Climate Change – a guide for SRTP users.

The Key to tackling Climate Change is to consider CARBON as a COST to the business. If we can effectively manage our Carbon Footprint, we can reduce business overheads.

"Be the change you want to see in the world…" – Mahatma Gandhi

Introduction

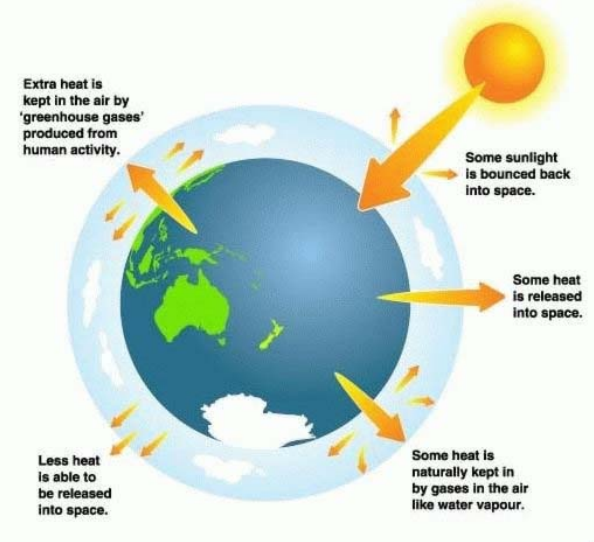
What is climate change?

The planet's climate is constantly changing. The global average temperature is currently in the region of 15C. Geological and other evidence suggests that, in the past, this average may have been as high as 27C and as low as 7C.

But scientists are concerned that the natural fluctuation has been overtaken by a rapid human-induced warming that has serious implications for the stability of the climate on which much life on the planet depends.

What is the "greenhouse effect"?

The greenhouse effect refers to the role played by gases which effectively trap energy from the Sun in the Earth's atmosphere. Without them, the planet would be too cold to sustain life as we know it.



The most important of these gases in the natural greenhouse effect is water vapour, but concentrations of that are changing little and it plays almost no role in modern human-induced greenhouse warming.

Other greenhouse gases include carbon dioxide, methane and nitrous oxide, which are released by modern industry, agriculture and the burning of fossil fuels.

Their concentration in the atmosphere is increasing - the concentration of carbon dioxide has risen by more than 30% since 1800.

The majority of climate scientists accept the theory that an increase in these gases will cause a rise in the Earth's temperature.

What is the evidence of warming?

Temperature records go back to the late 19th Century and show that the global average temperature increased by about 0.6C in the 20th Century.

Sea levels have risen 10-20cm - thought to be caused mainly by the expansion of warming oceans.

Most glaciers in temperate regions of the world and along the Antarctic Peninsula are in retreat; and records show Arctic sea-ice has thinned by 40% in recent decades in summer and autumn.

There are anomalies however - parts of the Antarctic appear to be getting colder, and there are discrepancies between trends in surface temperatures and those in the troposphere (the lower portion of the atmosphere).

How much will temperatures rise?

If nothing is done to reduce emissions, current climate models predict a global temperature increase of 1.4-5.8°C by 2100.

Even if we cut greenhouse gas emissions dramatically now, scientists say the effects would continue because parts of the climate system, particularly large bodies of water and ice, can take hundreds of years to respond to changes in temperature.

It also takes greenhouse gases in the atmosphere decades to break down.

It is possible that we have already irrevocably committed the Greenland ice sheet to melting, which would cause an estimated 7m rise in sea level.

There are also indications that the west Antarctic ice sheet may have begun to melt, though scientists caution further research is necessary.

How will the weather change?

Globally, we can expect more extreme weather events, with heat waves becoming hotter and more frequent.

Scientists predict more rainfall overall, but say the risk of drought in inland areas during hot summers will increase.

More flooding is expected from storms and rising sea levels.

There are, however, likely to be very strong regional variations in these patterns, and these are difficult to predict.

What will the effects be?

The potential impact is huge, with predicted freshwater shortages, sweeping changes in food production conditions, and increases in deaths from floods, storms, heat waves and droughts.

