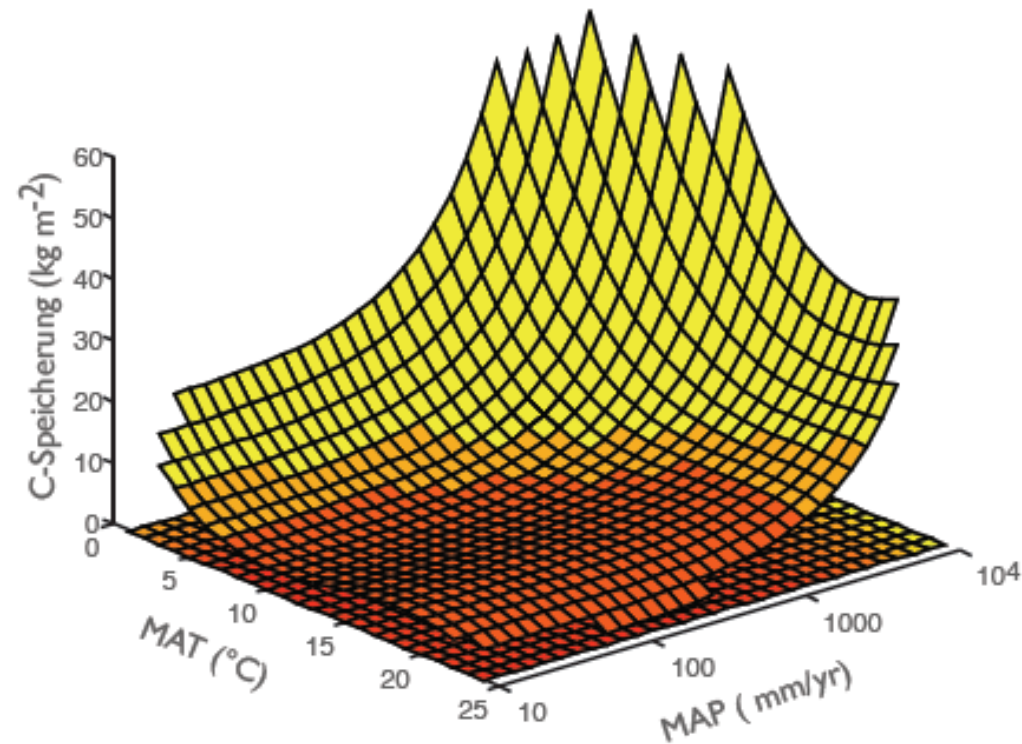
- Nearly 50% of our soil has organic carbon below 2 % - it should have more than 6 %
- Loss of water absorption
- Erosion and desertification
- Rise of CO<sub>2</sub> and CH<sub>4</sub> thru extinction of microorganisms in the soil
- Further loss of 30 million t carbon a year – the energy equivalent of additional 40 million cars every year

European Commission - Joint Research Centre

# Global Carbon storage in soil as a function of climate

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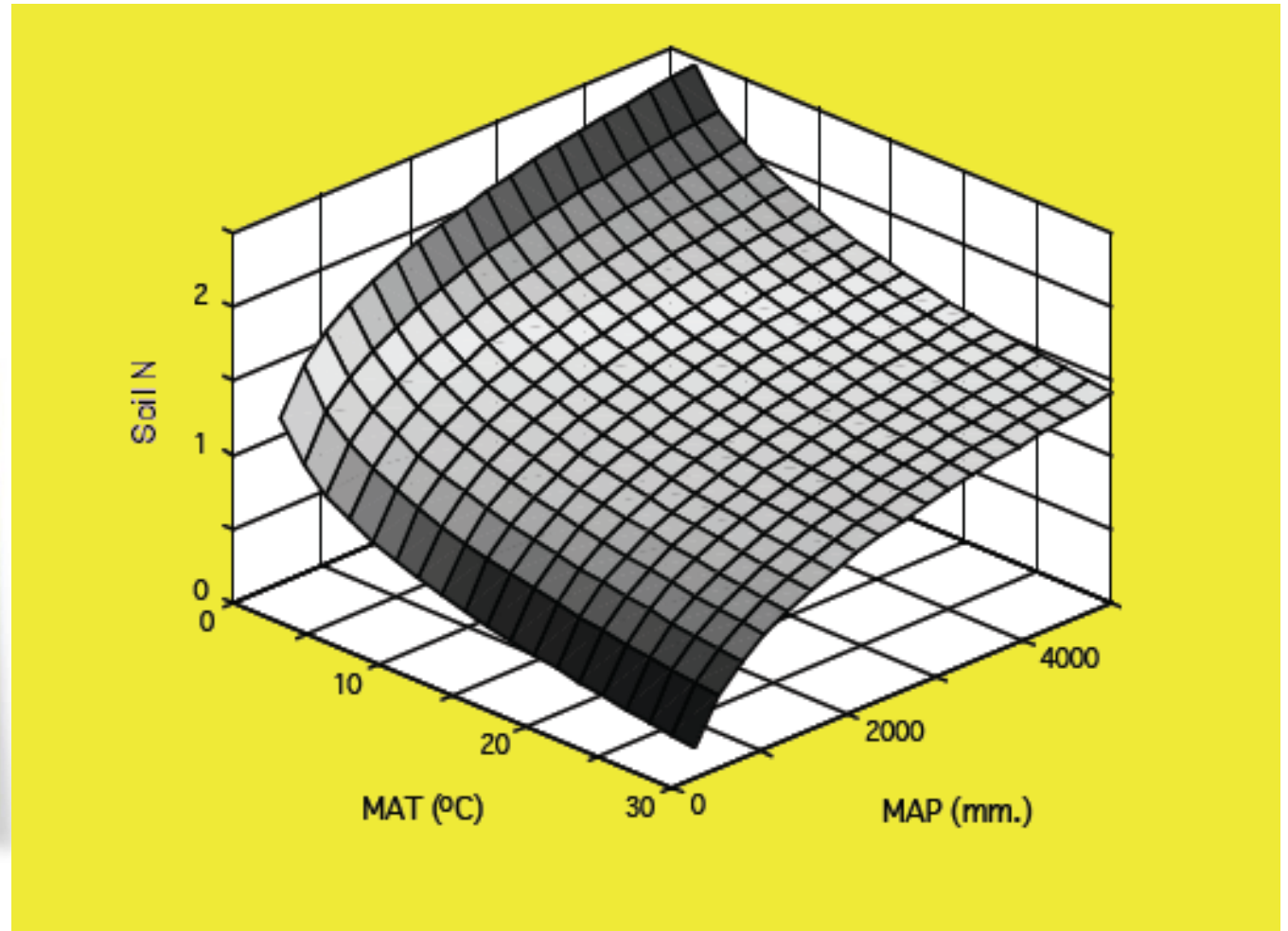
European Commission - Joint Research Centre



# Total Soil N ( kg/m<sup>2</sup> )

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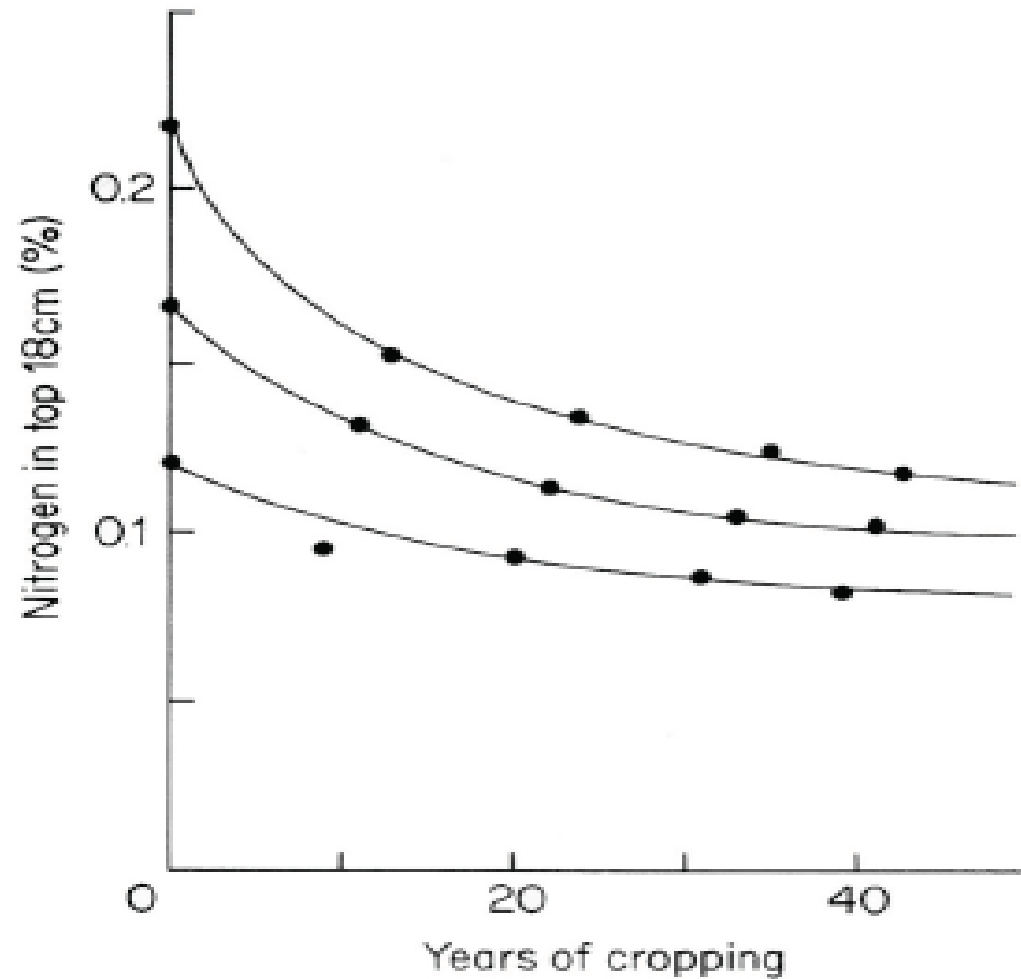