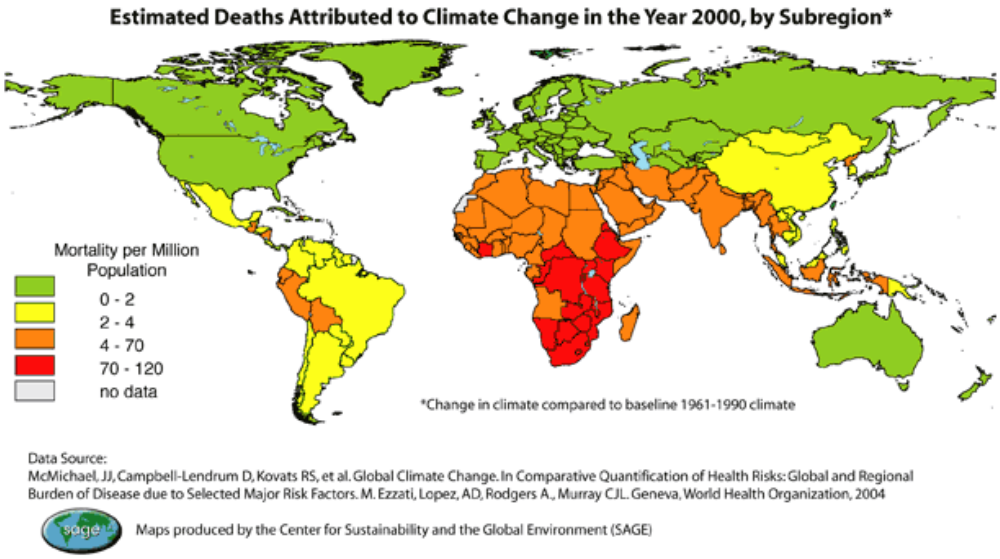
Poorer countries, which are least equipped to deal with rapid change, will suffer most.

A DECADE OF CO2

1993: 357.04 ppm
1994: 358.88 ppm
1995: 360.88 ppm
1996: 362.64 ppm
1997: 363.76 ppm
1998: 366.63 ppm
1999: 368.31 ppm
2000: 369.48 ppm
2001: 371.02 ppm
2002: 373.10 ppm
2003: 375.64 ppm

Mean annual carbon dioxide concentrations recorded at Mauna Loa in Hawaii

Plant and animal extinctions are predicted as habitats change faster than species can adapt, and the World Health Organization has warned that the health of millions could be threatened by increases in malaria, water-borne disease and malnutrition.



(Source: http://www.sage.wisc.edu/)

What don't we know?

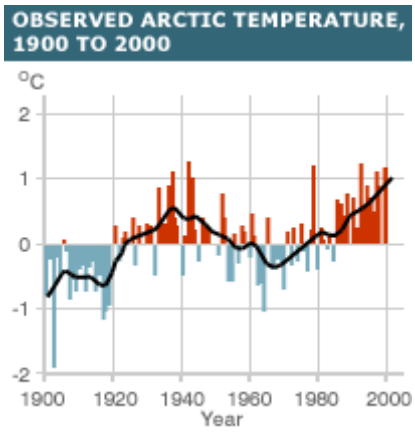
We don't know exactly what proportion of the observed warming is caused by human activities or what the knock-on effects of the warming will be.

The precise relationship between concentrations of carbon dioxide (and other greenhouse gases) and temperature rise is not known, which is one reason why there is such uncertainty in projections of temperature increase.

Global warming will cause some changes which will speed up further warming, such as the release of large quantities of the greenhouse gas methane as permafrost melts.

Other factors may mitigate warming; it is possible that plants may take more CO2 from the atmosphere as their growth speeds up in warmer conditions, though this remains in doubt.

Scientists are not sure how the complex balance between these positive and negative feedback effects will play out.



Annual Arctic air temperatures relative to the 1961-1990 average

What about the sceptics?

Global warming "sceptics" fall into three broad camps:

- those who maintain temperatures are not rising
- those who accept the climate is changing but suspect it is largely down to natural variation
- those who accept the theory of human-induced warming but say it is not worth tackling as other global problems are more pressing.

Nevertheless, there is a growing scientific consensus that, even on top of the natural variability of the climate, something out of the ordinary is happening and humans are to blame.

(Source: http://news.bbc.co.uk/1/hi/sci/tech/3928017.stm)

What can be done?

"…the cost of compliance is less than the cost of the consequences of doing nothing." - (STERN Report - http://en.wikipedia.org/wiki/Stern_Report)

On a national scale -

Kyoto Protocol

The Kyoto Protocol, an international and legally binding agreement to reduce greenhouse gas emissions worldwide, entered into force on 16 February 2005. (more information - http://unfccc.int/kyoto_protocol/items/2830.php)

There are 192 member states split into 3 categories –

- **Annex I** countries agree to reduce their emissions of greenhouse gasses to targets that are mainly set below their 1990 levels.
- **Annex II** countries are a sub-group of the Annex I countries. They are required to provide financial resources to enable developing countries to undertake emissions reduction activities under the Convention and to help them adapt to adverse effects of climate change
- **Developing or Non Annex I** - Developing countries are not expected to de-carbonize their economy unless developed countries supply enough funding and technology (Further detail: http://unfccc.int/parties_and_observers/items/2704.php and on www.leaftc.com/downloads/cc/kyotolist.xls)

The Kyoto protocol seeks to reduce emissions of the following six greenhouse gases.

Carbon Dioxide (CO_2)
Methane (CH_4)
Nitrous oxide (N_2O)
Perfluorocarbons (PFC)
Sulphur Hexafluoride (SF_6)
Hydrofluorocarbons (HFC)

Different gases have different warming potentials. The global warming potentials (GWP) of all gases are expressed in comparison with the global warming potential of 1 tonne of CO2, considered to be the reference gas. The emissions are expressed as Carbon Dioxide Equivalent (CO_2e)

The primary source of CO2 is the combustion of fossil fuels to obtain energy to run factories, operate farming equipment and transport products The primary GHG's from our industry will be Carbon Dioxide and perhaps Nitrous Oxide.

	GWP (1 tonne)	**Sources**
CO2	1	Combustion of fossil fuels Clearing of land (depending on vegetation, highest emissions from clearing peat) Soil tillage and fertilisers
Methane (CH4)	23	Breakdown of organic matter
N_2O	296	Fertiliser use Cultivation
HFC	1300	Air conditioning
MethylBromide (CH3Br)	5	Fumigation

(Details: http://www.grida.no/publications/other/ipcc_tar/?src=/climate/ipcc_tar/wg1/248.htm)

Within a business -

"The Key to tackling Climate Change is to consider CARBON as a COST to the business.
If we can effectively manage our Carbon Footprint we can reduce business overheads."

Carbon is an indicator of the amount of fuel we use across the business, the amount of fertiliser, the amount of pesticides; Increasingly, in the USA and the EU, carbon is being taxed in its own right and is becoming and additional business cost.

If each business can account for its CO2 equivalent Emissions (Carbon Footprint) in a Greenhouse Gas Inventory, it can then develop strategies to reduce or mitigate them.