European Commission - Joint Research Centre



# Mineral fertilizer also doesn't help


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## But where does the Nitrogen - fertilizer go to?

- Partly into  $N_2O$  = laughing gas
- It goes into 10,000,000 tons/Year laughing gas ( A.R. Ravishankara, 2009 NOAA)
- The climate equivalent of 3,000,000,000 tons  $CO_2$  every year ( 10 % of the world wide  $CO_2$  emission )
- FCKW has had only 1 million tons peak - and was less dangerous

Fertilizer  
Kills  
Ozone layer  
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Crop science as we use it today is only half of the truth – the other half is an inconvenient truth :

- Cropping for fuel
- Cropping for biogas
- Ignoring the nature



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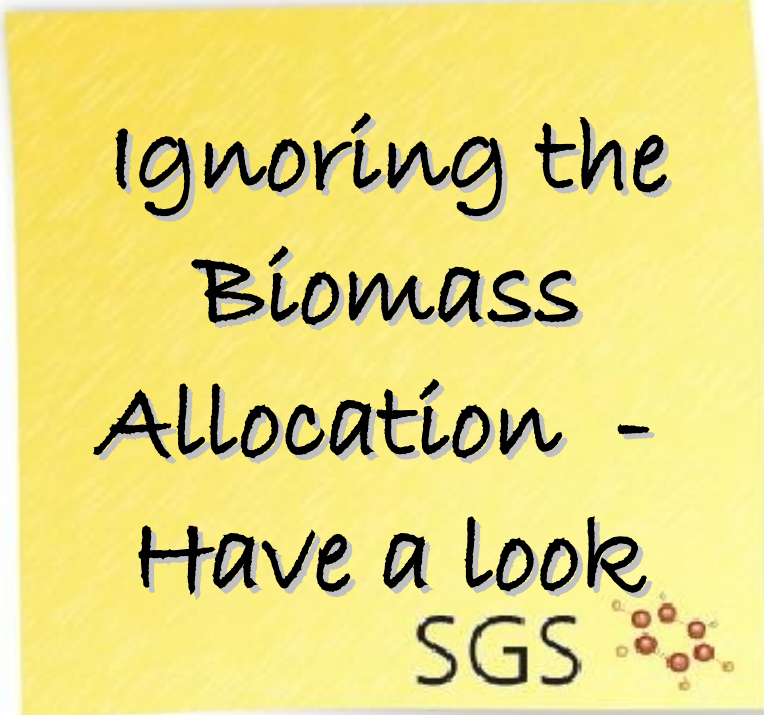
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Ignoring the  
Biomass  
Allocation -  
Have a look  
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## Organic mass, bound in:

- Crude Oil 500 bill. tons
- Gaz 500 bill. tons
- Vegetation (land) 650 bill. tons
- Atmosphere 800 bill. tons
- Coal 4,000 bill. tons
- OCEAN 40,000 bill. tons



Biomass  
Allocation


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## Organic mass, bound in:

You see, if you need biomass  
- don't look on our vegetation,  
That helps regenerating the soil  
And saves enough to eat  
for everyone

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The carbon circuit is the basis of our life – we need the carbon, also the CO<sub>2</sub>

We also need the carbon transferring system

- The soil, the atmosphere and the water
- The microorganisms
- Flora and Fauna



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The carbon circuit is the basis of our life – we need the carbon, also the CO<sub>2</sub>

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- The s
- The l
- Flora

We are part of it -  
let's bring the CO<sub>2</sub>  
back, where it belongs to

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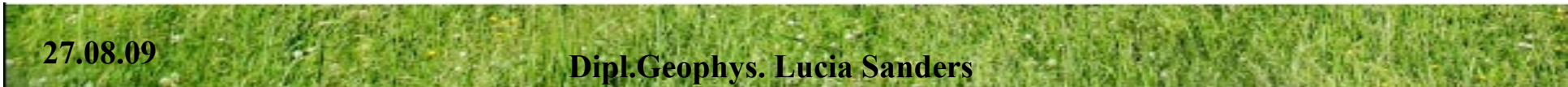


CO<sub>2</sub>  
Reduction  
+  
Storage  
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Our early atmosphere contained a lot of

- CO<sub>2</sub>
- CH<sub>4</sub>
- H<sub>2</sub>S
- Nitrogen compounds

Microorganisms started consuming those gases .....today we still see them doing their reduction work in the ocean and the soil, but not so successful, because we disturb their environment





## The CO2 Capture and Storage Technology ( CSS ) for example

- Captures CO2 from combustion gas
  - It needs between 20 and 50 €/t \*
- Transport is difficult
  - And costs 1 – 25 €/t ( 250 km ) \*
- Storage in deep boreholes, storage on and in the ocean ground ...
  - It costs more than we can pay, it costs the damage of our soil and environment, it cost our food


CO2  
Reduction  
+

Storage  
SGS 

\* Ausfelder, Bazzanella, DECHEMA E.V., 2008





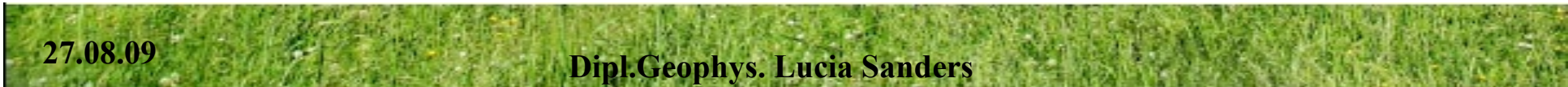
CO<sub>2</sub>  
Reduction  
+  
Storage  
SGS 

We need this CO<sub>2</sub> – to store it in biomass, in

- microalgae
- Macroalgae
- Bacteria

We need all that green waste, like


- 20.000 t orange piles per DAY
- .....





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CO<sub>2</sub>  
Reduction  
+  
Storage  
SGS 

We r

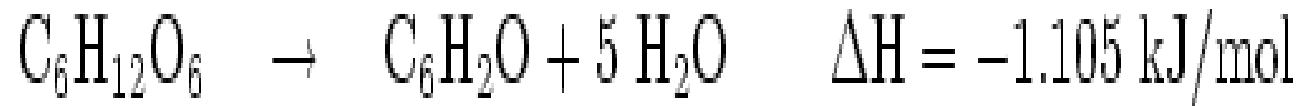
- 20.00
- .....

Why?

Because this is the way  
to return the carbon  
into it's circuit  
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## Using a Hydrothermal Reaction to carbonize the biomass

Biomass, like orangepeels, waste from food production, macroalgae a.s.o will be carbonized at temperatures up to circa 180 °C and under pressure.



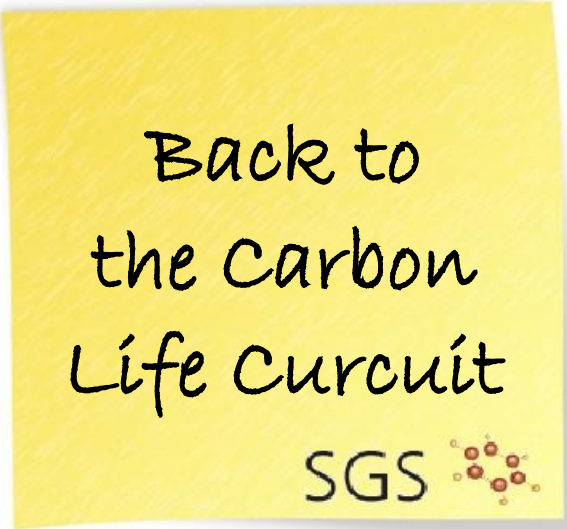
The way from sugar to coal

Back to  
the Carbon  
Life Circuit

SGS 



Highly porous coal – a perfect environment



Back to  
the Carbon  
Life Circuit

SGS 

- To absorb and store water
- To release fertilizer over long time
- For microorganisms
- To aerate the soil
- To increase the C/N-ratio