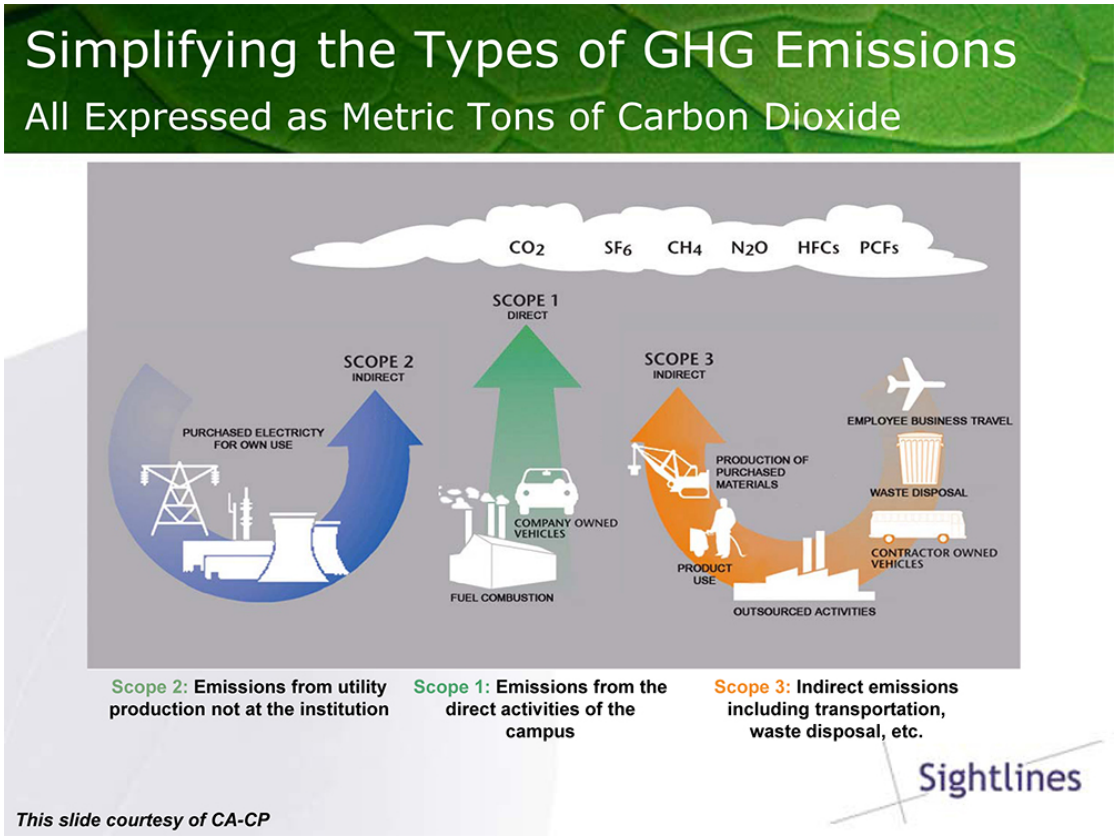
The collation of data is purely an accounting procedure, however before we start we do need to know the parameters.

The main GHG emissions are conveniently split into 3 Scopes – see below.

The 3 Scopes

It is important to understand the 3 scopes of emission for your GHG Inventory.

- Scope 1: All direct GHG emissions from sources that are owned or controlled by the reporting entity.
- Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, outsourced activities, waste disposal, etc.



(Source: http://www.clemson.edu/facilities/energy/ghg/index.html)

For the purposes of this exercise it is crucial to decide whether emissions from curing barns come under scope 1 or 3. Remember Scope 1 emissions are all emissions that are from sources owned ***or controlled*** by the reporting company, therefore curing emissions from directly contracted farmers may well come under Scope 1.

Where to Start

For those suppliers who have not yet begun a Greenhouse Gas Inventory, LeafTc and Imperial Tobacco have drawn up a plan of action to help guide you through the steps required.

This plan is not compulsory but will help suppliers tackle this new roadmap section in a structured way. The plan is split into actions to be implemented within the first 4 years.

Further information on each item is available further down this document.

Year 1

- Start a survey of risks and opportunities (will roll into Year 2)
- Define and document Organisational and Operational scopes
- Identify Carbon Hotspots in scopes 1 2 and 3 (Best Case / Worst Case scenario)

Year 2

- Complete risk survey with a Formal Declaration of intent
- Implement Scope 1 and 2 Accounting
- Engagement with Farmers and communities
- Engagement with suppliers
- Drive towards sustainable woodlots

Year 3

- Develop a Scope 3 Strategy
- Begin projects with Farmers and communities
- Develop accounting procedures with suppliers
- Work towards creating Carbon Offsets
- Implement waste management / accounting
- Implement water management / accounting

Year 4

- Implement Scope 3 Accounting

The Process

Year 1

1. Start a survey of risks and opportunities (will possibly roll into Year 2)

This needs to be a comprehensive risk and opportunities survey looking at how your company is exposed to risks related to climate change?

- New Regulatory Requirements (e.g. carbon trading schemes, restrictions on use of energy or water,...)
- Physical Risks (e.g. increased heavy weather patterns, floods, droughts, sea level increase...)
- Financial Risks
- Business Continuity Risks
- Market Risks
- Energy saving and financial opportunities
- Regulatory opportunities
- Carbon offset opportunities

How do any of the following present opportunities for your company?

- How do current or anticipated regulatory requirements on climate change offer opportunities for your company? (e.g. carbon trading schemes; by building on the existing capacity for planting woodlots, carbon credits can be obtained which have a monetary value as a financial commodity. Planting trees could therefore become an income generating activity rather than just an activity to guarantee sustainable supply of wood)
- How do current or anticipated physical changes resulting from climate change present opportunities for your company? (e.g. modified weather patterns, increase in precipitation or sunshine...)
- Do you invest in, or have plans to invest in, projects and services that are designed to minimise or adapt to the effects of climate change?
- How does climate change present general opportunities for your company? Note that there are considerable opportunities to reduce cost when

2. Define and document Organisational and Operational scopes

You need to document all sources of emission that the company has ownership of or direct control of, these will be your Scope 1 emissions.

Scope 2 emissions cover electricity or steam that is bought by the company.

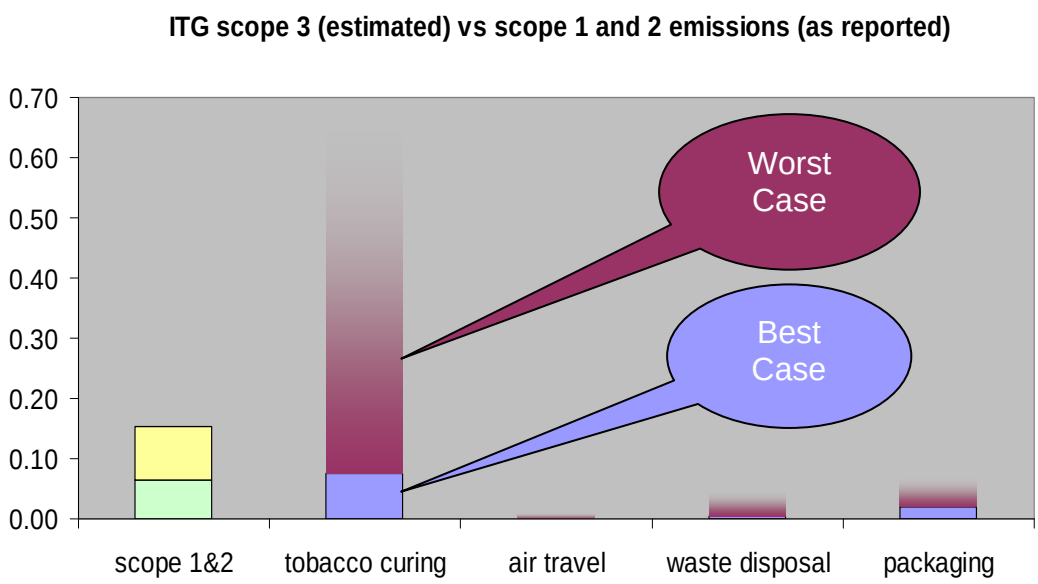
You will have to define the boundaries of Scope 3 emissions to be considered, a rule of thumb is to include all scope 3 emissions that are likely to account for greater than 10% of Total Scope 3 emissions.
Fertiliser use is a good example. But curing is also scope 3, if it is **not** done in curing barns owned or directly controlled by the supplier. So is transport, if it is not done by trucks owned by the supplier. The scope is potentially endless, e.g. the fuel consumed by the florist who delivers flowers to reception every week! It is therefore important to do a mapping exercise, considering every eventuality, and then focus on the most significant scope 3 emissions, while documenting which emissions are out of your scope and why.
Over time you will have to revisit the scope as the political environment evolves.

3. Identify Carbon Hotspots in scopes 1, 2 and 3

As part of the 2 documents above, it is important to identify Carbon Hotspots or the key contributors to your Carbon Footprint.
As part of this you will need to make some estimates of your Scope 3 emissions (Best Case / Worst Case scenario) so that you can decide which emissions will be included in your Scope 3 analysis.