# The SGS-reaction path

humus and peat ( 45 min )



brown coal ( 75 min )



black coal  
(120 min )

Back to  
the Carbon  
Life Circuit

SGS 

# Water capture of the SGS peat



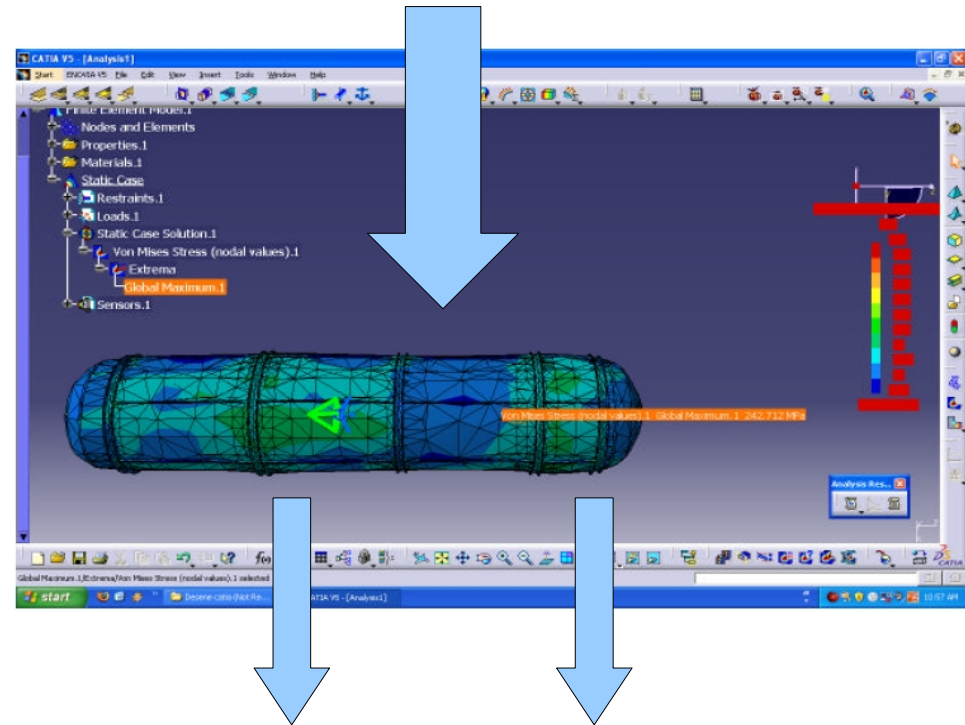
storage of 88 g water = more than 6  
times of the dry weight