Below is a visual example of the Best Case / Worst Case estimates made by Imperial Tobacco as shown against the actual reported Scope 1 and Scope 2 emissions.

Please note that they have only picked up on the most significant emissions but that as a supplier, your most significant scope 3 emissions may be different – consider fertilisers, CPA's etc.



Year 2

1. Complete R and O analysis with a Formal Declaration of intent
All of the separate analysis conducted in Year 1 need to be collated and finalised in a Formal Declaration of the suppliers intent. It needs to define all the boundaries set for future accounting and commit to formalised procedure.

2. Implement Scope 1 and 2 Accounting
Collation of data for Scope 1 emissions is a simple process of collating the amount of fuel directly used by the operating facility and all machinery and vehicles owned by or controlled by the reporting entity.
The Greenhouse Gas Protocol Initiative website (http://www.ghgprotocol.org/) has a number of templates and calculating tools available for download (application for Free membership required) to help companies translate volumes of fuel used to CO_2e.

Scope 2 emissions are worked out from all bought in energy – (electricity, steam etc.)

See Appendix 2 of the attached – "Climate Disclosure Standards Board Reporting Framework" for an example of internationally recognised format for your annual GHG report.

3. Engagement with Farmers and communities
Now that the company is documenting its own carbon footprint in terms of scope 1 and 2 emissions it is important to engage with the local communities and particularly contracted farmers to begin the process of developing a model for collating data for your scope 3 emissions.

4. Engagement with suppliers
It is important to begin discussions with suppliers so that they understand your future requirements from them.

5. Drive towards sustainable woodlots
Sustainable forestry, particularly where wood is used for curing, is imperative. Once sustainability is achieved the next step is to consider exploiting certain opportunities from carbon trading, e.g. the possibilities of developing offsetting projects with carbon credits from tree planting

Year 3

1. Develop a Scope 3 Strategy
Now that Scope 1 and 2 emissions are being fully accounted for, a scope 3 strategy needs to be developed and agreed.
2. Begin projects with Farmers and communities
Following on from initial engagement with farmers, it is now time to begin to develop projects to help farmers reduce their own carbon footprints. Consider alternative fuels and advanced curing techniques and the development of other green energy sources.
3. Develop accounting procedures with suppliers
Suppliers will need to provide details of their own carbon emissions by year 4 so procedures need to be developed with them now.
4. Work towards creating Carbon Offsets
Working with farmers and communities to develop carbon offsets through carbon trading or carbon credits if it can work as a business venture.
5. Implement waste management / accounting
Develop an accounting procedure for all waste produced by the supplier – destruction of waste and general garbage creates GHG emissions and is a Scope 3 emission.
6. Implement water management / accounting
Water use and in particular the reduction of water wastage is very important and a detailed analysis of consumption and discharge must be implemented.

Year 4

1. Implement Scope 3 accounting
All scope 3 emissions identified in the Formal Declaration and the Scope 3 strategy now need to be accounted for with input from suppliers and farmers.
Of particular concern is the collation of data from contracted farmers on the amount of fuel used for curing. (LeafTc and Imperial will endeavour to produce a tool to account for the different types of wood and biomass fuels used around the world, however for now there is an all encompassing "biomass" selection in the "calculating tool for Stationary Engines" on the GHG Protocol website.

Other areas of key interest in an agricultural business are GHG emissions from fertilisers and CPA's (particularly fumigants). Some details of fertiliser emissions can be gleaned from the following document – *"GHG Emission from Fertilizer Production June2004*" available from the LeafTc website.
(www.leaftc.com/downloads/cc/GHG_Emission_Fertilizer_Production_June2004.pdf)

Further information and Links

United Nations Framework Convention on Climate Change (UNFCCC)
(http://unfccc.int/2860.php)

The Greenhouse Gas Protocol Initiative – an accounting tool for businesses
(http://www.ghgprotocol.org/)

Greenhouse Gas Equivalencies Calculator
(http://www.epa.gov/cleanrgy/energy-resources/calculator.html)

Climate Change Documents from LeafTc Ltd
(www.leaftc.com/downloads/climate.htm)