# Mass balance of the SGS process

10 tons biomass =

9 tons sugar compounds + 1 ton minerals



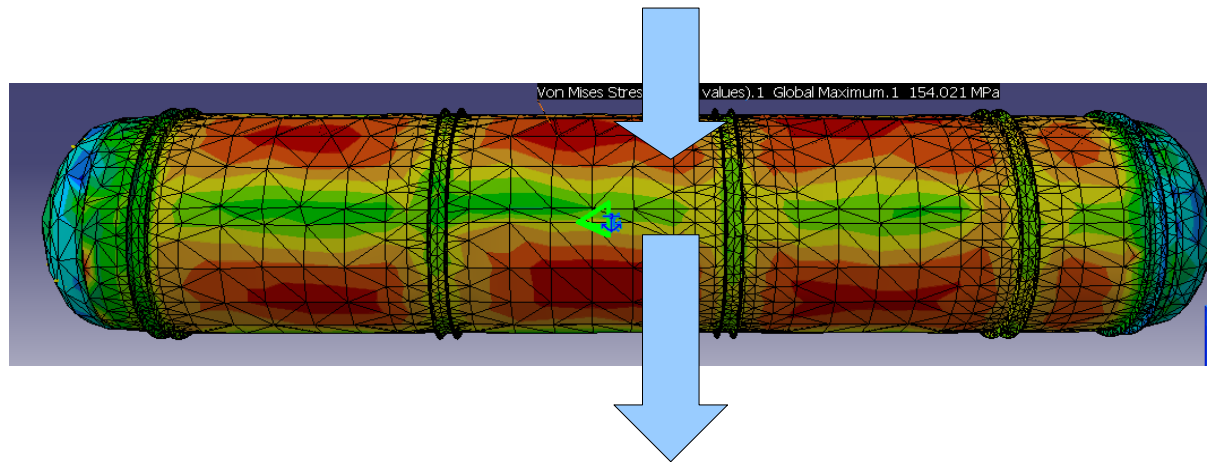
4.5 tons coal

4.5 tons water  
+ 1 ton minerals

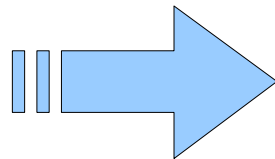


## Energy balance of our process

3.700 kWh - 2.400 kWh (Exotherm Reaction)  
= 1.300 kWh net energy demand



4.5 tons carbon => 36,600 kWh



remaining 35,300 kWh => 96 %

SGS  
carbon

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## Cost of operation of the 20 m<sup>3</sup> unit ( based on a work package of 10 units )

- Interest / capacity cost for thousand €
  - Property 110
  - Building 410
  - Mashinery 400
  - Mobil equipment 50
- Manpower 360
- Operating resources 310
- Other 160
- Energy 300

**TOTAL 2,100**

What we all  
win


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## Cost of operation of the 20 m<sup>3</sup> unit ( based on a work package of 10 units )

nd €

What we all  
win

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Energy is calculated  
without  
exothermal help !

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**TOTAL**

**2,100**

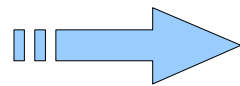


You gain ( Thousand €)

- CO2 reduction certificates 3.000
- Soil regeneration
- Cut down on fertilizer
- Rainforest
- .....

What we all  
win

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and as profit 1,000

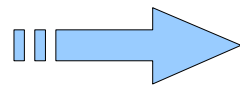
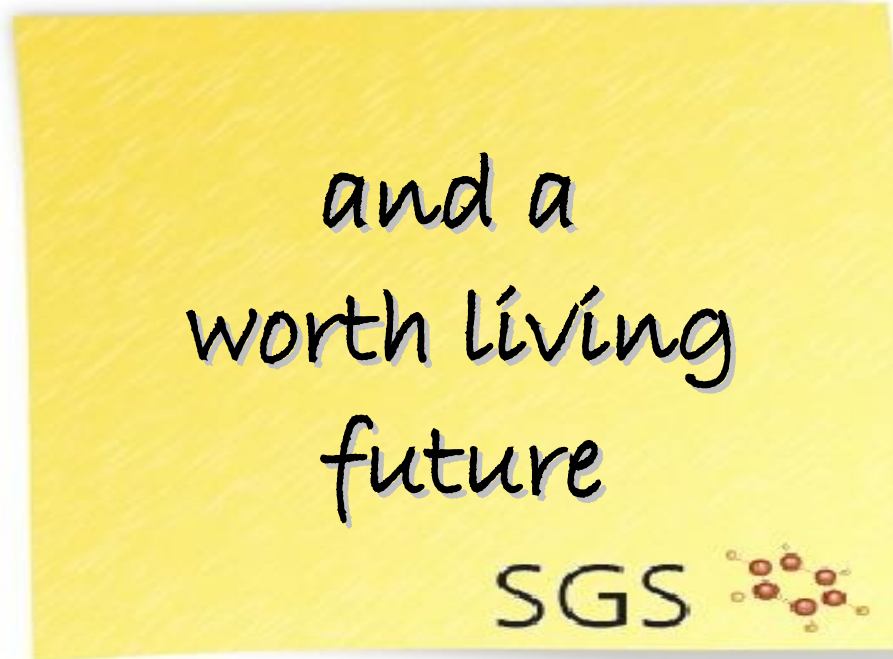


You gain

( Thousand €)

3.000

- 
- 
- 
- 
- 



and as profit

1,000

# SGS supports our future

info (at) Lucia-Sanders.de

and a  
worth living  
future

SGS

